THESIS WORK

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Exploring the technological acceptance of Immersive Technologies

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Abstract

Immersive technologies, including virtual reality (VR), augmented reality (AR) and mixed reality (MR), are rapidly evolving and becoming an integral part of different sectors. Today, they are a key part of the rapid evolution of technology. This paper explores the factors influencing the adoption of these immersive technologies, using the Technology Adoption Model (TAM) as a theoretical framework. The aim of the study is to explore the interaction between individuals' motivations and the factors and attitudes that influence the adoption of immersive technologies in two different sectors, tourism, and education. The research aims to provide a comprehensive picture of how perceived usefulness, ease of use and perceived enjoyment shape individuals' decisions to adopt immersive technologies, using mixed-methodologies, qualitative and quantitative methods. For the research, I used in-depth interviews as a qualitative method and IBM SPSS AMOS software as a quantitative method for data analysis. Research shows that the adoption of immersive technologies is influenced by a number of factors. Qualitative interviews provided insights into motivations and attitudes towards these technologies, which showed a mixture of excitement and concern. The quantitative analysis highlighted individual innovativeness as a key driver, with perceived enjoyment and perceived usefulness playing a crucial role in the intention to use. Furthermore, attitudes towards immersive technology differed across educational and tourism contexts, highlighting the importance of context in shaping behavioural intention.

Keywords: Immersive Technology, Technology Acceptance Model (TAM), Structural Equation Modelling (SEM), attitude, behaviour intention, motivation

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1. Introduction

1.1. The topic, the aims, and the scope of the thesis

Immersive technologies, like all digital technologies, are rapidly evolving and becoming an essential part of our lives. Numerous fields have given these technologies plenty of attention, so a more thorough understanding of the variables impacting their adoption is essential. Immersive technologies include Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR) that give consumers immersive experiences that obfuscate the distinction between the real world and the virtual one (Spittle et al., 2022). The rapid growth of immersive technology has ushered in a new era of immersive and interactive experiences, even though we are unable to predict where the pace of development will go. Like all other technologies that have appeared in the past, such as smartphones, many people were sceptical at first, but if you look around you can see that almost everyone is using it now. However, technological advances are becoming more and more daunting, offering technological innovations that are playing an ever-increasing role in everyday life. This is dividing society on its adoption. This paper aims to explore the technological acceptance of immersive technologies, focusing on the variables that influence acceptance of the technology. The research questions that form the core of the thesis aim to explore motivations, interactions between factors, influences on behavioural intentions, and differences in technology adoption in different sectors.

The main research question is: *Which variables, to what extent and how do they influence technology adoption?* Further research questions are: *What motivations and consumer behaviour patterns can be identified behind the technology adoption process? How do the factors interact in concrete terms? How do the different variables influence behavioural intentions? What are the differences in technology adoption between tourism and education?*

The aim of this thesis is therefore to provide a comprehensive picture of the technological adoption of immersive technologies, exploring the variables influencing technology adoption in different sectors and the interactions between them. I will investigate people's attitudes and openness to these technologies, what they think about them, how much they fear them or, on the contrary, how open they are to them. The primary aim of the study is to understand, explore and shed light on the technological acceptance of immersive technologies, through different motivations and other influences. How people in general respond to immersive

technologies, and how open they are to using and incorporating them into their daily lives, and how positive they perceive these technologies in different areas of life.

The initial phase in investigating technology adoption is to identify and comprehend the factors that affect the adoption of immersive technologies. Factors such as perceived usefulness, perceived ease of use, and social influence in general all play a role in shaping and transforming individuals' decisions to adopt new technologies. (Davis, 1989). In this thesis, I will search for and investigate the factors and variables that are key determinants of technology adoption in relation to immersive technology. Furthermore, I identify the factors that are most relevant in this area, which influence technology adoption of immersive technology and may influence individuals in their decisions about whether to use the technologies, and I also investigate the extent to which some factors influence adoption. I use both qualitative and quantitative methodologies for the research. For the qualitative research I will conduct in-depth interviews and for the quantitative research I will collect data using a questionnaire and analyse the data using IBM SPSS AMOS software.

1.2. The relevance of the topic

The use of immersive technologies is becoming increasingly important in different areas of modern life. Immersive technologies are reaching more and more industries and sectors and gaining acceptance among users as they provide an interactive three-dimensional environment that enhances engagement and usability (Sagnier et al., 2020). Nowadays, virtual reality (VR), augmented reality (AR), mixed reality (MR) and augmented reality (XR) are becoming increasingly popular across different industries and sectors. Although initially linked to the gaming industry, these technologies are now being adopted and used in other areas such as education, healthcare, construction, and tourism. The potential of these technologies goes beyond pure entertainment and has the potential to revolutionise different aspects of life. Immersive technologies have been described as a medium that can transcend physical reality and offer novel ways to achieve life-changing goals (Slater & Sánchez-Vives, 2016).

The introduction and widespread use of immersive technologies can bring positive changes in sectors such as healthcare, education, industry, and services, both in Hungary and globally. It is appearing in more and more sectors and people are becoming accustomed to and familiar with it and it could become an integral part of most industries in the future. There is a lot of potential in new digital technologies, including immersive technologies, but we should not

forget the risks and their consequences (Szondy, 2019). Therefore, exploring the adoption of these technologies is useful in general and can also benefit companies.

In current studies, there is a growing interest in the technological acceptance of immersive technologies and the interaction between people and digital devices. The theoretical framework used in this thesis, the widely used and accepted Technology Acceptance Model (TAM), can help explain the acceptance of immersive technologies. Understanding the determinants of technology acceptance of immersive technologies can be essential and can help companies in the future to adapt people to immersive technologies.

The theoretical framework of this thesis can provide a starting point for understanding the factors influencing technology adoption of immersive technologies and can help to understand the future adoption of immersive technologies, which can help to adapt technology in the future. The thesis also contributes to the extension of the theoretical framework for the adoption of immersive technologies.

1.3. The structure of the thesis

The structure of the thesis is as follows. After an introduction, the second chapter contains the literature review. This is divided into two parts, firstly an overview of the different types of immersive technologies, followed by a detailed discussion of the theoretical background of the model used for the research, and a theoretical background and definition of the variables used in the model. The third chapter discusses the research methodology and presents the hypotheses formulated during the research. The fourth chapter provides an evaluation of the research results, both qualitative and quantitative, and a detailed analysis of the data. This chapter presents the final measurement model and tests the hypotheses. Relationships and effects between factors are also established. The final chapter summarises the results of the work, its scientific and practical significance, and discusses the limitations of the research and possible directions for further research.

2. Literature review

2.1. Immersive technologies

2.1.1. Definitions and Current Landscape of Immersive technologies

Immersive technologies include all technological developments that combine and connect the virtual and real worlds, while creating a sense of immersion. While there is a growing amount of research and interest in immersive technologies, it is still very limited to comprehensively understand how users relate to these new technologies and what their experiences and perceptions of them are in the field (Suh & Prophet, 2018). Already in the early 1980s, the concept of immersive reality began to be defined and applications at different levels began to emerge. This was the forerunner of new developments that are now having a growing impact on our society. Today, consumers can use virtual reality for a wide range of professional and scientific purposes, in addition to games and entertainment. Its applications are becoming more widely available and affordable. It is no longer just focused on entertainment, but also helps in areas such as medicine. But reporting standards and scientific rigour must be maintained to ensure effective use in all areas (Slater &Sanchez-Vives, 2016).

Immersive technologies have undergone more dramatic developments in recent years than in the decades before. While the technology is also rapidly evolving, this dramatic change is mainly due to the COVID-19 pandemic, as it has also forced global economies to deeply rethink their business strategies. Businesses that use technologies such as augmented reality and virtual reality to digitally simulate or replicate the physical world have undergone a major transformation, and this is just the beginning. The World Economic Forum's Global Futures Council on Immersive Technologies has assessed the impact on virtual reality, augmented reality, and mixed reality. Their results show that the adoption of immersive technologies, accelerated by COVID-19, has accelerated remarkably, and is having a wide-ranging impact across industries (World Economic Forum,2022). Further research confirms and supports this even further, such as a recent survey by McKinsey & Company (2020), revealing a multi-year acceleration in the digitization of customer interactions. This is also evidenced by the fact that some industries that have been relatively reluctant to adopt any immersive technology (such as museums) are now thinking about how to engage the digital world to redefine the experience based on audience needs (McKinsey & Company, 2020). Although immersive technologies have made great strides in recent years, user-level sales are lower than sales of VR and AR headsets, which were forecast to be three times higher five years ago. This is

because some people have mixed views on the adoption of these technologies, with varying degrees of fear and doubt. However, the early successes of VR and AR are evident and recent research suggests that adoption of these technologies is accelerating. For example, Forbes cites research that predicts significant growth in the global VR and AR markets. (World Economic Forum,2022). Over the past few years, AR/VR headsets have undergone significant technological advances, including improvements in displays, sensors, and graphics. These advances have led to a reduction in problems such as 'VR sickness'. (World Economic Forum,2022) Discomfort known as VR sickness are symptoms such as headaches and nausea that users experience during the VR experience. There has been a recent focus on eliminating this, as it has also deterred people from buying VR goggles and these technologies. Various methods have been introduced to mitigate the VR phenomenon, to also reduce aversion to immersive technologies (Rebenitsch& Owen, 2016).

However, whatever technology we talk about, what is always a central theme, even if there is growing interest in it, is the importance of privacy and security. Immersive technologies face more privacy and security concerns than other digital devices. For example, VR systems take data collection to a higher level, often collecting detailed information about body movements and gaze, potentially identifying individuals and characteristics of interest to third parties. Moreover, AR, VR and MR systems with immersive technology enable lifelike and close interactions that can be perceived not only by users but also by those nearby. And if this offends, disturbs, or is directed at those individuals in the surrounding virtual environment who are not aware of it, the consequences can be real. It is therefore important to balance the debate about the benefits of technology with addressing privacy and security concerns by implementing safeguards to ensure the well-being of users and society (World Economic Forum,2022).

In general, considerable growth in the virtual market is anticipated in the upcoming years, driven by technological advances, the disappearance of Covid, growing cross-industry adoption, increasing openness of people, and the growing popularity of virtual events and experiences. In the future, as technology advances, the distinctions between the two worlds will increasingly blur, raising questions about what reality is and what is perception. This can be positive for the experience, but it also has its downsides, with the dangers of losing presence. In order to fully exploit the potential of immersive technologies and at the same time be aware of the potential problems they may cause, the field requires continuous research (Slater &Sanchez-Vives, 2016).

2.1.2. Types of immersive technologies:

Any virtual reality is conceptually referred to as immersive technology. The latest virtual reality technology, represented by XR, is defined by the set of different technologies shown in Figure 1. Immersive technologies are an umbrella for virtual reality (VR), augmented reality (AR) and mixed reality (MR), collectively referred to as extended reality (XR). These technologies introduce a completely new way of interacting with computer-generated information, allowing tasks to be performed directly in a real or virtual 3D environment. By exploiting spatial context, they provide a more immersive and interesting experience than traditional 2D interfaces. Interaction within such environments includes auditory, visual, and environmental cues, from speech recognition to object manipulation. The types of immersive technologies vary in their capabilities and functions: VR provides a fully simulated virtual experience, AR superimposes digital content on the real world, and MR seamlessly blends elements of the virtual and real worlds. Each type offers unique ways to engage and interact with users and serves different use cases and applications (Spittle et al., 2022).

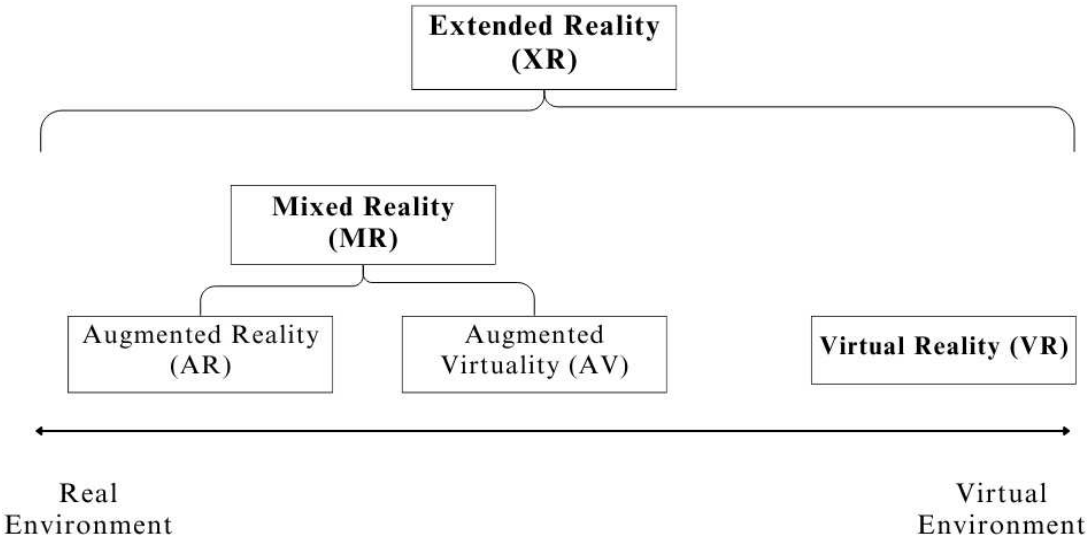

Figure 1: Extended Reality, Augmented Reality, Mixed Reality, and Virtual Reality (Milgram & Kishino,1995)

2.1.2.1. Augmented Reality

Augmented Reality, a world where virtual content is connected and integrated with the user's real-time perception of the physical environment. Augmented Reality has a rich history, ranging from literature to theatrical representations to technological experiments. The novel "The Master Key" introduced the concept of augmenting reality with digital overlays as early

as 1901. (Vertucci et al., 2023) Even earlier than that, AR-like illusions were foreshadowed in stage productions in the 1860s, but without digital technology. But the idea was already there (Rauschnabel et al, 2022). Augmented reality (AR) is generally defined as the integration of digital information with the real world in real time (Azuma, 1997; Milgram et al., 1995). This means that with this technology, AR can be used to display digital elements in a real-world environment, which can be indoor or outdoor. These elements can be viewed, for example, through our smartphones to display digital elements such as graphics, text, or animations in a real environment such as a room or outdoors. These digital elements usually track and react to changes in the real environment in real time. As with other immersive technologies, AR has undergone a major transformation in recent years, driven by both technological advances and the pandemic. At European level, it is now one of the most widely used technologies in the public domain. Different industries have introduced various AR-based phone applications that greatly improve our daily lives. Whatever type of AR system we are talking about, it should be noted that they all serve specific purposes, such as improving navigation in Google Maps or other interactive environments (Kuhail et al, 2022).

Overall, AR and its development could be a pioneering technology for humanity and one of the emerging technologies that could blur the boundaries between the digital and physical worlds, offering countless opportunities in different industries. The technology is constantly evolving and has great potential to transform everyday life.

2.1.2.2. Virtual Reality

Virtual Reality is a reality in the VR continuum that places the user in a digital world and provides a fully immersive experience. When using VR, the user wears VR glasses, which isolate them from reality and transport them into a new space, in their imagination. Here the user can immerse themselves in virtual reality and experience a unique holistic and atomistic experience. As technology evolves, so does VR, offering users increasingly complex and immersive experiences across the continuum (Rauschnabel et al, 2022).

VR technology first appeared in early science fiction and fantasy novels. There, VR appeared as a panoramic painting, filling the user's field of vision to transport them to another world as if they were there. (Bown et al., 2017). The panoramic paintings were used to represent a sense of presence, but the major advance was the later stereoscopic photo viewers, which gave an even stronger sense of presence. The Link Trainer program, which trained pilots both before and during World War II, was the first widely utilized example of modern VR technology. The VR of today was first made possible by this technology (Jeon, 2015).

Most people nowadays identify virtual reality as a head-mounted device that creates a new virtual world for users, completely isolating them from the outside world, in the illusion of a virtual world. The initial purpose of these 'head-mounted displays' was entertainment and gaming, but over time their applications have expanded to include workplace training, marketing, prototyping and travel (Shahab et al., 2021). Nowadays, it is more widespread and is present in many other businesses.

2.1.2.3. Mixed Reality

Most of the literature on new realities focuses on augmented reality and virtual reality, ignoring what is likely to have the greatest potential in the future. The term "mixed reality" (MR) describes a generated reality, a blend of real and virtual representations. Elements of virtual reality and physical reality are mixed in this hybrid reality, where real elements also appear within the virtual world. In other words, mixed realities allow us to experience novel things or situations that are not real, but we can still feel them real. Think of the insertion of virtual characters or objects into a live video stream in the real world. Pokémon Go has shown, through a game, mixed reality and how these two realities can work together. Its creator used mixed reality, a seamless blend of the real and virtual worlds, as the basis for the game (Farshid et al., 2018).

Other literature claims that because mixed reality (MR) enables users to interact and manipulate virtual things in the actual world, it exceeds augmented reality. In other words, MR offers more dynamic and richer virtual material than AR. Within MR is also Augmented Virtuality (AV), where users can see real objects in a virtual environment, complementing AR and creating MR where virtual objects can interact with the user and the physical world.

The driving force behind the development of this technology is the giant companies that have recognised its huge potential and are constantly innovating to gain a competitive advantage (Speicher et al., 2019).

2.1.2.4. Extended Reality

The five basic senses that humans use to perceive real objects are sight, hearing, touch, smell, and taste. In the case of a virtual object, if it satisfies these senses, we perceive it as real, it can convey the same perception, so we perceive it as if it really exists, all artificially designed (Kang& Yang, 2020). These virtual contents can be grouped into several categories, but the one that brings them all together and contains them all is the XR, as illustrated in *Figure 1*. It is composed of AR, MR, and VR. The letter "X" in XR can stand for any spatial computing

technology. Although additional technologies may be added to XR in the future, for now it focuses only on AR, MR, and VR. Even with these, it can already create an experience as if it were real (Milgram & Kishino,1995).

2.1.3. Trends and Emerging Use Cases

It is becoming more widely used in Training and education, in Real Estate and Architecture, in Healthcare and Therapy, in Art and Design, in Travel and Tourism, in Fitness and Rehabilitation, in Retail and Shopping, in Journalism and Storytelling, in everyday life, in Gaming, in Business and in Military and Warfare.

2.1.3.1. Immersive technologies in Education

There are different interpretations of what immersive technology learning is as different authors attribute different meanings to the term. Some argue that it is learning facilitated using immersive technologies. Others, however, argue that a distinction needs to be made between the technology itself and the effects it has. The term 'immersion' encompasses both the technological aspects of virtual reality and the response generated by a combination of human perception and motor systems (Kuhail et al, 2022).

Dengel and Mägdefrau (2018) detailed two main perspectives on immersive learning: the user and the provider side. The user side focuses on creating a sense of presence, while the provider side focuses on the educational tools to facilitate the learning process. By focusing on the learning and perceptual processes and not only on the technological features, but immersive learning also becomes timeless and not dependent on technological developments. For this reason, immersive learning facilitates learning through technological opportunities, fostering the development of presence, togetherness, and identity.

