

**Impact of Virtual Reality Technology's Quality on
the Selection of Tourism Destination: An Empirical
Investigation in North Cyprus**

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ABSTRACT

The use of virtual reality in the tourism industry continues to rise remarkably due to the significant advantages for supply and demand sides. This dissertation examines the IS Success model's essential parameters in the context of virtual reality (VR) to assess how they influence the individual visit intention towards a touristic destination. Despite the extensive research about VR, however, only little has examined the impact of factors that alter customers' attitudes and trigger purchasing intention. This current research paper applied Information Systems Success Model and conducted a survey using the convenience sampling method with tourists who visited Northern Cyprus. The data were analyzed using the Partial Least Square –Structural Equation Modelling (PLS-SEM) technique. The findings demonstrated that VR has great potential to influence visitors' final destination by promoting tourism products and services. This dissertation revealed that VR, as a marketing medium, creates positive impacts and stimulates individuals' intentions to visit a destination. The study provides implications for tourism sector actors such as tourism planners, policymakers, travel agencies, and hotel managers as well as prosocial guest experience to improve their marketing strategies.

Keywords: Virtual Reality (VR), IS Success Model, Emerging Technologies, Technology, Tourism, Immersion, Intention, Perception, PLS-SEM.

ÖZ

Sanal gerçekliğin turizm sektöründe kullanımı, arz ve talep tarafına sağladığı önemli avantajlar nedeniyle dikkat çekici bir şekilde artmaya devam etmektedir. Bu tez, turistik bir ürüne yönelik bireysel ziyaret niyetini etkileyen Sanal Gerçekliğin (VR) temel özelliklerini incelemektedir. Bununla birlikte, VR ile ilgili birçok araştırma yapılmış olmasına rağmen, müşterilerin tutumlarını değiştiren ve satın alma niyetini tetikleyen faktörlerin etkisini çok az incelemiştir. Bu çalışmada, Bilgi Sistemleri Başarı Modeli temel alınarak Kuzey Kıbrıs'ı ziyaret eden yabancı turistler ile kolayda örnekleme yöntemi kullanılarak bir anket yapılmıştır. Veriler, Kısmi En Küçük Kare Yapısal Eşitlik Modelleme (PLS-SEM) tekniği kullanılarak analiz edilmiştir. Bulgular, sanal gerçekliğin turizm ürünlerini ve hizmetlerini tanıtarak ziyaretçilerin nihai varış noktasını etkileme konusunda büyük potansiyele sahip olduğunu göstermiştir. Bu tez, bir pazarlama aracı olarak sanal gerçekliğin olumlu etkiler yarattığını ve bireylerin bir destinasyonu ziyaret etme niyetlerini uyandırdığını ortaya koymuştur. Çalışma, turizm planlamacıları, politika yapıcılar, seyahat acenteleri ve otel yöneticileri gibi turizm sektörü aktörlerinin yanı sıra toplum yanlısı misafir deneyiminin pazarlama stratejilerini iyileştirmeleri için çıkarımlar sağlamaktadır.

Anahtar Kelimeler: Sanal Gerçeklik (VR), Bilgi Sistemleri Başarı Modeli, Teknoloji, Turizm, Daldırma, Niyet, Algı, PLS-SEM.

DEDICATION

First and the most, this thesis is dedicated to the memory of my dad. It is also committed to my devoted sister and the rest of my family. I cannot thank you enough for your prayers and good wishes throughout this journey. My dad was an incredible man with honor and dignity. Unfortunately, he was unable to see this extraordinary moment of my life. But, I know that he is there somewhere and still prays for me. Thank you, DAD, this is for you. I also wish to present my gratefulness to my mom and for the rest of my dear family: Thank you for your prayers, love, understanding, and never-ending support during this achievement.

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"Celebrate what you've accomplished but raise the bar a little higher each time you succeed." -- Mia Hamm

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Chapter 1

INTRODUCTION

Technology, geographical location, and demographic structure are the vital factors that play a crucial role in a country's overall socio-economic growth (Vong & Song, 2015). While current technologies have already made significant changes in our daily lives and business operations, one can expect future technologies to make more radical changes in every aspect of our and future generations' lives. Virtual reality (VR), on the other hand, is being improved with highly effective innovative software and hardware developments and became a transformative power of business operations around the globe. VR technology is an information and communication technology that can reverse the negative patterns of countries' economic growth with geographical and demographical limitations. Cyprus is a small island that faces many challenges due to geographic, political, and socioeconomic problems or limitations in the Mediterranean Sea. The constant development of innovative technologies, in particular, in the realm of VR technology, offers possibilities to reshape and dominate the tourism activities and enrich socio-economic status while preserving its unique historical, cultural, ecological, and environmental values.

With the flourishing of emerging innovative tools, including hardware and software, the service sector and the travel industry have undergone dramatic changes in the 21st century. As technology gets more sophisticated, it significantly revolutionizes the entire tourism industry (Buhalis & O'Connor, 2005). Technology triggers all size of

companies' and organizations' competitiveness in a highly challenging job market. Innovative technologies also help to shape consumers' shopping behavior significantly. Innovative systems offer several functionalities in which customers feel engaged with highly captivated interfaces, programs, and applications to customize their choice's touristic destination. In recent years, technology began controlling, *manipulating*, and modifying the state of minds enormously at high speed and user's location by using any mobilized or stationed innovative tools. With the comfort of using technology, they also purchase the tourism destination without leaving their home, office, or coffee shop.

Manipulation is a pejorative word that comes with many unwanted and misleading overtones. Even though the word '*manipulation*' has been used pervasively to define the literature's information communication technologies, its real meaning could be conveyed to the readers negatively. Using *manipulation*, especially in the context of VR, may lead to misunderstanding or misjudgment of its intended meaning due to disparaging and the lack of nuance in the definition's perception. This nuanced distinction might cause negative overtones than the original meaning. Hence, this research paper tries to emphasize its original meaning to demarcate between technologies in general and solely in VR technology, particularly in

One of the significant differences between VR and other innovative devices, such as audio or visual, is about a target location's delivered messages or contents. While providing the contents or messages for marketing purposes of a touristic destination, VR allows user to experience indistinguishable objects from its original form instead of artificially composed or developed images in the developing photography baths or using the third-party programs such as Photoshop, which enables the producers to

convert or modify the content or an object more attractive than its original look. Unlike these technologies, VR does deliver the visual items as it looks in its tangible form to the user that is hard to distinguish from reality. The VR glasses provide the user's brain whatever is recorded or generated from the original content via the computer. The immersive effect of VR is not at the point yet. Its impact will be advanced in parallel with improving virtual reality display technology with a higher resolution and latency rate.

Despite the sophisticated hardware component, its importance might have turned into massive waste if it is not integrated with highly well-tailored coding, including designing, developing, and proper implementation. Hence, software development in VR technology is crucial to accelerate the VR process's growth. Software and hardware are two inseparable elements that significantly impact productivity, efficiency, and satisfaction with knowledge. Its importance is even vital for VR technology in terms of generating a highly practical and realistic environment. Virtual reality technology simulates the real world using 3D technology that allows the users to experience the illustrated environment as if they are in it. VR makes a critical shift from classical long term habits from changing our way of life to the method we design, develop, create, implement and experience in all industries, including personal development, teaching, training, and entertaining. Users feel engaged and immersed with VR technology if they can create immersive 360 degrees of VR environments. Therefore, software development is a crucial factor that requires state-of-the-art approaches to broaden its range of usability.

VR, as one of the immersive technologies, has been used in the tourism industry for various purposes. Tourism-related branches such as travel agencies and information

centres can benefit most from implementing VR to bring the customers back to their offices since the internet took their customers away. VR can also help the companies to present more objective and accurate information about the hotel, restaurant, site, and even airplanes before pre-purchasing the tourism products (Guttentag, 2010; Loureiro, Guerreiro, & Ali, 2020). In other words, VR poses to be an essential marketing tool in the coming years.

On the other hand, tourism destination organizations or companies can also benefit from technological development in myriad ways such as from ordering their needs to marketing the products that help them to maximize their productivity, efficiency, and "organizational competitiveness" (Adamuthe & Thampi, 2019; Buhalis, 2003; Buhalis & O'Connor, 2005). Technology allowed suppliers to promote their products without any limitation and beyond their borders. Cyprus that went online can be purchased at the furthest location of the earth. All these technological transformations indicate that technology and information are two inseparable components of the tourism industry. In other words, tourism and technology are interconnected forces that influence every aspect of our lives.

Despite the industrial 4.0 and constant technological revolutions that began almost five decades ago, tourism has been one of the most crucial income and employment sources for many countries worldwide. According to the WTO, tourism generates a considerable income and creates a remarkable number of nations' employments. Developing feasible and applicable tourism strategies or plans has been one of the most important priorities for many countries worldwide. Regardless of their economies, tourism stands as one of the most critical and optimal alternative branches for uplifting socio-economic affairs. According to the ourworldindata.org and World Tourism

Organization (UNWTO), international arrivals increased from 25 million tourist arrivals in 1950 to 1.460 billion tourist arrivals in 2018. In other words, it means that a 58.4-fold increase occurred per year in the world (See figure 1). On the other hand, in a regional base, while only 177 million international tourist arrivals were achieved in 1990, it jumped to 745 million tourist arrivals in Europe in 2019. In other words, it is a 4-fold increase in less than 40 years.

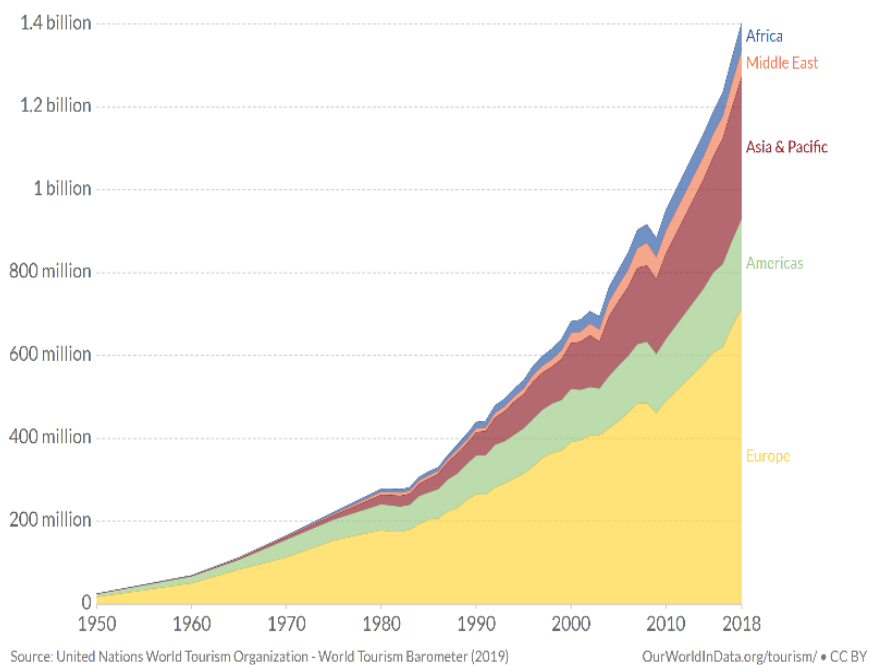


Figure 1: International tourist arrivals by world region
Retrieved from: <https://ourworldindata.org/tourism>

Aligning with these remarkable shifts in tourism affairs, the other indicators, such as international tourism receipts, global tourism exports, and receipt per arrival by region, increased significantly (WTO). The ongoing trend shows that tourism creates enormous alternative economic sources in employment and income for the countries. However, it also indicates that critical environmental, social, and cultural problems is continue to occur even more severely if this increase is not appropriately managed.

On the other hand, tourism has also been a critical economic source for developing countries. Its importance is even more vital for countries like Northern Cyprus. Northern Cyprus's economy heavily depends on tourism (Katircioglu, 2010; Katircioglu, Arasli, & Ekiz, 2007; Roudi, Arasli, & Akadiri, 2018). However, the country has not been in the tourism industry's center due to political issues and lack of marketing and promotion strategies (Alipour & Kilic, 2005; Altinay, 2000; Okumus, Altinay, & Arasli, 2005). The local and national authorities seek alternative plans and approaches to attract investors for tourism growth to receive more touristic activities in their area. More tourist visitation has significant meaning because it results in economic growth in many vital areas, such as employment opportunities, improving the country's infrastructure, and generating more exchange. In this respect, the adoption and implications of the emerging technologies may influence the potential tourists to impact the tourism industry in the countries that are desperate to promote their tourism attractions.

