

The effect of the theory of acceptance and use of augmented reality on the intention to use mobile tourism augmented reality apps: the mediating role of hedonic motivation

Payam Partovinia/ Niloofar Abbaspoor*

Abstract

Today, augmented reality has become one of the most critical technologies in the tourism industry. However, the intention to accept and use tourism augmented reality programs depends on various factors that can be analyzed using the integrated technology acceptance and use theory. On the other hand, each of these factors can influence the hedonic motivation of people to use these programs. This study aimed to examine how the Theory of Acceptance and Use of Technology and hedonic motivation affect the use of mobile augmented reality tourism apps in Iran. The statistical population of the current research consists of the users of tourism augmented reality programs. 201 users were selected as sample. The data collection tool was a questionnaire. Structural equation model was used to analyze the data. The research results showed that four factors (performance expectancy, effort expectancy, social influence, and facilitating conditions) positively and significantly affect the hedonic motivation to use tourism augmented reality apps. Furthermore, research findings have shown that all four factors of the Technology Acceptance Model positively impact the intention to use augmented reality applications on mobile phones. Also, the research has shown that hedonic motivation positively and significantly affects the intention to use tourism augmented reality apps on mobile phones. Finally, the research findings have shown that hedonic motivation plays a crucial role in mediating between the different dimensions of UTAUT and the intention to use augmented reality applications. However, the mediating role of hedonic motivation was not supported for PE and BI.

Keywords: Augmented reality, Hedonic motivation, MART, UTAUT

Introduction

Due to technological advances in artificial intelligence, the Internet of Things, and augmented reality, people's lives have undergone various changes and transformations (Zhao et al., 2023). The acceptance and use of technologies, like augmented reality, can transform people's lifestyles (Althewaynee et al., 2022). Augmented reality has become one of the essential technologies in the tourism industry due to the information it provides. Augmented reality in tourism tries to transmit information to people using the Internet and mobile phone applications. Therefore, the acceptance and use of these apps can be essential for tourism managers (Pinto et al., 2022) because the willingness to use these technologies increases the desire to visit tourist attractions (EL-said & Aziz, 2021).

The intention to use augmented reality is a behavioral characteristic that people try to adopt a new technology to their lifestyle (Gharaibeh et al., 2021). Hedonic motivations can influence this tendency. Hedonic motivation is a behavioral characteristic of people and states that the amount of use of a new technology causes entertainment, pleasure, and happiness (Siyal et al., 2020). Hedonic motivation, and other factors such as performance expectancy, social influence, effort expectancy, and facilitating conditions, are essential in accepting and using new technologies such as augmented reality (Fajardo et al., 2022). Performance expectancy refers to the degree of ease of use and understanding of the relative advantages of technology. Also, social influence deals with the influence of people to accept technology. The Effort expectancy refers to the degree of ease of use of technology, and finally, the facilitating condition refers to the existing solutions to solve the problems surrounding the technology (Pinto et al., 2022).

In Iran, due to a lack of maturity in the production and use of mobile phone augmented reality apps in tourism, this field is associated with challenges such as the need for more information transmission to encourage people to visit tourist attractions (Shirmohammadi & mohammadi, 2021). In addition, we confront lack of research about the acceptance of augmented reality applications for mobile phones in Iran. Besides, due to the lack of widespread use of such applications in introducing and raising awareness about tourist attractions and destinations, their enjoyable and entertaining aspect has also been neglected. In contrast, this hedonic aspect can positively affect the willingness to use augmented reality applications and contribute to tourism development by creating awareness among potential tourists. Pinto et al. (2022) investigated the impact of factors affecting the acceptance and use of augmented reality applications for mobile phones. Nevertheless, in this study, the effect of the four main factors

of the theory of acceptance and use of technology (performance expectancy, social influence, effort expectancy, and facilitating conditions) on the hedonic motivation of users of these programs has not been mentioned. Furthermore, this study examines the mediating role of hedonic motivation between the theory of acceptance and use of technology dimensions and the intention to use mobile augmented reality applications. In today's world of information technology, Augmented Reality (AR) applications have become quite popular in the tourism industry. These applications offer various capabilities to enhance the overall tourist experience (EL-said & Aziz, 2021). It has been observed that users are more inclined towards using these applications due to hedonic motivation. AR applications are considered powerful tools in the tourism industry that can provide a highly engaging and immersive experience for travelers (Siyal et al., 2021). However, the widespread use of these applications is still challenging as there is limited understanding of the factors influencing users' intention to use them. Despite these challenges, it is essential to understand better the impact of the Technology Acceptance Model on users' inclination to use mobile AR tourism applications. Therefore, the present study aims to Investigate the effect of UTAUT theory variables on both the hedonic motivation and the intention of use of people that use tourism augment reality apps on their mobile in Iran.

