International Journal of Management and Marketing Intelligence	International Journal of Management and Marketing Intelligence, 2(2), 60-70.	
	Volume: 2	http://ijmmi.com
	Issue: 2	ISSN: 3080-860X
	Received: Feburary 23, 2025	Accepted:. May 12, 2025
	Citation: Benghadbane, F., Khawaldah, H., Alshurideh, M. and Alzboun, N. (2025) The Impact of Using Virtual Reality (VR) and Augmented Reality (AR) on Museum Marketing to Enhance Visitors' Engagement, Enjoyment, and Experience. International Journal of Management and Marketing Intelligence, 2(2), 60-70. DOI: https://doi.org/10.64251/ijmmi.78	

The Impact of Using Virtual Reality (VR) and Augmented Reality (AR) on Museum Marketing to Enhance Visitors' Engagement, Enjoyment, and Experience

Foued Benghadbane[1*], Hamzah Khawaldah[2], Barween Al Kurdi[3], Nidal Alzboun[4]

[1]Institute of Management of the Urban Techniques, University of Oum El Bouaghi, Algeria.
[2]Department of Humanities, College of Arts and Sciences, Qatar University.
[3]Department of Marketing, School of Business, The University of Jordan, Amman, Jordan.
[4]The University of Jordan, School of Arts.

ARTICLE DETAILS

Article History:
Published Online: June 2025

Keywords:
Museum Marketing
Virtual Reality
Augmented Reality
Flow state
Immersion
Experience
Enjoyment
Engagement

JEL Codes:
C39, L82, L83 & Z33

Corresponding Author Email:
foued.benghadbane@univ-oeb.dz

ABSTRACT

The immersive technology in museum displays significantly impacts the users' experience, providing visitors with new and engaging encounters with cultural objects and historical situations. Large number of studies are highlighting the importance of using both Virtual Reality (VR) and Augmented Reality (AR) in both museum business and museum marketing to enhance visitors experience and purchase intention these days. This study examines how virtual reality (VR) and Augmented Reality (AR) could influence museum marketing, emphasizing how using both can improve visitors' engagement, enjoyment, and experience. To be more precise, this study explores how using AR/VR influences visitors' behaviors through engagement, enjoyment, and experience by employing both immersion and flow stat. Through such employment, these technologies help to make museums' business and marketing more dynamic and appealing. The study collected the primary data from 441 visitors to test the study model and test the study hypotheses. More information will be found about the study's main constructs, literature review, methodology, and discussion of results. The main results indicated that both AR and VR might enhance and modernize museum business and profits by boosting visitors' visits and revisits.

1. INTRODUCTION

Virtual Reality (VR) and Augmented Reality (AR) technologies are increasingly seen as revolutionary tools in both commercial and nonprofit sectors, including education, tourism, and cultural heritage. 2016 saw a turning point for mass-market consumer VR with the arrival of cost-effective and easily available VR and AR devices like the Oculus Rift and Samsung Gear VR. This trend has continued to gain popularity with the worldwide VR/AR market, which includes both gear and software which had a valuation of USD 16.3 billion by the year 2022, which suggests not just widespread consumer acceptance but also the introduction of new channels for connection and participation (Lee et al., 2020). Virtual Reality (VR) is a simulation tool employing 3D eye technology that enables an immersive feeling about the real world. At the same time, Augmented Reality (AR) combines digital content with the physical world, creating a hybrid experience that dramatically improves user immersion, interactivity, and information retention. This is especially important in disciplines that rely on visual narrative and spatial cognition, such as geology and museum-based education. AR marketing, which commercial companies formerly used, is now being used by nonprofit organizations like museums and cultural institutions to help them improve visitor experiences and present complex themes in more advanced ways. Digital images of geological maps or fossils can dynamically animate ancient structures (Zhu & Wang, 2022). Cultural and scientific tourism and geological tourism have become major parts of the global growth industry. Geological museums and displays that deal with regional stratigraphy or petroleum systems can potentially use augmented reality to make abstract or technically complex subjects more accessible (He et al., 2018). VR is also becoming more important in the museum environment because technology enables institutions to handle two fundamental challenges: authenticity and the demands of the new museology. Today, museums are expected to give not only real and relevant material but also "edutainment," which is a combination of teaching and enjoyment. VR conditions add authenticity to virtual object presentations, allowing visitors to interact deeply and enjoyably with collections. Top institutions such as the British Museum, Museo Del Prado, and the Vatican Museums have been using VR technologies to provide stunning and immersive experiences (Lu et al., 2023). This study is essential because it highlights how VR/AR can influence visitors' flow state and immersion, influencing their engagement, enjoyment, and experience.

2. THEORETICAL FRAMEWORK

2.1. Marketing in museums

More strategic and visitor-centered strategies have replaced the practical approaches used in museum marketing in the 1980s. One of the main issues that scholars considered is how to increase visitor engagement, visit and revisit the tourism business, especially when COVID–19 –influenced tourist behavior (Alzboun et al., 2023; Hamour et al., 2023; Qurah et al., 2023). Keep in mind that the three main stages of arts marketing are Foundation, Professionalisation, and Discovery (Rentschler, 2002). Extending marketing into cultural regions sparked this change, part of a broader trend. Global organizations like the International Council of Museums (ICOM) have helped museums transition from object-based institutions to people-focused experiences. Despite their increasing recognition as distinctive service organizations providing experiential value, museums continue to face obstacles because of funding constraints and opposition from traditional stakeholders (Addis, 2005). Internal arguments over preserving traditional missions continue, but museums increasingly embrace entertainment and experience-driven methods as visitor expectations change. Due to new technologies and shifting visitor expectations, edutainment, a combination of education and entertainment, is becoming increasingly popular at museums. Some experts worry that it threatens conventional values, even while it makes museums more interesting and approachable. Many understand that instructional missions and entertainment must be balanced to draw tourists despite worries about over spectacularization. To meet the expectations of modern visitors, tools such as virtual reality (VR) are being utilized increasingly to build immersive, interactive, and instructional narrative experiences (Carrozzino & Bergamasco, 2010; Borsotti & Mason, 2023).

