The Effects of Experience-Technology Fit on Consumption Behavior: Extended Reality Visitor Experience

Abstract

Purpose: Traditionally, Task-Technology Fit (TTF) theory has been applied to examine the usefulness of technology in the work environment. Can the same approach (based on experience rather than tasks) be applied to non-work, cultural heritage environments? This is the question we ask in this study. This study proposes a new variation of TTF based on the experience economy model, namely Experience-Technology Fit (ETF), for the non-work environment, in particular in the context of cultural heritage, where visitor experience is enhanced by extended reality technology, which combines immersive technologies and artificial intelligence.

Design/Methodology/Approach: Employing a quantitative survey method, the empirical analysis seeks to determine the influence of Mixed Reality (MR) characteristics (interactivity, vividness), Voice User Interface (VUI) characteristics (speech recognition, speech synthesis) and experience economy factors (education, entertainment, esthetic, escape) on satisfaction, revisit intention and actual purchase to propose a new ETF model.

Findings: VUI, MR, and experience factors were significantly associated with ETF; when combined with MR-based experience, ETF was significantly associated with satisfaction. Our findings further demonstrate the relationship between users' satisfaction when engaging with MR-based experience and revisit intention, while purchase intention was significantly associated with the actual purchase.

Originality: The novel contribution of this study is the proposal of the EFT model, a new variation of TTF based on the experience economy model. Overall, this study expands the applications of TTF to an experience-oriented business, thereby broadening our understanding of technological success with a specific focus on the technology fit of Extended Reality (XR) in the context of cultural heritage.

Keywords: extended reality; task-technology fit; experience-technology fit; visitor experience.

1. Introduction

Cultural heritage has extended its application of immersive technologies including Augmented Reality (AR), Virtual Reality (VR), Mixed Reality (MR) and eXtended Reality (XR) to support sensory visitor experiences through a blend of real and digital content (Rahaman *et al*., 2020; Bekele and Champion, 2019). AR refers to a combination of digital information with the real world that is presented in real-time (Azuma, 1997; Milgram et al., 1995). VR, on the other hand, refers to a computer-generated simulation of a three-dimensional environment that the user can view, manipulate, or interact with (Kilman et al., 2010, p. 315). MR is defined as a particular subset of VR-related technologies that involve the merging of real and virtual worlds (Milgram & Kishino, 1994, p. 2). In this study, XR is an advanced version of immersive technology that encompasses any environment involving virtual elements such as VR, AR, and MR (Reading et al., 2021), combined with intelligent AI technology. By fusing layered virtual objects into the real world, users can partake in activities that are not possible in a strictly digital environment, or the physical world (Giannachi, 2023; Margetis *et al*., 2021).

These technologies are used for different purposes from education and exhibition enhancement to exploration, reconstruction and virtual museums (Bekele *et al*., 2018). Such experiences not only enhance the user experience but also satisfy enthusiastic, tech-savvy visitors and audiences (Rahaman *et al*., 2020) while reinforcing learning and understanding in the cultural heritage context (Camuñas-García *et al*., 2023). Many empirical tourism and hospitality management studies have investigated correlations among tasks, technologies, utilization, user satisfaction and performance outcomes from the task-technology fit (TTF) perspective (Lin *et al*., 2020) including in cultural heritage contexts (Vatanasakdakul *et al*., 2010). Although TTF has been used as a representative concept to explain the successful selection of information technology in various digital transformation contexts (Lafi, 2023; Sinha *et al*., 2019), the TTF model is not a perfect fit for the tourism and hospitality context, as the *experience* aspect is much more important than the *task* aspect in the application of the TTF model in the context of the visitor economy, including cultural heritage tourism. Therefore, it is essential to develop a new concept that embraces both experience and technology from the perspective of the experience economy. The TTF model, which is frequently used to understand the effect of technology on individual or organizational performance, was originally a utility-anchored model exhorting the positive effect of the fit between technology and task on performance. However, it is difficult to utilize TTF theory as it is in several contexts because experience-oriented immersive technologies such as MR and Voice User Interface (VUI) have not only utilitarian value but also hedonic value. The task concept discussed in TTF and the experience concept in the Experience Economy are different. A task is a generic label for a development activity and should not be used to refer to user experience. Tasks typically do not include emotions or feelings. In fact, task-related or task-oriented experience has been distinguished from general experience in several studies (Agoglia et al., 2009), and even general experience and task-related experience have been distinguished (Lobo et al., 2004). Therefore, experience and task are separate concepts used in various studies, including in the field of VR (Cooper et al., 2021). Thus, when using the TTF in the context of experiences such as cultural heritage, museums, drama, or tourism, we need to refine the TTF. The research question is whether the application of the existing TTF in the context of hedonic contexts is valid and how a new model that embraces both experience and technology could be developed from the perspective of the experience economy.

Specifically, given that experience is the central component of XR in cultural heritage contexts, by drawing on TTF research, this study proposes that *experience* is a key concept which replaces *task*, where the fit in the existing TTF becomes a fit between technology and experience. In this context, four experiential factors (e.g., educational, esthetic, entertaining, and escape experience) central to experience economy theory replace task characteristics. To investigate this further, survey data was gathered from visitors to an immersive experience combining MR and VUI at an exhibition hall in South Korea.

The novel contribution of this study is the proposed a new variation of TTF based on experience economy theory, namely, the experience-technology fit (ETF). Overall, this research aims to determine the influence of MR characteristics (e.g., interactivity, vividness), VUI characteristics (e.g., speech recognition, speech synthesis), and experience economy factors on experience satisfaction, revisit intention and actual purchase of souvenirs reminiscent of the experience. By doing so, this study expands the applications of TTF to experience-oriented businesses, thereby broadening our understanding of technological success with a specific focus on the technology fit of XR (MR and VUI) in cultural heritage contexts. For cultural organizations, this study importantly highlights the suitability of carefully designed MR and VUI technology for enhancing customers' experience and positively contributing to economic success.

2. Theoretical Background

2.1 VUI (AI/Chatbot) and MR in Cultural Heritage Contexts

Current state-of-the-art XR technologies provide clear benefits for cultural heritage sites in terms of attracting visitors and encouraging revisits (Doukianou *et al*., 2020). Therefore, it is important to understand the impact of these technologies on the visitor experience. In the MR environment, real and virtual content coexist and interact in real-time and as a result, this technology offers users a unique perspective where users feel immersed and their perception of both the real and virtual environments is enriched (Bekele *et al*., 2018). MR interfaces, interaction techniques and devices are developing at a rapid pace while the cost of building suitable applications has declined considerably. Users can experience cultural artifacts and digital storytelling in completely new ways whereby flexibility, immersion, interaction, coexistence and enhancement are essential aspects of an effective MR experience (Bekele *et al*., 2018).

Advances in this technology have meant that MR cultural heritage applications are emerging and growing in popularity as organizations aim to predetermine their relevance (Bekele and Champion, 2019). In previous research, both the interactivity and vividness of an MR cultural heritage exhibition have been found to positively influence perceived immersion and perceived enjoyment as well as brand awareness, brand association and brand loyalty (Bae et al., 2020). Presence and immersion are important concepts in virtual environments and in his early study, Slater (1999) found a relationship between the degree of presence experienced in simulation and an individual's performance. Further, Slater (2009) revealed that two components of Presence (Place illusion and Plausibility) can lead to realistic behaviour in immersive virtual environments and these two concepts can be used as the basis for the psychophysics of presence in virtual environments (Slater et al., 2010) and later Slater (2018) clarified the concepts of immersion and the illusion of presence in the context of VR environments. Recently, Rey et al. (2023) investigated implicit behavioural and psychological emotional responses to emotional olfactory, auditory, and visual stimuli delivered in a rich virtual environment. Further, Kim and Choo (2023) revealed that the experience mode of VR (non-immersive vs immersive) increases consumers' creative ability through an increased perceptual curiosity toward the VR store.