As aforementioned, the ongoing digital transformation and revolution have influenced our economic, social, and cultural experiences in myriad ways, from traditional communication practices and activities to the form of performing our work (Guttentag, 2010; Steinicke, 2016). Innovation efforts, in particular, in emerging technologies, have been a driving force in all businesses. Adapting and staying up to date with emerging technologies reduces operational costs and ensures companies reach their highest potential (Adamuthe & Thampi, 2019). Even though a new technology's life does not last too long due to constant evaluations, they significantly impact the tourism sector.

Moreover, engaging with the most current emerging technologies also greatly influence business partners to provide more efficient and quality customer services in the tourism industry (Escobar-Rodríguez & Carvajal-Trujillo, 2014). In other words, digital transformation originating in new technology is only a portion of an organization's overall strategy to survive in a highly competitive world (Vial, 2019). Besides technological factors, some other critical factors affect organizational effectiveness and customer satisfaction to compete with their rivals in the tourism industry for companies or organizations. However, investigating the cause and relationship of a corporate goal is beyond the research paper's scope.

The tourism industry heavily depends on technology for its operational business processes (Guttentag, 2010; Wiltshier & Clarke, 2017). The question is what type of technology should be developed and implemented to catalyze tourism activities. One needs to clarify two significant points to implement new technology (Horan, 1996). The first one is understanding the sector in-depth, and the other one how the proposed technology is related to the industry (Horan, 1996). Then one can expect to have the utmost benefit of the desired technology. There are numerous studies in the literature which indicate that technologies such as smartphones (D. Wang, Park, & Fesenmaier, 2012), websites (Doolin, Burgess, & Cooper, 2002), and augmented Reality (Chung, Lee, Kim, & Koo, 2018) trigger potential users' attitude and decisions making process to visit a destination. There are also several studies (Hudson, Matson-Barkat, Pallamin, & Jegou, 2019; Jung, tom Dieck, Lee, & Chung, 2016; Wei, Qi, & Zhang, 2019) which also investigated the impact of VR in the tourism field.

Novel technological innovations can have a significant impact on the tourism sector in many different ways. The use of virtual reality, as an innovative state-of-the-art tool,

continues to rise in the tourism industry remarkably, and it transforms the industry significantly due to the advantages it provides for supply and demand sides. From the suppliers' perspective, VR presents several economic benefits, such as cost-effective technology in terms of marketing purposes. On the other hand, VR allows potential customers to imagine a virtual version of touristic destinations, such as a small site, hotel, restaurant, and popular destinations, without physically being there.

VR technology has two major elements, hardware and software that captivate and embrace the potential tourists before buying the tourism destination. What sets VR apart from the other technological device is using highly advanced cameras and rigs to create 360 degrees visuals. Then converting the images with special programs or applications or software in an immersed way and then presenting the content to the users with either mobilized, VR headsets or stationed VR environments in smartphones and computers. Three hundred sixty-degree images can be photographs or videos containing every aspect, every angle, and location's scene. It allows the users to discover every detail authentically without doing any makeup. These images are much more useful than traditional photographs or marketing tools such as media regarding its enormous cost and limited promoting effect.

VR provides users to select their destinations at their own comfort. The selection process allows users to make a better decision than the classical marketing approaches, such as looking at the magazines or brochures, including the destinations' contents one angle. VR, with higher immersed technology that is combined with a highly expensive camera, rigs, and software, has excellent potential for the promotion of the touristic destination or destination the users with the immersed images by appealing that attracts and engages the users.

In recent years, it has been observed that as VR applications and software are advanced, and the availability of VR-related applications and content is increased as more destinations and organizations adapt to new technologies. Constant development and availability of VR constitute a paradigm shift from traditional business operations and marketing approach to modern technology originated models that minimize the physical interactivity in the context of the tourism industry. VR provides opportunities to preserve the immeasurable naturally, culturally, historically, and environmentally sensitive destinations. VR also presents newer opportunities for people with boundaries or disadvantages with financial, health, age, and time issues by offering them a technology that creates computer-generated immersed images. They are psychologically teleported to the depicted place.

With industrial 4.0 and constant technological revolutions, as was aforementioned, tourism has been one of the most crucial income and employment sources for many countries worldwide. Besides the prevalence of the internet, as transportation, telecommunication, and the service sector are operated with more cutting edge technologies, people's desire to travel worldwide increased significantly. The transformation of technology opened a new era of opportunities for the countries which needed alternative economic affairs other than age's old classical good production. The goal of importing consumers to the tourism product at the destinations became more significant than exporting industrial goods to the consumers. A remarkable shift from classical production economic systems to a more digitalized era also required tourism developers and beneficiaries to transform their mindset or mentality from acquired behaviors such as marketing or promoting their destination using old fashioned tools in order to compete with their rivals at local, national, or international level. In this

regard, destinations needed more investors and more employees to meet rapidly increasing demands and develop new era strategies in the workplace and destinations to raise the standards. The digital age offers golden opportunities to bring more tourists to destinations, but it also requires developing creative ways to make significant increases in generating more foreign exchange that influence every aspect of the life standards at destinations.

Despite some of the plan developers who prefer short-term interests over the long-term benefits, long-term value creation has been one of the significant concepts of sustainable tourism in the literature. Developing suitable development plans that clearly explained the relationships between the tourism industry's needs and values and predicted technology enhances the opportunity to ensure long-term value creation. VR is one of the advanced technologies that offer enormous options for most stakeholders to create achievable long-term benefits, improve marketing endeavors, and preserve highly ecologically and culturally sensitive destinations. Implementing the right technology at the right time in the tourism sector will help achieve long-term goals and benefits by extending destinations' lifetime

Therefore, integrating advanced technology with the sustainable tourism phenomenon will promise more convincing preservation of socio-economic, cultural, and environmental values of touristic destinations worldwide. Furthermore, VR also assures that tourism sites, whether they are the most or least sensible destinations, can be visited virtually without being in the same physical environment. Hence, a well-managed, well-organized, and well-prepared tourism plans, projects, and policies can provide more sustainable tourism development to create a better future for the world citizens by preserving the tourism destinations' values.

On the flip side of the coin, tourism can be the source of unwanted problems in overpopulation during the peak days, inflation, and cost of living besides tons of extra environmental waste. When tourism and technology integration is not considered carefully, some depletions such as pollution, destruction of nature, erosion, noise, traffic congestion, habitat loss, loss of cultural identity, and many other negative impacts may occur and create more harm than the goods. Shortsighted tourism development plans, projects, or policymakers who only focus on the tourism activities' financial outcome cause severe issues and challenges such as inflation on both economic and traffic. Last but not least is the pollution problems. Policy and strategy developers usually focus on assessing their plans' success with international and local tourist arrivals.

Nevertheless, getting tourists to a destination, whether it is a small touristic site or a big metropole, does not always leverage their community's expected life standards. Instead, it may cause discomforted, distasted, and depressive local citizens and put environmentally sensitive locations in danger. Thus, technology can offer some benefits as an alternative tool if its features and the industry's needs are investigated in-depth, to satisfy the local and preserve the ecosystem.

In essence, the questions are: how can a technology like a VR play a role in minimizing the depletion issues? And if it can, how can one of the latest technologies, in the case of VR, be implemented and integrated with tourism affairs to sustain an upward trend? The answers may vary on whom you ask. Some may say collective planning endeavor that includes local and governments authorities with the tourism developers will minimize the issues (Burns, 1999, 2004). Nevertheless, within the concept and scope of the current research paper, it is argued that technology presents a range of

opportunities not only to uplift the tourism outcomes (Buhalis & O'Connor, 2005; Hays, Page, & Buhalis, 2013; Navío-Marco, Ruiz-Gómez, & Sevilla-Sevilla, 2018), but it also helps to minimize the risks of possible degenerations of the touristic values due to the exceeding number of the visitors and human intrusion. Three hundred sixty degrees videos of these environmentally sensitive destinations or landmarks can be reached to a wide range of potential tourists via applications and internet to the potential customers. Therefore, the current research study suggests that a well-prepared tourism development plan focused on the relation between the technology and industry features, which can create a higher degree of positive outcomes for all shareholders in the tourism industry. The goals or objectives of tourism organizations can be achieved by implementing the right and the most suitable innovative tools in the tourism sector.

1.1 Problem Statement and Need for Study

Tourism destination developers, policymakers, and destination-based organizations or companies are looking ways to create a whole range of opportunities and tools in order achieving their tourism goals, maximize their share from the touristic activities to attract more people or visitors by using the latest innovative tools, applications and programs for their tourism destination or destinations. Next, as stated earlier, more people have been moving around for touristic purposes than ever before as the years pass by. Finally, to maintain a destination's environmental, social, cultural value, long term policies, tourism plans, and projects should be developed to minimize the possible risks and threads of the uncontrolled and financially oriented tourism affairs.

On the other hand, Cyprus heavily depends on tourism income that can only be achieved with more tourist arrivals worldwide. Moreover, Northern Cyprus is a small

country with extraordinary beaches, unique ecological characteristics, and rich history. Hence, the government needs to create a source of solutions to improve employment opportunities, support businesses, and generate income for its overall reconstruction. Furthermore, a sustainability development process will enhance its people's prosperity and infrastructures such as transportation, telecommunication, water supply, and power generation instead of creating a source of depressing natural, environmental, and historical values promoting the tourism development process.

However, due to the current research paper's scope, researchers investigate how innovative technology influences tourists' decision-making process that shapes tourism's future from a micro-level. In this respect, the recent study manifests a study model and a theory to discover how these technologies will be part of sustainable tourism development for countries like Cyprus. The research paper's primary framework strives to understand the consumers' attitudes towards technological devices and programs. Therefore, to build a robust epistemological perspective, the research study raises technical and psychological questions by focusing on the system's quality, quality of the service, and quality of the proposed plan's information.

1.2 Purpose of the Thesis

Tourism marketing is one of the essential components of the tourism industry. Having touristic destinations with several historical, cultural, natural, and environmental values does not guarantee to appeal to people worldwide. Hence, effective tourism development plans, projects, and strategies need to be developed and applied to promote destinations. Even though tourism sector operations require technology to be adopted pervasively, as they are invented and used at every level, some critical

questions remained unanswered about their efficiency, applicability, and feasibility in the current literature.

Therefore, the current research paper seeks to understand the importance of the VR phenomenon and its features that impact consumers and the suppliers and destination's overall value, including cultural, historical, and environmental. From the supplier point of view, one of the significant challenges of designing, developing, and implementing a new technological device into a workplace requires careful consideration to maximize the operational business goals, reduce costs, and improve the organization's efficiency. However, the paper investigates how new technology should influence consumers' attitudes throughout the consumers' decision-making process. In contrast, consumers are actively involved with the innovative system or device. Lastly, adapting and adopting a marketing tool also impacts environmental and natural values, in short, the entire ecosystem.

In light of these factors, as mentioned earlier, VR characteristics based on the IS Success model's theoretical approach would offer some benefits for all the stakeholders in the tourism industry. A sophisticated, innovative tool that provides the quality of the system, quality of service and quality of information has incredible potential changing consumers' mindset, attitude, and intention to visit a destination.

Furthermore, several studies (Hudson et al., 2019; Jung et al., 2016; Wei et al., 2019) also investigated the impact of VR in the tourism field. However, neither of these studies investigated the role of VR by implementing the IS Success Model to look into the deeper relationship between tourism destination and technology in terms of its information quality, system quality, and service quality towards to visit intention to a

destination. Hence, the primary aims manifest and contribute to the existing literature by revealing the technical factors aligned with the emotional factors that influence users' satisfaction to visit a destination.

1.3 Research Questions

The study presents a study model adopted by Delone and McLean (2003) to build a sound epistemological knowledge about the relationship between technology and tourism. Investigating such a relationship improves our understanding to measure the impact of each construct. Discovered relationship leads to the attitude changes of the consumers. Even though current literature shows some theoretical and practical evidence that result in user satisfaction and travel intention to a destination. Yet, the most crucial characteristics of VR have not been discovered. Hence, in an attempt to understand what features of VR trigger customer intention, the current paper presents Information Systems Success (ISS) model (Delone & McLean, 2003) to answer the following research questions:

- What role do (a) VR information quality, (b) VR System quality, and (c) service quality plays in explaining a VR user's satisfaction?
- What role does VR user satisfaction play in shaping users' intention to visit the destination?
- Does VR user satisfaction mediate the association between (a) VR information quality, (b) VR system quality, and (c) service quality and VR users' satisfaction?