2.2. Virtual Reality (VR) and Augmented Reality (AR)

The new technologies of virtual reality (VR) and augmented reality (AR) significantly improve user interaction with digital material. AR creates a mixed space where virtual things coexist and react to real-world settings by adding digital features to the real-world environment. It allows information and experience to be seamlessly combined, and it has been used to create more personalized, dynamic, and engaging brand experiences in a variety of industries, including marketing, food, construction, and education (Ozdemir, 2021; Omeish et al., 2023; Sulieman et al., 2024). By providing immersive product engagements, improving brand awareness, and strengthening emotional bonds, brands are using augmented reality (AR) more and more to draw in and keep consumers. Conversely, VR completely covers viewers in a computer-generated environment, creating innovative virtual worlds or reproducing real-world environments. Virtual reality (VR) is becoming increasingly recognized as a tool for emotional connection, simulation training, storytelling, and virtual showrooms, offering brands new ways to engage with customers. When combined, AR and VR are changing how customers interact with information, goods, and services, breaking the boundaries between the real and virtual worlds and providing immersive, amusing, and educational experiences (Renu, 2021).

2.2. Virtual reality and augmented reality in museums

In recent decades, museums have increasingly relied on technologies that engage visitors to meet their educational and entertainment goals. The cultural and creative sectors are now pressured to create more innovative platforms to improve communication between museums and visitors (Pence, 2010; Geroimenko, 2012). Augmented Reality (AR) has emerged as an essential driver of this technological shift by providing enhanced experiences that preserve the heritage, increase visitor engagement, and attract new possible visitors worldwide. This also allowed museums to generate meaningful narratives and multisensory experiences through storytelling, gamification, and context-aware interactions. Augmented reality improves not only entertainment but also the educational outcomes of the visit. It will also enhance better knowledge and the memorization of cultural heritage through personalised and engaging experiences that are especially beneficial to students and people less interested in going to museums (Lu and Liu, 2015). Tools like the "Exhibot" AI audio guide demonstrate how artificial intelligence AI and the Internet of Things (IoT) may work with augmented reality AR to create contextual and natural communication in exhibits. Augmented reality's conceptual foundation in museums comes from its capacity to integrate actual and virtual aspects, changing exhibition halls into "augmented museum spaces." Recent improvements in hardware, for example (haptics and eye tracking) and software such as (personalized algorithms and digital twins) have changed augmented reality from a novelty to an essential component of the museum experience (Carrozzino & Bergamasco, 2010). These advanced changes gave virtual museums realistic visual depictions and dynamic user engagement. Museums like the National Museum of Natural History use visitor data to personalize augmented reality tours, significantly increasing happiness and engagement. Also, immersive technology has improved accessibility by addressing adult and senior audiences. Notably, virtual reality projects like the Viking encampment or the FabricVR programs provide the reconstruction of immersive historical events, enhancing storytelling and preservation efforts (Leung, 2022).

2.3. VR, flow stat, immersion, and enhancing visitors' engagement

The immersive technology in museum displays significantly impacts the users' experience, providing visitors with new and engaging encounters with cultural objects and historical situations (Verhulst et al., 2021; Dağ et al., 2023). These immersive technologies offer sensory-rich and interactive settings that give visitors a strong sense of presence and transport them to different periods and locations while encouraging emotional connections with the material shown in them (Dogan & Kan, 2020). VR and AR technologies have greatly improved engagement, motivation, and performance among younger audiences (Trunfio et al., 2022). According to studies, students love using VR in learning, achieve better results, and have a greater interest when AR is used in their educational travels. Museums that use these technologies can develop interactive experiences that make heritage education more accessible and engaging to their visitors. (Sanabria & Arámburo-Lizárraga, 2017). AR has proven particularly helpful in enhancing children's interest in museums, with educators seeing that interactive visits inspire increased historical curiosity. AR applications have regularly been proven to improve educational value and visitor happiness in various museum contexts, including art, science, and natural history. Addetionally, museums increasingly

use edutainment tactics that combine teaching and entertainment to suit visitors' expectations for participatory and pleasant experiences. This strategy is designed to appeal to younger audiences who value knowledge, emotional involvement, visual appeal, and authenticity. While museums provide a variety of experiences, including visual aesthetics and educational ones, genuinely multimodal displays are still rare. However, augmented reality can help bridge this gap by allowing for physical and emotional immersion (Economou, 1998). To add more, the "optimal experience," based on Flow Theory, is defined by deep engagement, an impression of control, loss of self-consciousness, and distorted time perception. When people are in a flow state, their activity becomes innately pleasurable. In the context of VR in museums, flow can be achieved through immersive, game-like settings that encourage concentration and active engagement. VR allows users to interact with cultural information, promoting high engagement and presence and boosting educational and emotional connections (Roy et al., 2014). Many other studies, such as Bodzin et al. (2021), Oh & Kong (2022), Fang & Chung (2025), Portugal et al. (2025), and Shamim et al. (2025), found that using VR technology influences positive flow, immersive visitors engagement.

