

**“The role of using the internet two-way communication technique  
‘as a new product’ on customer engagement. Applied on the  
tourism sector in Egypt”**

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## Abstract

This paper aims to study the impact of using two-way communication technique (metaverse) on customer engagement applied on the tourism sector in Egypt. Mixed-method approach was adopted to fill the literature gap through skimming past literature, performed exploratory research by interviewing experts from the industry and tourists. The researcher then formulated the conceptual framework and tested by collecting 377 questionnaires from national and international tourists. Structural equation model was then applied to the data which showed great significance and impact of novelty of metaverse on customer engagement. This research gives great insights and implications for marketers and tourism stakeholders to leverage the use of metaverse as a promotional tool.

**Keywords:** Metaverse novelty, Tourism, Customer engagement, Social Influence, Perceived ease of use, Perceived Usefulness, Demographics.

المخلص:

تهدف هذه الدراسة إلى تحليل تأثير استخدام تقنية الاتصال ثنائي الاتجاه (الميتافيرس) على تفاعل العملاء في قطاع السياحة في مصر. تم اعتماد نهج مختلط لسد الفجوة في الأدبيات من خلال مراجعة الأدبيات السابقة وإجراء بحث استكشافي من خلال مقابلات مع خبراء من الصناعة والسياح. قام الباحث بعد ذلك بصياغة الإطار المفاهيمي واختباره من خلال جمع 377 استبيانًا من السياح الوطنيين والدوليين. ثم تم تطبيق نموذج المعادلات الهيكلية على البيانات، مما أظهر أهمية كبيرة وتأثيرًا للابتكار في الميتافيرس على تفاعل العملاء. تقدم هذه الدراسة رؤى وتوصيات هامة للمسوقين وأصحاب المصلحة في قطاع السياحة للاستفادة من الميتافيرس كأداة ترويجية.

## 1. Introduction

In an era characterised by rapid technological advancements, the traditional boundaries of communication have shifted into the digital sphere, introducing innovative tools and channels that redefine how individuals interact with information and brands (Zaho et al., 2023; Rathore, 2018). Not only does the Metaverse offer a new dimension of sensory-rich experiences, but it also presents itself as a potent weapon in the arsenal of contemporary communication techniques (Wei, 2023; Tsai, 2024).

As per Ali and Khan (2023); Rathore (2018); Dwivedi, et al., (2023), The word metaverse is divided into two words; Meta which is a Greek prefix that means after, post or beyond and universe. Despite the immersive experiences offered by early virtual reality systems, they were only limited to environment isolations. To put it differently, Metaverse is considered a post-reality universe. A multiuser environment that merges the physical and real world with digital virtuality. Metaverse provides marketers with an opportunity to tailor experiences according to customers preferences. Through machine learning and data, it is now possible to offer hyper-personalized experiences that can be present in real time.

As Steinmetz, et al., (2022); Ali and Khan (2023) aptly remark, The Metaverse, frequently described as a virtual, internet-accessible, interconnected reality, has evolved beyond its original conception. It now stands as a multifaceted platform, facilitating two-way communication between brands and consumers in ways previously unimaginable. In this immersive digital universe, users interact with both realistic and fantasy domains, making the Metaverse an alluring marketing and advertising arena (Zaho, et al., 2023; Tsai, 2024).

The Metaverse opens up new avenues for immersive storytelling. Brands have the ability to craft detailed narratives within their virtual domains, engaging users directly. This engagement can build loyalty and facilitate more effective communication of brand values. Traditional advertising in the Metaverse could transform into augmented reality (AR) advertising, allowing brands to integrate ads into users' personal spaces within their virtual settings. This method is more interactive and provides a chance to showcase products in a context meaningful to the user (Tsai, 2024; Ali and Khan, 2023; Wei, 2023; Yang and Wang, 2023).

In the Metaverse, customer engagement goes beyond simple interactions. Brands can create immersive digital experiences, events, and communities that engage customers in a whole new way. For instance, they can host virtual concerts, fashion shows, or launch products within the Metaverse, allowing customers to interact directly and in real-time with their brand (Rathore, 2018; Steinmetz, et al., 2022).

Notably, Anderson and Rainie (2022); Ramadan (2023) highlighted, while the Metaverse promises a paradigm shift in communication techniques, we still have a significant knowledge divide. The extent to which Metaverse-driven multisensory interactions, including touch, visual, and auditory experiences, influence consumer engagement (Yang and Wang, 2023; Rathore, 2018) and their ensuing application in refining tourism marketing strategies in Egypt remains to be thoroughly investigated.

This research embarks on a journey to bridge this knowledge gap and unravel the transformative potential of the Metaverse as a cutting-edge advertising tool within the domain of two-way communication. By examining how sensory-rich interactions in the Metaverse influence consumer engagement, she hopes to cast light on novel approaches for enhancing Egypt's tourism marketing initiatives along with the moderating role of demographics.

## **2. Literature Review**

### **Evolution of metaverse**

Back during the 90's, a phrase named metaverse emerged in the literature of the computer science regarding the extensions of virtual-human research, interactive virtual worlds and real-time autonomous agents. Therefore, metaverse was deemed as a virtual reality world, quasi-physical and maybe even cyber-planet that participants were embodied or referred to as avatars (Dwivedi, et al., 2023; Antonijevic, et al., 2022).