1.4 Expected Contribution of Thesis

Investigating such a relationship between these variables would have numerous benefits for the literature (theoretical) and the industry (practical). Findings can help tourism agencies, hotel managers, policymakers, planners, and authorities to improve

their marketing strategies and attract more visitors to their touristic attractions. Assessing VR's impact in the real-world environment would also enhance our understanding of what VR specifications stimulate customers' overall satisfaction. By way of contrast, to the best of our knowledge, the study's constructed model helps measure predictors' impacts on tourist engagement and satisfaction, leading to visiting intention.

1.5 Structure of the Study

The current research paper consists of five chapters. The first chapter explains the principal elements and concepts of the entire study to broaden our understanding of VR technology, emerging technology, and their relations with the tourism industry. The study tries to explain the importance of technology and gives brief information about VR and its impact on consumers to all tourism stakeholders. Furthermore, the first chapter also includes background and statement of the problem, research questions, and finally, the purpose of the study in order to build epistemological knowledge.

The second chapter introduces and defines VR and its importance in the tourism industry's realm by evaluating the related studies in the existing literature to address what is missing or lacking conceptually and theoretically. The second chapter also investigates information communication technology's characteristics in determining what stimulates customers' decisions to visit a tourist destination. Hence, the chapter outlines the study model to investigate each variable's impact and the relationship between the proposed constructs by revealing theoretical and methodological problems, paradoxes, controversies, and missing parts in the past studies. The second chapter also presents the study's theory in which the research stands on. The third

chapter presents the methodological part of the study. The third chapter discusses the study's sample and population and instruments to collect data and, finally, statistical techniques and programs that help analyze the data. Next, chapter four describes and discusses the participants while reporting the results and findings from the study. Chapter 4 also compares the findings with existing studies. Finally, chapter five concludes the results and synthesizes the critical findings' discussions by restating or summarizing the research's primary focus. It also includes implications of the findings for theoretical and practical perspectives while it finalizes the study with future studies recommendations.

Chapter 2

LITERATURE REVIEW

2.1 Digital Transformation: Information Communication Technologies and Tourism

Innovation technology is interwoven with the tourism industry during the last three decades, and each emerging technology influences tourism affairs and leisure sectors significantly (Buhalis & Law, 2008; Guttentag, 2010; Hudson et al., 2019). Each emerging innovative technology, ideas, or insights have made dramatic transformational effects not only on our daily lives, but also within the travel industry's overall organizational structure, industry's operational and strategic practices, and finally, potential tourism customer interaction with a tourism product (Buhalis & Law, 2008; Guttentag, 2010; Navío-Marco et al., 2018). Smart technologies like Virtual Reality (VR) opened a new era by bringing the touristic attractions, including sensitive attractions such as world heritages, natural parks, beyond our homes without any barrier and limitations (Dorcic, Komsic, & Markovic, 2019; Guttentag, 2010; M. J. Kim & Hall, 2019; Tussyadiah, Wang, Jung, & tom Dieck, 2018). On the other hand, technological transformation benefited senior citizens and people with disabilities who are culturally, socially, and physically isolated from regular activities and emerging technologies (Fernández, Hernández, Gutiérrez, Escuela, & Fino, 2017).

Furthermore, VR can help the destinations to generate a considerable amount of exchange, whether their economy, at a macro level, depends on tourism income or not.

One of the most important of VR technology in the tourism industry is giving a chance to a potential customer to try the destination before they buy it. The convenience of experiencing the location and feeling the destination's atmosphere allows potential customers to set more realistic expectations before booking their possible trip. The convenience of using VR also allows the customers to decide whether it is worth their time and money before buying the tour or transportation and accommodation.

The tourism industry has benefited from the advancement of technology, in particular, after the 'eTourism era' (Buhalis, 2003; Buhalis & Sinarta, 2019). The constant evolution of technology, so-called 'eTourism,' also is being evolved rapidly and influenced every layer of the tourism industry. According to WTTC (2020), the tourism industry's contribution is about 10.3% of the global GDP, and it creates 1 in 10 jobs in the world. Countries heavily dependent on tourism income have a greater chance to take the more significant portion from the pie when they adopt and adapt to the emerging technologies.

However, lack of timely adoption and adaptation of some innovative based technologies resulted in obsolete information that does not create any useful marketing and management strategies/outcomes in the highly dynamic tourism industry (Buhalis, 2003; Buhalis & Law, 2008; Guttentag, 2010). The Digital revolution has also played a critical role in the consumer decision-making process as it flourished even deeper (M. J. Kim & Hall, 2019). But the question is what type of technology and application needs to be applied so that the new technology will serve its best for the entire industry.

With the burgeoning growth of the digital transformation in tourism, VR has been one of the most popular trends among the researchers. The researchers have pointed out

that to develop and implement new technology, and one needs to understand the industry and the relationship between the proposed technology and industry (Navío-Marco et al., 2018). On the other hand, consumer experience with digital technology is crucial in assessing a particular device or program (Hudson et al., 2019). Customer experience depends on two significant elements: active or passive participation and connection with the proposed destination (Hudson et al., 2019). Marasco, De Martino, Magnotti, and Morvillo (2018) argued that the process of developing innovative technology demands a systematic approach to create more user-driven technology in tourism.

An essential aspect of the current research paper is providing more reliable evidence related to how a digital technology engages and alters the consumer's decision for a destination; research took place in a real-world environment with the active participants. Therefore, the current paper indicates that quality of service, quality of the system, and quality of information are significant factors that influence tourist satisfaction and visit intention as tourists actively involve with the VR setting. The above factors are vital for transforming potential consumers into a potential customer towards a touristic destination.

The role of destination images is one of the most crucial aspects of the tourism product marketing process. Furthermore, destination images are also inseparable elements of the virtual reality environment. Using destination images has been prevailing marketing and promoting objects for the contemporary tourism sector due to its effect on customers' behavior and purchasing intention (Baloglu & McCleary, 1999; D. Kim & Perdue, 2011; Nicoletta & Servidio, 2012). It impacts the potential tourism customer's perception to attract them while selecting the destination that fits best for

their visiting purpose (Baloglu & McCleary, 1999). The way images are prepared and presented evolved as the digital era has been enormously changing how we work, live, act, and achieve our goals. Pictures and videos are not static form and illustrate only one perspective of the place any longer. They are being created with 2D, 3D, and so forth and create more opportunities for marketers. Advanced technology also made it possible to present these more attractive images with highly influential cutting-edge technologies such as virtual reality.

Some of the significant reasons for their failings are lack of understanding of the needs, scopes of industry, the relationship between the proposed technology and industry, and customer resistance (Heidenreich & Spieth, 2013; Rodríguez Sánchez, Williams, & García Andreu, 2020). Another critical point is how emerging technology can improve marketing strategies for efficiency and productivity, overcome destination image problems, and enrich people with the disadvantage. Offering technology should be designed and developed with more user-friendly and affordable design to engage all ages (Fernández et al., 2017). Therefore, it is necessary to explore how digital technology's fundamental characteristics influence user engagement and visit intention.

There are myriad ways, such as travel agencies and the internet, to get information, critics, and reviews using social networks to influence customer decisions towards a tourist attraction. With a few exceptions, prior work in current literature mostly argued that technologies such as online reviews (Abubakar & Ilkan, 2014; Rouliez, Tojib, & Tsarenko, 2019), the Internet (Buhalis & Sinarta, 2019; Park, Kang, Choi, & Han, 2020) and social media (Canovi & Pucciarelli, 2019; Li, Guo, Wang, & Zhang, 2019) are strong determinants and enticers for potential consumers' decision-making process.

With emerging technologies such as artificial intelligence, augmented reality (AR), virtual reality (VR), and games, accessing and practicing real-time visitation moved to the next level.

2.1.1 Virtual Reality

What is VR? There is not a standard definition of VR in literature. However, it can be defined as VR is a computer-generated high-quality digital image in which participants are *manipulated* with the sense of immersion as if they are transferred from the physical world to the illustrated virtual environment during the real-time interactivity (Slater, 2009; Suh & Prophet, 2018; Yl, Flora, Frederick, Patrick, & Kw, 2019). As one of the latest innovative technological tools, virtual reality has been one of the paramount emerging technologies that has excellent potential to make significant achievements in the lives of the people and organizations (S. LaValle, 2016; Steinicke, 2016; Yim & Park, 2019). VR has also been interested in multidiscipline areas such as education, art, psychology, entertainment, and marketing (S. LaValle, 2016; Ludlow, 2015; Steinicke, 2016). VR can be defined as a gadget that allows the users to feel and react to the stimulated or depicted (virtual) environment with all the senses as if they are in the actual place (Hudson et al., 2019; Laurell, Sandström, Berthold, & Larsson, 2019).

Due to the constant development of innovative technologies and its transformational impact in the tourism industry, tourism organizations began using VR to improve visitor satisfaction and business capacity (Jung et al., 2016). Navío-Marco et al. (2018) argued that understanding the tourists' behavior, such as their wishes and motivation, is crucial elements that will help design and implement an innovation that will orbit around the tourist-centricity.

In other words, VR can be seen as a device that makes a dream come true by moving us to the virtual world without actually leaving a physical place by *fooling* the brain (S. M. LaValle, Yershova, Katsev, & Antonov, 2014). VR's implementation in real-life situations began influencing the organizational progress, user satisfaction, and engagement in particular, after integrating the portable VR headsets with smartphones in which VR contents and applications are found quickly. The adaptation of emerging technologies, including VR, helps organizations keep up with the current or advanced technologies for marketing, communication, psychology, and business operations and helps them for entertainment and training purposes (Avidar, 2018; Guttentag, 2010). The constant development of information, communication, and virtual reality technologies promise common implementation areas throughout the tourism sector (Cheong, 1995; Wei et al., 2019). However, it demands careful consideration and planning to discover what factors influence consumers' desire to purchase tourism destinations.

Using VR, customers will have the opportunity to experience what they will encounter in the destination they like to visit. They will have pre-knowledge about the culture they will meet. They will have ideas about what type of food and drink is available for them. They will figure out whether public transportation is available for them or not. Visitors will decide where they want to visit before they arrive at the destinations. Based on all these preferences, creating images will be more useful and practical for tourism organizations. The technological achievement will help the tourism sector to identify what type of images are being transmitted to individuals' minds that attract their mental process about their decision-making process. However, when the theoretical grounding of image representation's impacts on tourists' perception is

investigated, unfortunately, it is found that the existing literature could neither generate a sufficient theoretical framework and nor the precise and clear conceptualization that helps to understand how customers' emotional thoughts, attitudes, and intentions are changed with the attribution of the destination image (Kock, Josiassen, & Assaf, 2016; Styliadis, Belhassen, & Shani, 2015).

Virtual Reality (VR) has great potential to influence tourists' behavior in many ways for all tourism industry stakeholders while tourists are on or before deciding for their trip (Hudson et al., 2019; Tussyadiah et al., 2018). Nevertheless, as Guttentag (2010) suggested, VR based innovative technologies may require reformulation to enable the adoption and adaptation of the newer generations towards the VR environment. Despite how genius the innovations are, many fail in the marketplace (Heidenreich & Kraemer, 2015; Heidenreich & Spieth, 2013; Rodríguez Sánchez et al., 2020).

2.1.2 Types of VR

There are two major types of VR: Untethered that is commonly known as Head-Mounted and Tethered displays. Head-mounted or untethered VR is a mobilized version, and it does not require any digitalized station. On the other hand, head-mounted one is categorized as immersive, while tethered one is classified as non-immersive technologies. Tethered VR is connected to the computerized devices such as a personal computer, server, or automated platform (Suh & Prophet, 2018). In any form, virtual reality is composed of software and hardware that provide the immersed virtual environment in which users are engaged and attracted to VR content.

Nevertheless, some critical questions are raised, such as how a technology -even if built with state-of-the-art equipment and program, can replace real experiences, create a positive attitude, and shift consumers' behavior. In the tourism context, VR denotes

an interactive virtual medium that enables individuals to create simulated experiences of unreal environments using a head-mounted display (HMD) of a VR device (Perry Hobson & Williams, 1995). VR mounted headsets use 360-degree video to take viewers to a virtually constructed world, allowing users to view and have full information in six areas of tourism, including "planning and management, marketing, entertainment, education, accessibility, and heritage preservation" (Guttentag, 2010). While immersed gets more sophisticated with mobilized hardware such as smartphones (Hassan & Jung, 2018), content and program create a more engaged, authentic virtual environment with realistic and indistinguishable images and information from reality. Therefore, the mobilized version of VR tends to alter the customer's decision-making process towards a tourism destination significantly (Buhalis & Sinarta, 2019; Dorcic et al., 2019; Guttentag, 2010).