2.4. VR, flow stat, immersion, and visitors' perceived enjoyment

Perceived enjoyment becomes essential to using VR and AR in tourism (Çalışkan et al., 2025; Zhu et al., 2025). Perceived enjoyment improves visitors' well-being in virtual museum experiences, particularly those involving VR applications. Previous research, such as Sthapit et al. (2025) has found that well-being increases engagement, the intention to revisit, and even immersion levels. As a result, it is critical to investigate how perceived enjoyment in VR and AR situations affects visitors' subjective well-being, thus influencing their behavioral intentions and sense of immersion. (Huang et al., 2012). To add more, the term edutainment was presented by linking entertainment with many other terms, such as education, customer engagement, and enjoyment (Aksakal, 2015; Chan, 2019). The term "edutainment" describes blending entertainment and education to produce entertaining and educational experiences (Addis, 2005). In the context of museums, edutainment makes learning more interesting to a broader audience, particularly the younger generations, by applying interactive technologies and attractive displays. Although certain museum professionals first criticized edutainment for perhaps harming educational missions, more recent perspectives acknowledge that striking a balance between entertainment and educational objectives might improve visitor engagement without sacrificing academic value. This change reflects visitors' evolving expectations, which call for learning to be more engaging, social, and enjoyable (Kotler et al., 2008). Addetionally, a study by We et al. (2021) investigated the visitors' intention to visit museums using flow experience and immersive virtual reality techniques. The study found that the revisit intention of the museum tourists who experienced the VR games has increased. Also, The results demonstrated that perceived enjoyment was significantly influenced by positive immersion. Furthermore, the study found that flow status and subjective well-being significantly positively impacted both visitors' intention and immersion. Another study by Issock et al. (2024) examined the impact of personality traits, perceived enjoyment, and flow on virtual reality technology adoption. The study found that curiosity is a primary personality trait influencing perceived enjoyment and flow state. Aldo, the results denoted that both perceived enjoyment and anticipated flow state significantly influence the intention to adopt VR technology for tourism. Many other studies, such as Fan et al. (2022), Melo et al. (2022), Shamim et al. (2025), and Yang & Zhang (2022), found that there is a positive influence of flow and immersion on visitors enjoyment.

2.5. VR, Flow stat, immersion, and visitor experience

Marketing tools used have been changed these days while institutions have started using new marketing technologies such as IoT, Digitization, big data, intelligent information systems, Cybersecurity, and social media (Al Kurdi, 2024; Amponsah, 2024; Vasudevan, 2024; Zahra, 2024; Ahmad & Alshurideh, 2025). Experiential marketing is changing a lot, especially due to the combination of real-world environments with interactive digital elements in AR (Sülük & Aydin, 2019; Alshurideh, 2024; Ozturk, 2024). This would create chances for brands to take their audiences, especially those digital native consumers, through a unique and unforgettable experience. Entertaining AR campaigns provide the fun and sensory engagement that would make it out of regular advertising and create a deeper emotional attachment with brands. Examples include gamified marketing location-based augmented reality experiences and virtual try-ons, boosting user engagement and recall (Javornik A, 2014; Kataria et al., 2024; Alhammadi & Alshurideh, 2025). Next to these entertainment factors are functional augmented reality applications that are paramount in influencing consumer behavior. AR overlaps product information, demos, or reviews directly into the users' environment, making deciding on a purchase easier and more confident (Sarfraz et al., 2025). This dual capability of creating compelling stories while providing functional abilities supports customers throughout their journeys, thus improving satisfaction and brand loyalty. Developing the future of experience-driven marketing will largely depend on AR to close that gap between engagement and informed decision-making (Ross, 2016). The four realms framework, which includes entertainment, education, design, and escapist experiences, provides a thorough understanding of how AR may create immersive brand experiences. AR improves entertainment by providing dynamic, interactive content. It supports education by delivering product information in engaging formats, enriches aesthetic experiences through visually appealing design, and promotes escapism by transporting users into virtual environments outside of the physical setting (Agostino, 2022). To gain a better understanding of the framework, it is combined with the classic stimulus-organism-response (S-O-R) model, which explains how environmental stimuli (such as AR features) influence users' internal states (emotions, perceptions, and attitudes), ultimately leading to behavioral responses (such as purchase intention or brand engagement). Combining these two models, this research offers a systematic approach to investigating how AR experience marketing promotes consumers' emotional and cognitive responses and how these responses influence their behavioral results (Roy et, 2014). This framework enables a more nuanced evaluation of AR's dual role as a hedonic and utilitarian marketing tool. The main model variables, critical elements, and assessment items that represent the entire range of sensory, emotional, cognitive, and behavioral experiences generated by AR applications in museums are included in Table 1 to implement these ideas.

Table 1: Key variables used to assess AR experiences in museum settings based on previous research (Zhu, 2022)

Experience Dimension	Key Factor	Example Measurement Item
Sensory Experience	Technical Usability	AR is easy to use
Emotional Experience	Interesting Application	AR sparks curiosity and positive emotions
Cognitive Experience	Information Usefulness	AR enhances understanding and knowledge retention
Behavioral Experience	Instant Interaction	AR system encourages active participation
Social Experience	Peer Association	Desire to share AR experience with friends or on platforms
Brand Impact	Experience Satisfaction	Positive impression and loyalty towards the museum

Many other studies, such as Kim et al. (2019), We et al. (2019), An et al. (2021), Huang et al. (2020), Abou-Shouk et al. (2024) and Shamim et al. (2025) found that VR, Immersive VR, and flow influence visitors' experience.

3. THE RESEARCH MODEL AND PROPOSED HYPOTHESES

The study constructs relationships and flow effects, which are drawn on the following study model, as seen in Figure 1.

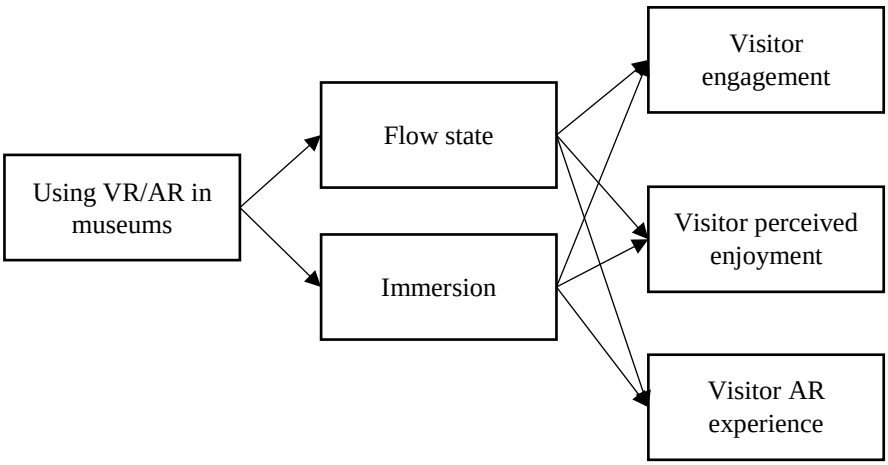

Figure 1. The study model.

