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Omani Women's Satisfaction with Metaverse Tourism: The Effect of Digital Literacy, Travel Risk Perception, and Emotional Engagement on Satisfaction

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ABSTRACT

This study explores the potential of Metaverse tourism by addressing cultural and geographical barriers to traditional travel. Metaverse tourism may offer culturally appropriate experiences by enabling women to engage in global tourism virtually. Grounded in the Technology Acceptance Model (TAM), the research extends the framework to include emotional engagement and travel risk perception, offering a comprehensive understanding of user satisfaction in Metaverse tourism. Data were collected from 248 Omani women in a two-wave survey, analyzed using structural equation modeling. Results confirm that perceived ease of use and usefulness significantly enhance satisfaction, mediated by emotional engagement. Travel risk perception moderates this relationship, amplifying satisfaction when physical travel risks are high. The findings highlight that Metaverse tourism has the potential to support women's empowerment, aligning with Oman Vision 2040's goals of digital inclusion and gender equality. The study advances TAM by integrating socio-cultural and emotional dimensions, providing a foundation for future research on Metaverse tourism in conservative societies. Limitations include the focus on a single demographic, warranting cross-cultural comparisons in future work.

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1. Introduction

Imagine a world where geographical barriers no longer constrain travel, where cultural boundaries dissolve, and where anyone, regardless of location or circumstance, can explore the globe in ways never before possible. This is the promise of Metaverse tourism, an emerging phenomenon that blends the digital and physical realms into an immersive, experiential adventure (Buhalis et al., 2023; Chen, 2025). As virtual spaces evolve, they open up a variety of applications, from virtual tours of iconic landmarks to interactive experiences that enable users to explore faraway cultures and destinations, all from the comfort of their own homes (Adnan et al., 2024). While the possibilities seem endless, the true potential of Metaverse tourism lies not only in its technological advances but in how it can transform social norms, bridge divides, and, most importantly, empower underrepresented populations, such as women in traditionally conservative societies (Inmor et al., 2025; Tran, 2025).

As the Metaverse continues to expand, understanding how users engage with these platforms has become crucial (Cheung et al., 2024; Shamim et al., 2025). Most studies on digital tourism and the Metaverse have focused on technological and economic aspects, such as destination promotion, environmental sustainability, or tourist consumption patterns (Buhalis et al., 2023; Miao et al., 2024). However, limited attention has been paid to the specific needs of marginalized groups, particularly women in cultures where social expectations, safety concerns, and cultural restrictions limit access to international tourism (Hemmings-Jarrett et al., 2025; Yang & Wang, 2025). This lack of focus on socio-cultural dynamics presents a unique opportunity to explore factors that drive the adoption of Metaverse tourism, which can serve as a tool for empowerment, especially for women in Oman, where cultural and geographical factors have traditionally limited access to global tourism experiences (Abdelfattah et al., 2023; Kiani et al., 2024).

This study aims to address this gap by investigating the factors driving the adoption of Metaverse tourism by Omani women, offering them an accessible and empowering avenue to engage in global tourism. This research examines how satisfaction with Metaverse tourism depends on its ease of use, usefulness, and the emotional engagement of users by providing them with new opportunities for exploration, independence, and social participation. It aligns with Oman Vision 2040, which emphasizes the importance of digital literacy, women's participation in the digital economy, and gender equality. Therefore, this research contributes to the academic understanding of Metaverse tourism adoption and highlights the potential for digital platforms to foster gender equality in conservative societies.