Enabling multimodal interaction through speech, gaze, gesture, touch and movement enables users to establish a contextual relationship and collaboratively interact with the virtual content, which increases engagement with the MR environment (Bekele and Champion, 2018). Specifically, the integration of VUI, that is, systems controlled primarily through voice input, allows users to request information (Myers *et al*., 2019) via MR technology. VUIs are becoming more integrated into people's daily lives with previous research showing that people's interaction behavior towards VUIs is influenced by personal characteristics such as technical knowledge where individuals with more technical experience adopt a trial-and-error approach (Myers *et al*., 2019). Hence, future considerations for the design of VUIs include developing systems that can recognize and be tailored to individual user differences.

2.2 Task-Technology Fit

TTF (Task-Technology Fit) refers to the degree of harmonization between the requirements of a person's task and the ability of technology to support that person's skills when performing the task (Dishaw and Strong, 1999). TTF is part of contingency theory, which explains the usefulness of technologies. The right technology for a given task may help individuals or organizations achieve their goals and improve performance. The importance of decision-making in choosing the right technology for organizational or individual success (Goodhue and Thompson, 1995) cannot be overstated. In addition, TTF is useful for understanding the technology-to-performance chain, focusing as it does on the match between user task needs and the available functionality of the IT in question (Howard, 2019).

Contingency theory, which includes the TTF, complements the existing utility focus in acceptance research based on models such as the TAM, in which the user's attitude toward technology influences his or her choice (Klopping and McKinney, 2004). However, the user's skill selection behavior does not always guarantee that the task will be performed successfully or that performance will improve. On the other hand, the use of the TTF model has been shown to improve personal and organizational task performance (Goodhue and Thompson, 1995). The TTF model suggests the importance of decision-making and choosing information technology suitable for different tasks.

TTF has been used as a representative concept to explain the successful selection of information technology in various digital transformation contexts such as online educational content that ensures sustainable use (Wu *et al*., 2018), IoT network systems for disaster management (Sinha *et al*., 2019), learning of VR technology to increase effects (Zhang *et al*., 2017) and decision support systems to improve decision quality (Erskine *et al*., 2019). In this study, we utilize a concept similar to TTF to examine the use of information technology in a specific digital transformation context: the exhibition hall in Seoul, South Korea.

The TTF model has been validated in many empirical hospitality management studies to investigate correlations among tasks, technologies, utilization, user satisfaction and performance out). For instance, in the hotel context, TTF has been used to explore both guests' (Schrier *et al*., 2010) and employees' technology usage and adoption. Applying TTF to the mobile commerce environment, Lee *et al*. (2007) found that tourism shoppers may increase their usage of mobile commerce when the contingent context fits in the task-technology usage. Even though users were more likely to use technology that was perceived to fit their culture, TTF still had a greater impact than culture on a firm's perceived performance (Vatanasakdakul *et al*., 2010). Similarly, Park *et al*. (2015) integrated the UTAUT and TTF with two antecedents of consumer characteristics to examine consumer response to an unfamiliar product (Park *et al*., 2015). Finally, in the context of e-Commerce found that the relationship between

TTF (Chen *et al*., 2017). The overall literature review is presented in Table 1.

Table 1. Literature on extended TTF model

Authors (Year)	**Study Context**	**Sample**	**Extended TTF model**	**Key Variables**
Chen et al., 2017	Electronic commerce, e-learning commercial website	749 registered members (consumers) (Male=327, Females=422)	Yes	Task-technology fit, Perceived navigation, Perceived reputation, Perceived privacy risk, Perceived performance risk, Purchase intention
Dishaw & Strong, 1999	Information Technology (IT) utilization behavior	IT programmers (60 maintenance projects collected from the three organizations)	Yes	Task-technology fit, Perceived usefulness, Perceived ease of use, Task characteristics, Tool experience, Intention to use, Attitude
Erskine et al., 2019	spatial decision support systems (SDSS), developers of SDSS to maximize decision-making performance	200 employed (Male=112, Females=88)	Yes	Task-technology fit, Problem Complexity, Input Complexity, Decision Time, Decision Accuracy, Geospatial reasoning ability
Howard, 2019	Technologies in business environments, TTF theory in need of refinement or extension	Sample A 204 participants employed (Male=135, Females=69), Sample B 246 participants employed (Male=160, Females=86)	Yes	Task–technology fit, Task characteristics, Technology characteristics, Task–technology misfit, User Reactions, Utilization, Performance Outcomes
Park et al., 2015	Really new product development, Consumer innovativeness	275 online consumer panel (Male=76, Females=195)	Yes	Task-Technology Fit, Consumer innovativeness, Perceived value of a customized product, Performance expectancy, Effort expectancy, Social influence, Facilitating conditions, Behavioral intention
Sinha et al., 2019	IoT technology and its applicability in the disaster management scenarios	298 target audience (Male=202, Females=96)	Yes	Task-technology fit, Task requirements, IoT technology, Strategic value
Zhang et al., 2017	virtual reality (VR), learning behaviours	135 Students (Male=46, Females=89)	Yes	Task-technology fit, Technology quality, Technology accessibility, Reflective thinking, Perceived learning effectiveness

In this paper, we suggest ETF as a variation of TTF. While contingency theory emphasizes cognitive fit in presenting TTF (Goodhue and Thompson, 1995), the things to consider when choosing an information system (IS) may be more based on experiential factors. Furthermore, an experiential model may make it easier to classify a fit more comprehensively than a cognitive/emotional model. In this paper, therefore, based on experience economy theory (Pine and Gilmore, 1998), we view the concept of "fit" in the existing TTF as a fit between technology and experience. Accordingly, the experiential characteristics that replace task characteristics are the four elements. As with former models, task characteristics will vary depending on the context.

Since Goodhue and Thompson (1995), TTF studies have demonstrated the binary relationship between a task and the fit of a technology, but in fact, a technology may be a mixture of two or more technologies; therefore, we define fit as a combination of technology and experience. From this combinatorial viewpoint and based on our ETF model, we posit that the characteristics of MR and VUI combine to contribute to ETF. Figure 1 shows our theoretical model, which posits that the use of MR affects visitor satisfaction as well as revisit intention, purchase intention and actual purchase behavior.

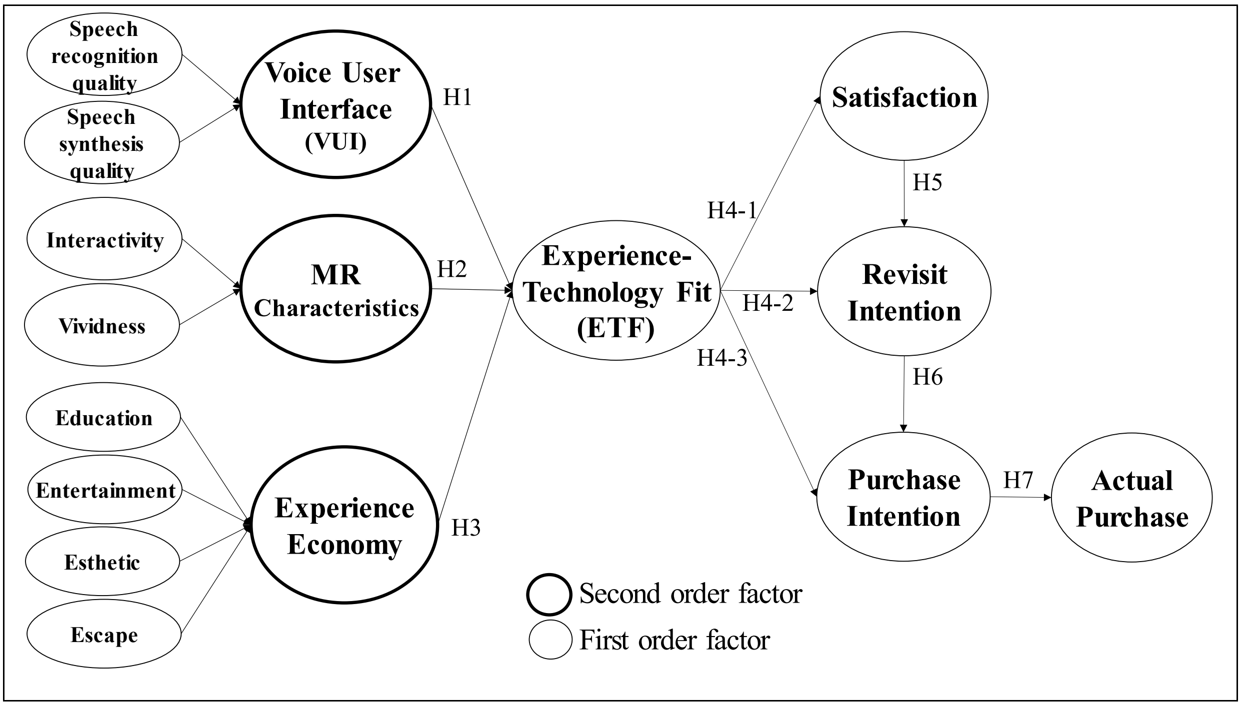

Figure 1. Research Model

3. Hypotheses

3.1 Technology Characteristics

The technology in focus in this study is the information technology used in the immersive exhibition hall, particularly the VUI (voice user interface) and MR, which are the most prominent information technologies in the exhibition hall.