Literature Review

The Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh developed the unified theory of acceptance and use of technology (UTAUT). In their initial model, they used four main factors, namely social influence (SI), facilitating conditions (FC), performance expectancy (PE), and effort expectancy (EE) on behavioral intention (BI) to accept and use mentioned new technology (Venkatesh et al., 2012). Researchers in various fields, such as artificial intelligence, e-government, and the Internet of Things, who have examined the UTAUT theory state that this model and theory has sufficient stability (Siyal et al., 2021).

They have defined social influence as the influence of reference groups such as family, friends, and colleagues in understanding and using technology (Venkatesh et al., 2013). Reference groups or the social environment can encourage people to accept a new technology (Siyal et al., 2021). Social networks have also accelerated this process. Social networks have created a kind of online interaction to influence

reference groups so that friends, family, and even strangers can easily influence people (Garcia & Pino, 2022).

Lack of access to facilities needed to use new technologies is a significant challenge affecting the intention to accept and use technology. Venkatesh et al. (2003) have defined facilitating conditions (FC) as the provision of infrastructure and support necessary to solve technical problems (Siyal et al., 2021). Factors such as lack of necessary and timely support, limited resources, and incomplete information can prevent people from adopting technology (Ambarwati et al., 2020). Facilitating conditions are essential because understanding this factor makes users of new technology easily understand its features and use its advantages (Sadreddin & Chan, 2023).

The effort expectancy (EE), equivalent to ease of use in the technology acceptance model, refers to the degree of ease associated with the operation of a technology (Venkatesh et al., 2003). A new technology's easy understanding and use can influence its acceptance and eventual use. When consumers realize that technology is easy to use and operate, they are more willing to accept and use it (Siyal et al., 2021). So, the more the complexity of a system or a technology decreases, the more willing its users are to use it (Winata & Tjokroputro., 2021).

Venkatesh has defined performance expectancy as a measure of ease of use and understanding the relative benefits of new technology (Venkatesh et al., 2013). Performance expectancy is equivalent to perceived usefulness in the technology acceptance model (TAM). In this theory, perceived usefulness means how much people consider using a system or a new technology to increase their performance (EL-said & Aziz, 2021). Also, this factor is one of the most important factors for predicting users' performance and goals. Therefore, this factor can inform managers about people's future actions in technology adoption (Liao et al., 2008).

Most researches and behavioral theories consider people's intentions as the best predictor of a person's behavior. In all these theories, the intention is to use an introduction to reach the action itself, and even in some of these theories, the action itself is the meaning (Huang et al., 2015; Ajzen, 1991). The behavioral intention to use (BI) in accepting augmented reality apps is the behavioral intention of people in using augmented reality (Pinto et al., 2022), which can lead to action or repeating the action (Winata & Tjokroputro, 2021).

Hedonic motivation

In any act, a person can have various motives, such as emotions, entertainment, Etc. (Tambuwun, 2016). Hedonic motivation means

using entertainment, recreation, and play in performing activities, which is evident in augmented reality apps (Pinto et al., 2022). In the model and theory of acceptance and use of early technology, the hedonic motivation of people was not considered (Siyal et al., 2021). However, over time and with the completion and improvement of this theory, hedonic motivation was expressed as an influential factor in acceptance and the use of technology (Pinto et al., 2022).

Mobile Augmented Reality in Tourism (MART)

Nowadays, it is essential to use digital technologies in various industries (Hassanzadeh, 2021). Augmented reality, as one of these technologies, combines virtual and computer visual aspects with the natural world and provides users with much information (Yung & Khoo, 2019). In tourism, augmented reality synchronizes real and virtual objects with each other and makes them available to users in three dimensions (Loureiro et al., 2020). Augmented reality became widely used when it was used in mobile phone applications (Buhalis et al., 2011). Augmented reality has many applications in the tourism industry and can reduce the limitations of this field. For example, tourists can get information about tourist attractions using mobile phone applications (Pinto et al., 2022).

Related research

Pinto et al. (2022), in a research entitled "Augmented Reality for a New Reality: Using UTAUT-3 to Assess the Adoption of Mobile Augmented Reality in Tourism (MART)," investigated the influential factors of mobile augmented reality in tourism. They found that the two dimensions of performance expectancy and effort expectancy have a positive effect, and the two dimensions of social influence and facilitating conditions have a negative effect on the behavioral intention of people to use mobile augmented reality in tourism.