The theoretical framework for this study draws upon the Technology Acceptance Model (TAM), which has been widely used to examine technology adoption across various domains (Davis, 1985; Liu & Park, 2024). TAM posits that perceived ease of use and usefulness are critical drivers of technology acceptance (Sagnier et al., 2020). While TAM has been applied to traditional digital platforms, its applicability to Metaverse tourism, an immersive and emotionally engaging experience, has yet to be fully explored (Jo, 2023; Zainal Abidin et al., 2025). This study extends TAM by incorporating emotional engagement and perceived travel risks, factors that are crucial for understanding how users, particularly women in conservative contexts, adopt and engage with Metaverse tourism. By integrating these factors into the model, this research aims to offer a comprehensive understanding of how Omani women perceive and adopt Metaverse tourism, emphasizing the role of emotional and psychological factors in shaping user satisfaction.

The contributions of this study are multifaceted. First, by integrating digital literacy, emotional engagement, and travel risk perception into the TAM framework, this research extends our understanding of the factors influencing the adoption and satisfaction of Metaverse tourism among Omani women. The broader implications of this research are to understand how such factors can be harnessed to promote empowerment and inclusion, granting access to global tourism in spite of cultural and social limitations. Furthermore, this research offers policy implications for policymakers to design culturally responsive Metaverse tourism platforms that address the specific needs of women in conservative cultures. By examining the dynamics of Metaverse tourism adoption and satisfaction, the potential implications of this study highlight the role of digital technologies to empower women and support their long-term achievement of gender equality, as outlined in Oman Vision 2040.

2. Technology Acceptance Model

The Technology Acceptance Model (TAM), developed by Davis (1985), is one of the most widely used theoretical frameworks for understanding how users accept and utilize new technologies. The model posits that two key factors, perceived ease of use and usefulness, are the primary drivers of technology adoption (Granić & Marangunić, 2019). Perceived ease of use refers to the degree to which a person believes that using a particular technology will be free of effort, while perceived usefulness is the extent to which a person believes that using the technology will enhance their job performance or provide value (Al-Qaysi et al., 2020). In this study, perceived ease of use influences how easily women can navigate and interact with the Metaverse platform, while perceived usefulness reflects how well the platform serves their needs. According to TAM, users are more likely to adopt technology if they perceive it as easy to use and valuable (Kemp et al., 2019; Venkatesh et al., 2003). These factors, in turn, influence attitudes toward using technology, ultimately leading to actual system use (Venkatesh et al., 2023).

However, existing studies applying TAM to Metaverse tourism have often overlooked crucial socio-cultural factors such as emotional engagement and travel risk perception (Debnath & Srivastava, 2025; Liu & Park, 2024). These dimensions are particularly significant in the context of conservative societies where traditional tourism may involve cultural constraints or safety concerns, especially for women (Al-Azri et al., 2024; Al-Qaysi et al., 2020). The omission of emotional engagement in the TAM framework can undermine a comprehensive understanding of the adoption process, as users' emotional connections to the technology play a key role in long-term engagement and satisfaction (Lu et al., 2019). Similarly, travel risk perception is seldom integrated into the model despite being a critical barrier for women in conservative societies, where physical travel may be fraught with safety, cultural, or societal concerns (Ghaderi et al., 2026). These concerns can include issues such as the perceived risks of traveling abroad or to unfamiliar places, and social constraints related to gender (Ghaderi et al., 2025; Sinha et al., 2026). Metaverse, however, lifts these barriers by providing a virtual environment that removes physical and safety risks of traditional travels (Tran, 2025). Therefore, this study extends the TAM framework by examining the role of emotional engagement and travel risk perception in Omani women's satisfaction with metaverse tourism.

To enhance the explanatory power of the TAM framework, this study introduces digital literacy as a moderating variable in the adoption process. In conservative societies, where women may have limited access to or experience with technology, their digital literacy plays a pivotal role in determining how effectively they engage with virtual platforms such as the Metaverse (Adnan et al., 2024). Women with higher digital literacy are more likely to feel confident and comfortable using the platform, which amplifies their emotional engagement and, consequently, enhances their overall satisfaction with the Metaverse tourism experience (Lim et al., 2025). By including digital literacy in the TAM framework, this study acknowledges the significance of users' technological capabilities in shaping their interactions with digital platforms. This expanded model addresses not only the technical and cognitive aspects of technology acceptance but also the emotional and psychological dimensions that are crucial for Omani women's adoption of Metaverse tourism. The conceptual model of the study, drawn from TAM, is presented in Figure 1 below.