Keeping in mind Huang, et al., (2023), who described metaverses as “an immersive 3D (three-dimensional) virtual worlds that people use to interact together as avatars and by software agent”. Moving forward, while still proceeding towards the metaverse with a single world point of view yet combining augmented realities as vital digital interactions, Antonijevic, et al., (2022) accredited that the social characterization and the scalable of the metaverse as well as clarified it as a widespread 3D networked virtual world that has the ability to support countless number of people instantaneously or

at the same time for social interactions. In oppose to the single-world perspective, other metaverse definitions present the aspect of interconnections (Huang, et al., 2023; Chen, et al., 2024).

For instance, metaverse was explained as a system of countless, connected virtual as well as user-generated worlds (Meta-worlds) that can be accessed through a single-user interface. Yang and Wang (2023) clarified metaverse as a consolidated network of 3D virtual worlds and suggested that it is distinguished by immersive spreading, scalability, realism, and interoperability. This aspect converses the entire other virtual aspect of metaverse in the conceptualization; however, it disputes for a wider context in which a lot of wholly virtual worlds are interconnected or in other words integrated. Definitions that are up to date assist the interconnectedness aspect (that are mentioned in some cases as interoperability), but the reason for new definitions of augmented reality interactions, the inclusion of the belief that the metaverse is not just virtual purely. Furthermore, up to date definitions are in favour that the metaverse connects the real physical as well as the virtual realities ( Hadi, et al., 2024).

Metaverse is considered the new beginning of creating something new, as the very early days of the internet. In 1992, the metaverse term was first introduced by the science fiction writer Neal Stephenson. It is defined as the model of an entire virtual world that people gather in to socialize, work and play (Ali & Khan, 2023; Riva & Wiederhold, 2022). It is a stimulated digital environment that mixes social media principles, virtual reality (VR), augmented reality (AR), and blockchain that creates areas for rich users to interact in a virtual world that imitate the real world. Recently, the term metaverse was publicized by Facebook's rebranding as Meta, it will impact how people interact in the world (Hennig-Thurau, et al., 2023). Mark Zuckerberg, Facebook CEO, stated that metaverse is the future generation of the internet and that the social media will come under the umbrella of this new wave. He further explained that metaverse is a virtual environment where people can present themselves with others in digital space, where they can feel that they are in an embodied internet that they exist in rather than just staring at (Abbas & Zohry, 2023; Riva & Wiederhold, 2022; Hennig-Thurau, et al., 2023).

Moreover, the term "metaverse" grown scholarly attention in 2021 when Mark Zuckerberg, the creator of Facebook, suggested renaming the

company Meta instead of Facebook and announced a large investment in the metaverse (Abbas & Zohry, 2023). Academic discourse on the metaverse and metaverse marketing exploded after Mark Zuckerberg announced his interest in the metaverse. Thus, the evolution of metaverse scholarship can be split into two categories: pre-2021 and post-2021. Prominent scholars in the domains of information systems and marketing began laying out a comprehensive agenda for further study. Prominent journals have begun to issue requests for submissions. Below is a quick explanation of some of the research agenda-driven publications; our study aims to expand on the growing body of knowledge regarding the metaverse and metaverse marketing (Duan, et al., 2021).

For instance, Duan, et al. (2021) and Sever (2023) has defined metaverse as a developing virtual world with limitless interoperability and portability in which real-time 3D rendering-related technologies like VR/AR are looked upon as the primary interaction port. Likewise, Chen et al. (2024) has described the metaverse as a virtual environment combining the physical and the digital, promoted by merging between the extended reality, Internet, web technologies, and mixed reality.

According to Anderson (2022), the scope and the conceptualization that are of metaverse have critically progressed in three vital ways: first off it has advanced from a slight single-world point of view to a wider one in which multiple virtual worlds are interconnected, second of all the metaverse has converted from a virtual characterization into a combination of reality perceptions that is composed of experiences along with the XR spectrum (augmented reality (AR), virtual reality (VR), also mixed reality (MR)), and the convergence of other technologies that are countless (Antonijevic, et al., 2022; Huang, et al., 2023). Thirdly, the metaverse does not only recognize the immersive and socially interactive aspects of its environment, but it also highlights it. The extended reality encompasses not only the real integrated settings, but also the virtual ones. Other limitless categories inside the range qualifies human users to experience the metaverse through numerous alternating realities that occur in both of the physical realms as well as the digital realms (Anderson & Rainie, 2022).

Extended reality technologies replace or supplement the perspective of real life that are crucial for the metaverse deployment. In spite of the discussion of a variety of realities, three main basic categories of reality were given the

utmost attention which varied in both the academic and industrial elements. During this segment, the research will start with virtual reality and will move on forward to the growing fields of augmented reality plus its up-to-date variations, magnetic resonance technology. Moreover, this part will be a simple introduction on how virtual reality connects the gap that occurred between actual settings and virtual entities (Monaco & Sacchi, 2023; Mystakidis, 2022).

### **Metaverse Characteristics**

- **Novelty**

The physical and digital worlds are both combined through AR to issue users a seamless as well as one of a kind experience. Individuals are more likely to be exposed to new stimuli anytime they utilize an augmented reality feature due to the complexity and complexity of manipulation between both the virtual and real worlds. Therefore, in this framework novelty was not being referred to as the “newness” of AR; yet it was referring to the distinctive, unique, new and original stimuli that AR is being displayed is continually exposed to (Anderson, 2022; Adel, 2023).