3.1.1 Voice User Interface and Experience-Technology Fit

A VUI (e.g., Google Assistant and Alexa) allows the user to interact with a system through voice or speech commands. VUI involves a combination of two technologies: speech recognition and speech synthesis. Speech recognition refers to the ability to input spoken words, which are then converted into audio format (Rai *et al*., 2017). VUIs equipped with speech recognition are being used for marketing purposes in contexts such as voice shopping (Carmel, 2019). The value of speech recognition is maximized when the technology fits the user's task. Accordingly, in the context of experience services, since speech recognition technology improves the timeliness and accuracy of the interface with the audience, the audience can enjoy the experience more (Tam and Oliveira, 2016).

Speech synthesis refers to the capability of technology to reproduce the written text as machine-generated speech (Schuller *et al*., 2012). Small changes in voice quality or latency have large impacts on customers' experience and preferences (Makino *et al*., 2020). Speech synthesis enhances the media richness and expression that are part of the experience. Accurate and timely speech synthesis has a beneficial effect on the quality of decision-making by users who hear it. Speech synthesis is also related to the quality of the information provided. Quality information is advantageous for users of information systems engaged in a specific task (Tam and Oliveira, 2016). The higher the quality of information, the better the fit between task and technology (Yim *et al*., 2017). In addition, speech synthesis enables representations that cannot be expressed using the human voice; it can also be tailored to the target experience (Wagner *et al*., 2019).

Thus, the better the quality of the VUI based on speech recognition and speech synthesis, the more beneficial it will be to the ETF. Therefore, the following hypothesis was established.

Hypothesis 1: *The quality of the VUI has a positive effect on ETF.*

3.1.2 Mixed Reality and ETF

MR refers to "an environment composed both by real and virtual objects" (Jacobs and Loscos, 2006, p.1). The main technical goals of immersive technologies such as MR include interactivity and vividness (Steuer, 1992). For this, interactivity can be experienced when interacting with entities in the digital world, and the vividness of the virtual world, must actually be felt (Bae *et al*., 2020).

First, interactivity refers to “the degree to which users of a medium can influence the form or content of the mediated environment” (Steuer, 1992, p. 81). It has been confirmed that interactivity has a positive effect on telepresence as well as satisfaction (Kim and Ko, 2019). Interactivity had a positive effect on users’ moods and loyalty through experience in the VR market (Cheng *et al.*, 2014).

Second, vividness refers to “the ability of a technology to produce a sensorially rich mediated environment” (Steuer, 1992, p. 80). The e-commerce research using AR revealed that when the content of the AR experience and the vividness of AR achieve a fit, it has a positive effect on perceived immersion and purchase intention (Yim *et al*., 2017). A study that combined the TAM and TTF also confirmed that vividness and TTF positively influence perceived usefulness (Lee and Lehto, 2013).

In summary, we can often find cases in which interactivity and vividness are considered among technology characteristics in TTF model-based studies. Thus, in the context of MR-based experience, we conclude that the interactivity and vividness of MR will be meaningful in achieving fit with the experience using MR. Thus, we hypothesized as follows:

Hypothesis 2: *MR quality has a positive effect on ETF.*

3.2 Experience Characteristics

An exhibition hall is a place of communication between visitors and experienced directors. The task in the exhibition hall, from the point of view of developers, is to achieve an educational effect, a kind of enlightenment or understanding of the experience creators' message through interaction with the exhibits. The message that the designer and director of the exhibition hall intend to convey is transmitted by the experience. In particular, the art experience center is geared toward producing an esthetic response, which may include appreciation for the beauty of the art exhibited there and a greater understanding of it, beyond simple knowledge or pleasure. In the context of this study, the task of the VUI is to enhance users’ experience of 19th-century Impressionist works.

With TTF, tasks are actions that members perform to achieve organizational goals. Tasks can vary, but in general, the characteristics of tasks are difficulty, interdependence, time-criticality (Gebauer, 2005), task routineness and task interdependence. However, experience in ETF is different from the traditional meaning of task. The characteristics of experience, as introduced in the experience economy theory (Pine and Gilmore, 1998), differ from the task characteristics suggested by contingency theory. Pine and Gilmore (1998) defined experience as a high-level combination of products and services and suggested the *theory of experiential economy*, in which consumers experience real meaning by directly participating in the process of creating the product or service. Here, experience collectively refers to knowledge or skills that are actually seen, heard, experienced, or obtained during this process.

In particular, looking at the factors inherent in the experience economy model applied in research on immersive technology, even in research on satisfaction with an AR navigation experience (Jung *et al*., 2021), AR and VR had positive effects even in museum experience situations (Jung *et al*., 2016). Also, Pine and Gilmore (1998) stated that including all four experiential factors provides a 'sweet spot'. They argued that a design that considers all four experiences is more likely to be successful than otherwise. Therefore, selecting the appropriate technology to include all four elements in the experience will improve ETF for the audience. Therefore, the following hypothesis was established.

Hypothesis 3: *Experience characteristics have an effect on ETF.*

3.3 ETF and Satisfaction

Technology experience is an important determinant of customer satisfaction. Technologies are often used for various purposes with different functions being context-specific and thereby providing value based on the task at hand (i.e., whether hedonic or utilitarian). In particular, self-service technology refers to “technological interfaces that enable customers to produce a service independent of direct service employee involvement” (Djelassi *et al*., 2018, p. 39), regardless of whether its use is utilitarian or hedonic (Hwang and Kim, 2007). Therefore, users are more satisfied when they use and experience things themselves. However, to maximize customer satisfaction due to technology experience, the technology and experience must be well-fitted (Djelassi *et al*., 2018). From the experience economy perspective, the value of experience-based technology differs from task-oriented technology, which focuses more on efficiency and effectiveness. For example, XR technologies revolutionize the museum and cultural heritage experience when they not only entertain visitors, but also allow them to better understand exhibits, increase their empathy with challenging concepts and topics, and enhance their knowledge (Margetis *et al*., 2021).

The importance of this experience and fit with technology is further observed in immersive technology research. Studies exploring VR in the sports field revealed that VR technology can improve customer satisfaction when it fits well with the resulting flow experience (Kim and Ko, 2019). For this reason, the suitability of customer experience and technology experiencing is an important determinant of satisfaction.

Correspondingly, in the context of MR, the fit of MR technology and tasks in MR experiences in the context of tourism is related to the quality of the audience’s experience (Paulo *et al*., 2018). Extending this to the context of the exhibition hall, ETF can be regarded as the extent to which information technology included in a theatrical space and/or production is suitable for acquiring the intended experience and its positive effect on the enhancement of customer experience. Thus, the following hypothesis is proposed.

Hypothesis 4: *ETF has a positive effect on satisfaction with an experience.*

3.4 Satisfaction and Outcomes

Since it has a positive effect on behavioral intentions in a museum context (Elgammal *et al*., 2020), visitor satisfaction can be identified as an important factor and performance indicator of contents or services. Performance is explained by the TTF model, and in our ETF model based on the TTF, we posit a connection between behavioral intention and satisfaction of the audience who experienced the fit of the MR, VUI and overall experience. In this study, we are interested in verifying the economic feasibility of VUI and MR in operating experience centers. In addition, we are also interested in understanding whether VUI and MR can help improve customer satisfaction, and if designing, developing, installing and operating exhibits based on VUI and MR provides the audience with a good experience. Therefore, two dependent variables were included in the analyses: intention to revisit, which is related to economic feasibility, and actual purchase of souvenirs from the souvenir shop in the exhibition hall as an indicator of customer satisfaction.