Figure 2: Tethered VR Headsets:
(Retrieved from <https://www.thenational.ae/business>)



Figure 3: Untethered VR Headset
(Retrieved from: <https://gfxspeak.com/2018/01/25/announces-untethered-headset/>)

2.1.3 Historical Aspect of VR

Each transformation of the production process and production tools had a remarkable impact on the communities' lives, from the clustered population in the cities to communication mediums. Although industry 4.0, the fourth industrial revolution, has begun with the rapid development and occupation of the Internet of Things (IoT), its transformation has been continuing to evolve, and it changes every aspect of our lives more significantly. Digital transformation enabled scientists to invent more efficient various methods and develop technological tools to capture and *manipulate* the users' psychological and state of mind (Moseley, 2016) in multidisciplinary areas and industries. Besides trying to ease the peoples' lives and improve the organizations' efficiency and productivity, scientists have been trying to develop a system to stimulate or induce people's basic instincts with the destinations and result in the constant digitalization development. The digital transformation era consists of innovative digital tools that aim to improve the efficiency of both human and nonhuman sources of an organization, empower the managers and owners, and boost an organization's productivity to compete with the highly demanding business world.

In the historical context of VR, VR has been evolved significantly after the prevalence of IoT. The momentum of IoT catalyzed using technologies in a broader area without any limitation at an instant moment. But, breathtaking progress or advancement has not been achieved over a night. It took several decades and after the ups and downs of many inventions. On the other hand, despite the authors and sources are not agreed on the birthdate of the VR, and by whom, Steinicke (2016) and Mihelj, Novak, and Beguš (2014) assert that VR historical root goes back to the 1960s. For these authors, Morton Heilig, the cinematographer, and filmmaker is the virtual reality father. Morton Heilig foresaw that the viewers would be immersed in future movies through the virtual environments.

Having such a vision-enabled Morton Heilig earned a patent of the first machine that allowed him to ride a bicycle virtually (Mihelj et al., 2014). The device they invented is called the '*Sensorama*' (the 1950s), which allowed the user to display "three-dimensional city display, heard the sounds of the city, felt the wind and vibration of the seat, and could even smell the scents of the city" (Mihelj et al., 2014). Sensorama (See Figure 2) as a first recognized VR environment composed of a "cabinet with a 3D display, vibrating seat, and scent producer" (Steinicke, 2016). It was invented by Stanley Weinbaum, a science fiction writer, the dream that he mentioned in his book called *Pygmalion's Spectacles* (1935) come true. In their book, Stanley Weinbaum's wrote that the readers might taste, smell, touch as if they are in the story (Mihelj et al., 2014).

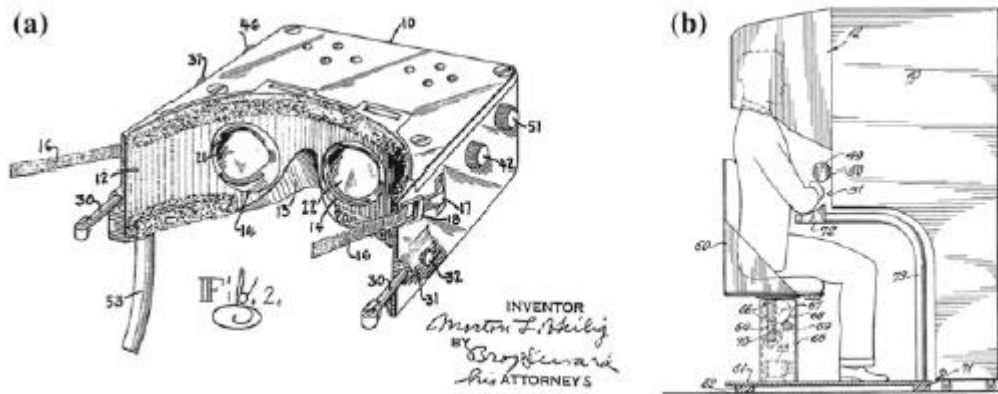


Figure 4: Images from early VR systems of Morton Heilig's patents: a Telesphere Mask (image taken from US2955156) and b Sensorama simulator (image taken from US3050870) Retrieved from: Steinicke (2016)

Following Sensorama, the Philco HMD (1965) was the first head-mounted device that allowed the users to experience "a video from a real, distant location" (Mihelj et al., 2014). Two engineers invented the Philco HMD (Head Mounted Display) (See Figure 3a) helmet, and they called it *Headlight* (Steinicke, 2016). The helmet consisted of "a single CRT element and magnetic tracking system" with "a closed camera system for telepresence setups" (Steinicke, 2016).

In 1965, Ivan Sutherland's vision resulted in inventing the 'Sketchpad,' the VR development process. The sketch is termed "The Ultimate Display" by Sutherland, and it was connected to the virtual environment (Mihelj et al., 2014; Steinicke, 2016). The sketch is the first computer graphical user interface that allowed the user to draw graphic images interactively. The program they used allowed the user to control graphics with his body's movement (Steinicke, 2016; Sutherland, 1968), Sutherland's headset is eventually resulted in a more advanced development called "Sword of Damocles" (1968). Sword of Damocles (See Figure 3b) was equipped with two small screens to create three-dimensional images. Still, it did not allow the active interaction

with the virtual environment (Mihelj et al., 2014). A virtual environment capable of responding to its users' movements required a more sophisticated system than previous VR versions, even though they were also a big step in the VR development process. Next, Myron Krueger is the first inventor who created a virtual environment that interactively involved with the users' movements and actions (the 1970s).

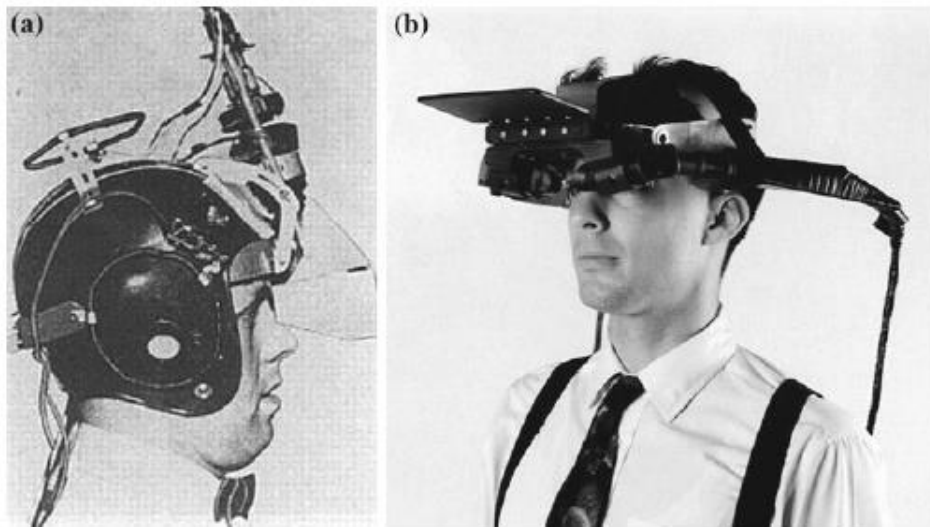


Figure 5: Images from first HMDs: 3a Headlight, and 3b Ivan Sutherland's "Sword of Damocles" (copyright by Harvard University)
Retrieved from: Steinicke (2016)

Nevertheless, the transformation of VR has not yet been completed. Moreover, scientists have been working to take the current system next level, where VR technology can influence the users with more immersions in more effective virtual environments. As of today, VR is used through mobile phones that allow VR applications to be used in every field of our lives. Its usage area varies from marketing to the training of flight and driving simulators, from the medical field to the engineering.

2.1.4 VR and Sense of Presence

A sense of presence is one of the most vital and critical concepts of VR technology. As IJsselsteijn, de Ridder, Freeman, and Avons (2000) asserted, a sense of presence depends on two core elements that are objective and subjective components. Sense of presence or 'being there' "is a subjective experience that is created, bringing of these two parameters in combining in a mediated environment" (IJsselsteijn et al., 2000). Virtual reality and sense of presence have been among the researchers' most trending phenomena for several decades (IJsselsteijn et al., 2000; Steinicke, 2016). Despite VR's definition differs as its transformation has not been completed due to fast-tracking technological development.

Nevertheless, VR and its inseparable aspect of 'sense of presence' are interwoven terminologies that need to be clarified. First, VR, as a cutting-edge computer-generated technology that provides high-quality visual graphics, included images and motions that create intensive interaction with its high pixel resolution, quickly and with high quality using affordable portable headsets (Steinicke, 2016). S. LaValle (2016) argues that VR stimulates any living thing's response mechanism in returns of interacting with a depicted images or simulation by being forced to believe that as if they are in the real environment.

Steinicke (2016) argues that a sense of presence is a highly sensitive and fragile concept that depends on different factors, such as hardware and software challenges. In the most recent form, a sense of presence is the core factor that either allows the user to engage or detach with the virtual reality environment due to the quality or lack of efficient hardware and software development presence. VR, with an improved sense of presence, can create attractiveness and engagement with its features that are

mentioned in the definition. A virtual reality system's innovative hardware and unique software, along with high resolution, fast-tracking, update rates with low latency, has the ultimate impact on the aspect of 'sense of presence. The current research paper defines the sense of presence as 'being transported from a real-world environment to the illustrated virtual setting for a particular time with the awareness of being lost.'

A virtual reality platform with the characteristics above has a greater chance of stimulating the organisms' desires, consequently influencing the responses, intentions, and behaviors towards the virtual setting's goal. Finally, the sense of presence gets more sophisticated with the identified factors/mediators for a virtual environment system. Implementing it in the tourism destination selection process will enhance the tourism organizations' performance and user experiences and satisfaction.

Some of these authors (S. LaValle, 2016; Moseley, 2016; Steinicke, 2016) argue whether the brain is *fooled*, *deceived*, or *manipulated* with the false perception of a sense of presence. Some of them also refer to paramount philosopher Plato's allegory of the cave in which the individuals chained together and had no chance to look around except a wall in front of them. As a result of being in that position for decades, these chained people believed that the real-world exists with the images on the wall reflected as candles function as the projector. The study does not cover philosophical theory due to its boundaries. Yet, it is necessary to mention that anecdote has been a historical and philosophical approach to inducing the individuals' internal organisms (S. LaValle, 2016; Steinicke, 2016).

On the other hand, given that a sense of presence is a critical function of the virtual reality system, it directly helps individuals develop cognitive engagement with the

environment depicted (Nash, Edwards, Thompson, & Barfield, 2000). Sense of presence is defined as "sense of being there" or "the feeling of being there" (McMahan, 2003) or "being there" in a subjective manner that is illustrated by the system (Barfield, Zeltzer, Sheridan, & Slater, 1995; IJsselsteijn et al., 2000; Lessiter, Freeman, Keogh, & Davidoff, 2001). Murray (2017) and McMahan (2003) argue that immersion is a metaphorical term often used interchangeably with 'presence' that indicates transporting from the real-world to the psychologically immersed environment, called, in essence, virtual reality.

Scholars in the 90s desired to discover what factors play an essential role in 'a higher subjective sense of presence' (North & North, 2016; Sheridan, 1999). Sheridan (1999) focused on four key factors: 'quantity of information, sensor position and orientation, the change of relative location of objects in response to static feedback, and direct *manipulation* commands. According to Steuer (1992), three factors enhance users' experience with the virtual environment; these are vividness, interactivity, and the user's characteristics that provide a realistic sense of presence. These factors are the primary influencers that create the highest and strengthen depicted virtual environment experiences with the VR. Furthermore, there are some unprecedented achievements in the innovation field, especially after the smartphone era. Today, virtual reality became possible and advanced even much more substantial as the system entered into the world of smartphones. Nevertheless, bear in mind that a sophisticated virtual reality system does not necessarily and automatically create a better sense of presence to be immersed by the virtual world.

Virtual reality is based on the factor that creates a cognitive connection with realistic images and videos. Cognitive relationships with the presence phenomenon occur due

to interacting with the VR environment (Carassa, Morganti, & Tirassa, 2004). VR illustrates images, videos, games, and movies in a 3D format that impacts users' perceptions, making them feel like they are in the depicted location (Burdea Grigore & Coiffet, 1994; Ludlow, 2015). VR allows users to control the system by physical movement, speech, or text depending on the user's characteristics, preferences, and platform's goal.