In this situation novelty is described as when someone perceives something as “new, unique, and different.” Novel and unusual stimuli are the combination of novelty. Images, reality content, movies, text, and other virtual elements are regularly engaged in augmented. For example, users that implement the use of AR applications have the ability to locate virtual objects in real spaces, such as furniture. Users have the ability to imagine a piece of furniture ins their own homes by virtue of the unique representation of this object, which offers highly novel and one-of-a-kind content (Anderson & Rainie 2022; Buhalis, et al., 2022).

According to Adel (2023), stating that, AR gives the users the ability to adjust content in order to match their personal interests and preferences. Augmented reality apps can also feature more than one product information, for instance videos and a lot of images. Extra product information can be incorporated using AR apps, such as supplementary text and videos, that includes material details, runway demos, and inventory evaluations (Anderson & Rainie 2022; Sever, 2023).

- **Interactivity**

The concept of interaction differs, for the reason that it is a component of practically all human interaction. Interactivity includes two complimentary

viewpoints that help in providing a comprehensive explanation that sheds light on the role of interactivity inside augmented reality, precisely as a result of technology and as a user’s perception (Huang, et al., 2023; Sever, 2023).

A relevance was shown of technological attributes that are used so as to define interactivity as a result of the technology implemented. Interactivity thus emerges from the technology system’s capability to facilitate user participation and engagement also inside the business’ operations. Technological features that require speed, as well as how rapidly users can edit data, may have an influence on consumers' perception of items. A person’s personal assessments of interaction form the point of view of the user are considered interaction (Anderson & Rainie 2022; Buhalis, et al., 2022).

- **Vividness**

Vividness is defined as the ability of a technology to create a sensory-rich mediating environment. By merging imagined objects' non-sensory knowledge with real objects' sensory knowledge, it creates a transparent image in a person's mind. Audiovisual content, and colourful images are just a few examples of how vivid data can take any form and carry the tangible and experiential properties of a transaction (Hadi, et al., 2023; Duan, et al., 2021).

Vibrancy is associated with visual appeal and the quality of the product display in a digital setting. Customers will likely be influenced by a product's excellent display. For the reason that it attracts more attention than dim material, it attracts more attention and stimulates a more thorough analysis of the information regarding the products. From a technical point of view, vividness can be enhanced by enhancing the quality of the information displayed and enlarging the range of senses (Ali & Khan, 2023; Hadi, et al., 2024).

Barrera and Shah (2023), speculates that vividness significantly impacts psychological aspects and memory retention. When information is vividly presented, it alters the elaboration process and aids in recalling previously acquired knowledge. This effect can either enhance or diminish product fondness, depending on the perceived significance of the remembered information. Similar to interactivity, vividness provides consumers with a lens through which they envision their future interactions with a product.



- **Functionality**

According to Buhalis, et al., (2022), Metaverse has the reward of an immersive virtual world that allows people to socialize and work with each other by using avatars, mixed reality (MR), VR headsets and other corresponding tools. Contrasting virtual worlds or VR games that often provide limited functions and social interactions, metaverse will allow users to socialize and communicate freely with each other in a simulated face to face settings. As Mark Zuckerberg presented at the Meta's annual conference (2021), users will be able to attend meetings freely, concerts, reply to mails and shop. Therefore, Metaverse is a mirror for real life in a virtual world. Metaverse is not an unrelated technology, as there is various ICTs working together effortlessly in the convergent universe. On the other hand, metaverse can integrate a wide range of ICTs facilitating users to function them instantaneously (Dwivedi et al., 2022).

- **Immersive**

According to Barrera and Shah (2023), Immersive is defined as the psychological experience of being there, that's why it is considered as a critical feature as it helps users generate a feeling of presence (Cummings & Wertz, 2018). Creating a convincing space is considered the first critical step in facilitating a sense of presence in any digitalized environment. The second crucial step is to let the users be immersed in that space. Thus, the more immersed a user is, the more likely he feels a sense of presence within the mediated environment (Dwivedi et al., 2022).

As Buhalis, et al., (2022), Developing an embodied representation for each user, in the form of an avatar, facilitates the immersion in metaverse. Avatars are humanlike digital representations that symbolize users' presentation in the virtual world. In metaverse, users design or select their avatars, and these avatars imitate their interactions within the digitalized world. When users are inside a virtual world in the form of avatars, they usually encounter loss of self and might cease to distinguish themselves from their avatars. The use of an avatar becomes particularly immersive when an individual's physical gestures and motions are mapped onto their avatar's activities (Cummings & Wertz, 2018; Leeq, 2022).

**Customer Engagement**

Early in the new millennium, the term "customer engagement" was first used in marketing literature by Bowden (2009), Kumar et al., (2010), and

Brodie, et al., (2011). It has only been the last five years that the terms "consumer engagement" and "customer engagement" have appeared in the academic marketing and service literature. Customer engagement is defined as the process through which companies establish relationships with their current customers to maintain long lasting profitable and loyal customers. It is considered as an ongoing cultivation relationship between the customer and the company that goes far beyond a single transaction. It is considered a consistent and intentional approach that companies take while providing customers with value during every interaction and thus creating loyal customers (Harmling, et al., 2017).

Companies may better organise their efforts to convert and retain leads by focusing on customer interaction. Modern engagement platforms leverage AI-driven data and technology to personalise a prospect's experience and encourage a purchase by automating repetitive tasks and interactions (de Oliveira Santini, et al., 2020). Additionally, companies are able to allocate responsibilities fast, foresee requirements, and quickly and efficiently draft unique answers to frequently asked queries and issues. By having thorough insights into their account and sales activity, companies can quickly and efficiently retarget prospective clients and streamline the purchasing process. Furthermore, the team will have more time to concentrate on higher-level responsibilities like innovation and expansion thanks to streamlined purchasing (Farook & Abeysekara, 2016).