Traditionally, IS research has reported that satisfaction with information systems has a positive effect on reuse and purchase intention. In particular, it was confirmed in research on theme parks (Wu *et al*., 2018), lodging (An *et al*., 2019) that satisfaction positively affects revisit intention. Hence, we posit that even in the exhibition hall, the context of this study, the audience's experience satisfaction will have a positive effect on their intention to return. We, therefore, hypothesize as follows:

Hypothesis 5-1: *Experience satisfaction has a positive effect on the intention to revisit.*

Most experience centers display souvenirs at the end of the experience. Souvenirs are reminiscent of the visit and stimulate memories of a good experience for a long time. However, in many cases, careful design so that audiences will have a good experience does not lead to the active purchase of souvenirs; therefore, questions have arisen about the economic feasibility of designing experiences. Factors affecting souvenir purchase behavior have been a subject of research interest. In general, research on the intention to purchase souvenirs focuses on the customer's attitude toward the souvenir itself in terms of the authenticity and esthetic of the souvenir (Meitiana *et al*., 2019; Yu and Littrell, 2003). However, other factors may also be involved in consumption behaviors such as the intention to purchase souvenirs or the actual purchase of souvenirs. For example, attitudes toward other cultures may influence the intention to purchase souvenirs related to that culture (Cho and Lee, 2013). The intention to purchase souvenirs is not only based on the characteristics of the souvenir itself, but also other factors associated with the souvenir.

Therefore, in this study, we considered satisfaction with the experience in the exhibition hall as an environmental element associated with consumption behavior related to souvenirs. Since the souvenirs of the exhibition hall refer to the characters or objects that appeared in the experience, they are designed to remind visitors of the experience. Therefore, we posit that the more satisfied the visitor is with the experience, the more positive they will be about the elements inherent in the souvenir, which will influence their attitude toward it. In addition, this attitude is expected to influence the intention to purchase souvenirs, which is consistent with the findings of existing research (Kim and Littrell, 1999; Meitiana *et al*., 2019). Thus, we assert that satisfaction with the experience in the exhibition hall will positively affect the intention to purchase souvenirs related to the experience, and that purchase intention will lead to actual purchase (Meitiana *et al*., 2019). We, therefore, hypothesize as follows:

Hypothesis 5-2: *Experience satisfaction has a positive effect on visitors' intention to purchase souvenirs.*

Hypothesis 5-3: *Intention to purchase souvenirs of the experience positively affects the actual purchase of souvenirs.*

4. Methods

4.1 Study Context

To test the hypotheses of this study, we chose an exhibition hall called L'atelier exhibition hall in Seoul, South Korea, which features MR exhibitions of the work of 19th-century Impressionist artists such as van Gogh and Gauguin among its attractions (L'atelier, 2020). As the introduction in the guidebook states, "The space in the frame soon becomes reality, and you become part of the picture". Some portraits are available for conversation, like that of van Gogh's friend, postman Joseph Roulin. The museum provides a VUI that recognizes the voice of the audience and responds according to the content of greeting or questioning. At this MR attraction, you can experience a media art show with the theme of "Monet's Garden." In particular, "Monet's Garden" recognizes the physical movement of visitors, who can experience the movement of leaves on the pond as well. There is also a musical performance based on van Gogh's life story, and a hologram talk show called "X Files on Masterpieces" tracks the events leading to the death of van Gogh. In these interactive media exhibits, actors and digital characters interact through dialogue. More details about the exhibition experience are shown in Table 2.

Table 2. Study context

Context 1 (VUI)	Conversation with van Gogh's postman Joseph
Figure of study context	
Feature	Artificial intelligence functions (voice recognition and speech synthesis) are applied so that the screen answers when the audience asks questions about van Gogh and his works. The postman can recognize and respond to people's voices, and when the postman in the portrait speaks, facial expressions and mouth shapes are appropriately expressed accordingly.
Context 2 (MR)	Monet's Garden
Figure of study context	
Feature	When visitors enter the MR attraction based on Monet's Garden, a 360-degree physical space appears, displaying white walls and floors. The four corners of the walls realistically display Monet's Garden. The top projector is designed to enable an experience on the 360-degree walls and floor, and the MR experience is designed to have sensors detect the movement of the visitors' feet and have the leaves in Monet's Garden respond accordingly.

4.2 Measures

In this study, the following procedure was performed to determine whether experiential technologies such as VUI and MR can be fully explained by the TTF model or whether the TTF model needs to be modified or improved. First, the TTF model, which is related to the fit between task and technology, and theories related to experience were reviewed in a literature study. Second, in-depth interviews were conducted with MR and VUI experts to select first-order factors that reflect the characteristics of tasks and technologies. Third, items were developed including the characteristics of tasks, experience, MR technology and VUI technology specified by experts during the interviews, and the validity and reliability of the items were confirmed in a pilot study.

The pilot study was conducted with 21 actual visitors who visited the exhibition hall in early September 2019. This pilot survey enabled us to develop the questionnaire before the main survey was conducted. The questionnaire was developed further in a second revision using factor analysis and reliability testing. Then, a second pilot survey was completed on September 19 including 29 visitors. Finally, the development of the survey was completed and factor analysis and reliability testing were done to ensure the validity of the instrument.

Questionnaire items were developed as follows. First, based on prior research, items were chosen that were pertinent to our study context. After that, the questionnaire items were modified to this study context of the visitor experience at the MR exhibition hall in Seoul, Korea. Questionnaire constructs and items are shown in Appendix A. The researchers used a tablet PC dedicated to the questionnaire and a packaged response product situated on the table in the cafe inside the L'atelier exhibition hall, where the survey was conducted. Interviewers in this survey collected data from five people a day (Appendix A). Questionnaire items concerned special features related to the VUI, MR technology, the overall experience, and visitor satisfaction, revisit intention, purchase intention, and whether or not they made a purchase. All survey responses were scored on a 7-point Likert scale. SPSS 26.0 was used for demographic analysis. Exploratory factor and reliability analyses were conducted and the results were applied to SmartPLS 4.0 (partial least squares software).

4.3 Data Collection

To collect data, a survey was conducted with visitors who experienced the MR attraction at the L'atelier exhibition hall. First, they experienced the MR attraction for one or more hours. The actual experimental time was the same for each participant. However, there was a slight variation in the total time due to the movement between MR attractions or waiting time to experience each MR attraction. Then they visited the souvenir shop and received a survey. Responses were included only for visitors who agreed to be contacted individually.

The survey was conducted at the L’atelier exhibition hall only on weekends for four weeks to ensure a relatively homogeneous sample. In addition, the survey was given only to adults who paid their own entrance fee. Since data for this study were gathered on-site using a questionnaire related to actual experiences, some involvement from the researchers was necessary. One researcher wore a L’atelier uniform and stood in the exhibition viewing area at the entrance, approaching potential participants about participating in the survey. The other researcher confirmed that the management of L'atelier agreed to allow the survey to be conducted in front of the cafe and souvenir shop near the exit and received consent to conduct the survey. All participants received a gift box worth about USD 5 as compensation for participation.

4.4 Subjects

In total, 293 surveys were collected, of which 232 were used in the final analysis; the others were excluded due to inappropriate answers to the reverse-coded questions. Table 3 shows the demographic characteristics of all participants.