The sense of presence created by VR is the primary element that serves as a motivator for a particular attitude or behavior (Carassa et al., 2004; Ludlow, 2015). However, as stated in Marchiori, Niforatos, and Preto (2018), identifying the VR technology factors or characters will improve the users' perceptions of the destinations and services.

2.1.5 Measuring Presence in Virtual Reality

Presence is a psychological perception of either being or lost within the virtual environment, but in any case, the user feels or perceives the depicted content as real (IJsselsteijn et al., 2000; Tussyadiah et al., 2018). Despite there is not common theory and original method to measure the impact of presence in the literature, however, with the constant development of technology, post-test rating scales and continuous presence assessment have been used throughout the studies (IJsselsteijn et al., 2000). Understanding the role of the presence in developing virtual reality platforms is crucial to measure the relationship between the cognitive process and the attitude change. A practical and robust social/sense of sight has a significant positive impact on user experience while using the virtual reality system (Gunawardena, 1995; North & North, 2016). Creating a heightened sense of presence relies on some dominant parameters that need to be measured whether a virtual reality environment system can influence and rely on user experience or not (IJsselsteijn et al., 2000; North & North, 2016).

According to IJsselsteijn et al. (2000), there are four determinants of presence. These are 'the extent and fidelity of sensory information,' 'the match between sensors and the display,' 'content factors,' and 'user characteristics' (IJsselsteijn et al., 2000). Each of these factors is significant indicators of whether the combination of subjective and objective components achieves the user's intended message successfully or not.

Discovering each factor's impacts determines the virtual system environment system's effectiveness for implementing the tourism sector. The investigated factors are information quality, system quality, and service quality, allowing users to experience the virtual environment in a real context during the pre-purchase phase. On the other hand, investigating the existing theoretical approaches and research studies with the relevant content of virtual reality in tourism will help develop the observed phenomenon's conceptualization. In particular, selecting appropriate theories will enrich the theoretical implications and allow the researcher to explore the factors that significantly impact implementing the virtual reality system as a marketing medium in the tourism sector.

2.1.6 Critiques

Unlike these authors, some studies indicate that the virtual reality environment's physical conditions are the most promising instruments that capture users' attention for the illustrated images. Authors argued that VR could amazingly stimulate the user's cognitive engagement and satisfy their experience with the enhanced screen size and the audio system's quality. McMahan (2003) asserted that people could be engaged with the virtual environment even if the system works on a desktop computer.

Some scholars also draw attention to the health-related issues or symptoms called cybersickness, which occurs due to interacting with virtual reality technology.

Steinicke (2016) defines it as motion sickness, despite the users stay still while experiencing VR technology. However, the visual often flows continuously with very low latency, fast and with a 360-degree perspective. The author explains it with three theories: the sensory conflict theory, which simply defines the differences or conflicts between the physical body and senses, such as cognitive perceptions. The other two approaches are 'the poison theory' and 'the postural theory.' There are some other crucial points that scholars critique and consider the negative impacts of VR technology. But, it is way beyond the scope of the current research paper.

However, the study's primary purpose aims to measure the impact of Information Systems Success's (ISS) model on satisfaction with the virtual reality environment. There are a total of six updated factors, which are 'system quality, information quality, use, user satisfaction, individual impact, and organizational impact,' in the ISS model that allow the researchers to measure the overall impact on the target phenomena (Delone & McLean, 2003). Applying the IS Success model into the virtual reality environment context will reveal the importance of information, system, service quality, and the satisfaction aspects that have not been measured before.

2.1.7 Information Systems (IS) Success Model

"Since the importance and role of technology have been growing significantly and impacts society's life in an addicted level, assessment of these fast pacing technological devices', programs' and applications' effectiveness, usefulness and reliability are getting more crucial for all" (Yuce, 2019). "These concerns impose researchers and theorists to discover and investigate the best method that can measure the effectiveness and success of technological devices" (Yuce, 2019).

The Information Systems (IS) Success Model helps avoid the possible speculations and biases about the dependent variable's real impacts of the dependent variable(s) to ensure that its effectiveness is measured objectively and accurately. Hence, the current research study tested the proposed model using the VR in a real situation with the real people to confirm its functionality and its impact on users by focusing on the three significant constructs (quality of information, system, and service) of the IS Success Model. The findings will not only contribute theoretically, but they will also provide healthier guidance for the managerial implementations.

The Information Systems (IS) Success Model has been a useful measurement tool, and it has been used pervasively with several topics in various fields, including the emerging technologies (Chiu, Chiu, & Chang, 2007; Ojo, 2017; Petter, DeLone, & McLean, 2008). ISS was first introduced by DeLone and McLean (1992) to evaluate the functionality and practicability of a medium in terms of what value it adds, to what degree it achieves the desired goals and improves overall quality and satisfaction of a system and a device in the context of industry standards (Gorla, Somers, & Wong, 2010; Ojo, 2017). The IS Success Model was updated in 2003 (Delone & McLean, 2003; Goodhue & Thompson, 1995; Rai, Lang, & Welker, 2002; P. B. Seddon, 1997; Y.-S. Wang, Wang, & Shee, 2007).

The fundamental difference between the two versions is the "service quality" dimension in the updated model (Delone & McLean, 2003). Service quality, along with the rest of the variables of the IS model, helped to measure the "effectiveness level" (Shannon & Weaver, 1949) or "influence level" (Mason, 1978) of the information system and proposed device. Discovering the "net benefits," which used to be "organizational impacts" in the original model, of a system does not only validate

how beneficiary it is for the organization, but it also helps the researchers identify the drawbacks to determine the final positive outcomes of the system/product (Delone & McLean, 2003; P. B. Seddon, 1997).

2.1.8 VR Information Quality and Satisfaction

Delone and McLean (2003) stated that a medium's 'semantic success' is essential to assessing the delivered message's value via a technological tool. In other words, how accurate, meaningful, and adequate the perceived images are the key elements that indicate the information's quality. VR transmits the information to the users with simulations in a virtual environment that creates a sense of presence as if they are moving to the depicted object/place virtually without detaching from the real physical site or environment (Mihelj et al., 2014).

The entire project's success is achieved through the degree of participants' captivation, reaction, and response to the depicted virtual environment or simulation. How successfully the given information besides system and service quality is crucial to increasing the mentioned innovative medium's applicability and benefits (Y.-S. Wang et al., 2007). In light of the argument, as one of the most critical dimensions of the IS Success model, information quality helps measure how precise, timely, secure, appropriate, and available the information conveyed to the users by the information system. (Peter Seddon & Kiew, 1996; Zaied, 2012). Information quality is measured based on the given information's reliability, comprehensibility, and completeness (Delone & McLean, 2003; Zaied, 2012).

On the other hand, Gorla et al. (2010) argued that information quality is measured with critical measures such as how the medium's overall satisfaction in terms of information quality, clarity, and relevancy to the intended goal or object. Satisfaction refers to the

participants' pleasant or unpleasant exp interacting with the virtual environment (Peter Seddon & Kiew, 1996). The better quality and adequacy information delivered via the VR, the higher the satisfaction that one can get. Hence, the paper posits that:

H1. VR information quality delivered to VR users has a significant positive impact on perceived satisfaction.

2.1.9 VR System Quality and Satisfaction

System quality refers to how comfort, consistency, user-friendliness, accessibility, and response rate goals are achieved during user experiences related to the presented medium, such as a virtual reality environment (Peter Seddon & Kiew, 1996; PB Seddon, Kiew, & Patry, 1994). VR systems should be prepared, designed, and implemented in a way that should be easy to use by individuals at all skill levels.

Conclusion: a potential customer or user should be able to adapt the system efficiently and effectively to keep them motivated and engaged through personalized information accessed at high speed (Y.-S. Wang et al., 2007). In other words, regardless of how brilliant the data is, if it does not transmit information effectively, accurately, and precisely using a reliable and user-friendly system, it can pose a high risk to achieving the desired goals of the implemented system (Yuce, 2019). Hence, virtual reality should be designed and prepared to ensure that the system offers useful, customizable, maintainable, and reliable content for the end-users (Zaied, 2012). A tangible measurement can help forestall future issues within a system to provide more achievable and workable outputs and create greater user satisfaction. Therefore, we hypothesize that:

H2. VR System Quality delivered to VR users has a significant positive impact on perceived satisfaction.

2.1.10 VR Service Quality and Satisfaction

Service quality indicates whether customers' expectations are achieved or not using the presented model's provided services. The most important characteristics are the service's reliability, availability, and integrity. (Collier & Bienstock, 2006; Zaied, 2012). Virtual system effectiveness cannot only be evaluated with the information or system quality that customers experience as they interact with the system. It is crucial to ensure that users are supported and guided with effective service as they interact with the system. Providing efficient and reliable service for the users is important due to their lack of familiarity with the current technologies.

Therefore, it requires a well-aware system and information to provide a novel virtual reality experience for the user. In order to understand the overall tangible and intangible benefits of VR, the service quality dimension of the IS success model should be evaluated for its effectiveness of the information system success with an empirical study. On the other hand, the lack of service quality, such as the level of assistance, guidance, and timely given feedback, may result in users' dissatisfaction with the system (Y.-S. Wang et al., 2007). Because service quality has a tremendous impact on user satisfaction, the study hypothesizes that:

H3. VR Service Quality delivered to VR users has a significant positive impact on perceived satisfaction.

2.1.11 VR Satisfaction and Intention to Visit

User satisfaction is seen as a lifeline for service firms. User satisfaction refers to how successfully the desired information is delivered to the users via the designed system or offered a device. A satisfied user is the one who is more likely to have the intention

towards the depicted destination. It also ensures that needs are fulfilled with reliable information thru the user-friendly system and well-prepared individuals.

Furthermore, it is vital to discover if satisfaction is achieved or not. Subsequently, if it is completed, then it should be found to what extent it affected users' decisions, attitudes, and emotions for future use. Unlike some studies (Bailey & Pearson, 1983; Rai et al., 2002), user satisfaction is measured indirectly. The current research focuses on and measures the causal relationship between information quality, system quality, service quality, and user satisfaction. As a result of the quality of information, quality of a system, and service, it is expected to have customers or users with a positive and constructive attitude towards the VR system. If the designed system captures users' attention and creates adequate satisfaction, it is expected to shift users' visitation intention significantly. Hence, we proposed the hypothesis that:

H4. VR User satisfaction has a significant positive impact on the intention to visit.

2.1.12 The Mediating Role of Satisfaction

Lu, Kuo, and Lee (2012) define satisfaction "as a consumer's positive judgment about the features of a product or service (Oliver & Swan, 1989). Satisfaction as the overall effective attitude and cognitive evaluation of the level of pleasure felt towards an IS application by someone who interacts with it directly (Au, Ngai, & Cheng, 2002; Doll & Torkzadeh, 1988)". Although it is a challenging task being able to measure the user satisfaction due to its complex and multilevel relationship with different constructs, nevertheless, the ability to measure the satisfaction level can contribute to discovering the summative and formative evaluations of the desired information systems (Shirani, Aiken, & Reithel, 1994).

Summative evaluation refers to how given constructs influence the users' attitude and behavior in terms of their satisfaction level. On the other hand, formative evaluation refers to whether altered behavior is formed or established enough for the desired outcome or not (Shirani et al., 1994). An information system's success is closely related to the user satisfaction in terms of increasing their "intention to continue using (continuance) information systems" or services (Bhattacharjee, 2001; Chiu et al., 2007) or purchasing the product. There is a significant relationship between innovative information, visitor attitude, and destination selections. D. Wang et al. (2012) argued that tourists are "hedonic pleasure-seekers," and their needs are fulfilled with mobile apps that lead to greater satisfaction.

Satisfaction as a mediator is an important indicator to determine whether antecedents of customer satisfaction are associated with the visit intentions or not. One notable study by Chiu et al. (2007) revealed that satisfaction has a significant mediating role between the IS success model and the intention to use the web-based learning platform. However, whether the mediation role of satisfaction influences the potential VR users' decision to visit a destination has not been measured in the existing literature. In light of those mentioned earlier theoretical and empirical arguments, the current study proposed a significant relationship between the predictors, which are information quality, system quality, service quality, and intention to visit through the mediation effect of the satisfaction. The hypotheses are proposed as follow:

H5a. Perceived satisfaction with VR mediates the effect of VR information quality on the intention to visit.