Lastly, customer engagement has three main dimensions that defines it which are cognitive engagement, emotional engagement, and behavioural engagement.

### **Cognitive Engagement**

Cognitive dimension refers to consumer's level of stability and mental flexibility during interacting with an organization or a brand or other consumers. It also reflects to consumer's willingness to either devote energy or time to understand, learn or gain more information. Cognitive engagement could be done when consumer wants to learn more information about the brand or the product. Using social media platforms, consumers search for information they need before engaging and interacting with brand (Ben-Eliyahu, et al., 2018; Huang, et al., 2022).

According to Huang, et al., (2022), The previous interactions encourage consumers to actively participate and involve with users and start sharing

knowledge, ideas and perspectives which are considered as cognitive engagement drivers. cognitive engagement plays an important role in consumer brand relationship, as consumers are willing to obtain more information and learn more about the brand or the organization are key factors to developing profitable customer relationships (Ben-Eliyahu, et al., 2018; de Oliveira Santini, et al., 2020).

### **Emotional Engagement**

Emotional engagement could be described as feelings and emotions. Emotions then can be defined as any stimulation of feelings. So emotional engagement is related to the pleasure or displeasure the customer feels during the engagement process. in many scientific researches, engagement with a particular brand or product is expressed by affection or dedication where dedication could be referred to as the consumer feeling of belonging and pride to be a consumer to the brand. While attachment is a positive feeling towards the brand while interacting with it (Huang, et al., 2022; Kumar, et al., 2010).

Emotional engagement doesn't only consider customer's real-time feelings and reactions during the experience including, excitement, joy, frustration, or anger, but also the emotional established connection between the customer and the brand. Thus, emotional engagement is affected by prior emotions in customer's minds which might influence their future actions and attitudes towards the brand or the product. So emotional engagement could be expressed as the degree to which a customer is dedicated and attached toward the brand, aligned with the positive feelings he has towards the brand after interacting with it (Özhan & Kocadere, 2020; Huang, et al., 2022).

### **Behavioural Engagement**

Behavioural engagement is directly related to the meaning of the word engagement. It reflects the actual action, including energy and interaction with the brand, other customers, or employees. Majority of studies have stated that engagement is a multidimensional construct that consists of three main dimensions, cognitive (explaining thoughts), emotional (explaining feelings) and behavioural (explaining actions) (Barari, et al., 2021; Brodie, et al., 2011).

The behavioural dimension in customer engagement reflects consumer behaviour that extend past only acquiring or transactional actions but also spreading positive or negative word of mouth on the product, recommending

the product to other customers, helping other customers and recreating value for the brand they have engaged with. The amount of effort and time consumers are willing to exert indicates their co-creation of the brand value (Ben-Eliyahu, et al., 2018; Barari, et al., 2021).

Behavioural engagement is driven mainly by both emotional and cognitive factors affecting the customer. Whereas emotional and cognitive behavioural dimensions mainly reflect the consumers’ mental reaction towards the brand or the product, feeling they had and the responses they make. Behavioural dimension reflects the actions the customers are willing to take as a respond to their cognitive and emotional engagement process (Bowden, 2009; Huang, et al., 2022).

### **Metaverse and Customer Engagement**

In Metaverse, Humans have what is known as avatars that enables them to interact with each other in an immersive world. Metaverse could be easily accessible through computers that have internet connections and could display virtual reality (Zaho, et al., 2023). Metaverse users can create avatars, travel, and play, construct virtual real estate, buy and sell and engage in whole world of human social and instrumental interactions. Consequently, metaverse is considered more of an open-ended digitalized culture besides the physical one and a promising two-way communication tool.

Metaverse offers a dynamic, innovative and an immersive platform for showcasing events, hospitality services, tourism destinations and attractions. From the tourism perspective, Metaverse offers a potent opportunity to market goods and services through immersive interaction (Zaho, et al., 2023; Anderson and Rainie, 2022). It aids businesses in expanding their understanding of the preferences, requirements, and desires of future clients. Travel agencies and service promoters can take advantage of this innovation to highlight their products and qualities in the digital realm. The metaverse is expanding quickly and presents businesses with enormous chances for deep brand interaction. Additionally, customers can co-create experiences, goods, and services with businesses in the virtual environment (Buhalis et al., 2023).

Social networking, teamwork, and persona dialogue are the classifications under which interactions take place in the metaverse. It's challenging to

redefine and make use of the social networking experience in the metaverse in an effective way. In addition, there's a growing interest in value creation through teamwork outside of solo VR experiences. By mirroring the traits of NPCs, persona dialogue keeps the dialogue flowing naturally (Nevelsteen, 2018; Deweedi, et al., 2023). Various research have debated the significance of networks as user engagement is what keeps metaverse environment functioning (Nevelsteen, 2018).