Table 3. Demographic characteristics of respondents (n = 232)

Category		**Frequency (%)**
Gender	Male	81 (34.9)
	Female	151 (65.1)
Age	20s	109 (47.0)
	30s	91 (39.2)
	40s	24 (10.3)
	50s	8 (3.4)
Education	High school graduate	25 (10.8)
	College registration	26 (11.2)
	College graduate	156 (67.2)
	Graduate student or above	25 (10.8)
Profession	Student	46 (19.8)
	Employee	117 (50.4)
	Housewife	14 (6.0)
	Practitioner	41 (17.7)
	Other	14 (6.0)
Actual Purchase	Yes	152 (65.5)
	No	80 (34.5)

5. Results

5.1 Factor Analysis

In the questionnaire, 34 items were analyzed by exploratory factor analysis using the Varimax rotation method. The factor analysis (shown in Appendix B) revealed that commonality exceeded 0.837. In total, eight factors were identified, with no multiple loading items for only one factor of 0.6 or more. The results of the exploratory factor analysis revealed that the KMO (Kaiser-Meyer-Olkin) value for the sample was 0. 915, which confirms that the data set is valid for factor analysis. In addition, the sphere formation test value for the sample was x^2 = 8636.482 (df = 561, p < .001), and the cumulative total variance of the factors was 91.018%, which is judged to be suitable for factor analysis. The reliability of the eight identified factors was confirmed by Cronbach's α coefficient, which was higher than 0.78, displaying high credibility. Appendix B presents the results of the exploratory factor and reliability analyses.

5.2 Validation

5.2.1 Validity and Feasibility of Measurement Model (First Order)

The validity and appropriateness of the measurement model were determined before testing the hypotheses of this study. According to the proposed ETF model, experience economy factors were considered for the experience factor, and VUI characteristics and MR technology characteristics were considered as technology factors. To prevent construct misspecification in verifying the measurement model (Jarvis *et al*., 2003), a two-stage approach (Becker *et al*., 2012) was carried out. The results of the measurement model of the first-order construct were confirmed as shown in Table 4. First, as shown in Table 4, the AVE (average variance extracted) exceeds 0.678, which indicates convergent validity (Bagozzi and Yi, 1988). Composite reliability (CR), which is an index that measures the feasibility of the measurement model, exceeds 0.811, indicating reliability. The Cronbach’s α value resulting from the PLS algorithm exceeded 0.534. Except for the MR technology variable, the internal consistency of all questionnaire items was indicated by a high reliability of 0.842 or higher on all other factors (Bagozzi and Yi, 1988; Hair *et al*., 2012). Furthermore, the communality value measuring the quality of the measurement model exceeded 0.682, indicating the suitability of the measurement model.

Table 4. Assessment of measurement model (first order)

Constructs	Items	Loadings	AVE	CR	Cronbach’s α	Communality
Speech recognition quality (SRQ)	SRQ 1	**0.970**	0.929	0.963	0.924	0.929
	SRQ 2	**0.958**				
Speech Synthesis Quality (SSQ)	SSQ 2	**0.976**	0.941	0.970	0.938	0.941
	SSQ 3	**0.964**				
Interactivity (Inter)	Inter 1	**0.960**	0.922	0.972	0.957	0.922
	Inter 2	**0.975**				

	Inter 3	**0.944**				
Vividness (Vivid)	Vivid 1	**0.904**	0.819	0.900	0.779	0.819
	Vivid 2	**0.906**				
Education experience (EduE)	EduE 1	**0.926**	0.845	0.942	0.908	0.845
	EduE 3	**0.923**				
	EduE 4	**0.908**				
Entertainment experience (EnterE)	EnterE 2	**0.970**	0.930	0.976	0.962	0.930
	EnterE 3	**0.952**				
	EnterE 4	**0.971**				
Esthetic experience (EstheE)	EstheE 1	**0.905**	0.844	0.942	0.908	0.844
	EstheE 2	**0.931**				
	EstheE 3	**0.920**				
Escape experience (EscapE)	EscapE 3	**0.886**	0.819	0.931	0.890	0.819
	EscapE 4	**0.936**				
	EscapE 6	**0.892**				
Experience-Technology Fit (ETF)	ETF 1	**0.966**	0.943	0.980	0.970	0.943
	ETF 2	**0.973**				
	ETF 3	**0.974**				
Satisfaction (Sat)	Sat 1	**0.976**	0.945	0.981	0.971	0.945
	Sat 2	**0.971**				
	Sat 3	**0.969**				
Revisit Intention (RI)	RI 1	**0.933**	0.884	0.958	0.935	0.884
	RI 2	**0.956**				
	RI 3	**0.931**				
Purchase Intention (PI)	PI 1	**0.954**	0.896	0.963	0.942	0.896
	PI 2	**0.928**				
	PI 3	**0.957**				
Actual Purchase (AP)	AP 1	**1.000**	1.000	1.000	1.000	1.000

AVE: Average Variance Extracted, CR: Composite Reliability

5.2.2 Validity and Feasibility of Measurement Model (Second Order)

We conducted a second-order, factor-based, PLS-SEM analysis (Becker *et al*., 2012; Roni *et al*., 2015). Second-order factors are used to contain and explain concepts that underlie the meaning of first-order factors (Roni *et al*., 2015). The independent variable in this study was the reflective-formative type. After confirming their first-order constructs, Jarvis *et al*. (2003) and Becker *et al*. (2012) proposed a two-stage approach in hierarchical models including latent variables. The results are shown in Table 5. We measured factor loadings for speech recognition quality and speech synthesis quality of VUI, interactivity and vividness of MR technology, and the experience economy factors education, entertainment, esthetic and escape;

Cronbach's alpha coefficients were 0.50, 0.80 and 0.70, respectively. The reliability of the model was therefore confirmed (Bagozzi and Yi, 1988; Hair *et al.*, 2012). Also, the AVE values were all above 0.678, exceeding the limit of 0.5; therefore, convergent validity was also satisfied (Bagozzi and Yi, 1988). Based on these results, we concluded that hypothesis testing could be performed.

Table 5. Assessment of measurement model (second order)

Constructs	Items	Loadings	AVE	CR	Cronbach's α	Communality
Voice User Interface	Speech recognition quality (SRQ)	**0.960**	0.860	0.925	0.845	0.860
	Speech Synthesis Quality (SSQ)	**0.894**				
MR Technology	Interactivity (Inter)	**0.807**	0.682	0.811	0.534	0.682
	Vividness (Vivid)	**0.844**				
Experience Economy	Education experience (EduE)	**0.793**	0.678	0.894	0.842	0.678
	Entertainment experience (EnterE)	**0.817**				
	Esthetic experience (EstheE)	**0.885**				
	Escape experience (EscapE)	**0.795**				

To ensure discriminant validity, the square root of AVE for each factor should be greater than the correlation coefficients between variables (Fornell and Larcker, 1981). The results in Table 6 show that the model satisfies this condition. In addition, the cross-loading results in Appendix C show that all factor loading values exceed 0.794, confirming the discriminant validity of each factor. Table 6 presents correlations among constructs.

Table 6. Correlations among constructs

Constructs	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Voice User Interface (VUI)	**5.71**	**1.17**	**.927**							
(2) MR Technology	**5.24**	**0.99**	$.397^{**}$	**.826**						
(3) Experience Economy	**5.72**	**0.93**	$.372^{**}$	$.618^{**}$	**.823**					
(4) Experience-Technology Fit (ETF)	**5.63**	**1.21**	$.399^{**}$	$.547^{**}$	$.589^{**}$	**.971**				
(5) Satisfaction	**6.18**	**0.94**	$.375^{**}$	$.501^{**}$	$.783^{**}$	$.568^{**}$	**.972**			
(6) Revisit Intention	**5.44**	**1.34**	$.247^{**}$	$.397^{**}$	$.609^{**}$	$.435^{**}$	$.635^{**}$	**.940**		
(7) Purchase Intention	**4.91**	**1.55**	$.160^{*}$	$.443^{**}$	$.541^{**}$	$.365^{**}$	$.500^{**}$	$.576^{**}$	**.946**	
(8) Actual Purchase	**1.34**	**0.48**	.068	$.208^{**}$	$.185^{**}$	$.130^{*}$	$.181^{**}$	$.178^{**}$	$.446^{**}$	**1.000**

Note 1: Values on the diagonal indicate the square root of AVE for each construct.

Note 2: * $p < 0.05$, ** $p < 0.01$

In order to mitigate the common method bias of the respondents, we collected data by introducing a time difference in responding to the survey items corresponding to the independent variable and those corresponding to the dependent variable. We also examined the presence of common method bias using collinearity statistics (VIF; Variance Inflation Factors). According to Kock (2015), common method bias is considered absent when the VIF is below 3.3. As shown in Table 7, we confirmed that all values were below VIF 1.795, indicating the absence of common method bias.