The impact of Covid-19 was perhaps one of the most significant in education. Classroom teaching stopped completely for a while, so other methods had to be considered. Immersive tools have facilitated face-to-face interactions through digital platforms and have filled significant gaps in education and school attendance. Pressure was a major pull factor, and different teaching methods and applications produced unexpected results (World Economic Forum,2022).

2.1.3.2. Immersive technologies in Healthcare

Immersive technology is also used and developed in medicine in the actual medical environment. These include surgical procedures and simulation of stroke and rehabilitation

therapy. These new technologies not only promote faster learning but also reduce the potential for error. Healthcare professionals will be trained using immersive technologies, primarily to learn the basics, but also to integrate the technologies into practice, for example in blood collection procedures, which is the basic level of AR. Similarly mixed reality, which is currently typically used in surgery. There are also developments where a doctor can view a patient's body in real time using an augmented reality headset that shows the digital internal anatomy of the body in 3D. MR-based devices can also facilitate real-life surgical procedures by providing holographic representations of the patient's vital signs and other data (Tang et al., 2020)

The impact of Covid 19 and the appreciation and increasing adoption of new technologies is supported by a survey that found that medical students at Case Western Reserve University reported equivalent or better experiences with mixed reality anatomy classes than face-to-face sessions. At this university, online VR/AR technology has already been introduced and students are using it to facilitate observation and assist in complex surgical scenarios. Furthermore, in recent years, interest in these technologies has increased in several immersive technology education events, thanks to the positive healthcare education experiences gained. (World Economic Forum,2022) In other significant achievements, the University of Michigan in the US and Imperial College London have pioneered immersive technologies in Covid with their "Mixed Reality Grand Rounds". This technology used Microsoft HoloLens and Zoom to bring students virtually to the bedside, allowing them to interact with patients, perform patient imaging, laboratory work and physical examinations. (University of Michigan, 2020) The potential of immersive technologies in medicine and medical education is underlined by the comments of Christoph Leuze, co-director of Stanford University. In his statement, he highlighted the value of immersive technologies, particularly mixed reality, in medical education, which allows clinicians to visualize and understand human anatomy in a digital format that is close to reality. This capability facilitates better collaboration within the medical community, as evidenced and supported by the results. In places where surgeons have used mixed reality headsets to view surgeries in real time and access expertise remotely, this has revolutionized medical education and collaboration in unprecedented ways (World Economic Forum,2022).

2.1.3.3. Immersive technologies in Tourism

Virtual travel is not a new topic either, it was discussed in the late 1970's and was mentioned as a threat to tourism (Cheong, 1995). Since then, this field has also developed a lot and we

are getting closer to the increasing role of virtual reality and immersive technologies in travel. What does this mean? Through virtual reality, technology takes us into a world that we can almost feel as real, using as much of our senses as possible. This is another area that exploits this feature of virtual space. However, while this is a great opportunity, it can also have many drawbacks. Let's first examine the advantages. The benefit is that it creates and presents us with a world that is perfect, so the sun is always shining, the snow is always perfect, everything is always what we want it to be. How many journeys can be ruined by bad weather, but not virtual travel. It also eliminates the stress of travel, not to mention the cost. You can easily "go" places you wouldn't dream of going, or even places the average person can't, like Mars. Virtual travel is not an obstacle if you are disabled or ill. There are no risks, no tropical diseases, or simply no danger of an accident. It can also make meetings easier for business travel, no unnecessary travel and no money spent on business. The biggest benefit would be the reduction of the environmental footprint. As global warming is an increasingly important issue and a major threat, VR in travel could be one of the solutions to reduce the problem. People avoid pollution because you don't even set foot outside your home. While yes, there are positives that could be listed further, there are also many drawbacks, and whichever way you look at it, a virtual trip is not comparable to a real trip. The first and biggest disadvantage is that some countries derive most of their income from tourism. Their economy relies heavily on tourism, so if tourism were to disappear, they would face a huge problem. Also, with virtual travel, the experience of getting to know a country would not be on the same level as in reality. No relationships could be built, there is a level of complexity and randomness in the real world that cannot be replicated in VR. So, the experience itself is not the same. And perhaps the main problem might be that not only are relationships not built, but they are also lost. Finally, the other big danger is that people may confuse reality with virtuality. They can lose sight of what reality is in real travel and real experiences (Cheong, 1995).

Predicting such a novel and game-changing technology is difficult, but for the moment, it seems that virtual travel does not threaten the disappearance and demise of real tourism, but rather exists as an alternative solution to complement and promote the tourist experience. Although it is not yet very much a part of our daily lives, but rather a heard rumour, most government tourism organisations are already anticipating its appearance. They are anticipating it in ways that will shape the rules and regulations and affect how tour operators market their products. (Lin et al., 2020) However, technology is evolving at a rapid pace, so it

is difficult to predict how this area will develop and how interest in it will grow. In today's world, where it is impossible to predict whether there will be another pandemic like Covid, and where environmental pollution is an increasingly critical issue, virtual tourism may become central in the future and may be needed (Wei et al., 2019).

2.2. Technological Acceptance Model (TAM)

2.2.1. Background and overview of the original TAM model

In the field of information systems (IS), understanding what influences people to adopt and use the systems that are created has always been a questionable topic. There is a large literature on the subject and many different theories have been developed to address this issue. The literature points to the fact that user acceptance is strongly influenced by the way the technology is made. This is because adoption can be very positively affected if it is produced in collaboration between analyst and user. This teamwork greatly facilitates user acceptance of the system (King & Cleland, 1971). Many different prototypes have been created to address this problem but in many cases without success. Understanding the difference between organizational and technological validity was also emphasized, as users cannot be identified by how technically compliant the technology is, this is not directly proportional to whether users accept it.

The first technology acceptance model, the TAM model, was proposed in 1986 by Davis, who adapted the TRA (Theory of Reasoned Action) model to create the TAM model. He created the model to assess the extent to which people give space to new innovative technologies, the behavioural intention of potential users to use a technological innovation. The model was based on the TRA model. Its objectives were to simplify TRA and identify a useful behavioural model that can be widely used to predict or explain variables that influence technology use.

The aim of the TAM model was to understand the factors that influence people's adoption of technology. The model can be used to understand the extent to which people adopt a technology, the factors that influence adoption and, ultimately, to test adoption methods. The TAM model aims to link the development work with the adoption phase. After all, the success of new innovations depends to a large extent on people's acceptance. It provides a basis for the testing process, thus creating the space for linking system design and user acceptance. The model mainly seeks to answer the question of the reasons that influence the end-user to use the newly emerging innovation. What motivations influence whether a user will use the

technology in an organisational context and how this relates to the characteristics of the system. a Motivation influences adoption and, with knowledge of motivation, system designers can develop new technologies in response to this (Davis, 1986).

2.2.2. TAM 1 Model

Technological acceptance is primarily determined by perceived usefulness and perceived ease of use. The model first developed by David in 1986 already included this, and subsequent research has confirmed their crucial importance. Users are influenced primarily by these factors in their acceptance or rejection of information technology. Perceived usefulness underpins the fact that their work becomes so important to them that they want to and will use it in all or most cases. They thus feel that it is useful and beneficial to them in their work. The other determining factor is perceived ease of use. Even if potential users feel that the technology is useful to them, but they are unable or unwilling to use it because of its complexity of use, this may prevent them from adopting the technology to its full extent. The benefits of using it are thus overshadowed by the effort to apply it. Thus, in general, perceived usefulness is also affected by perceived ease of use (Davis,1989).

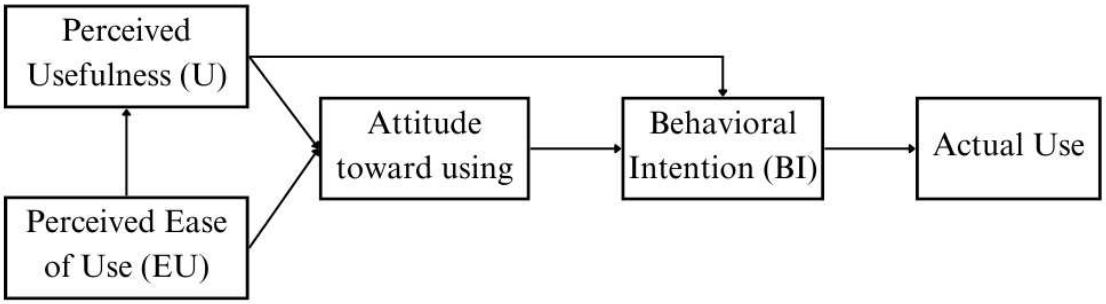

Figure 2: Original technology acceptance model (Davis, 1986).

2.2.2.1. Perceived Usefulness

Perceived usefulness is therefore measured in terms of the extent to which a person's work performance can be improved by using that particular benefit. Utility follows from the fact that it can be used to his or her advantage. Good performance in a particular workplace is rewarded. Thus, it can be used to their advantage. A system will have high perceived usefulness if its user believes in its positive benefits (Davis, 1989).

2.2.2.2. Perceived Ease of Use

Perceived ease of use is a result of, and depends on, the extent to which people perceive the system as difficult and believe that they will be able to use it. It also depends on the definition of what is considered difficult or easy for a particular person. If he or she predicts that he or she will not find it a great effort to apply the technology, then he or she will accept it more easily. It is important that the technology be free of heavy difficulties for them because effort is a finite resource that can only be allocated to certain activities. (Radner & Rothschild, 1975) If there is too much effort already in people's life, they are less likely to accept a new difficulty. Davis (1989) argues that factors that are perceived as easier than others, regardless of their difficulty, are more easily and more likely to be accepted.

2.2.2.3. Attitude

Attitude plays a crucial role in the TAM model. Attitude is the general opinion or feeling people have about a particular thing or technology. This feeling can be positive or negative and it determines their attitude towards its use and their behavioural intention to use that technology. (Teo, 2009) In addition, external factors also influence consumer attitudes, as well as behavioural intention and actual behaviour, and attitudes can influence behavioural intention and vice versa (Ji et al., 2007). In the original TAM 1 model, attitude influences behavioural intention, but in later models we can observe that this can also be the other way round. Perceived usefulness and perceived ease of use affect attitude. For example, if a user does not find it useful, but attitude is still positive, it is likely that perceived ease of use has an effect on attitude, or even perceived enjoyment for some entertainment purpose (Manis & Choi, 2019).

2.2.2.4. Behaviour Intention

In theoretical terms, behavioural intention refers to the individual's intention to perform or not to perform a given behaviour. (Ajzen, 1991) Behaviour can mean different things in every research, depending on the research situation and the research topic. In the present research, it is directed towards the adoption of immersive technologies, a kind of purchase or use intention. Behavioural intention is related to attitude, as confirmed by the research of Ajzen and Fishbein (1977), where they found, based on several studies, the extent to which the relationship between attitude and behavioural intention depends on our attitude in relation to the behavioural action. That is, they examined the extent to which people's attitudes correspond to actual behaviour. In the present research, I investigate the relationship between

attitude towards the technological adoption of immersive technologies in education and tourism and the intention to use real VR, AR, XR, ER. According to Venkatesh and Davis (2000), perceived ease of use and perceived usefulness are crucial factors in determining users' behavioural intentions. Venkatesh (2000) emphasizes that in TAM, perceived ease of use is used to predict usage behaviour. Furthermore, Won et al. (2023) found that among the determinants of TAM, perceived enjoyment significantly influences intention to use, followed by perceived usefulness and perceived ease of use. Furthermore, Al-Adwan et al. (2023) in their study on metaverse adoption also found that PU and PE factors are key drivers of behavioural intention to use.

2.2.3. TAM 2 Model

A few years after the first TAM was introduced, Davis and colleagues (1992) were the first to introduce *perceived enjoyment* into the TAM framework, complementing the factors of perceived usefulness and perceived ease of use. Their introduction focused on perceived enjoyment as an intrinsic motivating factor for technology adoption. Perceived enjoyment describes and measures the extent to which the user perceives the use of the system as enjoyable apart from any future benefits, any increase in performance. Davis and colleagues (1992) found that perceived enjoyment has a positive effect on behavioural intention and can be described as an intrinsic motivation. Furthermore, a study by Moon and Kim (2001) supports the importance of perceived enjoyment in influencing user behaviour. They found that perceived enjoyment had a stronger effect on behavioural intention than perceived ease of use. This implies that users may be more inclined to use a system if they find it enjoyable, even if they find it somewhat challenging to use.

However, when the TAM2 model was introduced in 2000, perceived enjoyment was not included in the model created by Venkatesh and Davis. The decision to remove perceived enjoyment in the TAM2 model was made so that the model could focus on the complements. Venkatesh and Davis (2000) therefore revised and extended the TAM model. The extended version includes social determinants and cognitive instrumental processes. This addition broadened the scope of the model. The extended version includes social influencing factors and cognitive instrumental processes. This addition has extended the scope of the model. In addition to these factors, control, intrinsic motivation, and emotions have been integrated into the TAM, and not only included but also highlighted as having a prominent impact on the perceived usefulness. The social influencing processes included in the model include the concepts of subjective norm, image, and voluntarism.

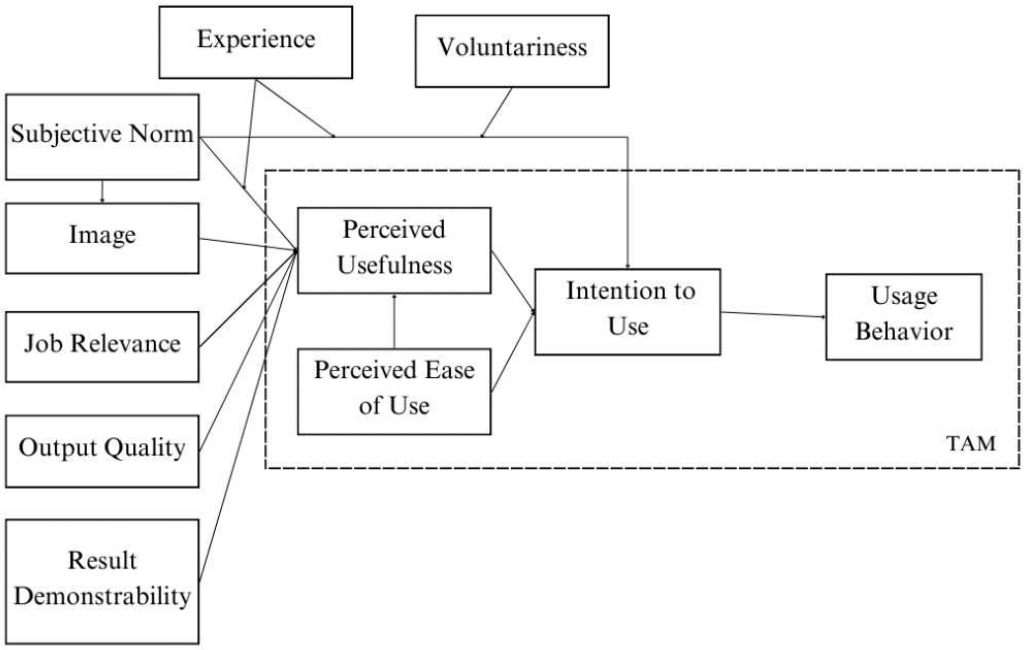

Figure 3: Proposed TAM2—Extension of the Technology Acceptance Model (Venkatesh & Davis, 2000).

The *subjective norm*, which reflects the way in which society leaves its mark on an individual's behaviour. A simpler interpretation of the subjective norm is how the external environment, the user's immediate environment, influences the adoption of technology. The subjective norm primarily influences the intention to adopt and has a particularly large impact when it comes to adopting a technology whose use is mandatory (Venkatesh & Davis, 2000). *Voluntariness* in this context therefore refers to whether one has a choice, whether to use and how this affects whether one will use it, and how much the social impact is determinant in this case. Previous studies have confirmed, and Venkatesh & Davis (2000) research shows that voluntariness is a legitimate part of the model and has an impact, most notably on intention of use and perceived usefulness. The next factor, *image*, is an important influence on people in all aspects of life. In most cases, people strive to create a positive image of themselves in the eyes of others, and this motivation makes them willing to do things they would otherwise be unwilling to do. Moore and Benbasat (1991) define image as a positive effect and the extent to which the use of an innovation improves an individual's social status in his or her community or social system. Improvements in image have an indirect positive effect on job performance, which increases an individual's perception of his or her usefulness in the workplace, thereby increasing job performance. (Venkatesh & Davis, 2000).

Experience refers to knowledge of the system, knowledge of the new technology to be developed, the user's knowledge of the system, its strengths, and weaknesses. How much prior knowledge they have that can help them to understand the system more easily. Research by Hartwick and Barki (1994) has shown that experience influences subjective norms, to the extent that people who have no experience or prior knowledge of the system rely more on their external environment and the opinions of others. Previous research has shown the positive effect of prior experience on perceived ease of use and behavioural intention in Bajaj and Nidumolu (1998) and Dishaw and Strong (1999), while different results have been found for the effect of prior use on perceived usefulness. Some studies have found a positive effect (Dishaw and Strong, 1999), while others have shown no significant effect (Jackson et al., 1997). This may be because users may have positive or negative experiences. These experiences can have a significant impact on an individual's perception and adoption of the technology. Research has shown that positive experiences with technology can lead to greater acceptance and use, while negative experiences can lead to resistance and reluctance to adopt new technologies (Venkatesh et al, 2003).

In addition to the social influencing processes mentioned above, cognitive instrumental processes also influence users' adoption of technology. As Hartwick and Barki (1994) put it, considering people's actions as motivation-driven, based on behavioural decision theory, or even shaped by psychological processes, we can identify three functions: relevance of work, quality of performance, and provability of results (Venkatesh & Davis, 2000). *Job Relevance* is a key element of cognitive, compliance processes. It involves the extent to which the user will use the technology in his or her work, and the greater the relevance of the work, the more relevant and useful the system, innovation or new technology is to him or her. The perception of job relevance is part of the compatibility test, as Davis and Venkatesh (2000) put it, as systems that do not fit the user's work domain are removed from adoption. The relationship between the *quality of output* and perceived usefulness has already been investigated by Davis (1992), who showed that the quality of output is not an exclusionary factor, it does not affect usefulness in such a way that if the quality is poorer, it will not be used, but its use may be a limiting factor. The final factor to be analysed is the *demonstrability of the results*, which suggests that everyone wants to see the results of their work, especially if they put extra effort into using the new technology. In the following, I consider an improved version of the TAM model, the TAM 3 model.