**Conceptual framework**

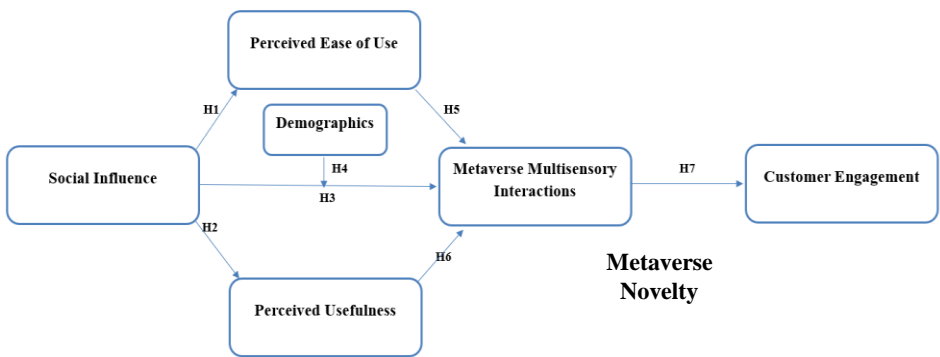


Figure 1 Conceptual Model

**Technology Acceptance Model**

How new technologies aim to deliver multiple benefits have stimulated IS management research to understand individual’s willingness to accept innovation technologies (Rauniar, et al., 2014). TAM model also known as the technology acceptance model describes the acceptance of technology by individuals. As cited by Marikyan and Papagiannidis (2021), It was first established by Fred Davis in 1986. Davis has adopted and contributed the theory of reasoned action that supposes that individual’s adoption of a technology is shaped by the cognitive process mainly that aims to maximize the usefulness of this technology.

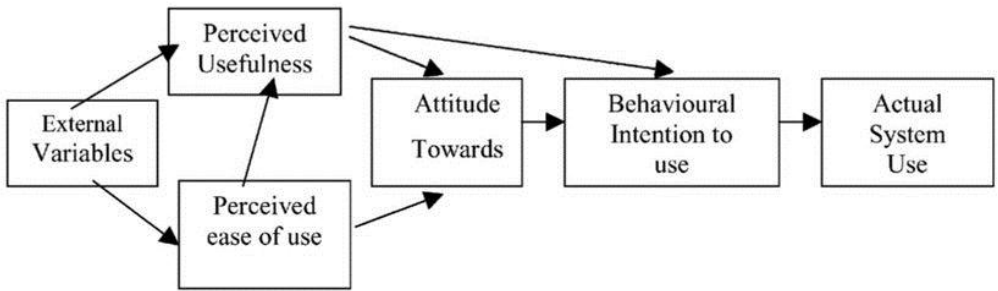
The main goal of the TAM model is to comprehend the mechanisms that underlie the adoption of any technology in order to forecast behaviour and provide a theoretical justification for the technology's successful application. In order to achieve this goal, numerous actions were taken. Through the

implementation of a procedure that mediated the interaction between the external influences and the actual usage of the system, Davis went on to build the model of technology adoption. The idea of reasoned action, which at the time was absent from the IS literature and offered a psychological viewpoint on human conduct, served as the foundation for the model's adoption (Davis, 1989; Davis, 1993; Rauniar, et al., 2014).

TAM is used to assess and evaluate the factors that influence individual's decision whether to reject or accept the new technology (Marikyan & Papagiannidis, 2021). Furthermore, TAM model was developed from a psychological perspective that explains that individual's or user's behaviour is based on attitudes, beliefs, intentions and user behaviour relationship (Martín-García, et al., 2022).

Using system utilisation as the dependent variable and perceived ease of use (PEOU) and perceived usefulness (PU) as two independent variables, Davis (1989) carried out a number of studies to validate TAM. He discovered that self-reported current consumption and self-predicted future usage were highly connected with PU. PEOU showed a strong correlation with both present and future consumption. In general, he discovered that PU and system usage were far more correlated than PEOU. Additional regression analysis revealed that instead of being a direct predictor of system utilisation, PEOU may be an antecedent of PU. In other words, PEOU indirectly influences technological acceptance (TA) through PU ((Rauniar, et al., 2014).

So, the aim of this model is to clarify the main factors regarding the user behaviour towards his acceptance to technology. According to the model, technology acceptance involves 3 stages, where the external factors trigger the cognitive responses which in return impacts the affective response, influencing the user behaviour. According to the model, there are different external factors that affect the user behaviour, along with perceived usefulness and perceived ease of use (Martín-García, et al., 2022).



**Figure 2 TAM model**  
(TAM) Davis (1986)

### 3. Research Methodology

In this research, mixed method approach will be used for data collection. The researcher will explore past literature and go through past studies in order to develop the conceptual framework. Along with collecting quantitative data through online questionnaires. A 377 questionnaire will be collected from tourists both national and international ones to gain more insights about the topic under investigation. The online questionnaire will be distributed through social media channels as Instagram and Facebook groups for travellers. The researcher will use non-probability convenience sampling technique as it is easy, accessible, time and effort saving. Data will be collected within one month due to the time limitation. For the qualitative data, exploratory research was performed. A set of questions were asked to experts from the tourism industry and a number of tourists both national and international ones who were interviewed over the phone after contacting them from Facebook groups for travellers. As for adopting the mixed-methods approach, Werner et al. (2021) advocated using both qualitative and quantitative techniques to capture profound understanding and thorough insights about this emergent research area. Integrating quantitative and qualitative methods of data gathering was reported in management literature (Adel and Younis, 2019; Younis and Adel, 2020) as being a beneficial approach for adopting comprehensive analysis of the research problem. Then data will be cleaned, coded and descriptive analysis will be performed using SPSS and then more statistical analysis will be performed using Smart PLs. Structural equation modelling will be used as it provides not only ordinary regression models that incorporate dependent and independent variables but also hypothetical latent constructs. Along with testing

relationships between variables and testing theories (Savalei and Bentler, 2006).