Based on the study model. A set of hypotheses can be suggested as:

H1: Using VR/AR in museums has a significant impact on flow state.
H2: Using VR/AR in museums has a significant impact on immersion.
H3: Flow state has a significant impact on visitor engagement.
H4: Flow state has a significant impact on visitor perceived enjoyment.
H5: Flow state has a significant impact on visitor AR experience.
H6: Immersion has a significant impact on visitor engagement.
H7: Immersion has a significant impact on visitor perceived enjoyment.
H8: Immersion has a significant impact on visitor AR experience.

4. DATA ANALYSIS

In this study, the Partial Least Square Structure Equation Modeling (PLS-SEM) technique was applied for the hypothesis testing using SmartPLS version 4. The analysis was conducted in two steps. The first step was to assess the reliability and validity of the model. The second step is to evaluate the path significance of the proposed hypothesis. In addition, Data were collected from an online survey focusing on museum visitors in the United Arab Emirates (UAE). A total of 441 valid responses were analyzed to test the proposed hypotheses.

4.1. Demographic characteristics

The demographic characteristics of the respondents are shown in Table 2. According to the results, most respondents were female (68.5%), while the rest were male (31.5%). In addition, most respondents were between 20 and 30 years old (52.6%), were single (67.6%), and held a bachelor's degree (60.1%).

Table 2. Demographics characteristics.

Characteristic	Classification	Frequency	%
Gender	Male	139	31.5

	Female	302	68.5
Age	Bellow 20	92	20.9
	20- less than 30	232	52.6
	30- less than 40	80	18.1
	40 - less than 50	30	6.8
	50 - less than 60	5	1.1
	Over 60	2	0.5
Marital Status	Single	298	67.6
	Married	125	28.3
	Widowed	14	3.2
	Divorced	4	0.9
Educational level	High School	87	19.7
	Diploma	54	12.2
	Bachelor	265	60.1
	Master	30	6.8
	PhD	5	1.1

4.2. Measurement model

The results of the measurement model are shown in Table 3 and Figure 2. Based on the results, all factor loadings and AVE values were above the recommended thresholds of 0.7 and 0.5 (Hair et al., 2019). The factor loading ranged between 0.759 and 0.880, while AVE values ranged between 0.691 and 0.716. Similarly, the CR and CA values were also higher than 0.7 (Hair et al., 2017; Usakli and Kucukergin, 2018). The values ranged between 0.868 and 0.850 for CA and 0.899 and 0.910 for CR.

Table 3. Measurement model.

Constructs	Items	Loadings	AVE	CA	CR
Using VR/AR In Museums (VR/AR)	VR/AR1	0.813	0.711	0.865	0.908
	VR/AR2	0.859			
	VR/AR3	0.850			
	VR/AR4	0.849			
Flow state (FS)	FS1	0.852	0.716	0.868	0.910
	FS2	0.844			
	FS3	0.852			
	FS4	0.838			
Immersion (IMM)	IMM1	0.837	0.691	0.850	0.899
	IMM2	0.871			
	IMM3	0.854			
	IMM4	0.759			
Visitor Engagement (VENG)	VENG1	0.856	0.701	0.857	0.903
	VENG2	0.857			
	VENG3	0.853			
	VENG4	0.781			
Visitor Perceived Enjoyment (VEP)	VEP1	0.855	0.696	0.855	0.902
	VEP2	0.824			
	VEP3	0.851			
	VEP4	0.807			
Visitor AR Experience (V_ARE)	V_ARE1	0.761	0.708	0.861	0.906
	V_ARE2	0.862			
	V_ARE3	0.880			
	V_ARE4	0.859			

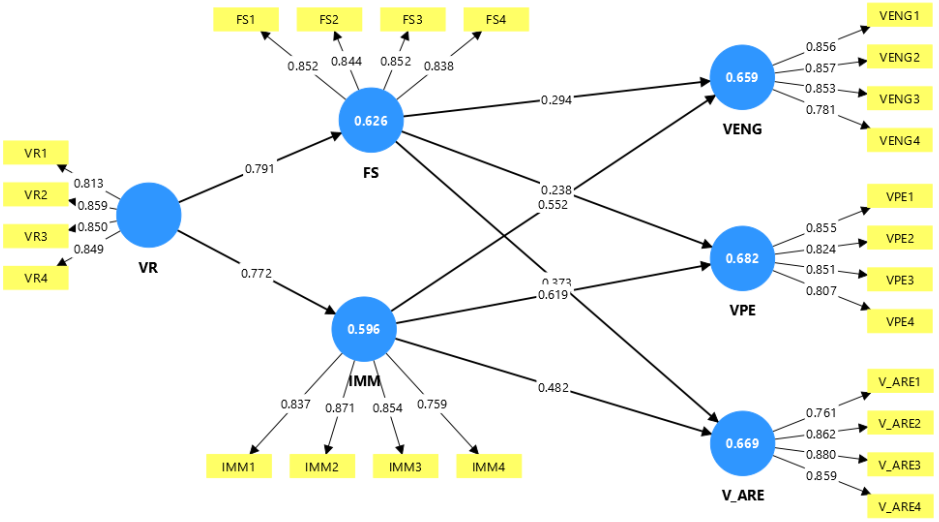

Figure 2. Measurement model.