2.2.4. TAM 3 Model

A few years later, Vankatesh, in collaboration with Bala (2008), created the TAM3 model, which was combined with TAM2 and the perceived ease of use model's determinants. (Venkatesh& Davis, 2000). In addition to these two models, three further theoretical extensions were added. Firstly, this model differs from its predecessor in that while it examines the determinants of perceived ease of use, TAM 3 also analyses in depth the factors that influence perceived ease of use. Secondly, the model does not imply cross effects because the factors determining perceived usefulness do not affect perceived ease of use, and the determinants of perceived ease of use do not influence perceived usefulness. This is one of the primary differences in the model. Similar to the TAM2 model, the TAM 3 model explains the relationship between perceived usefulness and its determinants through two theoretical processes: social impact and cognitive instrumental processes. Within these, different factors are influenced by subjective norm, image, job relevance, output quality and result demonstrability. While the perceived ease of use factors was divided into 2 groups. One is the anchor, which includes Computer Self efficacy, Perceptions of External Control, Computer Anxiety and Computer Playfulness. The other group is the adjustment which includes Perceived Enjoyment and Objective Usability. These all have an impact on the perceived ease of use (Venkatesh & Bala, 2008). The TAM3 model is shown in Figure 4, where you can see all the factors and their effects.

Computer self-efficacy, which refers to the degree to which a person believes they possess the skills necessary to utilize computers effectively (Clementson, 2019). The effect of *perceptions of external control* refers to how individuals perceive their interactions with technology, how reliable they feel the resources are. Furthermore, *computer anxiety* refers to the general acceptance of technology and is related to the degree of fear the user feels when using technology (Lewis, 1995). Finally, within this group, *computer playfulness* refers to the degree of cognitive spontaneity experienced when using technology. Furthermore, there are 2 additional concepts related to correction factors. The first is *perceived enjoyment*, which has been discussed previously but is not included in the TAM 2 model, which refers to the extent to which the user finds the technology enjoyable to use, which may also depend on the extent to which the user surrenders to the enjoyment. Perceived enjoyment is a crucial factor in determining users' attitudes towards technology and their intention to use it. *Objective usability* refers to systems and examines the level of effort they require (Keszey & Zsukk, 2017).

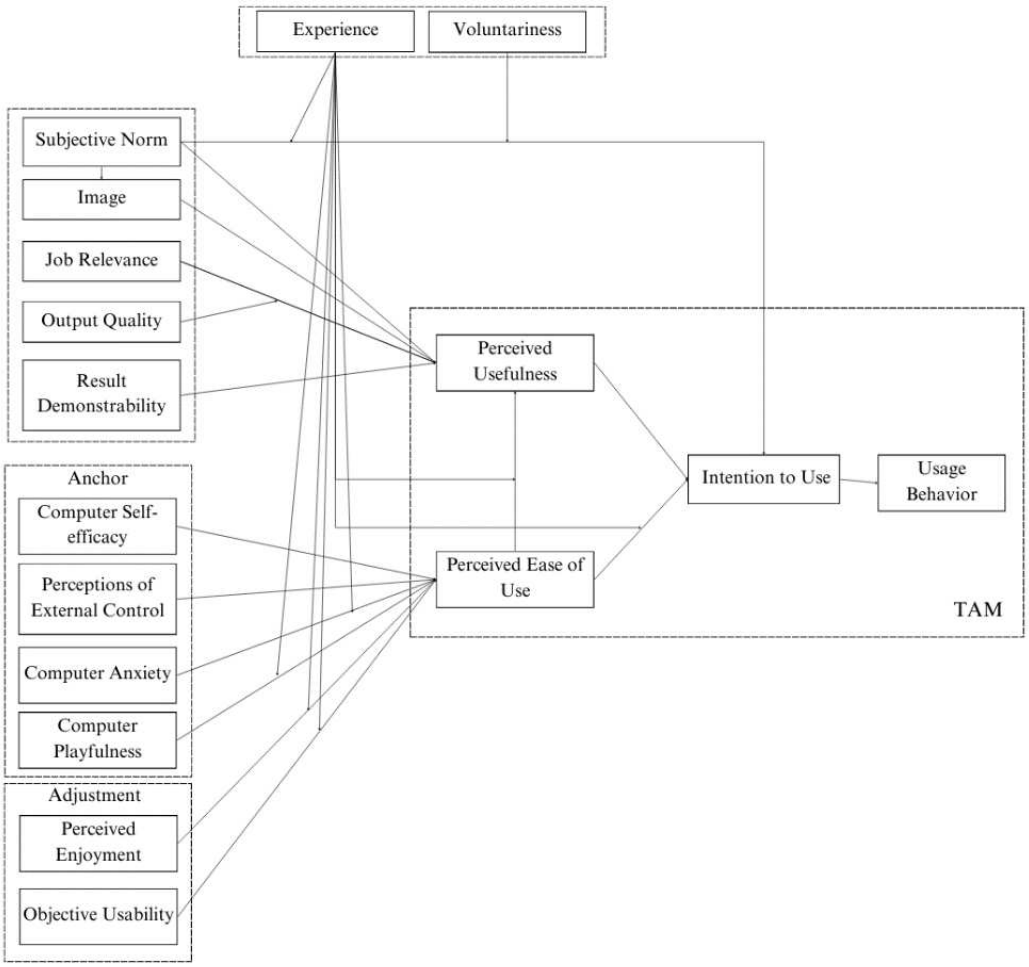

Figure 4: Technology acceptance model 3 (TAM3)— (Venkatesh & Bala, 2008).

The TAM3 model's new correlations show that experience weakens the connections between perceived usefulness and ease of use, perceived ease of use and computer dread, and, finally, perceived ease of use and behavioral intention (Venkatesh & Bala, 2008).

The three main TAM models have been summarised and their advantages and disadvantages highlighted and are illustrated in Table 1. All three models have advantages and disadvantages. The main strength of the TAM1 model is that it is the first model to have been developed and has therefore been accepted and applied in several studies. The TAM2 and TAM3 models are improved versions of this. The main weakness of the TAM1 model is that its creators did not delve deeply into the external variables. While TAM2 already includes the factors that determine perceived usefulness, TAM3 includes the factors that influence perceived ease of use. However, TAM3, despite being the most complex of the 3 models, omits several important variables, such as important individual characteristics like gender and age. (Keszey & Zsukk, 2017)

Table 1: Technology adoption models

Modell	Independent variables	Moderating variables	Dependent variables	Positive aspects of the model	Negative aspects of the model
TAM 1 (David, 1989)	• External variables		• Perceived usefulness • Perceived ease of use • Attitude towards using • Behaviour Intention • Actual use	• A widely accepted model that the basis for other models	• External variables general formulation • Important individual factors are ignored (e.g., gender, age)
TAM 2 (Venkatesh et al.,2003)	• Subjective norm • Image • Relevance of work • Output quality • Results demonstrability	• Experience •Voluntariness	• Perceived usefulness • Perceived ease of use • Behaviour Intention • Actual use	• Explanation of external variables affecting perceived usefulness	• Unchanged factors influencing perceived ease of use • Important individual factors are ignored (e.g., gender, age)
TAM 3 (Venkatesh& Bala,2008)	• Subjective norm • Image • Relevance of work • Output quality • Results demonstrability • Computer Self efficacy • Perceptions of External • Computer Anxiety • Computer Playfulness • Perceived Enjoyment • Objective Usability	• Experience •Voluntariness • Relevance of work	• Perceived usefulness • Perceived ease of use • Behaviour Intention • Actual use	• A complex model with most influencing factors	• Important individual factors are ignored (e.g., gender, age)

Source: Keszey & Zsukk (2017)

In what follows, I will examine a study that developed and summarized several TAM models to gain even deeper insight into the TAM models and help determine which factors and variables will be important and useful in setting up the measurement model for this study.

2.2.5. Summary of additional TAM models

Before we explore the conceptual model of the study, let us therefore examine the other models to gain a deeper insight into the TAM model. The previously presented Technology Acceptance Model and the extended TAM model were only precursors to the TAM models that have been extensively researched and analysed in the past year. The TAM model has become very popular and has become one of the most widely used models, mainly because of its simplicity and ease of understanding. However, the research conducted has shown different results and has included different factors and variables in the TAM model. The studies have shown that TAM is widely used to predict and explain user behaviour related to technology adoption. Further studies have been conducted to provide a comprehensive

overview of the effectiveness and applicability of the model. The studies focused on the previously researched TAM models to assess the ability of TAM to predict user adoption of new technologies in different contexts. A meta-analysis conducted in 2006 reviewed 88 TAM empirical studies to determine that there are as many models as there are variants, but this study summarizes and outlines the comparative aspects among TAM models. King and He (2006), after reanalysing the TAM model from various literature, made the following findings. Figure 5 shows a visual representation of the 4 groups. In the middle, the core elements of the TAM model are represented as the core of the TAM model, which includes Perceived Usefulness, Perceived Ese of Use, and their effects on Behaviour intention. The core model framework has been extended with 4 key modifications based on the literature reviewed. The first factor, the factors that are factors that arise prior to the user using the system, hence the antecedent factors. These include, for example, exposure to the technology in question through his or her job, previous use or experience, and the self-efficacy of the technology. The second group of factors that make TAM more accurate are what others expect (subjective norm), what users are willing to expect from the technology (expectation), how well it fits their task (task-technology fit), how risky it is (riskiness), and how much they trust it (trust). The third group includes broader contextual factors that can influence and moderate technology adoption, such as gender, culture, and technology specificities. Finally, the fourth group includes the consequences of technology use, the general attitude of users towards technology, their perception of their own perceived use and their actual use.

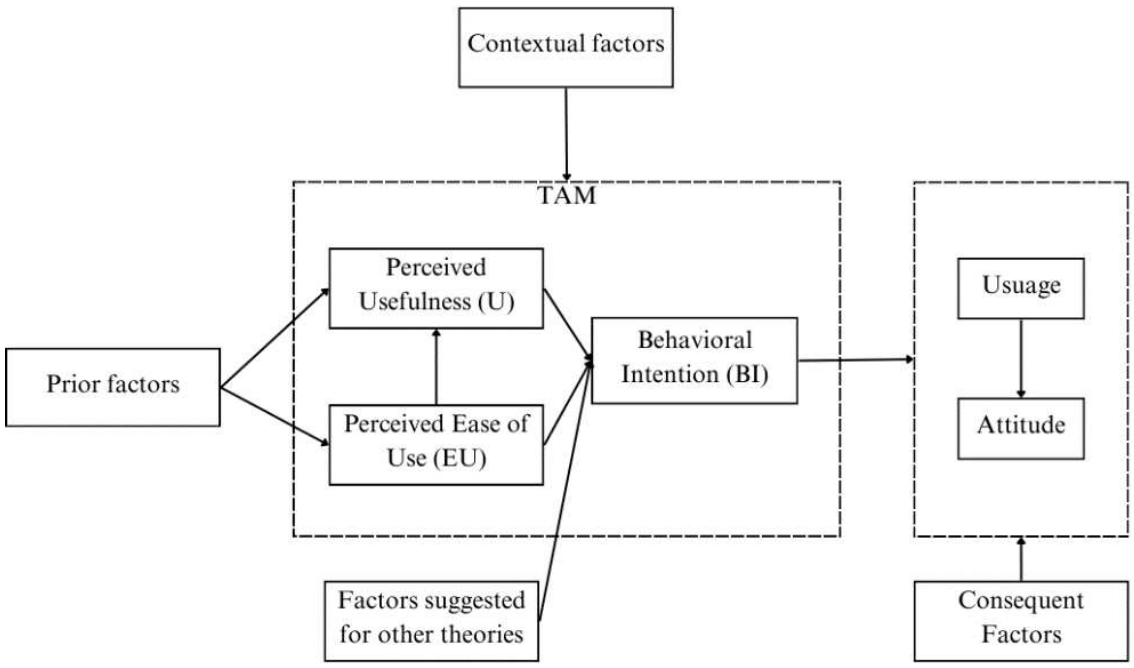

Figure 5: TAM and four categories of modifications (King & He, 2006)

There are many similarities between the model below and the extended model presented earlier. This model provides a better summary of several possible causes and effects that may be relevant in the development of the TAM model. Both models incorporate social determinants and cognitive instrumental processes to extend their scope and predictive power. Both recognise the importance of factors beyond perceived usefulness and perceived ease of use in influencing technology adoption behaviour. In sum, TAM models go beyond perceived usefulness and perceived ease of use and incorporate psychological, social, and contextual factors to explore technology adoption as broadly and accurately as possible. And it can also be stated that different variables may be more significant in some cases, in some situations, depending on a particular technology or study topic. In the following, I will briefly examine the contexts in which the model can be used in which fields and the conditions under which it is used, focusing on the areas relevant for this study.

2.2.6. Applications of TAM in different fields

The Technology Adoption Model (TAM) has been widely applied in various fields such as health, education, and tourism, showing its widespread acceptance and relevance in understanding technology adoption. The TAM has proven to be effective in these areas and studies have confirmed its relevance in understanding users' behaviour towards technology.

Holden and Karsh's (2010) study investigated the effectiveness of the TAM model for the adoption of technology and system use in *health care*. The study reviewed and summarised a number of studies and the results showed that the TAM model showed promise in assessing the adoption of IT tools by healthcare providers Perceived usefulness showed a significant result for health IT adoption and subsequent use, while perceived ease of use was less significant but correlated with usefulness. Concerning the social impact, a subjective norm, ambiguity, and lack of clarity were observed, suggesting that in this case it may depend on the mandatory nature of the system.

Over the years, TAM has become the leading paradigm in *education.* Students and teachers have generally been the target population studied in this field (Teo, 2011). Salloum and colleagues (2019) conducted an evaluation of the usefulness of the TAM model in education. Their research demonstrates the adequacy of the model and supports its applicability and robustness in the field of education. Other literatures also make extensive use of the TAM model in education, particularly in the area of the level of acceptance of the inclusion of digitalisation in education. It helps to assess the acceptance or rejection of technology. Granić

and Marangunić (2019) conducted a comprehensive study on the application of TAM models in education and found and confirmed that TAM models and its other adaptations, TAM++ models, are valid and the best models to assess technology adoption in education. Overall, it can be said that the TAM model can be well applied in education, which is supported by several studies.

The TAM model is also used in the *tourism* sector and has been shown in the literature to be well suited to evaluating the introduction of technology in tourism. Its applicability has previously focused on understanding and predicting consumer behaviour towards different technological innovations in different tourism sectors. These studies highlight the versatility of TAM in understanding technology adoption in the tourism sector. (Do et al, 2020) TAM has also been used in research on immersive technologies to investigate the adoption of currently new technologies in tourism marketing (Sarkady et al, 2021). In this research, the second attitude of using immersive technologies will be tourism alongside education.

2.3. Hybrid consumer behaviour

Since in this paper I will be looking at the adoption of immersive technology in two separate areas, it is useful to talk about hybrid consumer behaviour. Hybrid consumer behaviour refers to the preference of consumers for one product or service over another for different reasons. They adapt or adopt one product or service more than another and this may also refer to the adoption of one technology in one context more than another. This is since they are influenced by different motivational factors. They show a combination of preferences or actions that involve a mixture of different elements or factors.

Hybrid consumer behaviour is a new phenomenon in consumer behaviour that has transformed marketing segments, as it does not fit into the traditional market segments defined in the marketing literature. It refers to the phenomenon where consumers, regardless of their social class and income level, prefer both low- and high-priced products and shops. This behaviour can be influenced by several factors such as personal preference, social influence, and economic considerations (Ehrnrooth & Gronrooz, 2013). Similarly, Becker (1996) conceptualised hybrid buying behaviour as behaviour independent of income level, with consumers purchasing both cheap and expensive products, influenced not by income level but by other factors, mainly depending on the individual's preferences. In his study, Gierl (1989) explains that people allocate the financial resources available to them in the way that is most favourable to them. Each person manages money and time differently. This is

primarily influenced by the lifestyle they want to achieve and the social importance of the lifestyle-related products. The more expensive the product, the greater its social influence. Since the majority of people cannot afford to choose the more expensive product in every category, they can afford the more luxurious product in those categories that are more relevant to their lifestyle. According to Simon- Schmalen (1998), hybrid consumer behaviour can be grouped into 4 main categories: convenience-oriented brand shopping, savings-oriented brand shopping, savings-oriented cheap shopping, and convenience-oriented cheap shopping. In the case of convenience-oriented brand shopping, the shopper prefers well-known brands and thus shows a greater willingness to accept prices. In the case of savings-oriented brand shopping, the willingness to accept prices is lower, but the shopper still chooses from among well-known brands at the best possible price. In the case of the savings-oriented bargain shopper, both brand preference and price acceptance are low, so in this case the main consideration is low price. This can be both a considered and impulse purchase, the only consideration is getting the product at a low price. The fourth is convenience-oriented cheap shopping, where product awareness is low and price acceptance is high. This includes purchases that are necessary but not important to the consumer who is no longer willing to pay more for the brand (Neulinger et al., 2010).

In summary, hybrid shopping behaviour is characterised by consumers attaching different importance to different purchases for different product categories, and this influences both their price acceptance and their brand preferences. Their choices therefore depend primarily on their individual preferences rather than their income situation.

In the following, I will look at the theoretical background of another important factor in the adoption of technology: risk factors.

2.4. Risk types

Risk is usually defined as a danger, the risk of injury or loss. It is a danger that threatens us and that, if it occurs, may involve injury or loss of something (Macquarie, 1999). Three types of risk can be distinguished: real, absolute, and perceived. Perceived risk is relevant for us in the following research.

2.4.1. Perceived risk

Perceived risk refers to the uncertainty about a product or service, users are affected by fears of different risks, in the fact that the product will be unsafe for them. It refers to the fears, uncertainty and perception of possible negative consequences associated with a product or service (Dowling & Staelin, 1994).

The literature distinguishes between several types of perceived risk, including functional, financial, physical, social, psychological, and time-related risks. Functional risk refers to the fear that the functional existence of the product is inadequate, that the product is not suitable for the user, that it will not deliver the expected result. The customer will always have expectations of the product and functional risk refers to the risk that the product/service does not work as expected and does not meet their needs to the extent expected. Financial risk means that the value for money will not be right, i.e., you will not get what you expect for the amount you pay. Physical risk refers to people's fear of damage or loss when using the product. Psychological risk refers to the mental state of how people feel when using a product, i.e., mental comfort (Hofmeister-Tóth, 2003). This classification is consistent with the broader categorisation of perceived risk in the consumer behaviour literature, which includes risks related to satisfaction and time (Khan et al, 2015). Time risk is most relevant for services, but it can also be relevant for products, in which case it has an impact on the whole product journey and the entire purchase process. To summarise, the literature suggests that consumers take certain risks into account when making purchasing decisions, which determine their purchasing behaviour. A better understanding of these risks can help to reduce the risks people face.

2.4.2. Perceived Risk in TAM models

Various studies have extended the conventional TAM with *perceived risk*. And research shows that perceived risk can play a crucial role in technology adoption in the TAM model. Perceived risk is most often associated with behavioural intentions, but it also influences attitudes towards technology use. Studies have been conducted in various domains, such as e-commerce (Pavlou, 2003) or even mobile commerce (Zhang et al., 2012), but also in countless other domains, and have found that perceived risk plays a significant role in the model. The analysis of perceived risk also depends on the context in which the TAM model is applied. In summary, perceived risk is a fundamental element of TAM models that shapes

users' attitudes, intentions, and behaviour towards technology adoption. Incorporating perceived risk alongside traditional TAM constructs has led to the development of more robust models. These models better explain and predict user acceptance of different technological innovations.