H5b. Perceived satisfaction with VR mediates the effect of VR system quality on the intention to visit.

H5c. Perceived satisfaction with VR mediates the effect of VR service quality on the intention to visit.

2.1.13 The Study Model

There has been a need to discover the real impacts of an information system's success on digital or non-digital electronic devices regarding their consistency and suitability for the organizations (Petter et al., 2008). As Guttentag (2010) cited from Gutierrez, Vexo, and Thalmann (2008), VR engages the user physically and psychologically. Both functionalities depend on the quality of the system, information, and service. The more durable and more explicit the information quality, system quality, and service quality are, the greater satisfaction of the users presented with the information system (Wang and Liao, 2008). Hence, with its borrowed metrics, the IS Success Model can help discover some critical aspects such as VR's concrete and elusive advantages and the contributions to the tourism sector.

The study aims to test the proposed model (see figure 6) to assess the impact of antecedents and the mediating role of VR's perceived satisfaction over the intention to visit a destination.

Chapter 3

RESEARCH METHODOLOGY

It has been one of the most important and debatable questions to address what methodology or methodologies a researcher needs to choose for his/her study to ensure the most accurate, reliable, and highly effective outcomes. Although the intellectual discussion has been going on for decades, there is no specific or clear cut answer and common ground of agreement on a research phenomenon. Besides the research philosophies such as ontology and epistemology, research methods, tools, approaches, and ideologies such as positivism and interpretivism determine whether a study should be built on qualitative or quantitative methods also continue to be controversial topics in multidisciplinary research studies.

Neuman (2013) defines *science* as “a system for producing knowledge and the knowledge that results from that system developing.” Thus, scientific research studies aim to gain knowledge on a research phenomenon “to make descriptive or explanatory inferences on the bases of empirical information about the world” (Della Porta & Keating, 2008). These two and many other definitions refer to social science's goal that was ‘coined by Max Weber’ (Flick, 2014). Social scientists aim to “develop an analysis, a description, or an explanation for a phenomenon that was unclear before” (Flick, 2014).

In the context of VR, the current research paper aimed to provide robust knowledge gained as a result of a systematically built a research methodology. Despite the popularity of VR and countless studies in the literature, however, there are still many questions that await more detailed responses to improve its impact on users. Therefore, an empirical method is applied to understand what features of the presented study model shaped with the IS Success Model influences users' satisfaction.

The study of understanding, describing, or interpreting efforts for an unknown phenomenon has rooted back to the beginning of the philosophical age. Ontology and epistemology are two remarkable *philosophical assumptions* among the ideas that led several approaches to emerge to acquire the knowledge in describing, explaining, or using the combination of both. These two research philosophies can be characterized as *ontology* is the *study of being* or *nature of reality*, which focuses on a real, objective, and tangible world /reality directly and using the positivist approach to build a theory (Carson, Gilmore, Perry, & Gronhaug, 2001). *Epistemology*, however, claims that real knowledge cannot be achieved successfully due to the *nature and limitation of living things*. In other words, the knowledge gained in ontology is not a universal, ultimate, precise, or absolute truth due to the relationship between researcher and reality. Instead, it is a reality of individuals involved in the research process and influenced the acquired knowledge or constructed theory.

The significant difference between an ordinary person and a researcher towards a research phenomenon is that while the first one is making statements without any scientific bases, the second one makes his philosophical assumption with pieces of evidence that is emerged as a result of using scientific originated systematic approaches. From the philosophical approach, the speculation about a social

phenomenon can be made with one of these research philosophies: ontology or epistemology. The next question will be what type of research methods and processes need to be applied to draw a reasonable, objective, rational conclusion that will carry out a theory, factual knowledge, or reveal a reality (Bryman, 2015). These are positivism and interpretivism approaches. In light of the given information, the current paper aimed to contribute the existing literature with its presented research questions and proposed hypotheses while testing them with scientific methods to provide factual knowledge instead of speculations.

Bryman (2015) and Flick (2014) defines the positivism by reinforcing Auguste Comte's philosophy, implementing solely natural scientific approaches into social sciences as a result of focusing only on the observable realities or facts that Comte called 'positiva.' For positivists, there is a strong bond between the observed phenomena in the laboratory and social environment because each case is tested without using pre-existing theories. Thus, the laboratory environment presents the real world's true reflection to discover a particular subject's reality under the scientific approaches included controlling the variables. Further, Bryman (2015) asserts that positivism has five essential principles: Phenomenalism, deductivism, inductivism, objectivity, and the difference between scientific and normative statements.

Contrary to quantitative approaches with a numerical explanation of the research phenomenon, the qualitative approach gives non-numerical information and evidence after detailed research procedures and established procedures (Neuman, 2013). Social science-based research studies heavily conducted quantitative methodology throughout the 20th century (Tuli, 2011). Using a quantitative method in positive science, such as physics and chemistry, did not create many issues in social sciences

(Tuli, 2011). Social scientists raised the question about building the knowledge due to using the quantitative approach due to its fundamental inefficiency about explaining the external factors that influence the consequences of the observed research phenomenon (Tuli, 2011). Despite the abovementioned argument, Neuman (2013) argues that both methods can be used in social science using typical research techniques such as surveys, interviews, and ethnography because of the commonalities between them.

The current dissertation examines the IS Success model's essential parameters in the context of virtual reality (VR) to assess how they influence the individual visit intention towards a touristic destination. The researchers of the study also developed hypotheses based on the research model that is derived from theory. The primary structure of the research paper's approach allowed us to discover the core reasons from a particular to a general statement of the social science research phenomena so-called VR. As a result of analyzing, testing the causal relationship of the research model revealed significant reasoning, and it confirmed the hypothesis between the construct of the study model. The study's findings can be generalized since there is a meaningful or significant causal relationship between the proposed variables of the study.

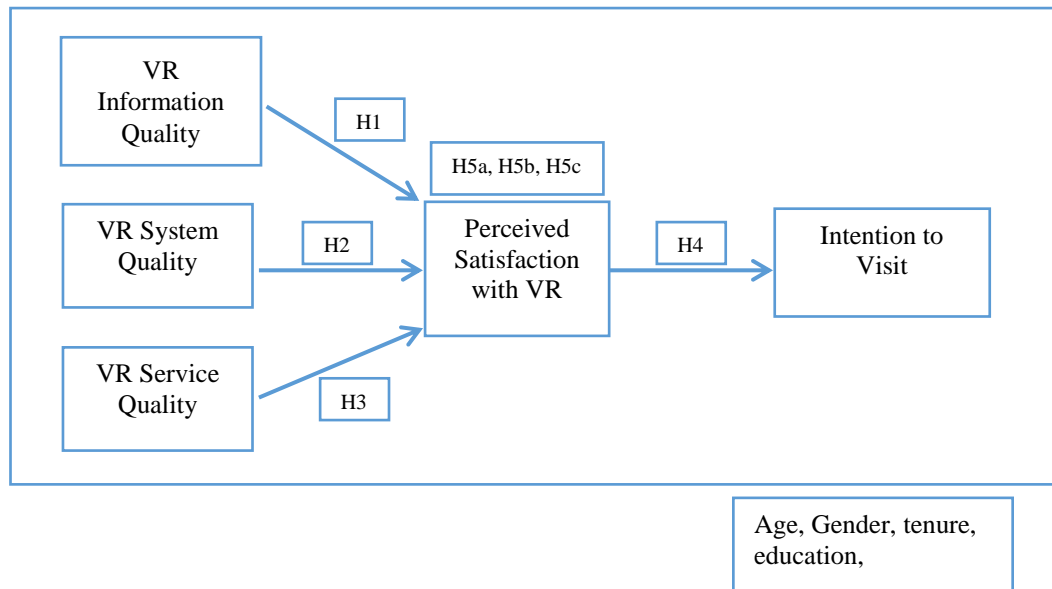


Figure 6: Hypothesized model

3.1 Sample and Procedure

For the current empirical research paper, data is collected from a diverse group of international tourists in Northern Cyprus. One of the significant problems of Northern Cyprus is lacking efficient marketing strategies due to the economic and political issues the country has faced. However, recent innovational technological advancements with lower cost and more powerful features offer alternative approaches to overcome these challenges than traditional marketing tools.

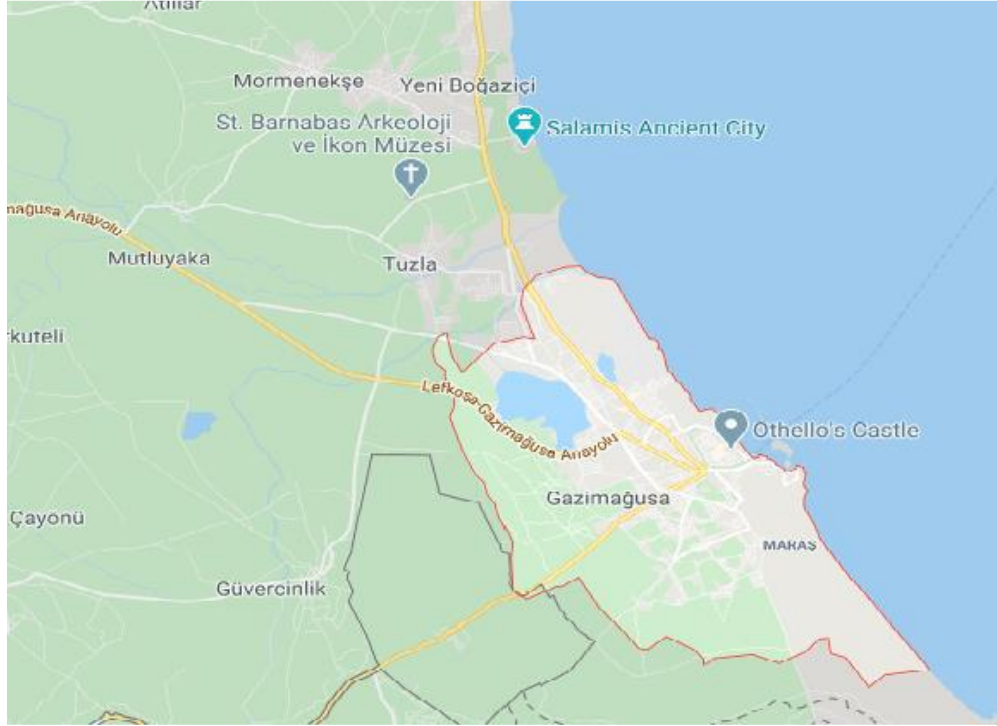


Figure 7: Famagusta

Retrieved from:

<https://www.google.com/maps/place/Famagusta/@35.1193908,33.8639272,12z/data=!3m1!4b1!4m5!3m4!1s0x14dfc842da4c163d:0x29db03c5a5d3ce87!8m2!3d35.1149116!4d33.919245?hl=en-US>

The current research paper used the convenience sampling method of the nonprobability technique to enhance the study's reliability and validity. Each individual was selected based on their availability and had an equal chance to join a large population group. Convenience selection allowed to recruit the participants without categorizing them under a specific term to eliminate the possible biases and classification errors. The researchers conducted a pilot study with 15 international tourists to test the items' clarity and consistency by targeting several international tourists in Famagusta, Northern Cyprus. Cyprus is the third biggest island in the Mediterranean Sea, and tourism is the primary source of income for its economy (Katircioglu et al., 2007; Roudi et al., 2018). The international tourists who visited Famagusta, Northern Cyprus, were the target population of the research. The

researchers focused on travel agencies, churches, and other attractions, such as hotels, to conduct the study in Famagusta's life-like environment. They contacted the agency owners and other authorities to give them detailed information about the research's aim and scope.

Participants were given head-mounted VR glasses, and their experience lasted about 10 minutes. They viewed the image of Paris. The image was about Eiffel Tower, and they were amazed and attracted remarkably as a result of being immersed with the notion shown in the VR technology. They kindly responded to the self-administered questionnaire, and then they placed the questionnaire in a basket. A total of 229 questionnaires were distributed among the international tourists, and 217 of them were collected. It is essential to collect data from diverse groups of individuals to develop better solutions and approaches to enhance the touristic benefits for the destinations and improve visitors' satisfaction. The majority of the target population consisted of various nationalities and cultures. Most of the participants (64.9 %) included data set were aged between 21-25 years old.