Table 7. Collinearity statistics (VIF)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Voice User Interface (VUI)								
(2) MR Technology								
(3) Experience Economy								
(4) Experience-Technology Fit (ETF)	1.261	1.795	1.775	1.000	1.477	1.477	1.234	
(5) Satisfaction								
(6) Revisit Intention							1.234	
(7) Purchase Intention								
(8) Actual Purchase							1.000	

5.2.3 Fit of Structural Model

In this study, all values except that for the deviation experience factor of MR are positive. Predictability exists when all values for all path coefficients are positive (Tenenhaus *et al*., 2005). Also, the size of goodness-of-fit in the PLS path model is regarded as large if the value is 0.36 or larger; the value for MR in this study was 0.528, thus showing high goodness-of-fit (Tenenhaus *et al*., 2005).

5.3 Hypothesis Testing

The hypotheses in this study were tested through path counting and the valence of each path coefficient was confirmed by setting 5,000 bootstrapping specimens (Hair *et al*., 2011). The significance of individual paths is summarized in Figure 2 and Table 8. Eight out of 9 paths exhibited a p-value less than 0.05. The explanatory power of the research model is also shown.

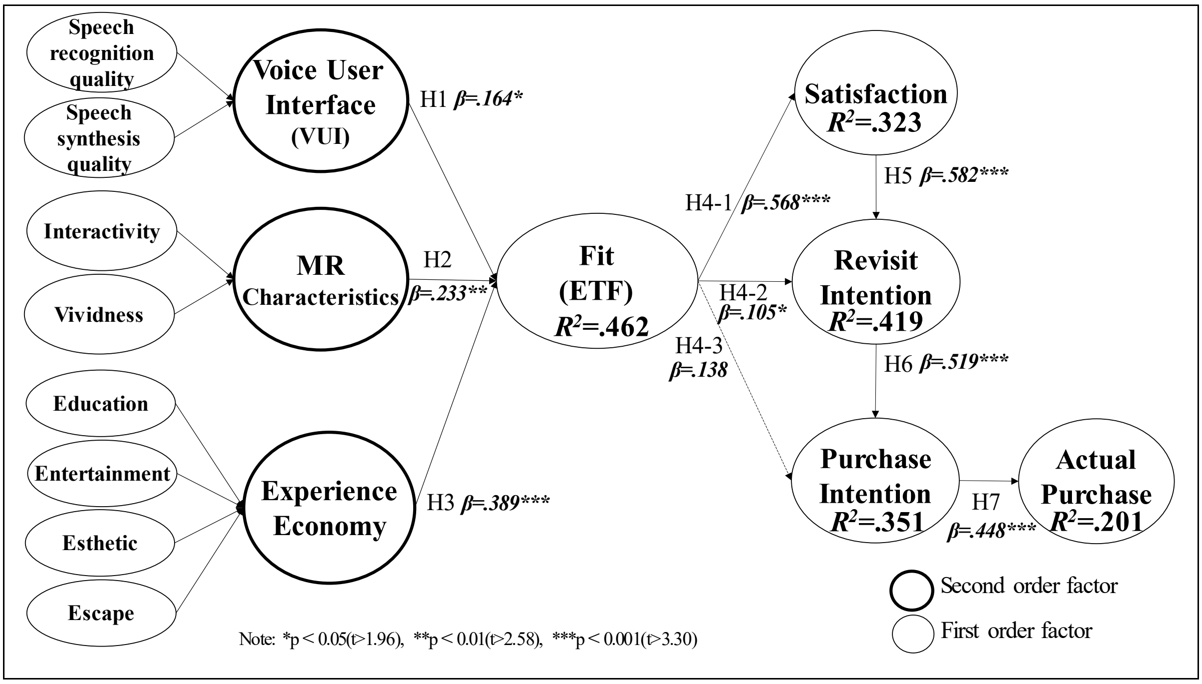

Figure 2. Hypothesis Test Results

First, *VUI* was significantly associated with *ETF* (β = 0.164, t = 2.079; H1 was supported). Second, *MR Technology* was significantly associated with *ETF* (β = 0.233, t = 3.192; H2 was supported). Third, *Experience* was significantly associated with *ETF* (β = 0.389, t = 4.865; H3 was supported). Fourth, *ETF* when engaging with MR-based experience was significantly associated with *Satisfaction* (β = 0.568, t = 8.354; H4-1 was supported) and *Revisit Intention* (β = 0.105, t = 1.981; H4-2 was supported), on the other hand *Purchase Intention* (β = 0.138, t = 1.794; H4-3 was rejected). Fifth, users' *Satisfaction* when engaging with MR-based experience was significantly associated with *Revisit Intention* (β = 0.582, t = 10.676; H5 was supported). Sixth, *Revisit Intention* was significantly associated with and *Purchase Intention* (β = 0.519, t = 8.506; H6 was supported). Seventh, *Purchase Intention* was significantly associated with *Actual Purchase* (β = 0.448, t = 8.812; H7 was supported).

Table 8. Path coefficients and results of hypothesis testing by bootstrapping

Hypotheses.	Path Name	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values	Accepted/ Rejected
H1	Voice User Interface → Experience-Technology Fit (ETF)	0.164	0.160	0.079	2.079	0.038	**Accepted**
H2	MR Technology → Experience-Technology Fit (ETF)	0.233	0.234	0.073	3.192	0.001	**Accepted**
H3	Experience Economy →	0.389	0.394	0.080	4.865	0.000	**Accepted**

	Experience-Technology Fit (ETF)						
H4-1	Experience-Technology Fit (ETF) → Satisfaction	0.568	0.567	0.068	8.354	0.000	**Accepted**
H4-2	Experience-Technology Fit (ETF) → Revisit Intention	0.105	0.104	0.053	1.981	0.048	**Accepted**
H4-3	Experience-Technology Fit (ETF) → Purchase Intention	0.138	0.140	0.077	1.794	0.073	Rejected
H5	Satisfaction → Revisit Intention	0.582	0.581	0.055	10.676	0.000	**Accepted**
H6	Revisit Intention → Purchase Intention	0.519	0.518	0.061	8.506	0.000	**Accepted**
H7	Purchase Intention → Actual Purchase	0.448	0.448	0.051	8.812	0.000	**Accepted**

Note: ***$p < 0.001$ ($t > 3.30$), **$p < 0.01$ ($t > 2.58$), *$p < 0.05$ ($t > 1.96$)

6. Discussion

The following results were obtained through the hypothesis verification of this study, which focuses on the integration of two XR technologies, VUI and MR, in a cultural heritage setting. First, VUI was significantly associated with ETF ($\beta = 0.163$, $t = 2.114$; H1 was supported). This is consistent with the adoption studies on weblogging and speech recognition system adoption (Azeta *et al*., 2019), where the quality of technology has a positive effect on the fit between task and technology. As the concept of fit is important in research supporting media content and information systems, it can be said that the quality of VUI that synthesizes and recognizes speech in MR content positively affects fit with experience.

Second, MR Technology was significantly associated with ETF ($\beta = 0.233$, $t = 3.171$; H2 was supported). This can be interpreted as follows: MR quality, which is composed of MR's interactivity and vividness, is also important for ETF and to the audience experience of VUI quality. This is in line with studies that confirmed that incorporating more XR technologies - VR or mobile AR - provides an immersive experience, affecting perceived TTF (Zhang *et al*., 2017; Paulo *et al*., 2018).

Third, Experience was significantly associated with ETF ($\beta = 0.389$, $t = 4.893$; H3 was supported). Unlike other existing studies that viewed the target of fit with technology as a task (Lin, 2012); Lin and Huang, 2008; Zhang *et al*., 2017; Paulo *et al*., 2018), in this study, experience is viewed as an object of fit with technology. In addition, using the model combining the TAM and TTF, there was also a study explaining that TTF affects TAM factors (Rai and Selnes, 2019). However, this study is based on experience economy theory. Since experience elements affect ETF, designing experiences including them is important.