3. Hypothesis Development

3-1. Ease of Use and Satisfaction with Metaverse Tourism

Satisfaction with Metaverse tourism is defined as the overall contentment a user experiences with the platform after interacting with it (Mandal et al., 2024). It is shaped by how well Metaverse tourism meets users' needs, offering a seamless and enjoyable experience (Shamim et al., 2025). An easy-to-use platform facilitates smooth interactions, reduces frustration, and enables users to focus on the content and experiences that matter most to them, which enhances their overall enjoyment (Amron et al., 2024). For example, studies in online learning environments have demonstrated that when users find e-learning platforms intuitive and straightforward, they are more satisfied with their experience (Chang & Hsiao, 2025). In the context of Metaverse tourism, this is particularly relevant as the immersive and interactive nature of the platform can overwhelm users if it is not intuitive or easy to navigate (Mandal et al., 2024; Yang & Wang, 2025).

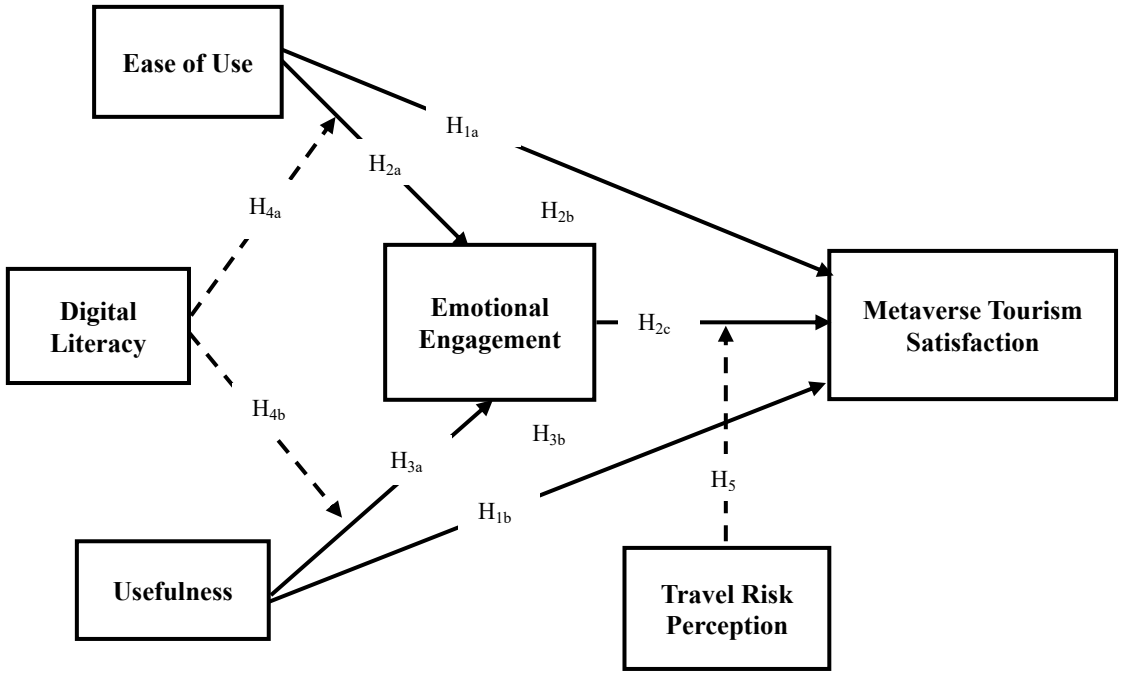


Fig. 1. Conceptual Framework of the Study

For women, particularly those from conservative or restricted environments, ease of use becomes even more crucial. A user-friendly Metaverse platform ensures that women can easily access global tourism experiences without encountering technological barriers or complexities (Liu & Park, 2024). Studies in virtual environments have found that when platforms are designed to be simple to use, users report higher levels of satisfaction and engagement (Venkatesh et al., 2023). Therefore, it can be hypothesized that:

H_{1a}: Perceived ease of use positively affects user satisfaction with Metaverse tourism.