### **Exploratory research**

After conducting in-depth interviews with both tourists and industry experts, it was concluded that:

The majority of people knew what metaverse is and have tried it at least once in their lives or even have experienced a similar experience using VR or AR. Most of them have really enjoyed their experience and encouraged them to revisit these locations in real life. Some of them believe that virtual worlds will never replace the idea of traditional tourism while others believe that metaverse and virtual worlds have already started conquering the world leaving no room for traditional tourism.

Though, metaverse is a new immersive technology that is considered very easy to be used and adopted, some of them placed some concerns on how to learn to use it. Leading to an important finding; perceived ease of use and perceived usefulness play a crucial role in the adoption or usage of new technologies. Additionally, demographics including age and gender have an impact on the usage or adoption of metaverse. Also, it was proven that metaverse experience allow them to be fully engaged and immersed in the virtual world either through touch, visuals, or audios. It was explained that if these multisensory interactions are functioning properly, it makes them feel so alive and focused in the moment, encouraging them to actually visit these places. Along with the amusing experience that metaverse provide by offering traditional historical sites visits and novel hidden gems that appeals to many tourists who prefer to explore the unexplored places yet.

The provided insights from the customers were aligning with the previously studied literature, leading the researcher to propose the conceptual model. Moreover, the insights from the industry experts were remarkable regarding how it could benefit marketers along with the ministry of tourism to use such technology to promote tourism in Egypt which will be further discussed in detail in chapter five.



## 4. Data analysis and Results

### Measuring Metaverse Novelty

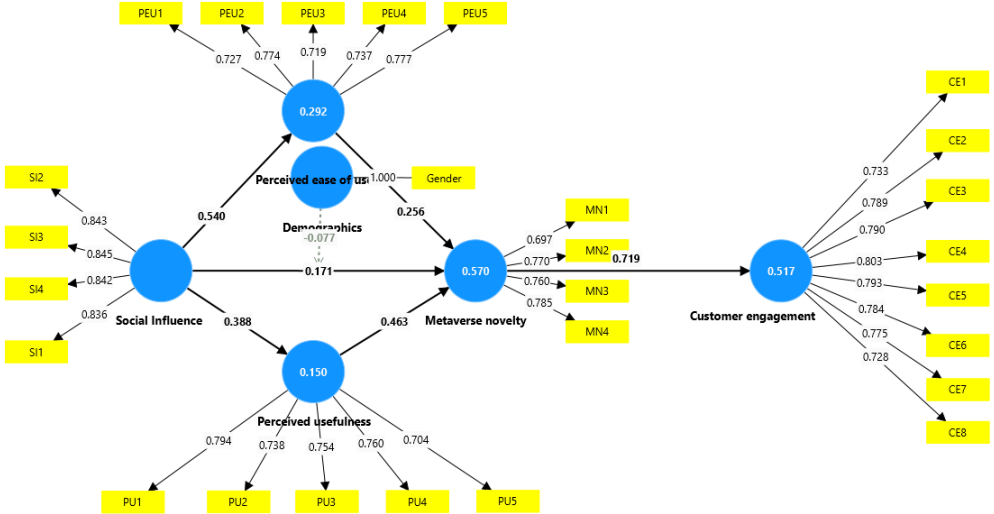


Figure 3 SEM for Metaverse Novelty

### Metaverse Novelty:

Table 1

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Customer engagement	0.905	0.923	0.600
Metaverse novelty	0.746	0.840	0.568
Perceived ease of use	0.802	0.863	0.558
Perceived usefulness	0.806	0.866	0.563
Social Influence	0.863	0.907	0.708

According to table (1), the results show great reliability of constructs and excellent consistency as indicated by the Cronbach's alpha of all the constructs which was higher than (0.7). Reliability is measured through composite reliability and Cronbach's alpha which refers to how related and consistent the items are measuring the construct. Both should be (0.7) or higher to indicate great and acceptable consistency among the items (Rasoolimanesh, 2022; Ahmed, et al., 2016; Cheung, et al., 2024).

As for the validity analysis, it is measured by average variance extracted (AVE). (AVE) higher than (0.5) indicates the validity of the construct

(Rasoolimanesh, 2022). According to the table, all (AVE) values are above (0.6) indicating that all constructs are valid and explain significant portion of the variance of their statements measuring them.

- **Testing demographics (Gender) as a moderator**

Table 2

	<b>β Value</b>	<b>P values</b>
<b>Demographics -&gt; Metaverse novelty</b>	0.044	0.511
<b>Metaverse novelty → Customer engagement</b>	0.719	0.000
<b>Perceived ease of use → Metaverse novelty</b>	0.256	0.000
<b>Perceived usefulness → Metaverse novelty</b>	0.463	0.000
<b>Social Influence → Metaverse novelty</b>	0.171	0.001
<b>Social Influence → Perceived ease of use</b>	0.540	0.000
<b>Social Influence → Perceived usefulness</b>	0.388	0.000
<b>Demographics (gender) x Social Influence → Metaverse novelty</b>	-0.077	0.320

The previous table shows that there is a strong and significant positive relationship between metaverse novelty and customer engagement according to the P-Value of (0.000) and the β Value of (0.719). Additionally, the results indicate moderate and strong significant positive relationship between perceived ease of use, perceived usefulness and social influence on metaverse novelty indicated by the P-value of (0.000) and (0.001) and β Value of (0.256), (0.463) and (0.171).

Furthermore, social influence has a strong and significant positive impact on perceived ease of use with a P-value of (0.000) and β Value of (0.540). Meanwhile it has a moderate and positive impact on perceived usefulness with a β Value of (0.388) and P-value of (0.000).