Pinto et al. (2022), in another study entitled "Using UTAUT-3 to Understand the Adoption of Mobile Augmented Reality in Tourism (MART)," investigated the factors influencing mobile augmented reality in tourism. They investigated the augmented reality of mobile phones. They found that performance expectancy, effort expectancy, social influence, and facilitating conditions do not positively and significantly affect the intention to use augmented reality in the tourism industry.

Siyal et al. (2021), in a research entitled "Structural equation modeling and artificial neural networks approach to predict continued use of mobile taxi booking apps: the mediating role of hedonic motivation," with the aim of investigating the effect of factors that make

people pleasurable toward frequent use of online taxi apps, they probed the augmented reality of mobile phones. They found that the main factors of UTAUT significantly affect hedonic motivation. Hedonic motivation also affects the behavioral intention of mobile phone users.

Ghraibeh et al. (2020), in an article entitled "Intention to Use Mobile Augmented Reality in the Tourism Sector," investigated the main variables of the integrated theory of acceptance and use of technology, the intention to use augmented reality apps in the tourism sector in Jordan. The results showed that the main factors of the integrated theory of technology acceptance and use, have a positive effect on the intention to use mobile augmented reality in tourism.

The above researches examined augmented reality in mobile phones from a perspective. However, the impact of the UTAUT theory on the hedonic motivation of people in the tourism industry has not been studied. In fact, in the current research, in addition to investigating the impact of UTAUT theory on the use of MART, the hedonic motivation of people to use MART has also been investigated.

Conceptual framework

Venkatesh and colleagues first expressed the theory of UTAUT in 2003 for adopting and using new technology (Venkatesh et al., 2012). This theory has been used in various fields and technologies and has been approved by many researchers. Augmented reality is one of the technologies that have attracted people's attention in recent years (Siyal et al., 2021). In the tourism industry, augmented reality has increased the intention to use augmented reality in tourism by using 3D images and written information it provides users. Mobile phones have also facilitated this issue (Gharaibeh et al., 2021). On the other hand, smartphones have increased hedonic motives due to the environment they have created (Yadav et al., 2020). In the tourism industry, a number of apps have been provided to improve and promote this industry; MART is one of them (Gharaibeh et al., 2020). Over time, the influencing factors in the acceptance and use of technology have changed and evolved. Today, hedonic motivation has been added to the influencing factors for using MART (Sitar-Tăut et al., 2021). So the effect of UTAUT theory variables on the hedonic motivation of people is significant because the hedonic motivation can influence the acceptance and use of MART (Siyal et al., 2021).

Social influence

One of the main factors in technology acceptance is social influence, which refers to the influence of reference groups for technology acceptance and use (Venkatesh et al., 2012). Oncioiu and Priescu

(2022) pointed out the positive effect of social influence on the intention to use virtual reality (VR). On the other hand, Pinto et al. (2022), in their two studies, pointed out to the negative effect of social influence and the intention to use MART. Finally, Gharaibeh et al. (2021) pointed out to social influence's positive and significant impact on the intention to use MART. On the other hand, Tăut (2021) stated that social influence positively affects hedonic motivation. Also, Siyal et al. (2021) pointed out the positive and significant impact of the social effect on the use of intelligent apps. Therefore, we argue that social influence can influence the hedonic motivation and use of MART.

H1a: Social influence positively affects the intention to use MART.

H1b: Social influence positively influences HM for using MART.

Effort expectancy

Another factor mentioned by Venkatesh et al. in 2003 for technology acceptance and usage is effort expectancy. The effort expectancy to accept technology is also used in the tourism industry (Venkatesh et al., 2003). The effort expectancy positively affects users' intention to use MART, considering the ease of use of new technology (Priescu & Oncioiu, 2021). Pinto et al. (2022) addressed this hypothesis in two studies. The effect was minimal in one of these studies, and the other had the opposite effect. The research of Gharaibeh et al. (2021) also pointed out the positive and significant impact of this research on the intention to use MART. Also, about hedonic motivation, Salimon et al. (2017) pointed out the positive relationship between effort expectancy and hedonic motivation in e-banking. In addition to this research, Weng et al. (2017) also pointed out the effect of this factor on the expectation of effort. Finally, Siyal et al. (2021) pointed out the positive and significant impact of effort expectancy on hedonic motivation about smartphone apps. Therefore, this research proposes the following hypotheses:

H2a: Effort expectancy positively affects the intention to use MART.

H2b: Effort expectancy positively influences HM for using MART.