Fourth, ETF when engaging with MR-based experience was significantly associated with Satisfaction

(β = 0.568, t = 8.400; H4 was supported). This is consistent with the finding that perceived fit affects satisfaction in studies of virtual learning systems (Lin, 2012). In addition, the results of a study of TTF's influence on Attitude towards the use of learning management systems and the results of a study of TTF's influence on perceived usefulness in digital textbook services were the same (Rai and Selnes, 2019). This can be interpreted as the results of satisfaction with the experience, which is the representative overall satisfaction of visitors in this study.

Fifth, users' satisfaction when engaging with MR-based experience was significantly associated with revisit Intention (β = 0.643, t = 13.667; H5-1 was supported) and Purchase Intention (β = 0.500, t = 8.884; H5-2 was supported). This is similar to the results of studies that demonstrate that not only does the perceived fit affect satisfaction, but satisfaction has a positive effect on continuance intention (Lin, 2012). In addition, satisfaction was confirmed to have a positive effect on the intention to purchase souvenirs (Klopping and McKinney, 2004). In other words, in a service centered on experience, the fact that MR-based experience positively influenced the intention to purchase is important from the economic perspective of the operation of the experience center. These results are meaningful in that we empirically confirmed that XR technology and XR experience influence intention to purchase, at least indirectly, via ETF.

Sixth, Purchase Intention was significantly associated with Actual Purchase (β = 0.449, t = 9.071; H5-3 was supported). This is the same as the results regarding consumers' purchase intention affecting actual usage through TTF in the context of e-commerce (Klopping and McKinney, 2004). Thus, the higher the satisfaction through the ETF in the XR-based exhibition hall, the more it affects the purchase intention, and thus acts positively on the actual purchase.

6.1 Theoretical Contribution

Since Goodhue and Thompson (1995), existing TTF-related research has focused on the performance or usefulness of work, whereas this study focuses on experience and how suitable the technology is for enhancing the audience's experience. TTF model has been applied in the visitor economy, such as tourism and hospitality and cultural heritage context. However, due to the clear distinction between *task* (utilitarian value) and *experience* (hedonic value), there is a limitation in terms of the application of TTF in the context of the experience economy and there is a need for the development of an innovative experience-oriented model rather than the existing task-oriented TTF model. To the best of the researcher's knowledge, this is one of the first studies which not only propose the ETF (experience technology fit) model from the perspective of the experience economy, which emphasises the importance of *experience* in order to bridge the research gap but also validate the ETF model using empirical data. In this study, by presenting experience as a task from the perspective of experience economy theory, we expanded the application of TTF to an experience-oriented business, thereby broadening our understanding of technological success. While users' intention to accept technologies such as AI and MR have received a lot of attention (Bae *et al*., 2020), the fit between experience and XR technology has not been the focus of the study. Thus, it is meaningful that this study defines organizational success in terms of the fit between experience and applied technology. Second, in this study, we proposed a fit of a combination of two types of technology, showing that TTF research is possible even in the context of multiple heterogeneous technologies. One previous study examined the fit between VR features and educational content and its link to learning outcomes (Zhang *et al*., 2017). In this empirical study, we showed that two XR technologies, MR and VUI, conjointly affect the variables related to consumption behavior. Third, this study examined the usefulness of the quality of VUI from the perspective of TTF, and the result was consistent with those of another study that confirmed that system, information, and service quality and TTF had positive effects on business performance in the context of m-banking services (Tam and Oliveira, 2016). In addition, we identified the quality of the exhibition hall VUI’s speech recognition and speech synthesis in an interaction-oriented experience situation as an important factor for variables related to visitor satisfaction (revisit intention, purchase intention). Finally, cultural heritage sites require modernization to create transformative experiences (Buhalis and Karatay, 2022). We are increasingly seeing the adoption of XR technologies, which provide a new, realistic experience that augments virtual content in physical environments. Therefore, this study focusing on satisfaction with a cultural heritage site contributes to our understanding of the impact of such technologies on XR-based visitor interactions and cultural heritage experiences.

6.2 Practical Implications

In the early days of research on AR/VR/MR applications and audience experience, the focus was on the development of only the visual dimension of this technology. However, the results of this study revealed that “virtual behavior,” including visual- and voice-based technology, should be considered essential to the implementation of MR featuring AI technology such as VUI. Fortunately, recent advances in XR technology are providing audiences with authenticity, and therefore today's XR technology is expected to enrich the audience's experience. First, we confirmed empirically that the adoption of XR technologies, including VUI technology and MR technology suitable for the customer's experience, contributed positively to the economic success of the exhibition hall. The results of this study showed not only the necessity and value of XR technologies (specifically VUI and MR), but also that an exhibition hall must be carefully designed in a way that satisfies the needs of the customer when building using this technology. Second, by expanding the TTF-related research with its focus on technology and individuals' work performance (Goodhue and Thompson, 1995), this study shows that high-quality MR and VUI technology can provide new and meaningful experiences to visitors, which is just as important to achieve. In other words, exhibition hall developers must develop high-quality XR technologies that can increase visitor satisfaction and that are well connected to the purpose of the experience. Fully exploring such opportunities could revolutionize the visitor experience (Buhalis and Karatay, 2022). In designing MR experiences that consider interaction with the audience, technology developers must pay attention to the implementation of high-level VUI technology. Third, economic factors are important in the development of immersive technology and experiential design (Jung *et al*., 2016). Practically speaking, the results of this study emphasize the importance of the design of experiential technology. The introduction of the ETF model which combines experience and technology developed in this study could be used as useful guidance for the design of unique and memorable visitor experiences using XR technology in the exhibition halls.

6.3 Limitations and Recommendations for Future Research

We identify several limitations of this study. First, the gender of respondents to the questionnaire was somewhat biased toward women, and the majority of respondents were in their 20s and 30s. While researchers speculate that the Metaverse will allow certain audiences (e.g., Gen Z) to co-create transformational experiences (Buhalis and Karatav, 2022), museum experiences may differ from other experiences in the kinds of visitors they attract; therefore, these limitations should be noted when generalizing the results of this study. Second, VUI only has a weak impact on ETF in our analysis, research has confirmed that it has a meaningful impact on ETF. The possibility of indirect effects of ETFs on perceived interactivity and vividness may be investigated in future research. Finally, the economic effect of audience experience does not necessarily lead to purchase intention or actual purchases at the souvenir shop. Therefore, in the experimental environment of this study, purchase intention and actual behavior in the souvenir shop were judged to be an acceptable proxy of the economic effects of the experience. This is in line with several studies that have characterized behaviors in souvenir shops as consumption effects (Zauberman *et al*., 2009).

Acknowledgment

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Appendix A. Constructs and Items

Variable	Items	References
Speech Recognition Quality (SRQ)	When I talked to the postman Joseph Roulin, the voice recognition software seemed to be at a technically high level.	Calefato et al (2014); Capretta & Moberly (2016) revised
	When I spoke with the postman Joseph Roulin, the speech recognition software seemed to be reliable.	
Speech Synthesis Quality (SSQ)	When I talked to the postman Joseph Roulin, the postman replied with words that I could understand.	Freeze et al. (2010) revised
	When I talked to the postman Joseph Roulin, the postman answered my questions with relevant answers.	
Interactivity (Int)	When I experienced Monet's Garden, the mixed reality water lily leaves matched my movement.	Mollen & Wilson (2010) revised
	When I experienced Monet's Garden, the mixed reality water lily leaves interacted with my movement.	
	When I experienced Monet's Garden, the mixed reality water lily leaves moved as I wanted.	
Vividness (Viv)	When I experienced the musical, the digital characters of the musical were clearly visible.	Huang et al. (2000); Huang & Tseng (2015) revised
	When I experienced the musical, the digital characters felt vivid.	
Education Experience (EduE)	I learned about Monet and van Gogh's stories and works through my experience at L'atelier.	Oh et al., (2007); Hosany & Witham (2010); Quadri-Felitti & Fiore (2013) revised
	It was a great experience to learn about Monet and van Gogh's stories and works from my experience at L'atelier.	
	I gained knowledge about Impressionist artists/works, including Monet and van Gogh, through my experience at L'atelier.	
Entertainment Experience (EnterE)	I enjoyed my experience of mixed reality such as the musical and Monet's Garden.	Mehmetoglu & Engen (2011) revised
	My experience of mixed reality such as the musical and Monet's Garden was fun.	Oh et al., (2007); Hosany & Witham (2010); Quadri-Felitti & Fiore (2013) revised
	I was interested in my experience of mixed reality such as the musical and Monet's Garden.	
Aesthetic Experience	The mixed reality content I showed attention to design detail as feel alive.	Oh et al., (2007); Hosany &