4.3. Discriminant validity

Table 4 presents the findings of the discriminant validity by assessing the Fornell and Larcker (1981) criterion. The diagonal values present the square root of the AVE values, and the off diagonal values show the correlation values. According to the findings, the root of AVE values is higher than the correlation values between the variables. Hence, this study confirms the model's validity and reliability.

Table 4. Fornell-Larcker criterion.

Constructs	FS	IMM	VENG	VPE	VR/AR	V_ARE
FS	**0.846**					
IMM	0.826	**0.831**				
VENG	0.750	0.795	**0.837**			
VPE	0.749	0.815	0.765	**0.835**		
VR/AR	0.791	0.772	0.711	0.718	**0.843**	
V_ARE	0.771	0.790	0.788	0.789	0.736	**0.842**

4.4. Structural model

To test the significance of the proposed hypothesis paths, this study conducted bootstrapping with 5,000 subsamples. According to the findings presented in Table 5 and Figure 3, using VR/AR in museums has a significant and positive impact on flow state ($\beta = 0.791$, $p = 0.000$); hence, H1 was accepted. Similarly, using VR/AR in museums has a significant and positive impact on immersion ($\beta = 0.772$, $p = 0.000$); hence, H2 was accepted. Moreover, flow state has a significant and positive impact on visitor engagement ($\beta = 0.294$, $p = 0.000$), visitor perceived enjoyment ($\beta = 0.238$, $p = 0.000$), and visitor AR experience ($\beta = 0.373$, $p = 0.000$). Therefore, H3, H4, and H5 were all accepted. Lastly, immersion has a significant and positive impact on visitor engagement ($\beta = 0.552$, $p = 0.000$), visitor perceived enjoyment ($\beta = 0.619$, $p = 0.000$), and visitor AR experience ($\beta = 0.482$, $p = 0.000$). Hence, H6, H7, and H8 were also all accepted.

Table 5. Structural model.

Hypotheses	Coefficient (b)	P-value	T-value	Results
H1: VR/AR -> FS	0.791	0.000	32.459	Accepted
H2: VR/AR -> IMM	0.772	0.000	23.915	Accepted
H3: FS -> VENG	0.294	0.000	4.992	Accepted
H4: FS -> VPE	0.238	0.000	4.257	Accepted
H5: FS -> V_ARE	0.373	0.000	5.548	Accepted
H6: IMM -> VENG	0.552	0.000	8.347	Accepted
H7: IMM -> VPE	0.619	0.000	10.954	Accepted
H8: IMM -> V_ARE	0.482	0.000	7.328	Accepted

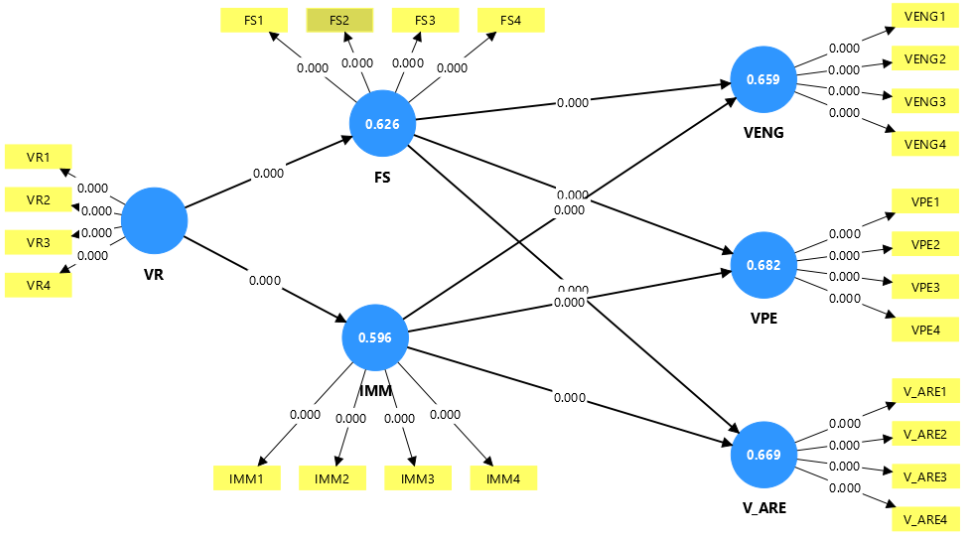

Figure 3. Structural model.

5. DISCUSSION

This study intended to evaluate the impact of multimodal AR encounters in museum contexts on cognitive and behavioral responses, emphasizing the mediating functions of enjoyment and empathy. The data support the primary concept that AR experience marketing has cognitive and educational impacts on young museum audiences, not through direct information transfer but through emotional immersion mechanisms (Addis, 2005). First, the concepts of enjoyment and empathy were statistically confirmed by demonstrating that they represent different and measurable emotional responses. The AR multisensory experience directly impacted 1 understanding the socio-spatial context of items and 2 generating reflective thought about local history, confirming that immersive digital environments can be effective instruments in heritage communication. In addition, while empathy served as a lesser mediator in grasping the geographical setting of objects, entertainment had no meaningful impact on thinking about local history (Javornik A,2014). This supports the theoretical claim that entertainment acts exclusively within the spatial and immediate experience, whereas empathy expands the temporal dimension, involving visitors in a larger cultural narrative. These findings are consistent with the stimulus-organism-response (S-O-R) model: the AR environment (stimulus) shows emotional immersion (organism), which then drives cognitive and behavioral reactions (response). The dual mediation structure entertainment for spatial comprehension and empathy for temporal reflection deepen our understanding of how AR technologies impact consumer experience in a cultural context. Furthermore, the growing use of virtual reality (VR) technologies in museum spaces has considerable potential to engage younger audiences (Roy et, 2014). Unlike AR, which adds to digital content in the real world, VR provides a fully immersive experience where users can go to bring back historical places completely. This level of immersion is especially appealing to digital natives who are used to high levels of involvement and gamification. Museums can utilize VR to mimic historical excavations, ancient towns, and cultural ceremonies, resulting in narrative-driven experiences that feel more like exploration or play than traditional study. This boosts engagement and improves memory recall and emotional connection to history, essential in encouraging long-term interest in cultural organizations. From a practical sense, museums that want to attract young visitors must go beyond boring displays. Instead, they should create AR and VR experiences that purposefully combine entertainment and empathy to increase emotional and cognitive engagement. The study has implications for long-term museum communication plans, as immersive technology can lessen the need for tangible interpretive materials, lower operational expenses, and improve accessibility for younger people knowledgeable about technology audiences.