2.5. Proposed extension of the TAM

Overall, the literature review suggests that TAM models can range widely based on what was defined as the variables in our TAM model. Almost every literature uses different variables for each study. This paper extends the variables used in the original and additional TAM2 and other summary models presented in this paper by adding two factors: curiosity and individual innovativeness, and financial constraints. In the following paragraphs, I will start with an analysis of the external variables incorporated in the model and then I conclude the literature review by presenting the conceptual model.

2.5.1. The model extended variables

2.5.1.1. Curiosity

Curiosity is defined as the desire to seek new information; people are curious about new information and curiosity leads them to try new thing. Two types of curiosity can be distinguished, one is directed towards the acquisition of positive feelings, this is called interest curiosity, and the other is directed towards the avoidance of negative feelings, this is called deprivation curiosity (Litman, 2008). In this study, we focus on interest curiosity because we assume that people try immersive technologies to generate positive feelings, not to avoid negative feelings.

2.5.1.2.Individual innovativeness

Individual innovativeness can be defined as a desire to collect new information (Fan et al., 2020). This concept is mostly used in the field of information technology and is also addressed in most of the literature. In the field of IT, it focuses on the desire to be open to new and innovative information technologies, which is also an innate disposition (Agarwal & Prasad, 1998). This openness is consistent with the priorities of individuals. People who are more open to innovation are less susceptible to uncertainty and unpredictability and more open to trying new things (Mun et al, 2006). This is also consistent with the fact that if they are more open, they are more likely to try new information technologies as soon as possible. Individual innovativeness can significantly influence perceptions and intentions to adopt

technology. Research has consistently shown that personal innovativeness positively influences perceived usefulness, perceived ease of use (Kim et al.,2010), and research by Yi and colleagues (2006) found that the higher the level of personal innovativeness, the more people tend to describe technology as enjoyable, implying that there is a positive relationship between the two. This factor completely fits our model, as immersive technologies are among the newest innovative technologies available today.

2.5.1.3. Age

In this context, age can certainly be relevant. People's preferences change over time as they get older. New technologies are typically received with greater enthusiasm by the younger generation. Research by Venkatesh and colleagues (2003) also confirms that young people value the usefulness of technology more than older people when deciding whether to try it. In addition, older generations approach new technologies with greater fear and anxiety, and perceived ease of use matters more to them compared to young people (Czaja et al., 2006), as learning new technologies at an older age can be more challenging. In addition, they are less interested and more competitive about their usefulness (Melenhorst et al, 2001). This difference between older and younger people may also be since young people tend to have earlier access to new technologies because of their individual innovativeness and curiosity. The relevance of age may be a determining factor in the assessment of technological adoption of immersive technologies. In the following, I present the conceptual TAM model with the following variables, which is the predecessor of the measurement model that will be analysed later in this paper.

2.5.1.4. Financial constraints

Financial constraints can challenge individuals to buy new technologies and therefore affect their adoption of technology. Even if it is said to be useful, enjoyable, or easy to use, financial constraints may prevent it from actually being used. Several studies have examined the impact of financial constraints in the context of TAM. A study by Venkatesh and Davis (2000) found that perceived costs significantly influence individuals' intention to use e-commerce technology. Similarly, other studies also found that perceived financial costs negatively affected users' intention to use technology.

2.5.2. Conceptual model

The proposed TAM model for the adoption of immersive technologies builds on a model and theoretical framework, TAM, that has been used and proven in these areas. It incorporates the

previously analysed TAM models and complements them with elements deemed relevant to the research topic and complements the model with relevant variables found in the qualitative research conducted prior to setting up the model in this study (see under section 4.1.2.3). It aims, in addition to investigating the indirect effect of factors on Behavioural Intention, to investigate their indirect effect on BI through attitudes towards the use of immersive technology. What is different and interesting about this study is that it does not only examine one attitude, but also explores possible differences in the adoption of technology in different areas such as education, tourism, and health. This seemed interesting based on the qualitative research, which is why the conceptual model included a separate assessment of the different domains. The conceptual model predicts the intention to use immersive technology through the factors influencing technology adoption, perceived usefulness, perceived ease of use, perceived enjoyment, perceived risk, age, curiosity, individual innovativeness, and previous experience interacting and analysing the factors. Figure 6 illustrates how each variable is assumed to interact.

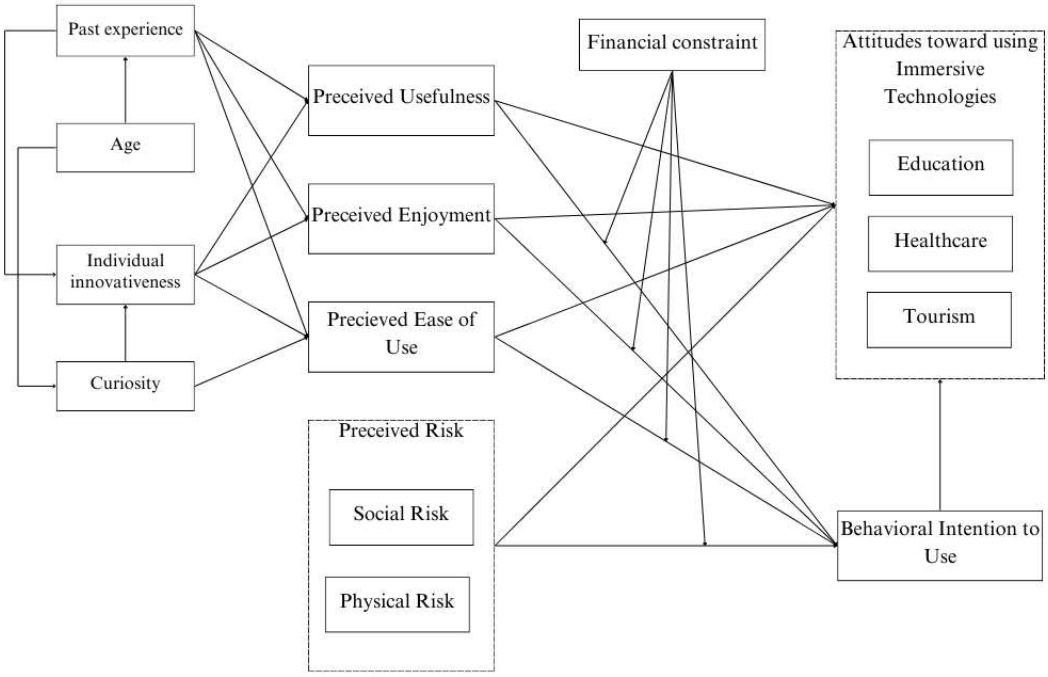

Figure 6: Proposed conceptual framework

The model links age to prior experience and curiosity, which affect both perceived usefulness, perceived ease of use and perceived enjoyment. Experience affects individual innovativeness, which also affects all three factors of perceived usefulness, perceived ease of use and perceived enjoyment. And perceived usefulness, perceived ease of use and perceived enjoyment, together with perceived risk, have a direct effect on both attitudes and behavioural

intention. Likewise, BI has a direct impact on attitudes. So, as I have suggested earlier, I will examine both the indirect and indirect effects of variables on attitudes. In the following sections, in the methodology section, I will narrow down this model to the measurement model and describe the relationships in more detail through hypotheses.

3. Methodology

3.1. Research aims and questions

In this research, I explore the technological adoption of immersive technologies in tourism and education. Similar studies have been done before, where specific immersive technologies have been examined in different contexts, but no comparative research has been done where the technological adoption of immersive technologies has been examined in several domains at the same time. In this research I use a mixed method, which is a mixture of qualitative and quantitative research. In the qualitative phase, I conducted in-depth interviews. The qualitative research aims to gather more knowledge about these technologies, collect more detailed information, expand the literature to build a conceptual model that I applied in the quantitative model, and better understand the current knowledge of future users of these technologies. This was followed by the quantitative research, which was a questionnaire survey, where I sought to answer how the variables in the conceptual model, based on literature and interviews influence behavioural intentions and attitudes.

Main question: *Which variables, to what extent and how do they influence technology adoption?*

The following additional research questions arose during the study, which I addressed through quantitative and qualitative research. *1. What motivations and consumer behaviour patterns can be identified behind the technology adoption process?* I sought to answer the first question through qualitative research. I am investigating what motivations drive people to adopt technology and what are the disincentives that may prevent them from adopting technology. Furthermore, the assessment of these motivations helped me to complete the factors of the conceptual model, which I was looking for the correlation of the factors of the model in the quantitative research. My second research question addresses this. *2. How do the factors interact in concrete terms?* Finally, the last two questions relate to how these variables influence consumer behavioural intentions and the relationship between the variables and the output of the model, i.e., how and to what extent users from different backgrounds and openness adopt immersive technologies in the two areas under study,

education, and tourism. *3. How do the different variables influence behavioural intentions? 4. What are the differences in technology adoption between tourism and education?*

3.2.Research hypotheses

This research aims to explore the technological acceptance of immersive technologies. Research has been done on this topic, but each study has included different factors in its model. Even though considerable research has been conducted, the relationship between the variables is not clear, this may depend on the area of research or the group of respondents.

In the following, I present the measurement model used in this research and the related hypotheses. I have narrowed the research model compared to the conceptual model due to research limitations. The model is shown in Figure 7. I retained the variables that have the greatest potential for investigation and that have played a dominant role in previous studies or that have been found interesting based on my qualitative research. Age and gender were not included in the model, but were also included in the questionnaire, the effects of which I will examine separately. The questions related to the model can be found in Appendix 6 and are identical in numbering to Q2-Q9 in the figure.

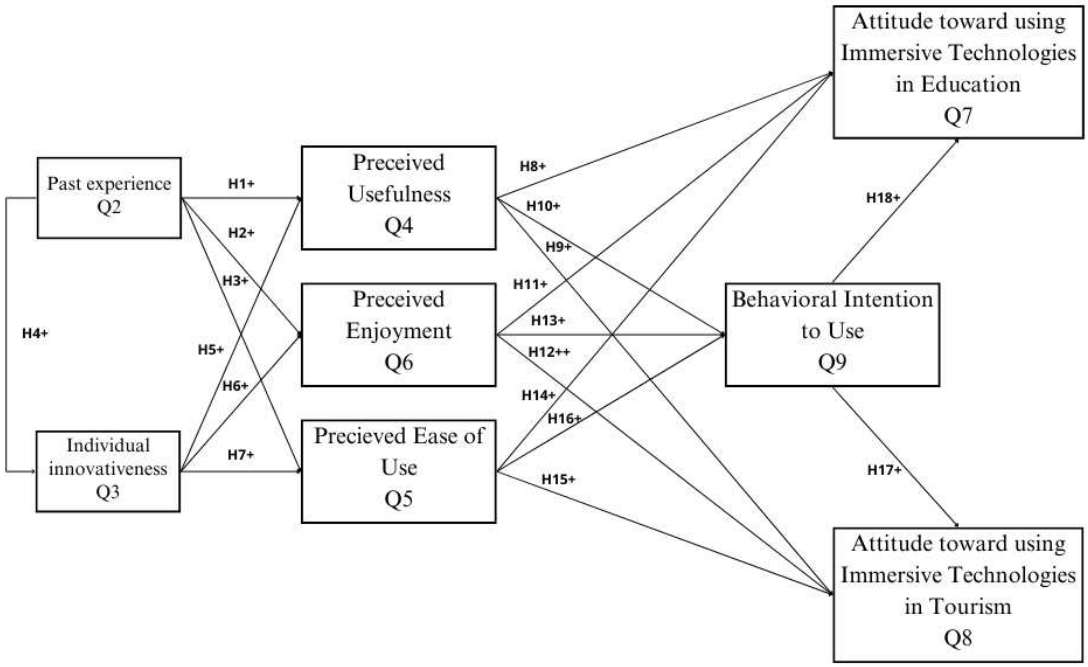

Figure 7: The research model

My first few hypotheses relate to past experience. Experience first appeared in the TAM 2 model of the TAM models. Subsequently, several researchers incorporated it into their models in several studies. Past experience emphasises the need to consider the wider technology

ecosystem and user experience to understand technology adoption. The relationships have been discussed in the theoretical background of this thesis, with previous research by Bajaj and Nidumolu (1998) and Dishaw and Strong (1999) showing a positive effect of prior experience on perceived ease of use, while different results have been found for the effect of prior experience on perceived usefulness and perceived enjoyment. Some studies have found a positive effect (Dishaw and Strong, 1999), while others have shown no significant effect (Jackson et al., 1997). In this research, I identified prior experience as a factor that I hypothesised would have a positive effect on both perceived usefulness and perceived enjoyment and perceived ease of use, which I consider plausible based on the literature and some of the qualitative research. This means that people who have used and experienced immersive technologies before finding them more useful, easier to use and more enjoyable. Furthermore, past experience also affects individual innovativeness and I assume the effect to be positive, since the more such technologies an individual uses, the more his/her innovativeness increases.

H1: Past experience has a positive effect on people's Perceived Usefulness (PU).

H2: Past experience has a positive effect on people's Perceived Enjoyment (PE).

H3: Past experience has a positive effect on people's Perceived Ease of Use (PEOU).

H4: Past experience has a positive effect on people's Individual Innovativeness (II).

The next factor is individual innovativeness. In general, if people are more open, they are more likely to try new information technologies as soon as possible. Research has consistently shown that personal innovativeness has a positive effect on perceived usefulness, perceived ease of use and perceived enjoyment (Kim et al.,2010; Yi et al., 2006). In the present research, I assume this positive relationship as well.

H5: Individual Innovativeness (II) has a positive effect on people's Perceived Usefulness (PU).

H6: Individual Innovativeness (II) has a positive effect on people's Perceived Enjoyment (PE).

H7: Individual Innovativeness (II) has a positive effect on people's Perceived Ease of Use (PEOU).

The analysis of the following relationships relates to attitudes and intention to use. I found it interesting to investigate the extent to which technology adoption differs between areas, so I

also looked at 2 areas separately. Based on the qualitative research (see chapter 4.1) carried out in this thesis, education and tourism were the most interesting areas, as these were the areas where opinions were most divided. I hypothesise a positive effect between the factors (perceived usefulness, perceived ease of use and perceived enjoyment) and attitudes examined in my research model in both areas. Based on the study of Manis and Choi (2019), where a positive relationship was hypothesized, a significant relationship was found between VR technology adoption and attitudes. Thus, I hypothesise that people who find these technologies generally useful, easy to use or enjoyable are more likely to have positive attitudes towards them in both tourism and education.

Furthermore, the relationship with behavioural intention is also positive, Venkatesh and Davis (2000) found that perceived ease of use and perceived usefulness are crucial factors in determining users' behavioural intention and Won et al. (2023) found that perceived enjoyment is the most influential of the determinants of TAM and that they all have a positive effect. I therefore hypothesize a positive relationship between all 3 factors and intention to use.

H8: Perceived Usefulness (PU) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

H9: Perceived Usefulness (PU) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

H10: Perceived Usefulness (PU) has a positive effect on people's Behavioural Intention of Use (BI).

H11: Perceived Enjoyment (PE) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

H12: Perceived Enjoyment (PE) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

H13: Perceived Enjoyment (PE) has a positive effect on people's Behavioural Intention of Use (BI).

H14: Perceived Ease of Use (PEOU) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

H15: Perceived Ease of Use (PEOU) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

H16: Perceived Ease of Use (PEOU) has a positive effect on people's Behavioural Intention of Use (BI).

Finally, I examined the effects on behavioural intention and its impact on attitude. Davis (1989) found that people who perceive technology as easier to use and useful are more likely to adopt it. As well as a later study, Davis, and colleagues (1992) confirmed that perceived enjoyment also has a positive effect on behavioural intention. And research by Ajzen and Fishbein (1977) confirms that the relationship between attitude and behavioural intention is generally positive but depends on the attitude towards the behavioural action. Therefore, I also assume the following relationships to be positive. This means that if someone is willing to try and open to using the following technologies, I assume that they have positive attitudes towards their use in both education and tourism.

H17: Behavioural Intention of Use (BI) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism (ATT).

H18: Behavioural Intention of Use (BI) has a positive effect on people's Attitudes towards using Immersive Technologies in Education (ATE).

3.3. Method of data collection and nature of the sample

I used a mixed method in this research. Mixed method is a form of research where qualitative and quantitative methods are presented together in a single study. In this way, numerical and narrative data are analysed together to answer specific research questions formulated in the research. Mixed methods allow researchers to answer both the more detailed, specific questions from the interviewees' perspective and the relationship between measurable, quantifiable variables within a single survey. Within the mixed method, therefore, quantitative, and qualitative research approaches complement each other (Williams, 2007). For data collection, I used an interviewer using open-ended questions for qualitative research and a questionnaire using closed-ended questions for quantitative research.

Table 2: Research data

	Qualitative	Quantitative
Data of sampling	maximum diversity sampling	convenience sampling
Data collection instrument	in-depth interview	questionnaire with Qualtrics
Composition of respondents	Different nationalities aged 20-30 from my circle of acquaintances	Hungarians aged 15-73 from my circle of acquaintances
Number of items	5	202
Date of data collection	27. November 2023. – 12. February 2024.	15. March 2024 – 22. March 2024.

Source: Own research, (Miles-Huberman, 1994), (Malhotra, 2010)

In qualitative research, researchers use theoretical sampling. The aim of qualitative research is not to have a random, large sample, but to find out as many specific cases as possible during each interview and to compare and present different perspectives. Sampling is not usually done by probability sampling, but by selecting candidates according to specific criteria in order to explore the most extreme results (Gyulavári et al., 2012). Miles-Huberman's (1994) study classifies the sample into 9 different groups based on the diversity of cases. Based on this, my qualitative research sample falls into the category of maximum diversity, as I aimed to explore differences, which is why I chose 5 interviewees of different nationalities for my in-depth interview. This was sufficient to explore the aspects needed to understand the research topic and to gather the background information needed to understand the topic in more depth. In terms of their age, the 5 interviewees were all in the 20-30 age range, which is one of the limitations of qualitative research, as I did not select them based on a specific selection criterion, but they were chosen from my circle of acquaintances. The interviews were conducted face-to-face. Qualitative data collection took place between 27 November 2023 and 12 February 2024. Each interview lasted approximately 60 minutes.