On the other hand, the analysis shows insignificant moderating effect of gender as a demographic factor between social influence and metaverse novelty according to the P-Value (0.320) and the β Value (-0.077).

- **Testing demographics (Age) as a moderator**

Table 3

	<b>β Value</b>	<b>P values</b>
<b>Demographics → Metaverse novelty</b>	-0.028	0.317
<b>Metaverse novelty → Customer engagement</b>	0.719	0.000
<b>Perceived ease of use → Metaverse novelty</b>	0.259	0.000
<b>Perceived usefulness → Metaverse novelty</b>	0.465	0.000
<b>Social Influence → Metaverse novelty</b>	0.138	0.002
<b>Social Influence → Perceived ease of use</b>	0.540	0.000
<b>Social Influence → Perceived usefulness</b>	0.388	0.000
<b>Demographics (age) x Social Influence → Metaverse novelty</b>	0.041	0.326

The previous table shows that there is a strong and significant positive relationship between metaverse novelty and customer engagement according to the P-Value of (0.000) and the  $\beta$  Value of (0.719). Additionally, the results indicate moderate and strong significant positive relationship between perceived ease of use, perceived usefulness and social influence on metaverse novelty indicated by the P-value of (0.000) and (0.002) and  $\beta$  Values of (0.259), (0.465) and (0.138).

Furthermore, social influence has moderate and significant relation on perceived usefulness with a P-value of (0.000) and  $\beta$  Value of (0.388). It also has strong significant positive impact on both perceived ease of use with a P-value of (0.000) and  $\beta$  Value of (0.540). On the other hand, the analysis shows insignificant moderating effect of age as a demographic factor between social influence and metaverse novelty according to the P-Value (0.326) and the  $\beta$  Value (0.041).

- **Indirect relationship explaining the mediator and mediating variables in the model**

Table 4

	$\beta$ Value	P values
Perceived ease of use → Metaverse novelty → Customer engagement	0.184	0.000
Perceived usefulness → Metaverse novelty → Customer engagement	0.333	0.000
Social Influence → Metaverse novelty → Customer engagement	0.123	0.002
Social Influence → Perceived usefulness → Metaverse novelty	0.180	0.000
Social Influence → Perceived ease of use → Metaverse novelty	0.138	0.000
Demographics x Social Influence → Metaverse novelty → Customer engagement	-0.055	0.324
Social Influence → Perceived ease of use → Metaverse novelty → Customer engagement	0.099	0.001
Demographics → Metaverse novelty → Customer engagement	0.032	0.512
Social Influence → Perceived usefulness → Metaverse novelty → Customer engagement	0.129	0.000

The previous table indicates the mediating role of perceived ease of use and perceived usefulness between social influence and metaverse novelty.

Indicating the indirect impact of social influence on metaverse novelty through perceived ease of use and perceived usefulness.

Moreover, it shows the mediating role of metaverse novelty between both perceived ease of use and perceived usefulness and customer engagement. Explaining the indirect impact of both perceived ease of use and perceived usefulness on customer engagement through metaverse novelty.

Furthermore, there is an indirect impact of social influence on customer engagement through metaverse novelty. Finally, demographics don't significantly impact the relationship between social influence and customer engagement through metaverse novelty. The previous table shows partial mediation in all relationships because the direct effects remain significant and exists even if the mediators are included in the model.

The previous findings align perfectly with the technology adoption theory (TAM), reinforcing the role of ease of use and usefulness as critical factors. Nonetheless, in the tourism sector these factors might interact with metaverse multisensory experiences exclusively, underscoring the need for tailored approaches to enhance user engagement which will be further illustrated in the recommendations section.

- **Determination coefficient of metaverse novelty**

Table 5

<b>Variable</b>	<b>R-square</b>
<b>Customer engagement</b>	0.517
<b>Metaverse novelty</b>	0.568
<b>Perceived ease of use</b>	0.292
<b>Perceived usefulness</b>	0.150

The results shown in the previous table indicate that (51.7%) of the variance in customer engagement is explained by social influence. While (56.8%) of the variance in metaverse novelty is explained by social influence and this is the highest R square in the model. Meaning that the factors used to determine metaverse variability are strongly relevant and effective. Moreover, perceived ease of use is explained by social influence by only (29.3%). Along with perceived usefulness that is represented by (15%). To conclude, the model shows good fit for customer engagement and metaverse but needs better improvements regarding perceived ease of use and perceived usefulness.

## 5. Discussion and recommendations

### Discussion

The results of the study exposed that there was a positive a positive relationship between social influence and perceived ease of use. Revealing that when considering the use of any new technology, people get so influenced by the opinions of the ones important to them. According to (Martín-García, et al., 2022) social influence is considered an important and crucial factor in predicting the acceptance and usage of technology as people consider others' opinions when adopting new technologies. It has been proved and confirmed that social influence has a positive impact on perceived ease of use (Bendary and Al-Sahouly, 2018). **Thus, H1 is accepted.**

The finding also revealed that people perceive metaverse as useful to use based on the opinions of ones around them. Additionally, they believe that metaverse might be useful to use and they are encouraged to use it after relying on the opinions of the ones important to them. After the Venkatesh and Davis (2000) modification of TAM to TAM 2, they have presented the model adding social influence as a significant factor influencing perceived usefulness. It was then tested and approved that social influence has positive and significant impact on social influence (Xi, et al., 2024; Amsal, et al., 2021; Al-Adwan, et al., 2023). **Hence, H2 is accepted.**