6. CONCLUSION, IMPLICATIONS, LIMITATIONS AND RECOMMENDATIONS

In conclusion, this comprehensive study profoundly underscores the remarkable potential of virtual reality (VR) to fundamentally transform museums' marketing strategies, particularly concerning the crucial task of attracting and engaging younger visitors, who are increasingly becoming the focus point of cultural institutions. Through the innovative creation of immersive and interactive environments, VR facilitates the production of unforgettable experiences, fosters emotional resonance, and deepens educational engagement, thereby enhancing the overall visitor experience in ways that traditional methods cannot achieve. The research findings elucidate that the cognitive repercussions associated with virtual reality encounters, such as the ability to process cultural content and to start a genuine interest in local history, are significantly influenced by two pivotal emotional motivators: entertainment value and the capacity for empathy. As museums have to adapt to the evolving demands and preferences of this digital generation, VR emerges as a dynamic and sustainable avenue that changes the visitor experiences, benefits the cultural identity, and ensures loyalty among audiences.

6.1. Theoretical implications and practical implications

The findings of this study have important policy and practice implications for museums. The robust positive impact of virtual reality (VR) on flow state and immersion implies that museums should provide high-quality VR experiences in their exhibitions. Such technologies are very effective in raising cognitive and emotional engagement, hence the value of the museum visit. Since flow state was demonstrated to have a significant effect on visitor engagement, perceived enjoyment, and AR experience, museums are encouraged to design VR experiences that are goal-directed, intuitive, and rewarding. Features such as narrative continuity, user control, adaptive challenge levels, and explicit objectives can encourage more flow experiences among visitors. Similarly, the study demonstrated that immersion significantly increases engagement, enjoyment, and AR experience. Therefore, museums must invest in immersive design elements, like realistic visual and aural inputs, interactive storytelling, and multimodal input, to increase visitors' psychological and emotional involvement. These findings make it meaningful to use immersive technologies as fundamental building components of museum exhibition policy. Museums looking to remain relevant and acting in the digital age should treat VR and AR more than ancillary designations but as anchor tools for visitor experience and satisfaction.

6.2. Limitations and recommendations

Despite the beneficial findings that this study has provided, there are certain limitations worth mentioning. Firstly, this study was conducted exclusively in the United Arab Emirates (UAE) and may have limited applicability elsewhere in other cultural or geographical contexts. Behavior patterns, requirements, and responses towards VR and AR technologies vary country-wise depending on cultures, economies, or technology variations. It is suggested that subsequent research be replicated and extended to other countries and museum types in order to validate the current findings and extend them towards a more global scale. Second, the study was largely based on self-reported data from an online survey, which might be susceptible to response biases such as social desirability or subjective experience interpretation. Future research might consider adding qualitative measures, experimental paradigms, or observational behavioral data (e.g., tracking movements or activities of visitors) to complement survey data and refine the understanding of VR and AR effects. Finally, the research focused on the short-term cognitive and emotional impacts of VR and AR experiences. Longitudinal studies may explore long-term effects, such as prolonged visitor loyalty, retention of learning, or repeat visit behavior, to further clarify the enduring effect of immersion technologies on museum marketing and the visitor experience.

REFERENCES

Abou-Shouk, M., Zouair, N., Abdelhakim, A., Roshdy, H., & Abdel-Jalil, M. (2024). The effect of immersive technologies on tourist satisfaction and loyalty: the mediating role of customer engagement and customer perceived value. *International Journal of Contemporary Hospitality Management*, *36*(11), 3587-3606.

Addis, M. (2005). New technologies and cultural consumption–edutainment is born!. *European Journal of Marketing*, *39*(7/8), 729-736.

Agostino, D., & Costantini, C. (2022). A measurement framework for assessing the digital transformation of cultural institutions: the Italian case. *Meditari Accountancy Research*, *30*(4), 1141-1168.

Ahmad, A., & Alshurideh, M. (2025). Digitization and IoT-Driven Transformation of Smart Buildings. *International Journal of Management and Marketing Intelligence*, *2*(1), 26-38.

Aksakal, N. (2015). Theoretical view to the approach of the edutainment. *Procedia-Social and Behavioral Sciences*, *186*, 1232-1239.

Al Kurdi, B. (2024). Social media addiction: Youths' perspectives. *International Journal of Management and Marketing Intelligence*, *1*(1), 1-10.

Alhammadi, S., & Alshurideh, M. (2025). Investigating the Determinants of Attitude, Use and Happiness of UAE Government Mobile Apps (GMA) Users: A Quantitative Approach in the UAE. *International Journal of Management and Marketing Intelligence*, *2*(1), 1-25.

Alshurideh, M. (2024). Utilize internet of things (IOTs) on customer relationship marketing (CRM): An empirical study. *International Journal of Management and Marketing Intelligence*, *1*(1), 11-19.

Alzboun, N., Alhur, M., Khawaldah, H., & Alshurideh, M. T. (2023). Assessing gastronomic tourism using machine learning approach: The case of google review. *International Journal of Data & Network Science*, *7*(3), 1131–1142.