Nevertheless, 12 of the questionnaires were discarded due to the incomplete information at different questionnaire categories. Finally, 205 of the questionnaires were analyzed with a response rate of 89.5%. As mentioned earlier, the hypotheses were tested to determine whether VR has any significant impact on visit intention. All adapted items were initially in English. Thus, there was no need to use the back-translation method. As mentioned above, the pilot study indicated that participants had no difficulties responding to the prepared questions.

3.2 Questionnaire Development and Measures

The first page of the questionnaire notified the participants of the aim and scope of the study. It also ensured that the participants' anonymity and confidentiality were preserved for the reliability of the study. The first page also allowed the participants to answer the items related to the IS Success Model's information quality, system quality, and service quality. The intuitive/perceptual constructs were measured with multiple items used in the previous studies in the relevant literature.

Four items to measure the Information Quality (IQ) were adapted from previous studies (Chiu et al., 2007; Delone & McLean, 2003; Peter Seddon & Kiew, 1996; Urbach, Smolnik, & Riempp, 2010; Y.-S. Wang et al., 2007) using the 5-points Likert scaling system. A higher score indicated greater perceived information quality.

Three items to measure the System quality (SQ) were adapted from the previous studies (Chiu, Chiu, & Chang, 2007; Seddon & Kiew, 1996;) using the 5-points Likert scaling system. A higher score indicated greater perceived system quality.

Three items to measure the Service (SEQ) were adapted from the previous studies (Delone & McLean, 2003; Seddon & Kiew, 1996) using the 5 points Likert scaling system. A higher score indicated greater perceived service quality.

VR Satisfaction was measured with the items adapted from Liaw, Chen, and Huang (2008) and (2007) using the 5- points Likert scaling system. A higher score indicated greater perceived VR satisfaction. Finally, the criterion variable, visit intention, was measured with three items adapted from Kozak and Rimmington (2000) and Tussyadiah (2016) using the 5-points Likert scaling system. A higher score indicated greater perceived visit intention.

3.3 Data Analysis

This current research paper applied a partial least squares (PLS) path modeling-based algorithm (Chin, 1998) to evaluate the structure of the proposed model (Figure 6). The PLS algorithm is designed and created by Wold (1982) as a newer version of the structural equation modeling (SEM) approach. PLS has been applied in numerous studies (Hair Jr, Hult, Ringle, & Sarstedt, 2014; MacKenzie, Podsakoff, & Rich, 2001). Confirmatory factor analysis (CFA) was applied besides PLS to investigate the dimensionality issues and to evaluate the convergent and discriminant validity of the measurement model (Hair, Anderson, Babin, & Black, 2010). Moreover, the average variance extracted (AVE) and composite reliability were employed to assess the scale items' convergent reliability. On the other hand, path analysis was deployed to test the relationship on the hypothesized model. Finally, mediating effects were tested based on the mediation principles adopted by (Karatepe & Ngeche, 2012).

Chapter 4

DATA ANALYSIS AND FINDINGS

4.1 Descriptive Statistics

Frequency analysis is applied to analyze the respondents' profile regarding their gender, age, education, and more. Based on the descriptive analysis, Table 1 indicates that 60.5% of the survey participants were male, while the rest (39.5%) of females. Frequency analysis showed that the overwhelming majority of the participants were young people (82.9%), 26 years old and younger. Furthermore, a large group of them held a bachelor's degree (68.8%), and an overwhelming number of them were single (90.6%). Finally, when we look at the income level, we see that 52.7% of the respondents had an income level under \$9,999, and only a total of 4% had \$50,000 and over.

Table 1: Demographic profile

	Frequency	Valid Percent (%)
Gender		
Male	124	60.5
Female	81	39.5
Total	205	100
Age		
Under 20	37	18.0
21-25	133	64.9
26-30	21	10.2
31-35	10	4.9
Over 35	4	2.0
Total	205	100
Education		
Associate Degree	26	12.7
Bachelor's Degree	141	68.8
Higher Degree	38	18.5
Total	205	100
Marital status		
Single	186	90.7
Married	9	4.4
Widowed	5	2.4
Divorced	5	2.4
Total	205	100
Income		
Less than \$9.999	108	52.7
\$10.000 – \$19.999	42	20.5
\$20.000 – \$29.999	31	15.1
\$30.000 – \$39.999	6	2.9
\$40.000 – \$49.999	14	6.8
\$50.000 – \$59.999	2	1.0
\$60.000 or More	2	1.0
Total	205	100

4.2 Psychometric Properties of the Measures

The reliability of measured constructs and items responded to by the participants in a developed model should be internally consistent and significantly correlated to generate a high level of reliable outputs. Hence, the model's constructs were assessed in terms of how consistent and adequate they were from the reliability, convergent validity, and discriminant validity perspectives. In light of given brief information, as it is shown in table 2, the composite reliability score is above the benchmark level .70, that can be interpreted as the degree of internal consistency being reliable, and there is not an issue or error between the measured items (Fornell & Larcker, 1981).

Confirmatory factor analysis is used to assess each variable of the hypothesized model. As shown in Table 2, the items for each construct were significantly related to the given constructs. According to Anderson and Gerbing (1988), all t-values above 2.00 are accepted as significant scores. As shown in Table 2, standardized loading estimates are between .60 and .93, and all t-values are not smaller than 2.00. Moreover, the average variance extracted (AVE) for each measured variable was more significant than the minimum threshold of .50. In other words, all these scores illustrated that there were neither convergent validity nor discriminant issues on the given constructs (Anderson & Gerbing, 1988; Bagozzi & Yi, 1988; Chin, 1998; Fornell & Larcker, 1981).

Table 2: Scale items, reliabilities, and confirmatory factor analysis results

Scale items	T-Values	Standardized loadings	CR	AVE
Information Quality			0.80	0.63
InQlty1 "VR provides the precise information I need."	30.45	0.84		
InQlty2 "VR provides sufficient information	20.26	0.79		
InQlty3 "VR provides up-to-date information."	26.71	0.81		
InQlty4 "VR provides reliable and useful information."	11.23	0.72		
System Quality			0.84	0.68
SysQlty5 "VR is user friendly."	36.99	0.88		
SysQlty6 "VR is easy to use"	25.37	0.86		
SysQlty7 (R) "VR is usable."	19.61	0.81		
Service Quality			0.70	0.56
SerQlty8 "VR has a problem-solving mechanism service."	5.97	0.60		
SerQlty9 "VR makes you feel safe with given activities."	19.97	0.81		
SerQlty10 "VR service gives me individual attention."	25.66	0.85		
Satisfaction			0.81	0.72
Sat11 "I am satisfied with the VR."	41.90	0.86		
Sat12 (R) "I am satisfied with the speed of the VR."	15.78	0.73		
Sat13 "I am satisfied with the functions provided by the VR."	34.64	0.84		
Sat14 "I am satisfied with the quality of information available on the VR."	36.48	0.85		
Visit intention			0.89	0.82
VisInt15 "I expect to visit [Paris] in the future."	22.35	0.86		
VisInt16 "It is likely that I visit [Paris] in the future."	54.11	0.91		
VisInt17 "I can see myself visiting [Paris] in the future."	98.06	0.93		

Notes: All items are measured on five-point Likert scales ranging from 1 = *strongly disagree* to 5 = *strongly agree*. All loadings are significant at the 0.01 level or better. All internal reliability estimates are above the .070 cut off value.

Table 3 demonstrates the study constructs' measurement results in terms of their correlations, means, standard deviations, and square roots. These measurement results display that all direct relations were significant. The composite score was calculated by summing and obtaining the average of all the items of each construct. Since the correlation coefficient was smaller than 0.90, all the constructs differ from each other (Tabachnick & Fidell, 2007). Table 3 also demonstrates no issue with discriminant validity; in other words, the study constructs were not correlated variables. Table 3 also depicts that the study's correlations ranged from 0.213 (service quality and visit

intention) to 0.467 (information quality and satisfaction). Specifically, information quality has the highest significant association with satisfaction ($r = 0.467$; $p < 0.01$). Furthermore, system quality and service quality also had significant impact on satisfaction ($r = 0.403$; $p < 0.01$) ($r = 0.376$; $p < 0.01$). Again, as shown in table 3, there was a significant positive correlation among satisfaction and visit intention ($r = 0.331$; $p < 0.01$). On the other hand, the accepted benchmark for the tolerance values is 0.10 (Hair et al., 2010), and Table 3 depicts that none of the variance inflation factor (VIF) values exceeded 0.10. Lastly, Table 3 also includes the means and standard deviations of the composite scores.

Table 3: Correlations, means, standard deviations, and square roots

Scale	1	2	3	4	5	VIF
1.Information Quality	0.78					1,383
2.System Quality		0.81				1,352
3.Service Quality	0.403**	0.424**	0.76			1,259
	0.400**					
4.Satisfaction		0.403**	0.376**	0.80		1,000
5.Visit Intention	0.467**	0.405**	0.213*	0.331**	0.70	-
	.291**					
Mean	3.75	4.28	3.81	3.92	4.17	
Standard deviation	0.88	0.86	0.92	0.96	1.01	

Notes: $n = 205$. **Correlation is significant at the 0.01 level; *correlation is significant at the 0.05 level. Correlation without an asterisk is insignificant. The results regarding variance inflation factors (VIF) did not demonstrate any problems of multicollinearity. The square root of AVE is in the diagonal.

4.3 Hypotheses Testing

Partial Least Square (PLS) path analysis method is employed to test the hypothesized relationships. A bootstrapping technique was utilized to assess the t -statistics and to discover the path significance (Chin, 1998; Hair Jr et al., 2014). Besides that, Table 4 also demonstrates the path coefficients, their significance, and the R^2 values of endogenous variables.

Hypothesis 1 proposed *that information quality has a significant positive effect on satisfaction*. As shown in Table 4, the path from information quality to satisfaction was significant and positive ($\beta = 0.42$, $t = 5.23$, $p < 0.05$). Hypothesis 1 was, therefore, supported. Information quality explained 18% of the variance in satisfaction. None of the control variables had a statistically significant effect when included in the model.

Hypothesis 2 suggested that *system quality has a significant positive effect on satisfaction*. As shown in Table 4, the path from system quality to satisfaction was significant and positive ($\beta = 0.43$, $p < 0.05$). Hypothesis 2 was, therefore, supported. System quality explained 18% of the variance in satisfaction. Again, none of the control variables had a statistically significant effect when included in the model.

Hypothesis 3 suggested that *service quality has a significant positive effect on satisfaction*. As shown in Table 4, the path from service quality to satisfaction was significant and positive ($\beta = 0.40$, $t = 3.75$, $p < 0.05$). Hypothesis 3 was, therefore, supported. Service quality explained 16% of the variance in satisfaction. Again, none of the control variables had a statistically significant effect when included in the model.

Hypothesis 4 suggested that *satisfaction has a significant positive effect on visit intention*. As shown in Table 4, the path from satisfaction to visit intention was significant and positive ($\beta = 0.41$, $t = 4.31$, $p < 0.05$). Hypothesis 4 was, therefore, supported. Satisfaction explained 17% of the variance in visit intention. Again, none of the control variables made a statistically significant effect when included in the model.

The path analysis indicates that satisfaction mediates the impact of information quality on visit intention ($t = 2.64, p < 0.05$), a full mediation. This is because, when information quality and satisfaction are controlled, it can be seen that the previously significant relationship between the independent and dependent variables was nonsignificant ($\beta = 0.16, t = 1.36, p < 0.05$). Thus, H5a was supported.

The result indicates that satisfaction partially mediates the impact of system quality on visit intention ($\beta = 3.32, p < 0.05$), because when information quality and satisfaction are controlled, it can be seen that the previously significant relationship between the independent and dependent variables was still significant ($\beta = 0.20, t = 3.25, p < 0.05$). Thus, H5b was supported.

In testing H5c, one of the mediation rules did not occur. As such, a direct link must be established between the independent and dependent variables to ensure there is a relationship to be mediated. Second, a direct relationship must be established between the independent and mediator variable. Third, the mediator must be shown to be related to the dependent variable. Last, the relationship between the independent and dependent variables must be significantly reduced when the mediator is added. The relationships between the independent and dependent variables and the independent and mediating variables should be theory-based and supported by the literature. The results show no significant relationship between service quality and visit intention ($\beta = 0.22, t = 1.44$). Thus, it could not be applicable to measure the mediating role of satisfaction in the relationship between service quality and visit intention. Therefore, H5c was not applicable to the current study.