Facilitating conditions

The next factor influencing the acceptance and use of new technologies is facilitating conditions (Venkatesh et al., 2013). Facilitating conditions indicate the ease of use of technical infrastructure in MART (Paulo & Rita, 2018). Facilitating conditions in augmented reality apps in the tourism industry positively affects users' intention to use MART (Priescu & Oncioiu, 2021). Pinto et al. (2022) also achieved different results in their two studies, one of which had a positive effect and the other had a negative effect on the intention to use

MART. Regarding hedonic motivation, Sailmon et al. (2017) pointed out the positive effect of facilitating conditions on hedonic motivation. Maldonado et al. (2011) also pointed out the effect of facilitating conditions in motivating technology adoption. Taut et al. (2021) also pointed out the positive effect of facilitating conditions on hedonic motivation. Finally, Siyal et al. (2021) pointed out facilitating conditions' positive and significant effect on hedonic motives about smartphone apps. Therefore, this research proposes the following hypotheses:

H3a: Facilitating conditions positively affects the intention to use MART.

H3b: Facilitating conditions positively influences HM for using MART.

Performance expectancy

Another factor Venkatesh et al. pointed out in 2003 for the acceptance and use of technology is the performance expectancy, which is defined as a measure of ease of use and understanding of the relative benefits of new technology. If users find it easy to use technology daily, their intention to use it increases (Al-Okaily et al., 2019). Jung et al. (2018) pointed out the positive effect of performance expectancy on the intention to use MART. Also, performance expectancy positively affects the use of virtual reality apps (Priescu & Oncioiu, 2021). Pinto et al. (2022) pointed out the positive effect of performance expectancy on MART in their two studies. In the context of hedonic motivation, the benefits of technology, such as its ease of use, create motivation among people (Seth et al., 2020). Performance expectancy positively affects hedonic motivation (Salimon et al., 2017; Taut, 2021). Furthermore, it has been noted in the research conducted by Siyal et al. (2021) that hedonic motivation also positively impacts the Intention to use online reservation technology. Therefore, this research proposes the following hypotheses:

H4a: Performance expectancy positively affects the intention to use MART.

H4b: Performance expectancy positively influences HM for using MART.

Hedonic motivation

Over time, the UTAUT theory has changed and transformed, and factors, like hedonic motivation, have been added to it. Hedonic motivation means the motivation to use entertainment in daily activities. This factor is more evident in innovative technologies like MART (Siyal et al., 2021). Previous researches point out the role of

hedonic motivation on customers' intentions (Ali et al., 2016; Saumell et al., 2019). Pinto et al. (2022) pointed out the effect of hedonic motivation on the intention to use MART in their two studies. Gharaibeh et al. (2021) also found that hedonic motivation positively and significantly affects the intention to use MART. Therefore, the fifth hypothesis of the research is as follows.

H5: Hedonic motivation positively affects the intention to use MART.

The Role of Hedonic Motivation as a Mediator

As mobile phone technology advances, more people use augmented reality applications. People are naturally motivated by enjoyable experiences, which is why using augmented reality can be so appealing. Individuals with positive experiences with this technology are more likely to use it consistently. However, factors like the unified theory of Acceptance and Use of Technology can influence people's motivation to use technology. Hedonic motivations may mediate between these factors and people's intention to use the technology. A recent Siyal et al. (2021) study explored this idea and found evidence to support it. They looked specifically at online booking and found that hedonic motivation was important in determining people's acceptance and intention to use online booking taxi services.

H6: Hedonic motivation plays a mediating role between Social influence and intention to use MART.

H7: Hedonic motivation plays a mediating role between Effort expectancy and intention to use MART.

H8: Hedonic motivation plays a mediating role between facilitating conditions and intention to use MART.

H9: Hedonic motivation plays a mediating role between Performance expectancy and intention to use MART.

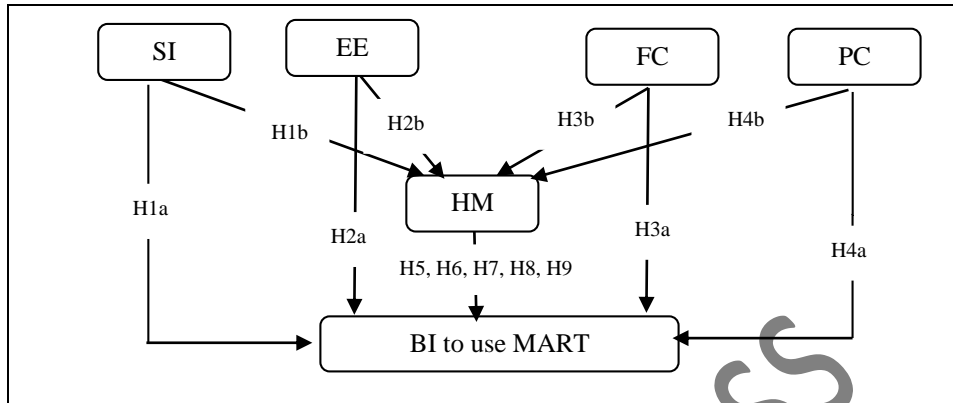
According to the research assumptions, the conceptual model is shown in Figure 1.