Amponsah, C. (2024). The Effects of Pros and Cons of Applying Big Data Analytics to Enhance Consumers' Responses. *International Journal of Management and Marketing Intelligence*, *1*(3), 1-8.

An, S., Choi, Y., & Lee, C. K. (2021). Virtual travel experience and destination marketing: Effects of sense and information quality on flow and visit intention. *Journal of Destination Marketing & Management*, *19*, 1-0.

Bodzin, A., Junior, R. A., Hammond, T., & Anastasio, D. (2021). Investigating engagement and flow with a placed-based immersive virtual reality game. *Journal of science education and technology*, *30*, 347-360.

Borsotti, M., & Mason, M. (2023). Immersive Narratives and Memories. The Design of Digital-Enhanced Visitor Experience. *PAD*, *16*(24), 63-89.

Çalışkan, G., Yayla, İ., & Pamukçu, H. (2025). The use of augmented reality technologies in tourism businesses from the perspective of UTAUT2. *European Journal of Innovation Management*, *28*(4), 1498-1526.

Carrozzino, M., & Bergamasco, M. (2010). Beyond virtual museums: Experiencing immersive virtual reality in real museums. *Journal of cultural heritage*, *11*(4), 452-458.

Chan, E. K. (2019). The role of personal relevance in the value creation process of edutainment consumption. *Journal of consumer behaviour*, *18*(3), 190-204.

Dağ, K., Çavuşoğlu, S., & Durmaz, Y. (2023). The effect of immersive experience, user engagement and perceived authenticity on place satisfaction in the context of augmented reality. *Library Hi Tech*, *42*(4), 1331-1346.

Dogan, E., & Kan, M. H. (2020). Bringing heritage sites to life for visitors: towards a conceptual framework for immersive experience. *Advances in Hospitality and Tourism Research*, *8*(1), 76-99.

Economou, M. (1998). The evaluation of museum multimedia applications: lessons from research. *Museum Management and Curatorship*, *17*(2), 173-187.

Fan, X., Jiang, X., & Deng, N. (2022). Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience. *Tourism Management*, *91*, 104534.

Fang, Y., & Chung, Y. (2025). Interplay of immersion, absorption, and flow in virtual reality: Based on experience economy theory and flow theory. *Journal of Global Fashion Marketing*, *16*(2), 212-230.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, *18*(1), 39-50.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: a comparative evaluation of composite-based structural equation modeling methods. *Journal of the academy of marketing science*, *45*, 616-632.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2-24.

Hamour, R. A., Alfouri, A., & Alshurideh, M. (2023, March). Remote Working in the COVID-19 Era. *In The International Conference on Artificial Intelligence and Computer Vision*, 459-473. Cham: Springer Nature Switzerland.

He, Z., Wu, L., & Li, X. R. (2018). When art meets tech: The role of augmented reality in enhancing museum experiences and purchase intentions. *Tourism Management*, *68*, 127-139.

Huang, X. T., Wei, Z. D., & Leung, X. Y. (2020). What you feel may not be what you experience: a psychophysiological study on flow in VR travel experiences. *Asia Pacific Journal of Tourism Research*, *25*(7), 736-747.

Huang, Y. C., Backman, S. J., & Backman, K. F. (2012). Exploring the impacts of involvement and flow experiences in Second Life on people's travel intentions. *Journal of Hospitality and Tourism Technology*, *3*(1), 4-23.

Issock Issock, P. B., Jacobs, A., & Koopman, A. (2024). Immersive escapes: examining the impact of personality traits, perceived enjoyment, flow and trust on virtual reality technology adoption intentions in an emerging market. *Cogent Business & Management*, *11*(1), 2364835.

Javornik, A. (2014). Classifications of augmented reality uses in marketing. *In 2014 IEEE international symposium on mixed and augmented reality-media, art, social science, humanities and design*, 67-68, IEEE.

Kataria, R., Pathak, P., Fatma, A., Bhatt, V., & Kumar, P. (2024). The Role of Augmented Reality (AR) in Retail Marketing: Enhancing Customer Engagement and In-store Experiences. *In 2024 International Seminar on Application for Technology of Information and Communication*, 223-228. IEEE.

Kim, M. J., & Hall, C. M. (2019). A hedonic motivation model in virtual reality tourism: Comparing visitors and non-visitors. *International journal of information management*, *46*, 236-249.

Kotler, N. G., Kotler, P., & Kotler, W. I. (2008). Museum marketing and strategy. San Francisco, CA: Jossey-Bass.

Lee, H., Jung, T. H., tom Dieck, M. C., & Chung, N. (2020). Experiencing immersive virtual reality in museums. *Information & management*, *57*(5), 103229.

Leung, R. (2022). Development of information and communication technology: from e-tourism to smart tourism. *Handbook of e-Tourism*, 23-55.

Lu, S. E., Moyle, B., Reid, S., Yang, E., & Liu, B. (2023). Technology and museum visitor experiences: a four stage model of evolution. *Information Technology & Tourism*, *25*(2), 151-174.

Lu, S. J., & Liu, Y. C. (2015). Integrating augmented reality technology to enhance children's learning in marine education. *Environmental Education Research*, *21*(4), 525-541.

Melo, M., Coelho, H., Gonçalves, G., Losada, N., Jorge, F., Teixeira, M. S., & Bessa, M. (2022). Immersive multisensory virtual reality technologies for virtual tourism: A study of the user's sense of presence, satisfaction, emotions, and attitudes. *Multimedia Systems*, *28*(3), 1027-1037.

Oh, J. E., & Kong, A. (2022). VR and Nostalgia: using animation in theme parks to enhance visitor engagement. *Journal of Promotion Management*, *28*(2), 113-127.

Omeish, F., Abuhashesh, M., Badran, R., & Alshurideh, M. T. (2023). Measuring the impact of social media influencers and digital marketing on tourist behavior in Jordan. *In 4th International Conference on Distributed Sensing and Intelligent Systems*, 2023, 376-409. IET.