3-2. Perceived Usefulness and Satisfaction with Metaverse Tourism

Perceived usefulness has been widely recognized as a crucial determinant of technology acceptance and user satisfaction (Amron et al., 2024; Gamage et al., 2022). It refers to the extent to which technology meets users' expectations. It provides tangible value, such as enabling users to explore virtual destinations and engage with experiences they may otherwise be unable to access (Jo, 2023; Tajeddini et al., 2022). In the context of Metaverse tourism, perceived usefulness can be particularly impactful for women, as it provides an opportunity to engage in global tourism experiences that are often restricted by cultural or geographical barriers (Cheung et al., 2024). Liu and Park (2024) found that when users perceive technology as beneficial, they are more likely to be satisfied with their experience, as it provides tangible value and enhances their ability to achieve their desired goals. This utilitarian perspective aligns with findings in various technology acceptance studies, where perceived usefulness has been shown to drive user engagement and satisfaction in digital environments (Cheung et al., 2024; Yu et al., 2025).

In the case of Omani women, the perceived usefulness of Metaverse tourism can relate to several factors, such as enabling them to explore international destinations from the safety and comfort of their home, without encountering the physical and cultural risks associated with traditional travel (Al-Azri et al., 2024). Shamim et al. (2025) found that Metaverse platforms are perceived as useful when people use them for discovering new locations, planning future travels, or enhancing their overall travel experience. Wu and Yu (2024) have shown that users report higher satisfaction when they perceive the platform as useful, as the perceived value enhances their overall experience. Additionally, in cultures with strict mobility constraints for women, Metaverse tourism provides an accessible and empowering alternative, thereby increasing its perceived usefulness (Tran, 2025). Therefore, following TAM, it can be hypothesized that:

H_{1b}: Perceived usefulness positively affects user satisfaction with Metaverse tourism.

3-3. Mediating Role of Emotional Engagement

Emotional engagement refers to how a Metaverse tourism platform elicits feelings of enjoyment, excitement, and personal involvement (Khairani & Fachira, 2022). Emotional engagement is an essential factor in understanding user satisfaction, particularly in immersive technologies where users interact in a digitally constructed environment (Yu et al., 2025). It helps users connect with the platform at a deeper, affective level, which drives their overall satisfaction (Shin & Miller, 2025). For Omani women, who may face cultural and societal constraints limiting their access to traditional tourism experiences, the emotional connection to a virtual tourism platform can be even more profound. Metaverse tourism offers them a unique opportunity to explore global destinations, experience different cultures, and engage in activities they might otherwise be excluded from due to geographical, societal, or personal constraints (Adnan et al., 2024). This emotional engagement becomes a key determinant of their satisfaction with the platform and its ability to meet their needs (Cheung et al., 2024; Shamim et al., 2025).

The ease of use of the Metaverse platform is particularly important in fostering emotional engagement. When Omani women find the platform intuitive, easy to navigate, and free from technical frustrations, they are more likely to feel a sense of immersion and enjoyment (Hao et al., 2025). This ease of use enhances their emotional connection with the experience, making them feel more in control and empowered as they navigate virtual environments (Al-Azri et al., 2024). For example, the ability to easily access virtual tourism experiences without needing advanced digital skills allows Omani women to fully engage with the content, fostering positive emotions and a deeper sense of involvement (Shin & Miller, 2025).