Figure 1. Research model

Research Methodology

Sampling, Data Collection & Methodology

The current research is practical in terms of purpose. Also, in terms of the nature and method of collection, it is in the descriptive-survey category. The statistical population of the present study consists of people who have used mobile augmented reality programs in Iranian



tourism (such as Iran Tour and the Takht Jamshid app) at least once. The sample size in structural equations should be more than 200, that equals 201 individuals in this study (Hu et al., 1999). In the current study, approximately one thousand questionnaires were distributed online via messaging services and the LinkedIn platform. Among which, 201 completed questionnaires were collected and analyzed by the researchers.

A significant number of participants completed the questionnaire, were not aware of the program's existence. As a result, they were asked to install the Apps and use them to fill out the questionnaire. Additionally, a 5-point Likert scale was employed to measure the responses to the questionnaire. All the questions of the questionnaire (21 questions) were also extracted from two studies by Pinto et al. (2022).

Normality and Analysis Methods

The normality of the data was assessed in this study using the Kolmogorov-Smirnov test. The results showed a significance value of 0.0 for the variables, indicating that the data distribution was not normal. Additionally, given the use of the structural equation modeling statistical technique, the Smart-PLS program was utilized for data analysis due to the non-normal distribution of the variables (Hair et al., 2019).

Data analysis

Convergent and Divergent Validity

First, convergent validity has been investigated to measure the degree of correlation between the research items. According to the results, the obtained numbers show that the amount of extracted

variance (AVE) in each variable is good (greater than 0.5). Also, the composite reliability (CR) values indicate a good value (greater than 0.70). The composite reliability value is also higher than the extracted variance value. These results show that convergent validity is confirmed. Table 1 shows the amount of extracted variance and Cronbach's alpha. Then, using the Fornell and Larcker test, the divergent validity of the constructs was examined. In this research, the diagonal value for each variable is larger than the other variables in the same row and column. Table 2 shows the results of the Fornell and Larcker test. As a result, the divergent validity of the present study is also confirmed.

Table 1. Summary of measurement scales

Constructs	Items	Factor Loading	Cronbach's α	Composite reliability	AVE
PE	PE1	0/87	0/87	0/92	0/80
	PE2	0/92			
	PE3	0/88			
EE	EE1	0/9	0/89	0/92	0/75
	EE2	0/87			
	EE3	0/84			
	EE4	0/86			
SI	SI1	0/89	0/88	0/92	0/74
	SI2	0/87			
	SI3	0/89			
	SI4	0/78			
FC	FC1	0/82	0/86	0/91	0/78
	FC2	0/88			
	FC3	0/88			
	FC4	0/86			
HM	HM1	0/88	0/87	0/92	0/8
	HM2	0/89			
	HM3	0/88			
BI	BI1	0/9	0/88	0/92	0/74
	BI2	0/91			
	BI3	0/87			

Table 2. Fornell and Larcker test

	BI	EE	FC	HM	PE	SI
BI	0/89					
EE	0/76	0/87				
FC	0/74	0/80	0/86			
HM	0/81	0/81	0/84	0/88		
PE	0/71	0/83	0/76	0/76	0/89	
SI	0/73	0/81	0/8	0/80	0/72	0/86

Results

Structural equation analysis

In this study, we utilized structural equation modelling (SEM) as a statistical technique to analyze the data. In this method, all relationships between structures are analyzed simultaneously. In Figure 2, standardized path values and Figure 3, significance values (T) are shown.