Ozdemir, M. A. (2021). Virtual reality (VR) and augmented reality (AR) technologies for accessibility and marketing in the tourism industry. *In ICT tools and applications for accessible tourism*, 277-30. IGI Global.

Ozturk, I. (2024). Factors influencing the use of the Internet of Things (IoT) to enhance customer relations and customer experience. *International Journal of Management and Marketing Intelligence*, 1(2), 1-9.

Pence, H. E. (2010). Smartphones, smart objects, and augmented reality. *The Reference Librarian*, *52*(1-2), 136-145.

Portugal, C., Vaz, D., Dias, M. S., Trocado, P., Prata, A., & Abreu, F. B. E. (2025). Enhancing the Visitor Experience with Immersive Technologies and Gaming: The Monserrate Use Case. *In Smart Life and Smart Life Engineering: Current State and Future Vision*, 273-291. Cham: Springer Nature Switzerland.

Qurah, R. A., Al-Husban, N. A., Mohammad, A. A. S., Aldaihani, F. M. F., Al-Hawary, S. I. S., Abazeed, R. A. M., ... & Al Kurdi, B. (2023). The impact of brand loyalty determinants on the tourists' choice of five stars hotels in Jordan. *In The effect of information technology on business and marketing intelligence systems*, 2193-2214. Cham: Springer International Publishing.

Rentschler, R. (2002). Museum and performing arts marketing: The age of discovery. *The Journal of Arts Management, Law, and Society*, *32*(1), 7-14.

Renu, N. (2021). Applications of ar and vr technologies in healthcare marketing. *Journal of Marketing Management*, *9*(2), 35-39.

Ross, H. F., & Harrison, T. (2016). Augmented reality apparel: An appraisal of consumer knowledge, attitude and behavioral intentions. *In 2016 49th Hawaii international conference on system science*, 3919-3927. IEEE.

Roy Chowdhury, I., Patro, S., Venugopal, P., & Israel, D. (2014). A study on consumer adoption of technology-facilitated services. *Journal of Services Marketing*, *28*(6), 471-483.

Sarfraz, M., Al Kurdi, B., & Rafiq, M. (2025). How Digital Marketing Shapes Consumer Decision-Making Employing (AIDA) Model with Respect to Consumer Knowledge and Consumer Experience. *International Journal of Management and Marketing Intelligence*, *2*(1), 39-48.

Shamim, N., Gupta, S., & Shin, M. M. (2025). Evaluating user engagement via metaverse environment through immersive experience for travel and tourism websites. *International Journal of Contemporary Hospitality Management*, *37*(4), 1132-1174.

Sthapit, E., Ji, C., Li, M., Garrod, B., Ibrahim, B., & Björk, P. (2025). Memorable wellness tourism experiences: antecedents that lead to enjoyable outcomes. *International Journal of Spa and Wellness*, 1-27.

Sulieman, N., Al-Khasawneh, M., Abuhashesh, M., & Alshurideh, M. T. (2024). The Impact of Jordanian Tourism Website Performance on Online Purchase Intention. *In Sustainable Horizons for Business, Education, and Technology: Interdisciplinary Insights*, 99-112. Singapore: Springer Nature Singapore.

Sülük, S. B., & Aydin, K. (2019). Marketing communications and experiential marketing in the context of augmented reality. *In Contemporary Issues in Behavioral Finance*, (Vol. 101, pp. 153-162). Emerald Publishing Limited.

Sülük, S. B., & Aydin, K. (2019). Marketing communications and experiential marketing in the context of augmented reality. *In Contemporary Issues in Behavioral Finance*, 101, 153-162. Emerald Publishing Limited.

Trunfio, M., Jung, T., & Campana, S. (2022). Mixed reality experiences in museums: Exploring the impact of functional elements of the devices on visitors' immersive experiences and post-experience behaviours. *Information & Management, 59*(8), 103698.

Usakli, A., & Kucukergin, K. G. (2018). Using partial least squares structural equation modeling in hospitality and tourism: do researchers follow practical guidelines?. *International Journal of Contemporary Hospitality Management, 30*(11), 3462-3512.

Vasudevan, A. (2024). Cyber Security: A Customer Perspective on Emerging Technologies. *International Journal of Management and Marketing Intelligence, 1*(4), 1-7.

Verhulst, I., Woods, A., Whittaker, L., Bennett, J., & Dalton, P. (2021). Do VR and AR versions of an immersive cultural experience engender different user experiences?. *Computers in Human Behavior*, 125, 1-10.

Wei, W., Qi, R., & Zhang, L. (2019). Effects of virtual reality on theme park visitors' experience and behaviors: A presence perspective. *Tourism management, 71*, 282-293.

Wu, S. H., Wei, N. C., Hsu, H. C., & Pu, T. C. (2021). Exploring the intention of visiting the museum using immersive virtual reality technique and flow experience. *International Journal of Organizational Innovation (Online), 14*(1), 25-40.

Yang, S., & Zhang, W. (2022). Presence and flow in the context of virtual reality storytelling: What influences enjoyment in virtual environments?. *Cyberpsychology, Behavior, and Social Networking, 25*(2), 101-109.

Zahra, A. (2024). Using intelligent information systems to enhance customers' knowledge. *International Journal of Management and Marketing Intelligence, 1*(3), 9-16.

Zhu, Y., & Wang, C. (2022). Study on virtual experience marketing model based on augmented reality: museum marketing (example). *Computational Intelligence and Neuroscience*, 2022(1), 1-21.

Zhu, Y., Li, J., Han, X., Wang, R., Wang, C., & Pu, C. (2025). Embracing the future: Perceived value, technology optimism and VR tourism behavioral outcomes among generation Z. *International Journal of Human–Computer Interaction, 41*(4), 2337-2351.