The study revealed that there is a positive relationship between social influence and multisensory interaction. The results demonstrated that peoples' behaviours are often shaped by the opinions of the ones they care for and the ones their opinions matter to them to adopt to new technologies. One of these new technologies is metaverse. In the context of adopting metaverse, social influence plays a crucial role. As cited by Al-Kfairy, et al., (2024), One of the main facilitators of adoption of metaverse is the familiarity and trust. Trust goes beyond system consistency and reliability, it encompasses trust in the virtual realm, overall feeling of community and interactions. One more component is friends/ families' influence. Humans are often influenced by their peers and social circles (Al-Kfairy, et al., 2024). No matter how the contexts differ whether technology, fashion or language, people tend to be influenced by their peers to take their decisions. Additionally (Hadi, et al., 2024), investigated the social influence impact on metaverse focusing on the interactive experience offered by the platform.

These studies emphasize the remarkable effect of social influence on user behaviour and interaction with the platform (Al-Kfairy, et al., 2024; Hadi, et al., 2024; Cheung, et al., 2024). **Thus, H3 is accepted.**

Contrary to expectations, the study showed no significant impact of demographics as a moderator between social influence and metaverse interactions. It was shown that gender didn't moderate the relationship between social influence and metaverse interactions. On the other hand, age also didn't have a significant impact on the relationship. As cited by Kathuria (2023); Alkhwaldi (2024), the behavioural development and socialization of both genders are different for different reasons, these reasons include biological factors and socio-cultural factors. Subsequently, males are branded by behaviours that enable self-expansion, self-assertations and their urge to employ power. Conversely, females are considered sociable and very nurturing. Moreover, Young people are more influenced and motivated to try new technologies like metaverse as per their social circles and peers' recommendations. Unlike elderly people, they don't rely much on social influence in taking their decisions and if they do it is more of family members or very trusted sources (Chen, et al., 2024; Hennig-Thurau, et al., 2023, Teng, et al., 2022). A per the results of the study, **there is insignificant moderating role of demographics among social influence and metaverse multisensory interactions, which means that H4 is rejected.**

The study confirms that there is a relationship between perceived ease of use and metaverse multisensory interactions. if users find the technology easy to use, they are more likely to engage with it. In the context of metaverse and with regard to the results, if users perceive metaverse multisensory interactions as easy to use, straightforward and user-friendly, they will be motivated to explore and use such technology. It was also demonstrated that there is a positive relationship between perceived usefulness and metaverse multisensory interactions. If users believe that the new technology will be effective enhancing their performance or will provide them with many benefits, they will be highly engaged with it.

According to Yu, et al., (2024); Wu and Yu, (2023); Al Adwan, et al., (2023), In the context of metaverse, perceived ease of use explains that users find it easy and efficient to use and navigate metaverse. As previously mentioned, perceived usefulness has a direct influence on people's decision

to adopt new technologies. It revealed the positive relationship between the key determinants of TAM ‘perceived ease of use and perceived usefulness’ and metaverse. Moreover, it was confirmed that users’ perceptions of ease of use and usefulness significantly and positively influence their attitudes towards their acceptance to use metaverse. **Hence, H5 and H6 are accepted.**

Considering the results of the study, it was indicated that there was a positive relationship between metaverse multisensory interactions. Multisensory interactions in metaverse creates an immersive and realistic experience allowing users to be more present in the moment. The interactions provide vivid and realistic experience via engaging multiple sense (touch-audial-visual) subsequently enhancing users’ engagement. According to previous research, using multisensory interactions, improves emotional resonance, focus and recalling leading to a deeper learning and joyful experience. Furthermore, multisensory interactions have improved users’ pleasure and engagement in many contexts including gaming, learning, entertainment and training (Akour, et al., 2022; Buhalis, et al., 2022). **So, H7 is accepted.**

### **Recommendations**

- As per the results, multisensory interactions allow users to be more engaged with the technology. Tourism providers in Egypt should maximize the interactions among metaverse to allow more engaging through incorporating features as 3D audio, haptic feedback and virtual reality to create more immersive and novel experiences.
- As there is a positive relationship between multisensory interactions and customers engagement, marketers and tourism providers should focus on customer engagement. Prioritizing sensory rich experiences that captivates the users. Creating interactive experiences that booster a sense of belonging and community within the virtual space.
- Since perceived ease of use has an impact on the adoption of metaverse technology, it is important for technology providers to make sure that it is easy and simple to use. Ministry of tourism should invest in simplifying the user interface, using user-friendly designs and smooth navigation to ensure an immersive and amusing experience.

- The ministry of tourism in Egypt should enhance the infrastructure by investing more in improving the infrastructure including accommodations, transportation, attractions and most importantly IT infrastructure to ensure the ease of adopting metaverse and other new technologies in touristic purposes in Egypt. Ensuring that all facilities are accessible, modern, safe and easy to use by all visitors.
- Ministry of tourism in Egypt could promote off the beaten path destinations through metaverse by highlighting the less known attractions. This will encourage tourists to explore the unusual spots and visit more of Egypt’s hidden gems along with the well-known and traditional ones.
- Integrating VR and AR along with interactive advertising will promote Egypt’s attractions by providing tourists with an interactive virtual journey and a preview for Egypt’s experiences.

#### **Suggestions for future research**

- Future researchers should study other dimensions of metaverse as functionality, interactivity, immersive and their impact on customer engagement.
- Future researchers might dig deep into what other factors the might moderate the relationship between social influence and metaverse multisensory interactions rather than demographics.



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