The quantitative questionnaire technique is suitable for analysing larger amounts of data. It provides standardised results, allowing for generalisation, but the factors influencing the respondents remain unknown (Boncz, 2015). Quantitative research starts with data collection and then the information is quantified to answer the research question through statistical tests. Quantitative research typically involves collecting numerical data and using mathematical models to analyse the data (Creswell, 2017). In my quantitative research, the data collection

of the questionnaires was done through an online questionnaire, using the Qualtrics online questionnaire software, with a convenience sampling method. Convenience sampling, defined as non-probability or non-random sampling, means selecting members of the target population based on practical criteria such as accessibility, availability, or willingness to participate (Malhotra, 2010). The questions of the questionnaire are presented in Appendix 1. There were no criteria for completing the questionnaire, which could be filled in by anyone. Completion was anonymous and voluntary. Respondents had access to the questionnaire through a shared Qualtrics link, which they could fill in on the interface, and the answers were automatically recorded in the system's database. Several platforms provided the sampling frame. The questionnaire was shared on my Facebook page, Instagram page, some groups, and direct messages. Some platforms had a complete sampling frame, others did not, as I arbitrarily selected my respondents based on who was a close friend or who I assumed would fill it out. So overall, the sampling is convenience sampling. The questionnaire was open to the public, but most of the respondents were mostly from my circle of acquaintances, so the sample does not meet the criteria of representativeness and no far-reaching conclusions can be drawn from it, but it is adequate for exploring and analysing correlations. The questionnaire was filled in between 15 March 2024 and 22 March 2024. 248 people filled in the questionnaire, but there were some incomplete responses, so I finally analysed 202 responses. The questionnaire contained 8x4 questions to measure the constructs of the research model and in addition 2 questions on demographics. The items of the questionnaire were adapted from previously published literature (see appendix 1). Some of the items were fully adopted, some were adapted to fit the setting of the present study and 3 questions were added by myself. At the beginning of the questionnaire, I summarised for the respondents exactly what the questionnaire is about with the concept of immersive technology to help them understand the questionnaire. I used virtual reality instead of immersive technology in the questions for ease and clarity. I used Five-point Likert scales to rate each item: 1. Strongly disagree, 2. Disagree, 3. Neither agree nor disagree, 4. Agree, 5. Strongly agree. Only past experience was tested with a single-choice 4-option question (see appendix 1). The data analysis of the quantitative research consisted of descriptive statistical analysis and full structural model testing. SEM was used to analyse the relationships between factors. I used the IBM SPSS AMOS program to perform the SEM. I used SPSS, AMOS, and Excel to evaluate the results and assess reliability and validity.

4. Results

4.1.Qualitative research

4.1.1. Overview of the interviewees

All interviews were conducted in Porto, Portugal, during my Erasmus program. Overall, they were all young and well-educated adults. Both men and women. This age group was relevant for me as future users of immersive technology. Each interviewee was from a different country see Figure 3. The limitation of the interviews is that I did not select them based on a specific selection criterion, but they were selected from my circle of acquaintances.

Table 3: Demographic characteristics of research participants in Qualitative research.

	Gender	Age	Nationality	Education	Experience
Interviewee 1	male	24	Colombian	Bachelor's degree	Already used
Interviewee 2	female	25	Greek	Bachelor's degree	Already used
Interviewee 3	female	20	Italian	Master’s degree	Already used
Interviewee 4	male	30	Hungarian	Master’s degree	Not yet used
Interviewee 5	female	26	Kyrgyz	Master’s degree	Already used

Source: Own research

The interviewees' awareness of immersive technology is growing, everyone knew it existed but not everyone had used it. The oldest of the interviewees was the one who had never used it. During the interviews I helped those with less knowledge with some extra information about what immersive technologies are currently in use or under development, so that they could identify with it and thus better express their acceptance to me during the interviews.

4.1.2. Overview of the interviews

Respondents had mixed views and knowledge about immersive technologies. There were some who had heard more about it, those who were more interested in the topic, and others who were very concerned about the topic and its impact on society. Overall, everyone has doubts about the technology, but they also see it as an asset in certain areas.

I interviewed people of several nationalities to get more colourful results. However, even though I had interviewees from several continents, I found no notable differences between them. With more interviewees, perhaps more differences could be found. This may be because, despite being from different countries, we are one in the digital space. We all have

access to the same news, just as Europeans have access to the same news as Americans, Asians, or South Americans. Also, even though they come from different places, they all live in Europe now, so they can have a similar mindset.

4.1.2.1.Common Themes and Patterns

All of them reported that technology is evolving at a rapid pace, faster than in recent years, and that this trend is likely to accelerate in the future, with immersive technologies dominating now. So far, everyone who has used it has tried it in a game environment. Up to now it's been mostly related to the gaming industry, but they've heard that it's being developed in other areas, but only from videos and articles. Of the areas they have heard about, the general opinion is that it could be useful and important in healthcare, but that there are doubts about its introduction in education, tourism, and the military. Financial constraints were mentioned by all as a potential barrier to future use. Interviewee 1: Limitations to buy it is the money can be in the beginning.", Interviewee 5: „Money can be a barrier because it is really expensive right now."

4.1.2.2.Divergent Viewpoints

Although not all respondents, several mentioned concerns that these technologies could lead to dependency and loss of social connections. Interviewee 1: "Their excessive use can lead to people losing touch with reality". Interviewee 5: " My fear is that people can easily become addicted." On the social side, the possibility of dependency and loss of asocial relationships was mentioned, but some even suggested that it could reduce the expression of emotions and make people less passionate. There are also fears that people will become dumber because these technologies will make life easier, and they will be able to do things with less effort. Interviewee 3: "People will be more stupid, with less emotion, less real experience and less problem solving". Interviewer 2: "I think it can destroy the brain". There were mainly positive opinions about the use of the past, but also negative and mixed experiences. For example, Interviewee 3 said, "After the experience, my head and eyes hurt. But I enjoyed it".

Some interviewees are open to the future use of immersive technologies, others have doubts. The oldest interviewee number 5 was the least open to future use. This supported the findings in the literature that older people are less open to new technologies and approach them with greater fear and anxiety (Czaja et al., 2006). As the age difference here was quite small, this issue can be further explored in further quantitative research with a larger number of participants and a larger age range. Some interviewees also raised parental concerns and

concerns about the development and socialization of children growing up with immersive technology. Interviewee 4: "My biggest fear is that our children will behave like robots. They will not socialize." Moreover, however, it also appeared that social pressure would increase in the future and more and more people will use it just because everyone else is using it. Interviewee 4: "Also, if you don't follow the technology, you will fall out of line".

4.1.2.3. *Understanding the motivations for technology adoption*

One of the research questions I used as a basis for the survey focused on motivation. It was as follows:

What motivations and consumer behaviour patterns can be identified behind the technology adoption process?

Using qualitative research and interviews, I seek to answer this question. During the interviews, several motivations and consumer behaviour patterns were found to underlie the adoption process of immersive technologies. These factors provide different perspectives on the adoption and use of immersive technology and may partly explain people's different reactions and attitudes towards technology, which I will discuss in more detail later in the quantitative research. Table 4 summarises the advantages and disadvantages that influence the motivation of individuals, based on what was said during the interviews.

Table 4: Factors that influence people's motivation according to the interviews

Pros – positively influence the motivation	Cons – negatively influence the motivation
- Entertainment and experience	- Fear of addiction
- Promoting improvements in healthcare and education	- Fear of the negative consequences of social isolation
- Facilitating efficiency gains	- Fear of personal data protection
- Benefits of convenience features	- Financial constraints

Source: Own research

According to respondents, one of the main advantages of these immersive technologies is that they are entertaining and exciting. As all the respondents who have tried these technologies have tried them in the field of games, this is the area where they associate most with their use. Those who had tried it reported it as a mainly positive experience. The second was its usefulness in the future as a benefit and a motivating factor. Several interviewees also

mentioned that the development of technology has the potential to improve people's efficiency, for example by making tasks easier and faster, and therefore has the potential to improve the overall efficiency of processes. On this topic, interviewees were unanimous in their support for the use of technology in healthcare, for example, in its potential to facilitate tasks and improve diagnostics. Some also mentioned its use in education as a positive aspect, but opinions were divided in this area. Furthermore, most respondents recognised that these technologies could provide several convenience features. And if the technology makes people's lives or work easier, it may encourage them to use it.

In addition to positive motivating factors, factors that negatively influence the use of immersive technology were also mentioned. The first and most frequently cited factor is concerns and fears about the use of immersive technology. These concerns include: the risk of addiction, especially among children, social withdrawal and alienation, and disconnection from reality. These can affect and reduce emotional expression. Such fears and concerns can hinder people's positive attitudes towards technology. In addition, there are further concerns about data protection due to the risk of misuse of personal data. Finally, another negative motivating factor is financial constraints. The price and availability of immersive technologies can also be an important factor in the adoption process. If the technology is too expensive or difficult to access, it may discourage people from using it.

Overall, the interviews provided a broader insight into individuals' attitudes towards immersive technologies and what motivates or may not motivate them to use immersive technologies. While respondents acknowledge the potential benefits of immersive technology, such as entertainment, improved healthcare, and convenience features, they also express significant concerns about dependency, social isolation, privacy, and financial constraints. These factors play a crucial role in influencing people's motivation and adoption of interactive technologies.

4.1.2.4.The impact of qualitative research on the development of the conceptual model for quantitative research

Based on the interviews, I identified the following factors, which I incorporated into the conceptual model by supporting and complementing the literature. The first of these factors is age, which based on the literature and qualitative research clearly influences technology adoption and is therefore worth further investigation. The second is that it is worth examining attitudes separately for tourism, education, and healthcare. They all considered that immersive technologies could play a useful role in healthcare, but in other areas there were mixed views

on adoption. There were also mixed views on past use, and it may be interesting to examine how past experience influences how open they are to it in the future. Also, what everyone identified as a limiting factor is financial constraints. Financial constraints influence individuals' attitudes and behaviours towards immersive technologies. In addition to financial constraints, social risks were also highlighted as relevant and important factors influencing individuals' attitudes and behavioural intentions. Social risk was therefore included in the conceptual model. Therefore, it was all included in the conceptual TAM model to complement and support the variables discussed in the literature.

The results of the qualitative research did not provide any major breakthroughs, but they helped us to understand people's motivations more deeply and helped us to build a conceptual framework alongside the literature.

4.2.Quantitative research

4.2.1. Structure of the sample

Based on the demographics of respondents, which are shown in Table 5, it can be said that a similar proportion of men and women completed the questionnaire, 51.5% men and 48.5% women. In terms of age, the list of respondents ranges from 15 to 73 years old. Although there are more young people completing the questionnaire, this may be since a large proportion of my acquaintances fall into this age group. Nevertheless, it is relatively diverse, and this diversity will help in the analysis of the questionnaire later.

Table 5: Demographic characteristics of research participants in Quantitative research.

Description		Frequency	Percent
Gender	male	104	51,5
	female	98	48,5
Age	15-25	88	43,6
	26-50	70	34,7
	51-73	44	21,8
Total		202	100

Source: Own research, SPSS output

Age was not included as a factor in the SEM model, so the relationship between age and past experience was tested in SPSS. The relationship between the two ordinal variables was tested

using chi-square test and it was found that there is a significant relationship between the two variables (Chi-Square (6) =58,94; p<0,001). This was also confirmed by Spearman's rho correlation (rho (202) =-0,556, p<0,001) (see Appendix 2). Table 6 summarizes the results from the SPSS. The results confirm the finding in the literature that older generations have less past experience than younger generations. While in the younger age group (15-25), 7 out of 88 had never used it and 12 used it daily, in the older age group (51-73), 44 out of 26 had never used it and none used it daily or even weekly. The results clearly show that younger people are more open to try and use new immersive technologies.

Table 6: The relationship between experience and age

	Experience with Immersive technologies									
	I have never used VR (E1)		I have used VR a couple of times but am not a frequent user. (E2)		I use VR a few times a week. (E3)		I use VR daily. (E4)		Total	
	num	percent	num	percent	num	percent	num	percent	num	percent
Age categories 15-25	7	**8%**	57	64%	12	**14%**	12	**14%**	88	100%
26-50	13	18%	52	73%	5	7%	1	2%	71	100%
51-73	26	**59%**	18	41%	0	**-**	0	**-**	44	100%
Total	46	23%	127	63%	17	8%	13	6%	203	100%

Source: Own research, SPSS output

4.2.2. Exploring the influencing factors of the Immersive Technology acceptance

In the following, I have analysed the factors involved in the quantitative research one by one, based on their mean and standard deviation. Mean and standard deviation values were used to analyse the mean level of responses and the variance of responses to better understand the role of these factors in the adoption of immersive technology. SSPS software was used for their analysis. The data are evaluated on a five-point Likert scale, where the scores are interpreted as 1 - Strongly disagree, 2 - Disagree, 3 - Neither agree nor disagree, 4 - Agree, 5 - Strongly agree. The factors considered in the survey were: perceived usefulness, perceived enjoyment, perceived ease of use and individual innovativeness.

First, I looked at the Perceived Usefulness factor, summarised in Table 7. For Perceived Usefulness, respondents generally expressed a moderate level of agreement with each of the statements regarding the usefulness of VR, as indicated by averages ranging from 3,11 to 3,33. However, there is a moderate variation between responses, as indicated by the standard deviations, which range from approximately 1,094 to 1,214. This can be considered as a medium level of variance, with a moderate degree of variance between the data.

Table 7: Perceived Usefulness statistics

	Mean	Std. Deviation
I believe using VR would help me be more effective. (PU1)	3,25	1,179
Using VR would be useful in my life. (PU2)	3,33	1,094
Using VR would improve my life. (PU3)	3,11	1,214
Using VR would enhance my effectiveness in life. (PU4)	3,22	1,144

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

The second factor is Perceived Enjoyment, the results of which are summarised in Table 8. Means for this factor were the highest of all the factors examined, ranging from 3,51 to 3,73, indicating that respondents generally have a positive perception of the enjoyment of using immersive technologies, meaning that they find them exciting and enjoyable to use. The standard deviation here ranges from 1,021 to 1,112, indicating that there is a moderate degree of variance across respondents.

Table 8: Perceived Enjoyment statistics

	Mean	Std. Deviation
I believe I would find using VR enjoyable. (PE1)	3,66	1,021
I believe I would have fun using VR. (PE2)	3,51	1,112
Using VR would be exciting. (PE3)	3,73	1,036
Using VR would be enjoyable. (PE4)	3,66	1,039

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

The next factor I examined was Perceived Ease of Use (see Table 9). In this case, the averages ranged from 3,42 to 3,59, indicating that respondents generally have a positive opinion of the ease of use using immersive technology. Respondents believe that using the new technology will be relatively easy, clear, and understandable for them, and that they can easily learn to use it in future. The standard deviation ranges from 1,059 to 1,114, which is a medium spread like the previous ones, suggesting that while some respondents think that they will find it very easy to use it, others think that it will be very difficult for them. This may be due to the past experience and individual innovativeness of the respondent. I will examine this relationship later in the hypothesis testing (see section 4.2.5.4).

Table 9: Perceived Ease of Use statistics

	Mean	Std. Deviation
I believe using VR would be easy for me. (PEU1)	3,58	1,072
I believe it would be easy to get VR to do what I want it to do. (PEU2)	3,42	1,114
I believe using VR would be clear and understandable. (PEU3)	3,57	1,059
It would be easy for me to become skilful at using VR. (PEU4)	3,59	1,076

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

For the Individual Innovativeness factor (see Table 10), the average distribution shows a slightly larger variance between questions. The average ranges between 2.79 and 3.70. For the second question, which was: "Among my peers, I am usually the first to try new technologies", this means that some respondents may be more hesitant about trying new technologies. However, the other scores are all above 3, so the average scores show that respondents are willing to experiment with new technologies. It is important to note here that I have recoded question 3 ("In general, I am hesitant to try out new technologies.") in SPSS because the scores for this question are reversed from the general interpretation. The standard deviation for this factor is also medium, and with the highest value (1.284) for question 2, which has the lowest mean, it can be said here that despite the relatively low mean, there are respondents who are first to try new technologies.

Table 10: Individual innovativeness statistics

	Mean	Std. Deviation
If I heard about emerging technologies in our lives (smartphones, artificial intelligence, virtual reality) I would look for ways to experiment with it. (II1)	3,36	1,129
Among my peers, I am usually the first to try out new technologies. (II2)	2,79	1,284
In general, I am hesitant to try out new technologies. (II3) (-)	3,70	1,202
I like to experiment with new technologies. (II4)	3,41	1,099

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

(-) reverse coded items

4.2.3. Understanding the Attitudes towards using Immersive Technologies in Education and in Tourism

The next section examines people's attitudes towards the use of immersive technologies in education and tourism. One of my research questions aims to explore to what extent and in which areas people are more accepting of immersive technologies within these two areas. Qualitative research has provided different perspectives on these two areas. Some of the interviewees were more open and others more closed to the adoption of immersive technologies in tourism and education. That is why I have included in my measurement model a separate study of these two areas in the quantitative research. In the following, I examine the mean and standard deviation of these two variables. Later, I will examine their relationship with the different factors in the hypothesis testing part (see section 4.2.5.4) to get a comprehensive picture to answer my research question.

Attitudes towards the use of immersive technology in education are presented in Table 11, which examines how individuals generally evaluate the use of immersive technologies in education. Based on the responses to each question, the means were found to be relatively high, ranging from 3.40 to 3.83. These results suggest that respondents have a generally positive attitude towards the use of virtual reality in education. Question 4 was decoded using the SPSS software, as the lower the value of the question, the more positive the responses were, so recoding was done for transparency. So there from 5 to 1 interpreted as Strongly

Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree. This question had the highest mean of 3.83, which means that respondents think that immersive technologies are relevant in education. In terms of standard deviations, the standard deviations here are mostly below 1, and since standard deviations below 1 are considered small, the responses suggest that the responses of the respondents are relatively close to the mean. Question 4 has the highest standard deviation with a standard deviation of 1.126. For this question, the mean of the responses is high, so the mean suggests that the use of immersive technologies in education is relevant, but the variance suggests that the responses are split, so that some do not consider its use in education to be relevant at all.

Table 11: Attitude towards Use of immersive technology in Education statistics

	Mean	Std. Deviation
Using VR in Education is a good idea. (ATE1)	3,68	0,857
I feel positively toward using VR in Education. (ATE2)	3,40	0,893
Using VR in Education is a wise idea. (ATE3)	3,59	0,933
I do not see the relevance of Virtual Reality in Education. (ATE4) (-)	3,83	1,126

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

(-) reverse coded items

The table below (Table 12) summarises attitudes towards the use of immersive technology in tourism. At first glance, the values are apparently lower than in education. The mean values range from 2.73 to 3.01. The standard deviation values range from 0.981 to 1.268. The second question "Using VR in Tourism is a wise idea." received the least positive responses with a mean of 2.73 and a relatively low standard deviation of 0.98, indicating that the responses were not so dispersed among people, so the majority of people tended to fall into the medium to negative category of using immersive technology in tourism being a wise idea. For question 4, which was about the relevance of technology in tourism, the mean score was 3.01, which is relatively neutral, between "neither agree nor disagree" and "Disagree", because for this question the answer choices were recoded because it was an opposite question to the others, so it was recoded for transparency. This indicates that on average individuals have a neutral attitude towards the relevance of immersive technologies in tourism. Here, however, the

standard deviation is higher at 1.268, suggesting that there is greater variation in individuals' opinions on this issue.