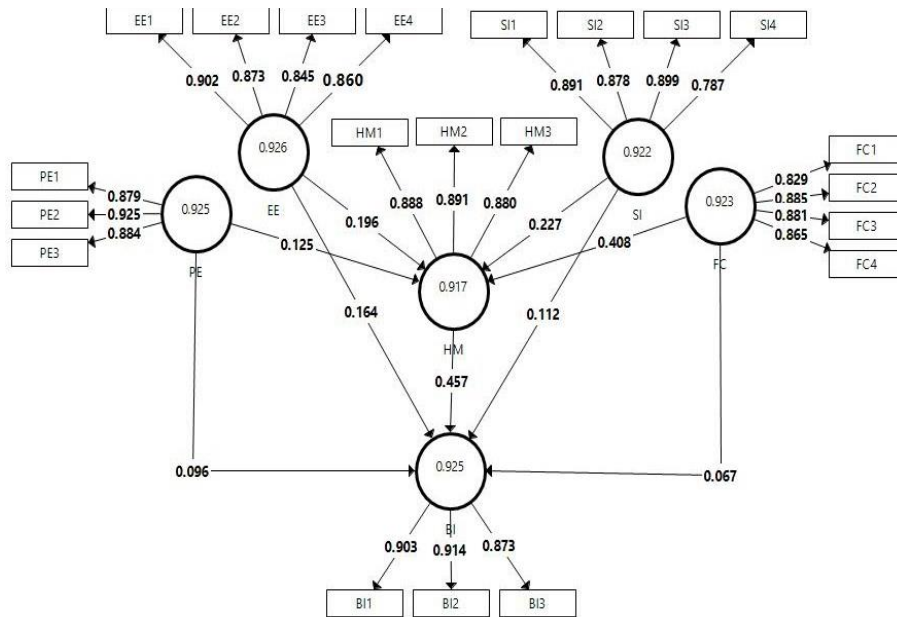


Figure 2. standardized path coefficients.

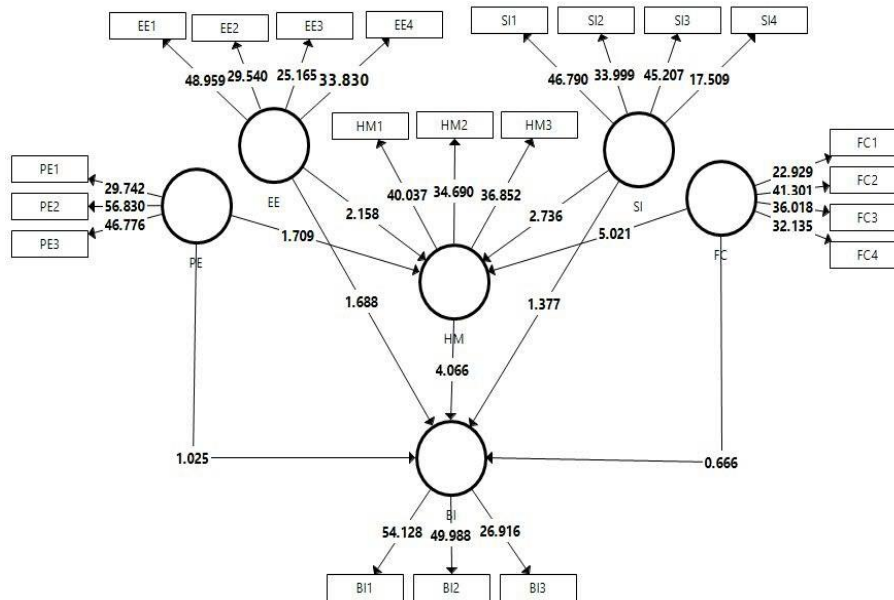


Figure 3. significance value (T)

The market analysis conducted using data analysis confirms hypotheses H1a and H1b. The path coefficient for H1a is 0.112, with a significance value of 1.377, while the path coefficient for H1b is 0.227, with a significance value of 2.736. These results indicate that both hypotheses are confirmed. Based on the path coefficients and significance values, both hypotheses H2a and H2b have been confirmed. The path coefficient for H2a is 0.164 with a significance value of 1.688, while the path coefficient for H2b is 0.196 with a significance value of 2.158. Based on our analysis, hypothesis H3a has been confirmed with a path coefficient of 0.067 and a significance value of 0.666. Similarly, hypothesis H3b has been confirmed with a path coefficient of 0.408 and a significance value 5.021. Based on the analysis, it can be concluded that hypothesis H4a is confirmed with a path coefficient of 0.096 and a significance value of 1.025. Similarly, hypothesis H4b is confirmed with a path coefficient of 0.125 and a significance value of 1.709. Additionally, hypothesis H5 was confirmed with a path coefficient of 0.457 and a significance value of 4.066. These results indicate that the data support the proposed direct hypotheses. In this study, we examined the mediating role of hedonic motivation in hypotheses 6 to 9. To test these hypotheses, we used the Sobel test, which allowed us to determine whether hedonic motivation played a mediating role. The results of the Sobel test showed that hypotheses 6,

7, and 8 were confirmed, indicating that hedonic motivation did indeed mediate in these cases. However, hypothesis 9, which examined the mediating role of hedonic motivation between PE and BI, was rejected due to a Sobel test statistic of less than 1.96. These findings suggest that hedonic motivation can play an important role in mediating the relationship between certain variables, but not in all cases.