Table 4: Path analysis results

Control variables and hypothesized relationships	Path coefficients	t-values	Results
(I) Impact of information quality			
<i>Control Variables</i>			
Gender	-0.06	0.46	
Education	0.09	0.72	Supported
Age	-0.10	0.80	
Marital status	-0.03	0.30	
Income	-0.02	0.22	
<i>Hypotheses</i>			
H1: INQLTY → SAT	0.42	5.23*	Supported
Explained Variance R ² = 0.18%			
ΔR ² = no significant change			
F = 0.260*			
<i>Mediating effect:</i>			
H5a: INQLTY → SAT → VISINT	0.33	2.64*	Supported
(II) Impact of system quality			
<i>Control Variables</i>			
Gender			
Education	-0.04	0.36	
Age	-0.01	0.14	Supported
Marital status	-0.07	0.63	
Income	-0.01	0.15	
<i>Hypothesis</i>			
H2: SYSQLTY → SAT	0.01	0.19	
Explained Variance R ² = 0.18%	0.43	4.43*	Supported
ΔR ² = no significant change			
F = 0.379*			
<i>Mediating effect:</i>			
H5b: SYSQLTY → SAT → VISINT	0.32	3.25*	
(III) Impact of service quality			
<i>Control Variables</i>			
Gender			
Education			
Age	-0.03	0.34	
Marital status	0.01	0.09	
Income	-0.09	0.81	
<i>Hypothesis</i>			
H3: SERQLTY → SAT	-0.02	0.31	
Explained Variance R ² = 0.16%	0.40	3.75*	
ΔR ² = no significant change			
F = 0.289*			
<i>Mediating effect:</i>			
H5c: SERQLTY → SAT → VISINT	-	-	N/A
(IV) Impact of satisfaction			
<i>Control Variables</i>			
Gender	0.05	0.59	
Education	0.07	0.62	Supported
Age	0.10	1.01	
Marital status	-0.03	0.38	

Income	0.06	0.72
<i>Hypothesis</i>		
H4: SAT → VISINT	0.41	4.31*
Explained Variance $R^2 = 0.17\%$		
$\Delta R^2 =$ no significant change		
$F = 0.286^*$		

Notes: $N = 205$; * The t -values demonstrate a statistically significant relationship at the 0.05 level or better. The other t -values without any asterisks are insignificant.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Technology has been a core catalyzer for a nation's wealth and welfare. On the other hand, tourism is a significant and primary source of economy for all ranges of countries, particularly developing countries. Integrating these two essential dimensions of available sources presents various possibilities for nations to achieve subjects' living standards and their overall prosperity. However, a technology without assessing its functionalities, its usefulness, and its relativeness with the proposed industry do not automatically guarantee to achieve expectations and goals in the long term. Even though most recent technologies focus on controlling, influencing, and *manipulating* the brain's state, the literature lacks efficient studies that reveal the most or least useful functionalities of innovative technologies such as in the case of VR.

Furthermore, understanding and discovering the core dimensions of VR that constitute subjects' brain state due to being teleported in a highly immersed virtual environment in the tourism context are the significant aspects of the study. Therefore, the research paper's primary goal was to discover the impacts of virtual reality on tourism destination selection by implementing the Information Systems Success Model. The IS Success Model helped broaden our understanding of the relationship between technology and the tourism industry by focusing on the system, service, and information quality dimensions of VR.

Hence, it is aimed to discover the impacts of the information systems success model's mediation factor on the virtual reality sense of presence towards the pre-purchasing tourism destination selection process. As a result of conducting an empirical study using the quantitative research approach by collecting datasets from international tourists in Northern Cyprus, the current paper illustrates that the measured parameters influence the user's attitude change towards selecting the tourism destination selection process. As a new supplemental marketing tool for the tourism sector, virtual reality offers a considerable amount of positive impacts to influence tourists' perception of the destinations to which the users are being transported virtually.

ISS model proved that the observed antecedent has a significant relationship with the consequences of the presented model. As the more concise of information, a more robust system, and reliable service are provided, and then a higher sense of presence feeling is achieved. In other words, the finding indicates that the theoretical framework of the study is confirmed in a myriad of ways. First, VR information quality, VR system quality, and VR service quality with the satisfaction factors have significant roles in changing the destination's intention. Second, with a higher sense of presence, tourists' satisfaction increase towards the destination. Lastly, customers' VR experience creates greater intentions for them to visit the destination.

There are a considerable amount of theoretical and practical implementations of the virtual reality environment in tourism. On a theoretical foundation, the study contributes to the literature significantly due to a lack of what factors impact creating a sense of presence phenomenon. Second, using the mediation effect of satisfaction is another critical characteristic that led to visiting a destination. On the practical side, the current paper recommends that tourism planners, managers, and authorities should

consider VR as one of the core emerging technologies that have compelling and promising features for the tourism sector. Furthermore, a heightened VR sense of presence presents better leverage/powerful marketing opportunities for marketing/selecting tourism destinations to embrace state-of-the-art technologies. Lastly, private or public organizations, which integrate/adopt effective emerging technologies, will most likely outperform those that undervalue the impacts of the sophisticated technological mediums.

The current research paper examined what feature(s) of virtual reality determines individual visit intention towards a touristic destination. Innovation has been a significant catalytic power for technological advancements for public and private organizations. Even though virtual reality is the latest technology and has a future through future innovative originated technological devices, it offers myriad opportunities in the highly demanding, challenging, and competitive digital automatized era for the tourism industry. Organizations invest some of their considerable capital for the smart-led growth tools/devices such as artificial intelligence, robots, virtual reality, and research efforts securing their firms for plans.

However, selecting the right technology requires understanding the sector's needs in-depth and analyzing the destination's features for its quality of the system, service, and information quality. Considering all these factors is vital since new technologies' life cycles are getting shorter than one can imagine. Moreover, innovative technology has an enormous impact on the nations' economic progress and the citizens' welfare in terms of their lifestyle, well-being, and fair income distribution. VR, with its great exciting functionalities, offers excellent potential to add significant gains to both public and private organizations.

VR has significant impacts on visitation purposes towards a destination as previous studies such as Guttentag (2010) and Y.-S. Wang et al. (2007) have revealed. As aforementioned, more concise information, a more robust system, and reliable service are provided, and the higher perceived satisfaction is achieved. The IS success model is applied in many studies across different disciplines to discover the essential factor that leads to a study's desired goal. However, it is investigated how VR impacts on user satisfaction and the intention to visit a touristic destination using the IS success model. As Huang, Backman, Backman, and Chang (2016) stated, discovering the factors that lead to influencing potential user attitudes and intention is a crucial turning point before it is applied in the tourism sector.

Therefore, this research paper is the first empirical study in VR, which applied the IS success model to identify these factors and test the relationship between information quality, system quality, service quality, and user satisfaction. On the other hand, applying the IS success model into VR study contributes to the literature. Next, to do the best of the authors, the current paper is also one of the first studies that tested the VR in a real-life environment by implementing the quality aspects of the information systems success model with the mediating effect of satisfaction pre-purchasing the destination. Applying a realistic approach helped to understand the significant advantages and challenges of using VR as a substitutional marketing tool in the tourism sector in terms of its implication and application to enhance the user intention.

The empirical study's first finding confirmed a significant positive relationship between information quality and user satisfaction. More significant given quality information meant more significant satisfaction perceived by the user, which is consistent with the previous findings (PB Seddon et al. (1994) and Zaid (2012)). The

second finding showed that there is also a significant positive relationship between system quality and user satisfaction that also validated PB Seddon et al. (1994), and Peter Seddon and Kiew (1996). In other words, as potential users interact with a higher quality system, their perceived satisfaction increases more significantly than otherwise.

The third finding indicated that service quality also has a significant positive relationship with user satisfaction, consistent with the previous studies such as PB Seddon et al. (1994) and Y.-S. Wang and Liao (2008). Next, the study showed that satisfaction has an essential role as a factor, and it does have a positive influence on visitation intention. Lastly, in the current research paper, it is also discovered that higher satisfaction results in greater visitation intention, which is in line with the findings of (Chiu et al. (2007)).

On the other hand, satisfaction as a mediator had a full mediation effect between information quality and visitation intention. In other words, information quality is one of the most critical factors that led to visiting intention through user satisfaction. Furthermore, satisfaction partially mediated the relationship between system quality and visit intention. As aforementioned before, the last hypothesis (H5c) was not applicable to the current research paper. A slight relationship seems but not at a significant level, but it does not mean that the same result will occur in other contexts.

5.2 Implications and Recommendations

In this current research study, it is demonstrated that there are many theoretical, practical, and social implications of the virtual reality environment in the context of tourism. The theoretical implications vary. To the authors' best knowledge, this is the

first study that implemented the Information Systems Success Model (ISS) theory's attributes to assess their impact on tourist engagement. Satisfaction has been one of the most critical dimensions of various studies. It is essential to explore consumers' motivation and understand their engagement level with innovation in the travel industry (Avidar, 2018; So, King, Sparks, & Wang, 2016). Despite several attempts to assessing the role of satisfaction with VR technology in the context of the tourism industry. According to the findings, the study presents definite conclusions to ensure the reliability and validity of the relationship between the antecedents and the consequences of implementing a mediation factor.

On a theoretical foundation, the study contributes to the literature in two significant areas. First, the study adds a significant contribution to the existing literature with its factual findings obtained from conducting empirical research in an authentic environment. Second, using the IS Success Model, it is discovered what factors influence the user satisfaction that triggers potential travelers' intention towards a destination.

The tourism industry is a dynamic industry that is continuously evolved, so does the technology. Thus, acquiring the findings may offer newer insights and approaches to the tourism industry. The study's discoveries showed that the tourism industry and technology developers might draw critical conclusions by focusing on the constructs of the hypothesized model. In this context, VR can help sustainably grow and enhance the travel industry around the globe. VR is a promising technology that has profound impacts on consumers' perception of tourism destinations, and it will have more significant outcomes in the coming years. VR has become a popular marketing tool for tourism destinations, such as San Francisco, because it provides potential tourists

with the opportunity to virtually engage and interact with a destination or attractions (Wei et al., 2019).

Therefore, on the practical side, tourism planners, managers, and authorities, including business owners and VR researchers, should consider VR one of the core emerging technologies with compelling and promising features for the tourism sector. Tourism developers can promote their touristic attractions with the highly effective innovative technological device. One of the most applicable of VR is that providing quality of information about the destinations during the pre-purchasing term. On the other hand, it is used as a less costly marketing tool with more realistic visualization. Virtual reality can also be used as a powerful educational and training tool for training purposes at each tourism industry layer, from hotel employees to the tour guides. Tour guides can experience all the touristic attractions around their site, country, and a world without leaving their labs, schools, or homes.

Lastly, the current research paper also showed that private and public organizations that integrate effective emerging technologies would most likely outperform those that undervalue the impacts of the sophisticated technological mediums. The current study also exemplified that implementing emerging technologies is closely related to the socioeconomic status of societies. The more effective innovative tools assessed based on its quality of information, quality of service, and quality of the system, the higher the likelihood of tourism-based economic affairs.

Assessing the destination's initial presence using the VR program based on the customers' preferences is not an easy task and process. Both VR hardware and software should enable the quality of information, effective system, and service to influence

customer satisfaction and attitude change towards visitation intention. Future studies may also need to ensure that the system is designed, prepared, and offered by targeting all levels of individuals while including ones with minimum technological skills. Thus, organizations, developers, and practitioners aligned with the researchers need to consider the accurate and objective value of emerging technology to achieve the organizations' and customers' total satisfaction.

On the other hand, the post-coronavirus term indicates that the way we live, work, socialize, educate, and travel will no longer be the same. VR seems to be one of the most important innovative technologies that will transform the way we travel. So, the study offers an alternative way to visit the attractions worldwide as people are forbidden to go out, and it poses high risks for their health.

The current study also offers several recommendations for future studies. First of all, the data collection tool, a questionnaire was in English, but future studies could be prepared in other languages to increase the number of participants. Most of the current research study participants were young people, but future studies can target different age groups to provide more generalizable results. Another critical point is that most of the participants were unmarried people, which can be considered a future goal for the upcoming studies.

5.3 Limitation

There are some limitations of the current research study that can be considered by future researchers. Instead of using convenience sampling, future research endeavors can be designed as probability sampling methods. Next, using the different approaches, models, and variables can also help identify potential consumers' attitudes and how

they changed. Lastly, the current study focused on the tourism industry from a wide-angle. However, the tourism industry is a vast industry made of many small, medium, and large sectors. The impact of VR can be assessed by looking at each of these sectors, such as hotels, restaurants, and souvenirs, separately at a time.

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