Table 12: Attitude towards Use of immersive technology in Tourism statistics

	Mean	Std. Deviation
Using VR in Tourism is a good idea. (ATT1)	2,99	1,027
Using VR in Tourism is a wise idea. (ATT2)	2,73	0,981
I feel positively toward using VR in Tourism. (ATT3)	2,83	1,032
I do not see the relevance of Virtual Reality in Tourism. (ATT4) (-)	3,01	1,268

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

(-) reverse coded items

In the next figure, Figure 8, a comparison of the Attitude towards Use of immersive technology in Education and Attitude towards Use of immersive technology in Tourism averages is shown to compare the two side by side more transparently. The analysis was performed in SPSS software using a T-test, where each question of Attitude towards Use of immersive technology in Education was compared with each question of Attitude towards Use of immersive technology in Tourism. A significant difference was found between all the correlations at the 99% significance level (see Appendix 4). Hypothesis 0 here assumes that there is no significant difference between two samples, which means that in this case there is no difference between the means of Attitude towards the Use of Immersive Technology in Education and Attitude towards the Use of Immersive Technology in Tourism. The level of significance in all cases is $p<0.001$, which means that the null hypothesis can be rejected, and the alternative hypothesis accepted, which means that the difference between the samples is probably real and not the result of chance. It is clear, therefore, that respondents are more open and accepting in the field of education, which was demonstrated for all questions. This means that education is considered closer to them in terms of the adoption of immersive technology than tourism.

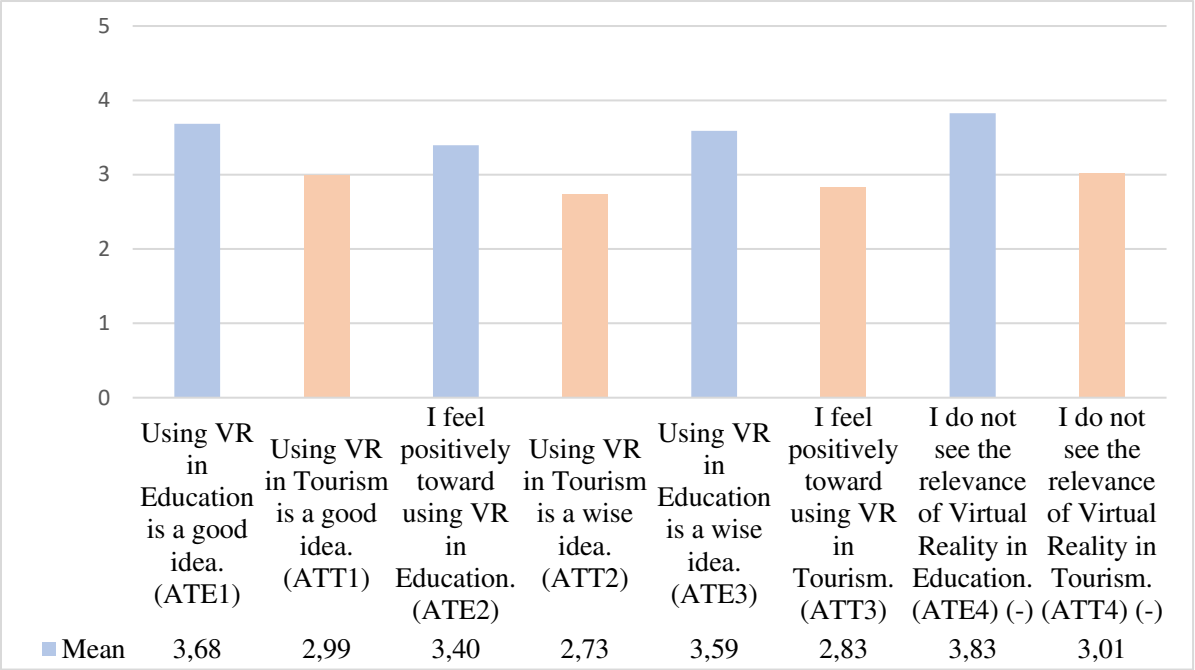

Figure 8: Comparison of Attitude towards Use of immersive technology in Education and Attitude towards Use of immersive technology in Tourism averages, Source: Own research, SPSS output

4.2.4. Understanding the behaviour intention to use Immersive technologies

Finally, I will analyse the last variable Behaviour Intention to use Immersive technology. Table 13 shows the descriptive statistics of this variable where I have examined the mean and standard deviation per question. The results show that the average Behaviour Intention is considered to be more positive. The values range from 3,24 to 3,87, indicating that respondents show a relatively high average level of willingness and intention to use Immersive technologies. In terms of variance, they have a low to medium variance of 0.953 to 1.166. The last question has the highest variance, which was on whether they would take steps to access the technologies and for this question, opinions are more divided. Further analysis of the survey data is worth exploring which factors influence behavioural intention to use immersive technologies.

Table 13: Behaviour Intention statistics

	Mean	Std. Deviation
(Assuming I had access to the technology), I am likely to use it. (BI1)	3,68	0,993
(Assuming I had access to the technology), I am willing to use it. (BI2)	3,87	0,953
(Assuming I had access to the technology), I intend to use it. (BI3)	3,69	1,068
I will personally take steps to use VR for my own purposes. (BI4)	3,24	1,166

Source: Own research, SPSS output

Note: Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

In the following, I will discuss the measurement and structural model analysis.

4.2.5. Analysis of the Model

The research was evaluated by Anderson and Gerbing (1998) using a two-stage approach. After checking the assumptions of the model, the measurement model and then the theoretical model were tested. Confirmatory factor analysis (CFA) was used to verify the measurement model and to assess its reliability, validity, and adequacy. CFA is key to assess the internal reliability, convergent and discriminant validity of the scales (Henseler et al., 2015). Structural equation modelling (SEM) was then tested. SEM is a statistical method that allows researchers to analyse complex relationships between several variables at once. SEM consists of two main components: the measurement model and the structural model. The measurement model generates latent variables inferred from directly observed variables and assesses the relationships between variables and their indicators, but does not examine causal relationships, while the structural model itself examines the relationships between latent variables.

Thus, the SEM model examines the relationships between observed and latent variables, as well as between the latent variables themselves (Kaplan, 2008). Compared to other methods, another similar method is factor analysis, which can be considered as SEM without a structural model, while path analysis is a special case of SEM where we cannot talk about a measurement model because we are working with individual indicators. The path diagram used in SEM is represented by a set of geometric diagrams and arrows showing the types of variables (observed or latent) and the relationships between them and allowing a quick

visualisation of the interdependencies in the theoretical model. SEM is a complex model, an extension of generalised linear models (GLM), which can test multiple regression models in parallel. It allows us to interpret research results more easily and transparently (Dörnyei& Gyulavári, 2011). For the CFA and SEM analyses, I used SPSS AMOS version 29.0.

4.2.5.1.Checking the assumptions of the model

SEM analysis has several preliminary criteria, both for the overall model and for the estimated parameters. Several sources have different estimates of the size of the respondents, some specifying a minimum number of elements sufficient for model analysis, others, for example, Bentler and Chou (1987) suggest that the minimum number of elements required for parameterization within SEM is five times the estimated parameters, while Bagozzi (1981) suggests that the difference between the number of elements and the number of parameters should be at least 50. For the model I have set up, 61 parameters were estimated, so the first condition is not met, but the second is met with an element count of 202. Therefore, for the purpose of this paper, this is accepted. The model fit indicators (see table 14) are more important to determine whether the model is appropriate for further analysis.

In statistical modelling, the assessment of model fit involves different types of fit indicators, each of which serves a specific purpose, Table 14 summarises the most important indicators and their acceptance criteria, indicating the model values based on the SEM test.

The table contains 4 types of indicators. Some fit indicators compare the goodness-of-fit of a model to a situation without a model, while others compare it to a specific base model. One category of indicators includes absolute measures, which compare the 'goodness' of a model with a situation with 'no model' (Byrne, 2001). Absolute measures provide a comprehensive assessment of how well the model fits the data and captures the underlying relationships. In contrast, incremental or comparative measures compare the model to the baseline model specified in the analysis. In this way, the approach allows a more nuanced assessment of the model's performance. Another approach to model evaluation involves indicators based on residual analysis. By evaluating the differences between the values that the model reproduces and the observed correlations and covariances, these indicators enable hypothesis testing regarding the model's suitability for the data. A fourth set of fit indicators, the parsimony indicator, is used to determine which of two models with similar explanatory power is the better one with fewer parameters. This indicator can therefore improve if the parameters are reduced, which is the opposite of the other indicators (Dörnyei& Gyulavári, 2011).

Table 14: Expected and observed value of model fit indicators

Indicators	Minimum acceptable value	Estimated value	Interpretation
	Absolute indicators		
GFI *(goodness-of-fit index)*	**≥ 0,9** (Segars & Grover, 1993)	0,855	Acceptable
AGFI *(adjusted goodness-of-fit index)*	**≥ 0,8** (Segars & Grover, 1993)	0,810	Excellent
	Incremental/comparative indicators		
NFI *(normed fit index)*	**≥ 0,90** (Hair *et al.*, 1992)	0,921	Excellent
CFI *(comparative fit index)*	**≥ 0,95** (Hu & Bentler, 1999)	0,96	Excellent
	Indicators based on residuals		
RMR *(root mean square residual)*	**≤ 0,10** (Jöreskog & Sörbom, 1983)	0,058	Excellent
RMSEA *(Root Mean Square Error of Approximation)*	**<0.06 / <0,08** (Tabachnick & Fidell, 2007 / Kenny et al., 2015)	0,069	Acceptable/ Excellent
	Parsimony indicators		
PGFI *(parsimony goodness-of-fit index)*	**≥ 0,5** (Mulaik *et al.*, 1989)	0,649	Excellent

Source: Own research, AMOS output; (Dörnyei& Gyulavári, 2011)

The results in Table 14 show that the model fits well and almost all indicators are within the acceptance range. To improve the fit of the model, some items from the original set of questions (see Appendix 1) were removed from the analysis and the remaining items were used to build the model. The questionnaire had previously been purposely constructed with 4 questions for each construct, so removing some items was not problematic.

The key fit metrics indicate a good fit of the model: NFI= 0,921; CFI= 0,96 (see Table 14 for other indicators and their ranges). The RMSEA=0,069 indicator differs depending on which condition is considered. Slightly higher than the most widely accepted <0,06 (Tabachnick & Fidell, 2007), but <0,08 is also considered a good fit in some literatures (Kenny et al., 2015). Finally, only 1 indicator falls below the ideal range and deviates slightly from it. This indicator is the GFI with a value of 0,855, which, although close to 0,9, still has some

potential for the model fit to be improved. However, the model fit is adequate for further analysis, for the purposes of the present analysis considering the limitations of the thesis.

Following an assessment of the overall model fit, the validity and reliability of the measurement model is evaluated.

4.2.5.2.Measurement Model

The adjusted CFA results for the measurement model are summarised in Table 15. A measure of internal consistency dependability that shows how closely connected a set of items are to one another is called Cronbach's alpha. The value ranges from 0 to 1, with higher values indicating stronger internal consistency. In research, a Cronbach's alpha of 0.70 or higher is generally considered acceptable (Cronbach, 1951). In this study, there were seven constructs and their Cronbach's alpha ranged from 0.899 to 0.942, indicating that latent variables are acceptably reliable.

The follow-up statistical measure is the composite reliability (CR). CR was calculated by "the squared sum of the individual item loadings divided by the squared sum of the individual item loadings plus the sum of the error variances for the measures" (Malhotra and Dash, 2015). A CR value greater than 0.7 is generally considered acceptable, indicating a high level of reliability of the measure (Gubik et al., 2018). In this research, all constructs show acceptable values for composite reliability, with values not only higher than 0.7 but even higher than 0.9, indicating reliability and the results obtained are likely to be accurate and consistent.

When evaluating the convergent validity of constructs in structural equation modelling, the average variance extracted (AVE) measure is frequently employed. Values above 0.50 indicate good convergent validity. A threshold value of 0.5 means that at least 50% of the variance of the observed variables is explained by the measured latent construct (Bagozzi & Yi, 2012). In the present study, all AVE values exceed the 0.5 threshold, supporting the idea that the items convergently measure the same underlying construct.

Table 15: Reliability and validity of the measurement model.

Latent Variables	Item	Factor loading	Cronbach's Alpha	CR	AVE
Perceived Usefulness	PU2	0,939	0,935	0,936	0,829
	PU3	0,914			
	PU4	0,878			
Perceived Ease of Use	PEU2	0,906	0,938	0,939	0,837
	PEU3	0,926			
	PEU4	0,913			
Perceived Enjoyment	PE2	0,891	0,942	0,944	0,849
	PE3	0,931			
	PE4	0,942			
Individual innovativeness	II1	0,927	0,912	0,915	0,781
	II2	0,845			
	II4	0,878			
Attitude towards Use of immersive technology in Education	ATE1	0,881	0,899	0,901	0,753
	ATE2	0,890			
	ATE3	0,831			
Attitude towards Use of immersive technology in Tourism	ATT1	0,953	0,929	0,929	0,814
	ATT2	0,887			
	ATT3	0,864			
Behaviour Intention	BI1	0,930	0,937	0,936	0,831
	BI2	0,884			
	BI3	0,920			

Source: Own research, AMOS output, SPSS output

CR=composite reliability, AVE= average variance extracted., Five-point Likert scales from 1 to 5: Strongly disagree, Disagree, neither agree nor disagree, Agree, Strongly agree.

In what follows, I examine the structural model and the hypothesized relationships between the model constructs.

4.2.5.3.Structural Model assessment

Before presenting the parameter estimates of the structural model, it is important to examine the fit of the structural model, this was done, and the fit statistics indicated a good model fit (see Table 14). The purpose of the study is to analyse the structural model and test, accept or reject the hypotheses, the latter being presented in the next chapter (see section 4.2.5.4).

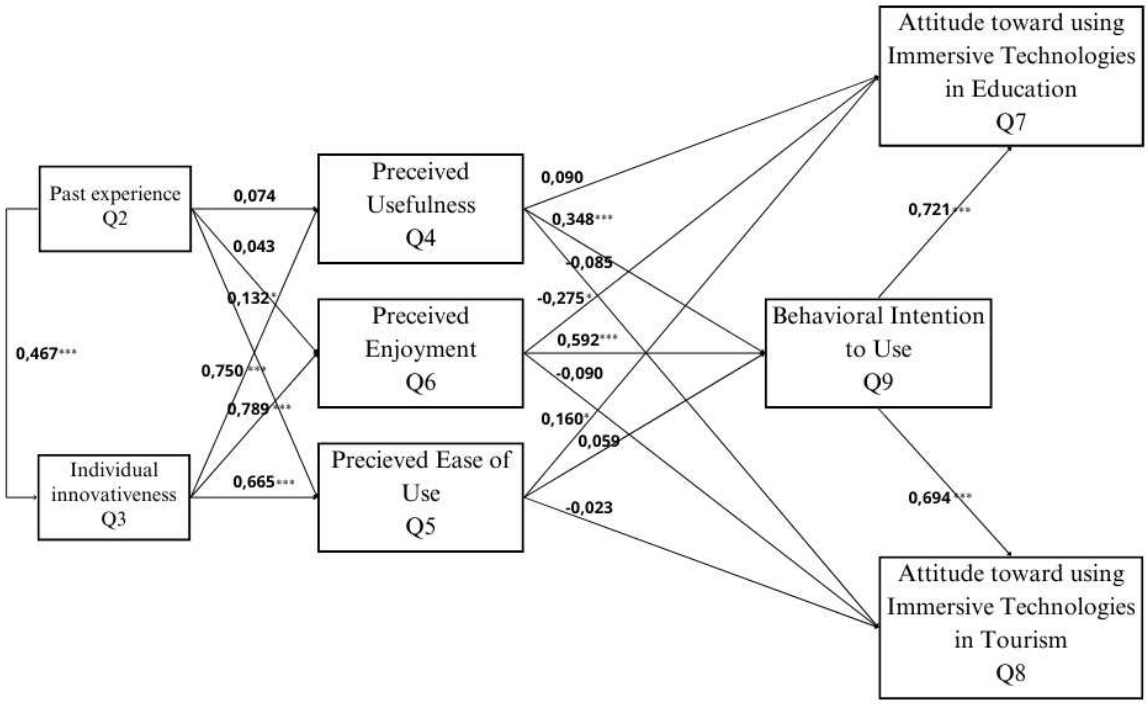

Figure 9: Validated structural model with standardised path coefficients, Source: Own research, AMOS output

Note. *** significant at p-value < 0.01; * significant at p-value < 0.05; insignificant path is dotted

First, the analysis of the estimated parameters. Figure 9 and Table 16 show the estimated standardised path coefficients. Examining the relationships, we can see that Perceived Usefulness, Perceived Enjoyment, and Perceived Ease of Use show a very weak significant and, in some cases, non-significant direct relationship with Attitudes. However, Perceived Usefulness (β = 0,348) and Perceived Enjoyment (β = 0,592) show moderate/strong significant correlations with the Behavioural Intention mediating variable, while the correlation between Perceived Ease of Use is not significant here either. The strongest correlation is between Behaviour Intention and Attitudes. Behaviour intention towards attitude towards using immersive technologies in tourism shows a strong significant correlation (β = 0,694) and behaviour intention towards attitude towards using immersive technologies in education (β = 0,721). The most interesting case is the one of Perceived Enjoyment with Attitude towards Using Immersive Technologies in Education. While the indirect effect via Behaviour Intention on Attitude towards using Immersive Technologies in Education (β= 0,721 * 0,592 = 0,426) is a relatively strong positive value, the direct effect (β= -0,275) is a weak co-movement in the opposite direction. Overall, we can see that BI has a strong effect on attitudes, while the other variables do not seem to. So, those who are open to using it are likely to have open attitudes in tourism and education. While for the following

variables, who finds it enjoyable, useful, or easy to use, no conclusions can be drawn about their attitudes towards these 2 areas. I will discuss the relationships in more detail in the next chapter, when testing the hypotheses.

4.2.5.4. Hypotheses testing

SEM was used to measure hypothetical relationships between constructs simultaneously. In the previous chapter I examined the model fit indicators (Table 14), which showed good model fit. In the framework used to test the hypotheses, 18 hypotheses were formulated, which were evaluated by testing the sign and statistical significance of each path coefficient. The Table 16 summarizes the standardized regression weights, paths between latent constructs, and results of the hypotheses.