(EstheE)	The mixed reality content I felt a sense of harmony. The design of the mixed reality content I experienced at L'atelier was attractive to me.	Witham (2010); Mehmetoglu & Engen (2011); Quadri-Felitti & Fiore (2013) revised
Escape Experience (EscapE)	During the mixed reality experience of the musical and Monet's Garden, I felt a sense of flow from one part of the experience to another. During the mixed reality experience of the musical and Monet's Garden, I was fully absorbed in the mixed reality experience. During the mixed reality experience of the musical and Monet's Garden, I felt immersed in the mixed reality experience.	Oh et al., (2007); Hosany & Witham (2010); Quadri-Felitti & Fiore (2013) revised
Satisfaction (Sat)	I am satisfied with the mixed reality content I experienced at L'atelier. The mixed reality content I experienced at L'atelier was excellent. Overall, I am satisfied with the mixed reality content I experienced at L'atelier. The mixed reality content I experienced at L'atelier was good.	Poushneh & Vasquez-Parraga (2017) revised
Revisit Intention (RI)	I am willing to revisit the L'atelier. I would like to visit the L'atelier again. I want to visit the L'atelier again someday.	Huang & Hsu (2009) revised
Purchase Intention (PI)	I want to buy a souvenir from the souvenir shop at L'atelier. I want to recommend my acquaintances to buy souvenirs from the L'atelier souvenir shop. I am willing to purchase souvenirs from the L'atelier souvenir shop.	Poushneh & Vasquez-Parraga (2017); Ramaseshan & Stein (2014) revised
Actual Purchase (AP)	I actually purchased souvenirs from the L'atelier souvenir shop.	Wee et al. (2014) revised

Appendix B. Exploratory Factor Analysis

Variable	Items	Factor Loadings												Eigen Value	Explained Variance (%)	Confidence Coefficient
		1	2	3	4	5	6	7	8	9	10	11	12			
Experience-Technology Fit (ETF)	ETF 2	**0.865**	0.119	0.137	0.183	0.082	0.128	0.170	0.149	0.142	0.145	0.128	0.017	3.137	9.228	0.970
	ETF 3	**0.864**	0.147	0.123	0.188	0.093	0.164	0.170	0.108	0.142	0.144	0.120	0.006			
	ETF 1	**0.862**	0.069	0.159	0.160	0.148	0.122	0.147	0.139	0.134	0.137	0.130	0.033			
Entertainment Experience (EnterE)	EnterE 4	0.134	**0.827**	0.151	0.140	0.140	0.185	0.202	0.167	0.183	0.156	0.102	0.021	3.081	9.062	0.962
	EnterE 3	0.111	**0.815**	0.187	0.096	0.140	0.163	0.178	0.168	0.203	0.178	0.137	0.015			
	EnterE 2	0.117	**0.812**	0.119	0.144	0.147	0.174	0.231	0.197	0.225	0.146	0.090	0.038			
Speech Synthesis Quality (SSQ)	SSQ 3	0.065	0.050	**0.954**	0.096	0.010	0.009	0.066	0.018	0.054	0.017	0.071	-0.001	3.036	8.931	0.938
	SSQ 2	0.111	0.131	**0.941**	0.101	0.037	0.033	0.095	0.009	0.021	0.038	0.045	0.013			
Speech Recognition Quality (SRQ)	SRQ 1	0.264	0.189	**0.681**	0.065	0.002	0.108	0.098	-0.010	0.152	0.132	0.134	0.024	2.966	8.724	0.924
	SRQ 2	0.154	0.187	**0.664**	0.149	0.036	0.120	0.095	0.008	0.114	0.161	0.141	0.005			
Interactivity (Inter)	Inter 3	0.156	0.065	0.071	**0.907**	0.144	0.058	0.066	0.082	0.024	0.070	0.075	0.054	2.917	8.579	0.957
	Inter 2	0.135	0.107	0.120	**0.904**	0.163	0.057	0.164	0.131	0.078	0.074	0.084	0.025			
	Inter 1	0.160	0.126	0.118	**0.888**	0.105	0.080	0.118	0.126	0.058	0.084	0.100	0.058			
Purchase Intention (PI)	PI 1	0.124	0.160	0.057	0.121	**0.849**	0.175	0.103	0.189	0.140	0.071	0.105	0.136	2.825	8.308	0.942
	PI 3	0.099	0.137	0.005	0.167	**0.843**	0.233	0.095	0.177	0.069	0.021	0.049	0.222			
	PI 2	0.093	0.083	0.008	0.184	**0.840**	0.254	0.095	0.154	0.116	0.143	0.068	0.029			
Revisit Intention (RI)	RI 2	0.160	0.158	0.037	0.047	0.219	**0.881**	0.112	0.124	0.130	0.087	0.087	0.011	2.766	8.135	0.934
	RI 1	0.166	0.147	0.037	0.082	0.225	**0.838**	0.165	0.184	0.099	0.102	0.055	0.094			
	RI 3	0.096	0.201	0.105	0.108	0.296	**0.731**	0.167	0.170	0.304	0.089	0.108	-0.053			
Education Experience (EduE)	EduE 1	0.146	0.164	0.137	0.131	0.103	0.164	**0.831**	0.136	0.119	0.071	0.128	-0.025	2.559	7.526	0.907
	EduE 4	0.164	0.143	0.046	0.137	0.101	0.154	**0.821**	0.178	0.027	0.141	0.134	-0.037			
	EduE 3	0.171	0.242	0.115	0.117	0.090	0.085	**0.788**	0.125	0.206	0.172	0.116	0.103			
Escape Experience (EscapE)	EscapE 3	0.126	0.110	-0.028	0.093	0.305	0.113	0.155	**0.803**	0.084	0.132	0.033	0.067	2.188	6.435	0.887
	EscapE 4	0.215	0.210	0.055	0.165	0.139	0.136	0.136	**0.790**	0.158	0.214	0.076	-0.014			
	EscapE 6	0.085	0.224	-0.006	0.181	0.142	0.285	0.205	**0.718**	0.218	0.108	0.067	0.093			
Satisfaction (Sat)	Sat 1	0.247	0.352	0.129	0.084	0.177	0.248	0.172	0.197	**0.719**	0.202	0.126	0.046	1.945	5.720	0.971
	Sat 2	0.246	0.320	0.095	0.105	0.175	0.255	0.176	0.255	**0.702**	0.202	0.171	0.022			
	Sat 3	0.222	0.329	0.116	0.070	0.198	0.290	0.194	0.223	**0.683**	0.244	0.140	0.036			
Aesthetic Experience (EstheE)	EstheE 2	0.200	0.252	0.128	0.114	0.130	0.116	0.240	0.194	0.298	**0.704**	0.207	-0.002	1.742	5.122	0.906
	EstheE 3	0.240	0.232	0.134	0.154	0.068	0.139	0.201	0.293	0.227	**0.702**	0.153	-0.002			
	EstheE 1	0.322	0.257	0.027	0.145	0.203	0.175	0.184	0.229	0.088	**0.605**	0.339	-0.054			
Vividness (Vivid)	Vivid 1	0.167	0.180	0.193	0.122	0.055	0.057	0.107	0.130	0.175	0.124	**0.805**	0.015	1.000	2.943	0.775
	Vivid 2	0.184	0.083	0.070	0.153	0.146	0.151	0.272	0.000	0.068	0.228	**0.772**	0.023			
Actual Purchase (AP)	AP 1	0.030	0.039	0.018	0.114	0.292	0.043	0.011	0.084	0.038	-0.022	0.022	0.935	0.689	2.027	1.000

Note: KMO (Kaiser-Meyer-Olkin measure of sample adequacy) = 0.915; Total variance = 90.740%; Bartlett's Test of Sphericity = 8636.482 (df = 561, Sig. = 0.000)

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