The summary of the results of the current research hypotheses is shown in Table 3.

Table 3. Summary of hypotheses

Direct Hypotheses	B	T	P	Result		
SI → Intention to use MART.	0/11	1/37	0/08	Confirmed		
SI → HM for using MART.	0/22	2/7	0/0	Confirmed		
EE → Intention to use MART.	0/16	1/6	0/46	Confirmed		
EE → HM for using MART.	0/19	2/1	0/0	Confirmed		
FC → Intention to use MART.	0/06	0/6	0/25	Confirmed		
FC → HM for using MART.	0/4	5/02	0/0	Confirmed		
PE → Intention to use MART.	0/09	1/02	0/15	Confirmed		
PE → HM for using MART.	0/12	1/7	0/04	Confirmed		
HM → Intention to use MART.	0/45	4/06	0/0	Confirmed		
Indirect Hypotheses	A	B	SE _A	SE _B	Z	Result
HM → SI → Intention to use MART.	0/22	0/45	0/08	0/10	2/21	Mediated
HM → EE → Intention to use MART.	0/19	0/45	0/08	0/10	1/97	Mediated
HM → FC → Intention to use MART.	0/40	0/45	0/08	0/10	3/34	Mediated
HM → PE → Intention to use MART.	0/12	0/45	0/07	0/10	1/56	Not mediated

Evaluating Model Fit

In this study, the Goodness of Fit (GOF) index was used to assess the fit of the research model. Moreover, the coefficient of determination (R^2) was utilized to evaluate the explanatory power of the structural model, and the index (Q^2) was employed to assess the model's predictive ability. The values of each of these indicators are presented in Table 5. Also, Table 4 mentions Construct Cross Validated Communality to obtain GOF.

Table4. Indices Used for Model Fit Assessment

Variable	Cross-Com	R ²	Q ²	GOF
BI	0/54	0/78	0/52	0/39
HM	0/51	0/69	0/57	
SI	0/54	-	-	
EE	0/55	-	-	
FC	0/54	-	-	
PE	0/54	-	-	

Discussion and Conclusion

Today, due to the advancement of technologies such as augmented reality in tourism, some tourist attractions have used augmented reality technology to encourage people visiting these places. However, in Iran, due to the need for sufficient information about people, this question has always been raised for managers and researchers about what factors can be helpful for the acceptance and use of this technology. So by using the UTAUT theory, which has sufficient stability according to many researchers, it is possible to measure the factors affecting the acceptance and use of augmented reality in the tourism industry. In the meantime, hedonic motivation is essential as a factor that can be the reason for using these technologies.

The research study shows that social influence positively impacts the intention to use mobile augmented reality tourism applications in Iran, as supported by previous studies conducted by Priescu & Oncioiu (2022) and Gharaibeh et al. (2021). While one study by Pinto et al. (2022) contradicts this finding, it is not supported by the majority of research in this area. Additionally, the research findings by Taut et al. (2021) and Soyal et al. (2021) provide strong evidence that social influence positively impacts hedonic motivation for using mobile augmented reality applications. This is consistent with the present study's findings, which conclude that social influence positively impacts hedonic motivation for using augmented reality tourism applications on mobile devices.

According to the research conducted, it can be concluded that effort expectancy has a positive and significant impact on the intention to use augmented reality applications on mobile phones. This finding aligns with the research carried out by Priescu & Oncioiu (2021) and Gharaibeh et al. (2021). However, this study contradicts the two studies by Pinto et al. (2022), which suggest the opposite effect of effort expectancy on the intention to use augmented reality phone applications. Furthermore, the hypothesis (H2b) also indicates that effort expectancy positively and significantly affects the hedonic motivation to use augmented reality tourism apps on mobile phones.

This finding is consistent with the research conducted by Salimon et al. (2017), Weng et al. (2017), and Siyal et al. (2021).

Based on the findings of this study, it can be concluded that facilitating conditions positively impact the intention to use augmented reality applications on mobile phones. This is consistent with previous research conducted by Pinto et al. (2022), which also showed a positive effect of facilitating conditions on hedonic motivation. However, it is essential to note that this study contradicts another study by Pinto et al. (2022). In terms of the positive effect of facilitating conditions on the hedonic motivation to use augmented reality tourism apps on mobile phones, this study is supported by previous research conducted by Salimon et al. (2016), Maldonada et al. (2011), Taut et al. (2021), and Siyal et al. (2021). These findings suggest that facilitating conditions are crucial in enhancing the user experience and motivation to use augmented reality applications and apps.