Table 16: Findings of the Structural Model Path Analysis

Hypotheses	Relationship			*CS*	*p*	Assessment
H1	Past E	->	PU	,074	,192	Not supported
H2	Past E	->	PE	,043	,429	Not supported
H3	Past E	->	PEOU	,132	,029*	Supported
H4	Past E	->	II	,467	***	Supported
H5	II	->	PU	,750	***	Supported
H6	II	->	PE	,789	***	Supported
H7	II	->	PEOU	,665	***	Supported
H8	PU	->	ATE	,090	,378	Not supported
H9	PU	->	ATT	-,085	,442	Not supported
H10	PU	->	BI	,348	***	Supported
H11	PE	->	ATE	-,275	*	Not supported
H12	PE	->	ATT	-,090	,524	Not supported
H13	PE	->	BI	,592	***	Supported
H14	PEOU	->	ATE	,160	,049*	Supported
H15	PEOU	->	ATT	-,023	,796	Not supported
H16	PEOU	->	BI	,059	,264	Not supported
H17	BI	->	ATT	,694	***	Supported
H18	BI	->	ATE	,721	***	Supported

Source: Own research, AMOS output

Note(s): CS = Completely standardized path coefficient ∗ $p < 0.05$. ∗∗∗ $p < 0.01$.(Statistically Significant)

First, I examined the relationship between past experience in different areas, as shown in the following hypotheses.

H1: Past experience has a positive effect on people's perceived Usefulness (PU).

H2: Past experience has a positive effect on people's Perceived Enjoyment (PE).

H3: Past experience has a positive effect on people's Perceived Ease of Use (PEOU).

H4: Past experience has a positive effect on people's Individual Innovativeness (II).

The results of the evaluation of the structural equations indicate that hypotheses H1 and H2 are not accepted, while hypotheses H3 and H4 are. These results indicate that past experience has no significant direct effect on perceived usefulness and perceived enjoyment but does have a significant direct effect on perceived ease of use (β= 0,132, p=0,029) and individual innovativeness (β= 0,467, p=0,000). This indicates that if someone has experience, they find the technology easier to use and their individual innovativeness is higher. Past experience can help people to be less worried about how well they will be able to use it. People today are more used to and less averse to technology than they were years ago, especially once they have tried it. The increase in innovation, on the other hand, is the result I expected, and the literature supports it. However, no significant relationship has been found between perceived usefulness and enjoyment. In previous literature, some have found a positive significant effect (Dishaw & Strong, 1999), others have found no effect (Jackson et al., 1997) between these variables. So, as I have already illustrated, my paper is not the first to find controversy on this issue, so this finding is not surprising. It may also depend on the nature of the experience. The degree of personal experience discussed in the theoretical background also plays a role here, in that positive or negative or neutral experiences can influence perceptions despite use (Davis, 1989). So, someone who has had a negative experience with it before, for example, is unlikely to find the technology useful or enjoyable. No negative relationship was found, but since there was no uniformity of opinion among respondents, no significant relationship was found between the variables.

The following hypotheses were related to the study of individual innovativeness, for which I expected a clear positive significant relationship based on the literature.

H5: Individual Innovativeness (II) has a positive effect on people's Perceived Usefulness (PU).

H6: Individual Innovativeness (II) has a positive effect on people's Perceived Enjoyment (PE).

H7: Individual Innovativeness (II) has a positive effect on people's Perceived Ease of Use (PEOU).

The results confirmed this, with individual innovativeness having a significant and relevant effect on perceived usefulness (β= 0,750, p=0,000), perceived enjoyment (β= 0,789, p=0,000) and perceived ease of use (β= 0,665 p=0,000). Hypotheses H5, H6 and H7 are accepted at the 99% significance level. They are statistically valid due to their significance level of 0,000 and confirm the positive relationship between individual innovativeness and the hypothesized 3 variables. The β-value is high for all three, supporting that individual innovativeness is an important factor and influencer of perceived usefulness, enjoyment, and ease of use. So those who are more innovative in general will be more open to immersive technology.

In the following, I compare the relationships between the different factors and attitudes one by one. One of the aims of the research was to examine the impact of different variables on attitudes towards education and tourism. This has been analysed previously, but here again I examine and compare them together. To do this, I will first examine hypotheses about attitudes towards the use of immersive technologies in education, followed by an examination of the relationship between attitudes and the use of immersive technologies in tourism. The first hypothesis according to the topic is the H8.

H8: Perceived Usefulness (PU) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

Hypothesis H8 assumed that perceived usefulness has a positive effect on attitudes towards education. Thus, those who find these technologies useful in general will be more accepting of them in the field of education. However, based on the research results, the relationship is not significant, and the hypothesis is rejected. This implies that usefulness does not play a determinant role on attitudes in the field of education, so just because someone finds an immersive tool useful does not make them more accepting of it in the field of education.

The next related hypothesis is H11.

H11: Perceived Enjoyment (PE) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

H11 assumed that perceived enjoyment has a positive effect on attitudes towards education. That is, people who generally find these technologies enjoyable have positive attitudes towards education. Here, however, an interesting result emerged. A significant relationship was found at the 95% significance level, but the relationship between the two was not very strong, and the result was the opposite of the hypothesis, so a negative relationship was found. That is, those who find these technologies enjoyable have a less positive attitude towards their use in education. This may also be because people who find these technologies enjoyable associate them with entertainment and do not see them as appropriate for use in education. However, further research is needed to answer this link and to understand the relationship between the two in more depth.

The next hypothesis is H14, which also relates to education.

H14: Perceived Ease of Use (PEOU) has a positive effect on people's Attitudes towards using Immersive Technologies in Education. (ATE).

In hypothesis H14, I hypothesized that perceived ease of use would have a positive effect on attitudes towards the use of immersive technologies for educational purposes. This relationship was significant at the 95% significance level. Thus, the hypothesis was accepted. Although the coefficient is relatively low β= 0,160, so the relationship is not very strong, but a positive relationship can be detected. This means that those who find it easier to use the technology have a higher probability of having a positive attitude towards its use in education. Of the 3 hypotheses, this is the only one that was accepted, so overall it can be said that in the field of education, only PEOU has any impact on BI.

Next, the hypotheses below examine the relationship between these variables in the field of tourism. The first hypothesis examined is hypothesis H9.

H9: Perceived Usefulness (PU) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

The first relationship examined in this area was between perceived usefulness and attitudes towards the use of immersive technologies in tourism, which I hypothesized to be positively related, but the relationship was not confirmed (β= -0,275, p=0,442). It is neither positive nor significant. Whether one considers immersive technologies useful has no effect on people's attitudes in this area. The next hypothesis tested on this topic is H12.

H12: Perceived Enjoyment (PE) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

Hypothesis H12 examined the relationship between perceived enjoyment and attitudes. No significant correlation was found between these two, so hypothesis H12 was rejected. Therefore, no effect of Enjoyment on attitudes towards tourism. Thus, just because someone finds them enjoyable does not necessarily make them more positive towards tourism.

Finally, I examined hypothesis H15 on the subject before summarising and comparing the results.

H15: Perceived Ease of Use (PEOU) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism. (ATT).

When examining the relationship between consumers' perceived ease of use and people's attitudes towards the use of immersive technologies for tourism, no significant relationship was found and thus hypothesis H15 was rejected. This means that in this case, contrary to education, PEOU in tourism has no effect on attitudes. Which means that just because it is easier to use does not mean that they will be more positive about using it in tourism.

Thus, to summarize, in the present study, only perceived ease of use showed a significant relationship among the three factors, and only with attitudes towards the use of immersive technology in education. Overall, these results contradict the findings of previous studies, where in most cases a relationship was found between them. The results of Manis & Choi (2019), which showed that attitudes towards the use and purchase of VR technology are positively correlated with consumers' evaluations of the usefulness, enjoyment, and ease of use of the device. As well, results from other studies have also shown a positive relationship between these variables and attitudes towards the adoption of different technologies (Davis, 1989; Davis et al, 1989, 1992). Furthermore, based on research by Manis and Choi (2019), which examined the path coefficients of the relationships between different attitudes, they found that perceived enjoyment was the best predictor compared to other belief variables, while previous TAM research found that utility was the primary determinant of technology use, with ease of use and enjoyment being secondary determinants (Davis, 1989; Davis et al, 1989, 1992). However, whichever one is considered above the relationship was found to be between them. In this research, however, the majority of the relationships were not proven by the analysis.

In the following I will examine the relationship between BI and attitudes.

H17: Behavioural Intention of Use (BI) has a positive effect on people's Attitudes towards using Immersive Technologies in Tourism (ATT).

H18: Behavioural Intention of Use (BI) has a positive effect on people's Attitudes towards using Immersive Technologies in Education (ATE).

Both hypotheses assume a positive relationship between intention to use and attitudes towards the use of immersive technologies in education/tourism. Thus, those who are willing to use and intend to use in the future are more likely to use both in education/tourism. In both cases, H17 and H18, the relationship is significant at the 99% significance level, with a high coefficient of β= 0,694 for H17 and β= 0,721 for H18. Thus, a strong positive relationship can be clearly demonstrated for both.

Interestingly, while there is no significant relationship between the three variables PU, PE and PEOU and attitudes, there is such a strong positive relationship between BI and ATE and ATT.

The following hypotheses examine the relationship between BI and the 3 factors.

H10: Perceived Usefulness (PU) has a positive effect on people's Behavioural Intention of Use (BI).

H13: Perceived Enjoyment (PE) has a positive effect on people's Behavioural Intention of Use (BI).

H16: Perceived Ease of Use (PEOU) has a positive effect on people's Behavioural Intention of Use (BI).

Finally, hypotheses concerning the relationship between PU, PE, PEOU, and BI are examined. In fact, only H10 (β= 0,348, p=0,000) found a significant relationship between perceived usefulness and BI, and H13 (β= 0,592 p=0,000) found a significant relationship between perceived enjoyment and BI. Both are significant at the 99% significance level. The relationship is stronger for PE and BI than for PU and BI, but there is a clearly significant positive relationship for both.

Unexpectedly, Hypothesis H16, which tested the effect between perceived ease of use and intention to use, was rejected as we found no significant relationship between them, indicating that PEOU does not play an important role in predicting users' BI in relation to their adoption of immersive technology.

If we look at previous studies, this result is not so surprising. Davis and Venkatesh's (2000) study (found that PEOU and PU are the most important factors in determining users' behavioural intentions. Won et al (2023) found that among the determinants of TAM, PE is

the most important factor influencing intention to use, followed by PU and PEOU. However, there have been studies (Al-Adwan et al., 2023) where while a significant relationship was found between PU and PE factors, no relationship was found between PEOU and BI. Finally, a study by Moon and Kim (2001) found that PE has a stronger effect on BI than PEOU and PU. Differences between studies may also be due to the type of completers, who the completers were, their prior knowledge or attitudes.

In the present case, the PE of the immersive technology, as determined by the respondent base, has the greatest impact on the intention to use, and PEOU, i.e., how difficult, or easy it is to use, is not as important a factor.

5. Discussion and conclusions

In the research I conducted both qualitative and quantitative research and created a conceptual model. Qualitative research was used to expand knowledge, supplement the literature, and help to set up the conceptual model. During the quantitative research I collected data using a questionnaire and tested it using the measurement model and the associated hypotheses that were formulated Based on the results, several hypotheses were rejected, but in many cases strong significant relationships were also found.

5.1.Summary of Findings and their practical importance

The aim of the research was to understand which variables, to what extent and how they influence technology adoption in the field of immersive technology.

One research question of the thesis was to identify the motivations and consumer behaviour patterns behind the technology adoption process. The qualitative research interviews did not yield any breakthrough results, but they helped to gain a deeper insight into people's opinions and attitudes, and motivating factors, towards immersive technologies. Based on the interviews, I found that negative factors such as financial constraints, fear of dependency, fear of negative consequences in social life and fear of personal data, as well as positive factors such as the multiplicative and exciting nature of immersive technologies, their useful improvements in areas such as healthcare, their effectiveness in facilitating tasks and their convenience features, play a key role in people's motivation and adoption of immersive technologies. The interviewees were simultaneously open and closed to these new technologies. They see the potential and possibilities to improve their daily lives, but they also see the fears and dangers associated with the technologies. Interestingly, even though I

interviewed young adults aged between 20 and 30, there was a high level of resistance to immersive technologies. And I was also surprised to find no notable differences between different nationalities. However, in the digital world we live in today, it is not surprising that people have similar views on things. We watch and read the same news. There is not as much difference in mindsets as there was 50-100 years ago.

In addition, respondents showed different attitudes towards the introduction of immersive technology in different areas. While attitudes were very positive in healthcare, opinions were mixed in tourism, education, and other areas. Many participants recognised the potential benefits of the technology but were reluctant to fully embrace it. This perception reflects a wider societal trend where people are experiencing technology fatigue and longing for a time when they did not rely so heavily on these innovations. This sentiment is particularly evident among older generations who have witnessed the rapid introduction of new technologies, while younger people see these developments as a natural part of everyday life. This was also somewhat visible and perceptible in the qualitative interviews, but in the quantitative interviews I further explored how and to what extent age influences adoption. The interviews also revealed that previous experience with immersive technology also influences its adoption. Among the interviewees, those who had used it before had a positive attitude because of positive experiences. However, the use of immersive technology was mainly related to entertainment and gaming, so interviewees were more reserved about its use in other areas. During the interviews, I supplemented their knowledge of new developments in immersive technology with additional information to gain a better insight into the potential of immersive technology in other sectors. The healthcare sector was the most open and receptive to immersive technology, while the tourism and education sectors were more mixed. Therefore, I found it interesting to explore these two areas further through quantitative research.

The interviews therefore showed that age, previous experience, financial constraints, and social risks play a significant role in whether people adopt technology. To develop and build the conceptual model, and later to develop the hypotheses, I considered these findings in addition to the literature to get a more comprehensive picture of the complex process of adoption of immersive technologies.

The quantitative research provided more concrete results. The methods used for the analysis were confirmatory factor analysis (CFA) and structural equation modelling (SEM). CFA was used to check the measurement model and assess its reliability, validity, and adequacy. The fit

of the model was not perfect, but overall, it showed a good fit, which was acceptable for the purposes of the present analysis. By analysing the SEM, I analysed the complex relationships between several variables simultaneously.

The model investigated personal innovativeness, past experience, perceived usefulness, perceived enjoyment, and perceived ease of use with 2 attitudes in the fields of tourism and education and the behavioural intention to use immersive technology and their correlations. The results did not fully replicate previous studies.

One of the research questions focused on how each factor interacts with the other. The results of the research showed that individual innovativeness had the largest effect of all the factors, that all hypotheses were accepted for individual innovativeness, and that in all cases there was a strong significant relationship. Individual innovativeness examined how open people are to technological innovation in general and how open they are to adopting the technology examined in this study. Considering that immersive technologies are among the most popular new innovations today; it is not surprising that people who like innovation are also open to this technology.

A study examined the factors influencing the intention to use immersive technology. The factors considered were perceived enjoyment, perceived usefulness, and perceived ease of use. The findings reveal that perceived enjoyment has the strongest and most significant association with the intention to use. This implies that individuals' perception of how enjoyable it is to use a technology influences their intention to use it. Perceived usefulness also has a weaker but significant relationship with the intention to use. This means that individuals' beliefs about the practical benefits and value of the technology influence their intention to use it. However, perceived ease of use did not show a significant relationship with the intention to use. This suggests that while ease of use is important, it may not be as crucial as perceived enjoyment and usefulness in determining individuals' intention to use a technology. There are also inconsistencies in previous studies examining these relationships, so this result is not so surprising. The difficulty of using a technology does not necessarily discourage people from trying it. Immersive technologies are not the first of these technologies, and people are becoming more adept at using them and less afraid of learning how to use them.

The last research question focused on the attitudes of individuals towards immersive technologies in different areas (education and tourism). The results summarised that people generally have a positive attitude towards the use of immersive technologies in education and

a relatively neutral attitude towards tourism. Participants were less convinced of the benefits of immersive technologies in tourism than in education. This finding suggests that although people are open to integrating immersive technologies in educational settings, they may have reservations or lack a clear understanding of how these technologies can enhance the tourism experience.

The results also show that behavioural intentions strongly influence both attitudes, as BI is highly correlated with attitudes in both education and tourism. Individuals who have positive attitudes towards the use of immersive technologies have generally positive attitudes towards the adoption of these technologies in both education and tourism. The strong correlation between behavioural intentions and attitudes in both education and tourism highlights the importance of understanding and influencing individuals' intention to encourage positive attitudes and behaviours. The contrasting results between education and tourism suggest that contextual factors play a crucial role, as attitudes may vary depending on the area or context under study.

In summary, the research findings show that the adoption of immersive technologies is influenced by a number of factors. The qualitative interviews provided insights into motivations and attitudes towards these technologies, which showed a mixture of excitement and concern. The quantitative analysis highlighted individual innovativeness as a key driver, with perceived enjoyment and perceived usefulness playing a crucial role in the intention to use. Moreover, attitudes towards immersive technology differed across educational and tourism contexts, highlighting the importance of context in shaping behavioural intention. The results of this research suggest that psychological, social, and contextual factors influence technology adoption and that concerns need to be addressed to promote technology adoption. Furthermore, to encourage adoption, it is essential to ensure that users of immersive technologies find them enjoyable and useful.

5.2.Limitations of the Research

After summarising the above conclusions and implications, it is important to say a few words about the limitations of the research.

One limitation of the study is that the sample size was relatively small and was convenience sampling. Therefore, the sample is not representative, which means that the personal characteristics of the respondents cannot be generalised to the population and the results should be treated with certain reservations. The internet questionnaire is also a limitation, and

the results may show some differences if people without internet access could have completed it.

A limitation of the external validity of the survey is that empirical testing of the measurement model was done on a limited factorial basis due to the limited number of respondents. The correlations within the model might have varied by measuring different factors.

The internal validity is affected by the level of knowledge of the immersive technology at the time of the survey, which could affect the results. As the adoption of immersive technology increases, user characteristics may also change, and thus the strength of the correlations in our model may also change.

Further testing is also needed to check whether any change in the variables in the model could change the relationship between the other constructs.

Finally, in some cases the fit of the measurement model was slightly below the specified and expected limits. It would therefore be recommended to consider further improvements of the model fit indicators.

5.3.Recommendations and Future Research

As a first step, it is recommended to remove the limitations discussed in the previous chapter and to further test the model in order to analyse the research questions in more depth and comprehensively.

In particular, it would improve the quality and validity of the analysis if the data collection could be repeated with a larger sample size. Secondly, the validity of the research would also be improved if methods other than those used in the research could be implemented. For example, parts of the model could be better validated if more specific experiments could be used.

The model includes a relatively large number of factors and variables, and although the explanatory power of the model seems relatively good, additional variables could be introduced, or new ones could be tested to replace the current ones. As an example, several variables could be included from the conceptual model set up in this study, such as curiosity or different risk variables. Also, age could be included in the model as a variable, which I tested separately in this study. But other variables could also be included, through further study of prior literature or another qualitative research.

Furthermore, looking in more depth at areas where hypotheses have been rejected could also lead to a deeper understanding of the research. In addition, a more detailed analysis of the sample, with more demographic and psychological questions included in the questionnaire, would help to examine people more specifically and to identify more accurately the differences between different groups of people. Another possible direction for future research could be to investigate more attitudes by including more areas besides education and tourism, such as healthcare or architecture.

In conclusion, further research could be conducted in future studies by incorporating more variables from the conceptual model summarised in this research, or by delving deeper into the topic and including other variables that are still important to analyse the adoption of immersive technology. The study of immersive technologies is relevant and important nowadays because it could bring a major revolution in the future in many industries in the future and have an impact on society.

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7. Appendices

Appendix 1: Questionnaire for the quantitative research, list of constructs and corresponding items

Construct	Measurement Items	Adopted from
Perceived Usefulness	I believe using VR would help me be more effective. (PU1)	Ajzen and Fishbein's (1980) in Davis (1989)
	Using VR would be useful in my life. (PU2)	
	Using VR would improve my life. (PU3)	
	Using VR would enhance my effectiveness in life. (PU4)	
Perceived Ease of Use	I believe using VR would be easy for me. (PEU1)	Ajzen and Fishbein's (1980) in Davis (1989)
	I believe it would be easy to get VR to do what I want it to do. (PEU2)	
	I believe using VR would be clear and understandable. (PEU3)	
	It would be easy for me to become skilful at using VR. (PEU4)	
Perceived Enjoyment	I believe I would find using VR enjoyable. (PE1)	Davis et al. (1992)
	I believe I would have fun using VR. (PE2)	
	Using VR would be exciting. (PE3)	
	Using VR would be enjoyable. (PE4)	
Individual innovativeness	If I heard about emerging technologies in our lives (smartphones, artificial intelligence, virtual reality) I would look for ways to experiment with it. (II1)	Fan et al. (2020); Mun et al. (2006)
	Among my peers, I am usually the first to try out new technologies. (II2)	
	In general, I am hesitant to try out new technologies. (II3) (-)	
	I like to experiment with new technologies. (II4)	
Attitude towards Use of immersive technology in Education	Using VR in Education is a good idea. (ATE1)	Esteban-Millat et al. (2018), Gong et al. (2004), Lee et al. (2018)
	I feel positively toward using VR in Education. (ATE2)	
	Using VR in Education is a wise idea. (ATE3)	
	I do not see the relevance of Virtual Reality in Education. (ATE4) (-)	Own added question

Attitude towards Use of immersive technology in Tourism	Using VR in Tourism is a good idea. (ATT1)	Esteban-Millat et al. (2018), Gong et al. (2004), Lee et al. (2018)
	Using VR in Tourism is a wise idea. (ATT2)	
	I feel positively toward using VR in Tourism. (ATT3)	
	I do not see the relevance of Virtual Reality in Tourism. (ATT4) (-)	Own added question
Behaviour Intention	(Assuming I had access to the technology), I am likely to use it. (BI1)	Venkatesh & Davis (2000)
	(Assuming I had access to the technology), I am willing to use it. (BI2)	
	(Assuming I had access to the technology), I intend to use it. (BI3)	
	I will personally take steps to use VR for my own purposes. (BI4)	Own added question
Experience with VR	I have never used VR. (E1)	Fussell& Truong (2022)
	I have used VR a couple of times but am not a frequent user. (E2)	
	I use VR a few times a week. (E3)	
	I use VR daily. (E4)	

(-) reverse coded items

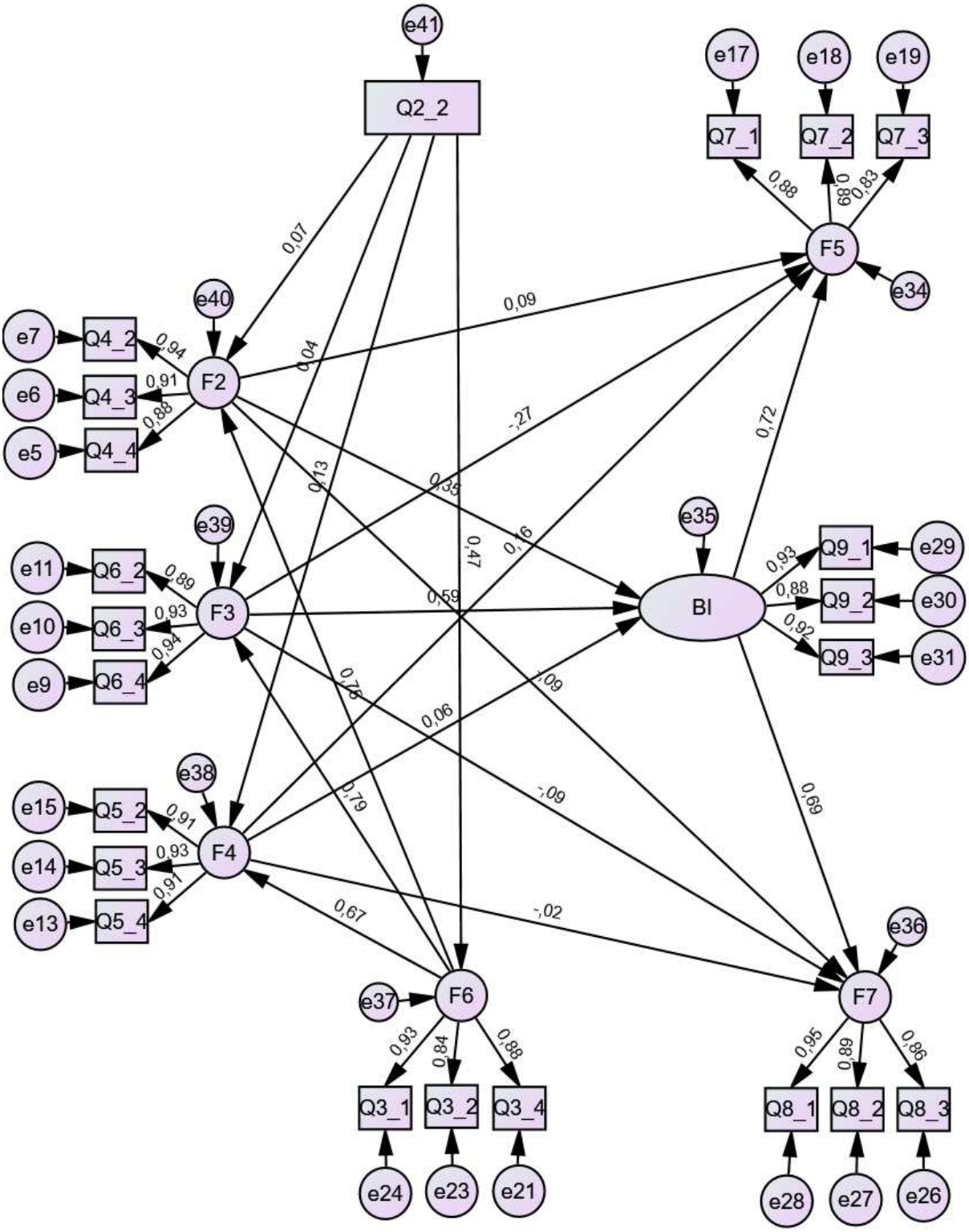
Appendix 2. Spearman's rho correlation

			Age	Experience with VR
Spearman's rho	Age	Correlation Coefficient	1,000	-,556**
		Sig. (2-tailed)	.	<,001
		N	202	202
	Experience with VR	Correlation Coefficient	-,556**	1,000
		Sig. (2-tailed)	<,001	.
		N	202	202

Source: SPSS output

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 3: SEM model with Standardized estimates



Appendix 4: T-test - Paired Samples Statistics, paired differences

		Mean	N	Std. Deviation	p
Pair 1	(Attitude towards Use of immersive technology in Education) Using VR in Education is a good idea. (ATE1)	3,68	202	,857	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a good idea. (ATT1)	2,99	202	1,027	<0,001
Pair 2	(Attitude towards Use of immersive technology in Education) Using VR in Education is a good idea. (ATE1)	3,68	202	,857	,060
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a wise idea. (ATT2)	2,73	202	,981	<0,001
Pair 3	(Attitude towards Use of immersive technology in Education) Using VR in Education is a good idea. (ATE1)	3,68	202	,857	<0,001
	(Attitude towards Use of immersive technology in Tourism) I feel positively toward using VR in Tourism. (ATT3)	2,83	202	1,032	<0,001
Pair 4	(Attitude towards Use of immersive technology in Education) Using VR in Education is a good idea. (ATE1)	3,68	202	,857	<0,001
	(Attitude towards Use of immersive technology in Tourism) I do not see the relevance of Virtual Reality in Tourism. (ATT4)	3,01	202	1,268	<0,001
Pair 5	(Attitude towards Use of immersive technology in Education) I feel positively toward using VR in Education. (ATE2)	3,40	202	,893	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a good idea. (ATT1)	2,99	202	1,027	<0,001
Pair 6	(Attitude towards Use of immersive technology in Education) I feel positively toward using VR in Education. (ATE2)	3,40	202	,893	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a wise idea. (ATT2)	2,73	202	,981	<0,001
Pair 7	(Attitude towards Use of immersive technology in Education) I feel positively toward using VR in Education. (ATE2)	3,40	202	,893	<0,001
	(Attitude towards Use of immersive technology in Tourism) I feel positively toward using VR in Tourism. (ATT3)	2,83	202	1,032	<0,001
Pair 8	(Attitude towards Use of immersive technology in Education) I feel positively toward using VR in Education. (ATE2)	3,40	202	,893	<0,001
	(Attitude towards Use of immersive technology in Tourism) I do not see the relevance of Virtual Reality in Tourism. (ATT4)	3,01	202	1,268	<0,001

Pair 9	(Attitude towards Use of immersive technology in Education) Using VR in Education is a wise idea. (ATE3)	3,59	202	,933	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a good idea. (ATT1)	2,99	202	1,027	<0,001
Pair 10	(Attitude towards Use of immersive technology in Education) Using VR in Education is a wise idea. (ATE3)	3,59	202	,933	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a wise idea. (ATT2)	2,73	202	,981	<0,001
Pair 11	(Attitude towards Use of immersive technology in Education) Using VR in Education is a wise idea. (ATE3)	3,59	202	,933	<0,001
	(Attitude towards Use of immersive technology in Tourism) I feel positively toward using VR in Tourism. (ATT3)	2,83	202	1,032	<0,001
Pair 12	(Attitude towards Use of immersive technology in Education) Using VR in Education is a wise idea. (ATE3)	3,59	202	,933	<0,001
	(Attitude towards Use of immersive technology in Tourism) I do not see the relevance of Virtual Reality in Tourism. (ATT4)	3,01	202	1,268	<0,001
Pair 13	(Attitude towards Use of immersive technology in Education) I do not see the relevance of Virtual Reality in Education. (ATE4)	3,83	202	1,126	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a good idea. (ATT1)	2,99	202	1,027	<0,001
Pair 14	(Attitude towards Use of immersive technology in Education) I do not see the relevance of Virtual Reality in Education. (ATE4)	3,83	202	1,126	<0,001
	(Attitude towards Use of immersive technology in Tourism) Using VR in Tourism is a wise idea. (ATT2)	2,73	202	,981	<0,001
Pair 15	(Attitude towards Use of immersive technology in Education) I do not see the relevance of Virtual Reality in Education. (ATE4)	3,83	202	1,126	<0,001
	(Attitude towards Use of immersive technology in Tourism) I feel positively toward using VR in Tourism. (ATT3)	2,83	202	1,032	,073
Pair 16	(Attitude towards Use of immersive technology in Education) I do not see the relevance of Virtual Reality in Education. (ATE4)	3,83	202	1,126	,079
	(Attitude towards Use of immersive technology in Tourism) I do not see the relevance of Virtual Reality in Tourism. (ATT4)	3,01	202	1,268	,089

Source: SPSS output

*All values are significant at 99% significance level.

Appendix 5: Interview script for the qualitative research

Introduction:

- What do you think about the current level of virtualisation and where is the trend going?

- Please share with me, when you hear the words immersive technologies, virtual reality, augmented reality, and mixed reality, what is the first thing that comes to your mind?

- When and where did you first hear about immersive technologies?

- Have you noticed any recent trends or developments in the VR and AR space?

Personal experiences:

- Have you ever used any of the immersive technologies?

- Can you describe a memorable experience you had with VR or AR?

- In what contexts or areas do you find VR or AR most useful?

Opinions on VR/AR:

- What is your general opinion on the current state of VR and AR technologies?

- What new developments are you familiar with? And how do you find these developments?

Barriers and concerns:

- Are there any barriers or challenges that you think may hinder the spread of immersive technologies?

- Do you have any concerns about privacy or ethical considerations related to these technologies?

- Do you have any fears about VR/AR?

Perceived advantages and disadvantages:

- What do you see as the main advantages of using immersive technologies? Are there any disadvantages or concerns that come to mind?

Social impact:

- How do you think VR and AR could influence social interactions and communication in the future?

- What positive or negative social impacts do you think the widespread adoption of VR and AR could have?

Acceptance and Usage:

- To what extent do you consider yourself accepting of immersive technologies? Do you plan to use them in the future?

Factors affecting acceptance:

- When considering whether to adopt and use a new immersive technology, what factors influence your decision (e.g., ease of use, perceived usefulness)?

Forward projections and prospects:

- How fast do you think immersive technologies will develop and when will they be in everyday use?

Appendix 6: Survey for the quantitative research

Q2: Have you ever experienced virtual reality or any other ever-changing technology? (Some of the most popular Augmented Reality (AR) apps include AR apps such as Snapchat (which allows users to apply various AR filters and effects to their faces and surroundings when taking photos and videos); interactive games such as Pokémon GO; and advertisements such as IKEA Place. While in the Virtual Reality (VR) space, games and educational programmes such as PlayStation VR or Google Expeditions.) / Találkozott már a virtuális valósággal vagy bármilyen más immerzív technológiával? (A legnépszerűbb Kiterjesztett Valóság (AR) alkalmazások közé tartoznak az AR applikációk, például a Snapchat (amely lehetővé teszi a felhasználók számára, hogy különféle AR szűrőket és effekteket alkalmazzanak az arcukra és a környezetükre a fotók és videók készítése során); interaktív játékok, mint a Pokémon GO; valamint reklámok, mint az IKEA Place. Míg a Virtuális Valóság (VR) területén az olyan játékok és oktatási programok, mint a PlayStation VR vagy a Google Expeditions.)

- I have never used VR. / Soha nem használtam a virtuális valóságot.
- I have used VR a couple of times but am not a frequent user. / Néhányszor már használtam a virtuális valóságot, de nem vagyok gyakori felhasználó.
- I use VR a few times a week. / Heti néhányszor használom a virtuális valóságot.
- I use VR daily. / Naponta használom a virtuális valóságot.

Q3: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- If I heard about emerging technologies in our lives (smartphones, artificial intelligence, virtual reality) I would look for ways to experiment with it. / Amikor tudomást szerzek az újonnan megjelenő technológiákról *(okostelefonok, mesterséges intelligencia, virtuális valóság)*, keresem a módját, hogy kísérletezzek velük.
- Among my peers, I am usually the first to try out new technologies. / A társaim közül általában én vagyok az első, aki kipróbálja az új technológiákat.
- In general, I am hesitant to try out new technologies. /Általában vonakodom kipróbálni az új technológiákat.
- I like to experiment with new technologies. /Szeretek kísérletezni az új technológiákkal.

Q4: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- I believe using VR would help me be more effective. /Úgy vélem, hogy a virtuális valóság használata segítene abban, hogy hatékonyabb legyek.
- Using VR would be useful in my life. /A virtuális valóság használata hasznos lenne az életemben.
- Using VR would improve my life. /A virtuális valóság használata javítaná az életemet.

- Using VR would enhance my effectiveness in life. /A virtuális valóság használata növelné a hatékonyságomat az életben.

Q5: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- I believe using VR would be easy for me. /Azt gondolom, hogy a virtuális valóság használata könnyű lenne számomra.
- I believe it would be easy to get VR to do what I want it to do. / Azt gondolom, hogy a virtuális valóság könnyen kezelhető és ezáltal könnyen fogom tudni arra alkalmazni, amire akarom.
- I believe using VR would be clear and understandable. / Úgy gondolom, hogy a virtuális valóság használata világos és érthető lenne számomra.
- It would be easy for me to become skilful at using VR. / Könnyedén gyakorlottá válhatnék a virtuális valóság használatában.

Q6: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- I believe I would find using VR enjoyable. / Úgy gondolom, hogy a virtuális valóság használatát élvezetesnek találnám.
- I believe I would have fun using VR. / Azt gondolom, hogy jól érezném magam a virtuális valóság használatával.
- Using VR would be exciting. / A virtuális valóság használata izgalmas lenne.
- Using VR would be enjoyable. / A virtuális valóság használata élvezetes lenne.

Q7: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- Using VR in Education is a good idea. / A virtuális valóság használata az oktatásban jó ötlet.
- I feel positively toward using VR in Education. / A virtuális valóság használata az oktatásban bölcs ötlet.
- Using VR in Education is a wise idea. / Pozitívan állok a virtuális valóság oktatásban való alkalmazásához.
- I do not see the relevance of Virtual Reality in Education. / Nem sok értelmét látom a virtuális valóság használatának az oktatásban

Q8: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- Using VR in Tourism is a good idea. / A virtuális valóság használata a turizmusban jó ötlet.
- Using VR in Tourism is a wise idea. / A virtuális valóság használata a turizmusban bölcs ötlet.
- I feel positively toward using VR in Tourism. / Pozitívan állok a virtuális valóság turizmusban való alkalmazásához.
- I do not see the relevance of Virtual Reality in Tourism. / Nem sok értelmét látom a virtuális valóság használatának a turizmusban

Q9: Please rate how much you agree with the following statements! (1. strongly disagree, 2. disagree, 3. neither agree nor disagree, 4. agree, 5. strongly agree) / Kérem értékelje, mennyire ért egyet az alábbi állításokkal! (1. egyáltalán nem ért egyet, 2. nem ért egyet, 3. sem nem ért egyet, sem nem ért egyet, 4. egyetért, 5. teljesen egyetért.)

- (Assuming I had access to the technology), I am likely to use it. / (Feltételezve, hogy lesz/lenne hozzáférésem) a virtuális valóság technológiáit valószínűleg használni fogom a jövőben.
- (Assuming I had access to the technology), I am willing to use it. / (Feltételezve, hogy lesz/lenne hozzáférésem) a virtuális valóság technológiáit hajlandó vagyok használni.
- (Assuming I had access to the technology), I intend to use it. / (Feltételezve, hogy lesz/lenne hozzáférésem) a virtuális valóság technológiáit szándékomban áll használni.
- I will personally take steps to use VR for my own purposes. / Saját magam is teszek majd lépéseket, hogy a virtuális valóság technológiáit használni tudjam a jövőben

Q10: Please provide your gender / Kérem adja meg a nemét!

- Woman / Nő
- Man / Férfi
- I do not wish to give / Nem kívánom megadni

Q11: Please provide your age (in numbers) / Kérem adja meg életkorát (számmal kifejezve)