Based on the findings of this study, having high-performance expectations is a critical factor that positively influences the intention to use augmented reality applications on mobile phones. This conclusion is supported by previous research conducted by Zhang et al. (2018), Priescu and Oncioiu (2021), and Pinto et al. (2022). Moreover, the study's results show that high-performance expectations also significantly impact hedonic motivation to use augmented reality tourism apps on mobile phones. This finding is consistent with the research of Salimon et al. (2017), Taut (2021), and Siyal et al. (2021). These results suggest that individuals who have high expectations of the performance of augmented reality apps are more likely to use them and enjoy the experience.

The fifth hypothesis of the study found that hedonic motivation positively and significantly impacts people's intention to use augmented reality apps on mobile phones. Previous research by Siyal et al. (2021), Nair and Hussain (2016), Saumell et al. (2019), Pinto et al. (2022), and Ghariabeh et al. (2021) also support this finding.

Based on the study, it has been hypothesized that hedonic motivation could potentially act as a mediator between the three dimensions of the unified theory of acceptance and use of technology (Social influence, Effort expectancy, and Facilitating conditions) and the intention to use augmented reality in mobile apps for tourism. This finding is consistent Siyal et al. (2021). However, it is essential to note that this study did not find any evidence that hedonic motivation is mediating between performance expectancy and the intention to use augmented reality in mobile apps for tourism.

Practical Suggestions

The present research findings lead to a better understanding of managers for the development of tourism. Also, this research helps better understand the factors of acceptance and use of technology for developing mobile apps. Therefore, according to the assumptions of the research, practical suggestions for developing and improving tourism augmented reality technology, which ultimately leads to the development of tourism, have been presented.

The result of the first hypothesis of the research indicates that the people around the person can have a positive but insignificant effect on the intention to use MART with their influence. Therefore, it is suggested to the managers of this area to use the word-of-mouth marketing method, which is one of the most effective advertising methods to influence people around, because it positively affects the intention to use MART. However, due to the insignificant effect of this, it is suggested to use other advertising methods, such as online advertising. Also, due to the positive and significant effect of social influence on the hedonic motivation of people to use MART, it is suggested that the managers of tourist attractions create hedonic motivation by branding their mobile phone tourism apps. This practice increases the hedonic motivation of people to use MART.

The research suggests that tourist attraction managers should improve the accessibility and accuracy of augmented reality apps to increase people's willingness to use them on their phones. Making the apps more user-friendly also positively affects people's enjoyment. Additionally, increasing user interaction through online chat features can further enhance their motivation to use these apps for tourism purposes.

The third hypothesis suggests that facilitating conditions positively affect the intention to use MART, but the impact is not significant. Transferring knowledge about these apps through smart devices does not significantly influence the intention to use MART. However, facilitating conditions have a positive and significant effect on the hedonic motivation to use MART. Therefore, it is recommended that tourism managers improve the hedonic motivation to use augmented reality tourism apps on mobile phones by incorporating supporters in the app and making it compatible with other technologies like web networks and virtual tours.

Based on the fourth hypothesis, the impact of performance expectation on the intention to use MART is positive but insignificant. To encourage the use of MART, managers are advised to enhance the perceived usefulness of the apps and create an environment where users can easily access the desired information. However, since the effects on performance expectations are insignificant, managers should focus less

on this aspect. Instead, they can improve user experience by making the app more user-friendly and ensuring relevant information is easily accessible. This can enhance users' pleasure from using augmented reality tourism apps on their mobile phones.

Finally, according to hypotheses six to eight, hedonic motivation may act as a mediator between Perceived Social Influence (SI), Facilitating Conditions (FC), Effort Expectancy (EE), and the intention to use augmented reality applications on mobile phones. Incorporating engaging factors such as games could positively impact the three dimensions of acceptance and use of technology (SI, FC, EE), increasing the probability of using augmented reality applications on mobile devices.

Limitations and opportunities for future research

Like other research, the current research had limitations; one of these limitations is that it needs to pay attention to the effect of environmental factors and age on the UTAUT model. Suppose these factors can have a significant impact on this model. Therefore, future researchers are suggested to investigate the impact of environmental factors on this model. Second, the collected data can be misleading due to the need for sufficient knowledge in the statistical community about the applications of augmented reality in tourism. Therefore, future researchers are suggested to repeat this research over time and with more awareness of society about the augmented reality of tourism. Third, almost everyone who completed the questionnaire had higher education, so the obtained data cannot be generalized to all the people in the statistical society. So, it is suggested that the researchers examine the model by changing the data collection method.

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