Furthermore, emotional engagement is not just about ease of use but also the quality and relevance of the experiences offered (Mandal et al., 2024; Venkatesh et al., 2023). In Metaverse tourism, particularly for women in conservative cultures like Oman, the ability to engage emotionally with a culturally sensitive, personalized virtual experience can significantly enhance their overall satisfaction (Al-Azri et al., 2024). Inmor et al. (2025) have found that when users feel emotionally connected to the technology, their engagement with the platform intensifies, which in turn boosts their satisfaction with the experience. For Omani women, experiencing virtual travel that aligns with their cultural values and allows them to explore the world in a socially acceptable manner fosters a stronger emotional bond with the platform.

In addition to improving satisfaction, emotional engagement also serves as a mediator between perceived ease of use and overall satisfaction. As Omani women become emotionally engaged with Metaverse tourism, the relationship between their perceptions of ease of use and their satisfaction is strengthened. This means that a user-friendly platform not only makes the experience more enjoyable but also enhances the emotional connection, leading to higher levels of satisfaction (Shamim et al., 2025). The emotional engagement, whether through joy, empowerment, or fulfillment, helps to drive satisfaction with the Metaverse tourism experience, as users are more likely to return to a platform that resonates with them on an emotional level (Inmor et al., 2025). Therefore, it can be hypothesized that:

H_{2a}: Perceived ease of use positively affects user emotional engagement.
H_{2b}: User emotional engagement positively affects satisfaction with metaverse tourism.
H_{2c}: User emotional engagement mediates the relationship between perceived ease of use and satisfaction with metaverse tourism.

Similarly, emotional engagement also plays a mediating role between perceived usefulness and user satisfaction. When users perceive the platform as useful, whether for exploring new destinations, enhancing their travel experiences, or aiding future travel plans, they are likely to experience greater emotional engagement, improving their satisfaction (Amron et al., 2024; Schiller et al., 2024). When Omani women perceive the Metaverse tourism platform as beneficial and valuable, whether by providing access to international tourism or enhancing cultural understanding, their emotional engagement with the platform is likely to increase. Cheung et al. (2024) suggest that the more users believe in the usefulness of Metaverse tourism, the more emotionally engaged they will be with the platform, leading to higher levels of satisfaction. Venkatesh et al. (2023) found that perceived

usefulness often leads to emotional responses, such as excitement or pleasure, which mediate the relationship between usefulness and satisfaction. This mediation effect suggests that emotional engagement is the conduit through which perceived usefulness influences overall satisfaction. Therefore, it can be hypothesized that:

H_{3a}: Perceived usefulness positively affects user emotional engagement.
H_{3b}: User emotional engagement mediates the relationship between perceived usefulness and satisfaction with metaverse tourism.

3-3. Moderating Role of Digital Literacy

Digital literacy enhances users' capability to understand and interact effectively with digital platforms, acting as a critical enabler that strengthens the cognitive and affective processes underlying technology use (Ng, 2012). Individuals with higher digital literacy are more confident and proficient in navigating digital interfaces, allowing them to translate the perceived ease of use into meaningful emotional experiences (Lim et al., 2025). Without sufficient digital literacy, users might struggle with technological aspects despite finding a platform potentially useful or easy to use, thereby diminishing their emotional engagement (Polizzi, 2025). For Omani women, who may have limited exposure to digital environments due to cultural or geographical constraints, digital literacy becomes a key enabler of their ability to fully participate in Metaverse tourism experiences (Belwal & Belwal, 2017). In conservative societies, where traditional travel opportunities are often restricted due to societal norms, digital literacy not only helps women overcome technological barriers but also empowers them to access virtual travel experiences that were previously inaccessible (Al-Azri et al., 2024; Cheung et al., 2024).

Women with better digital skills can navigate immersive environments, interact with virtual destinations, and enjoy a more seamless experience, heightening their emotional engagement with the platform (Polizzi, 2025). This emotional involvement is crucial because it fosters empowerment, autonomy, and a sense of inclusion, enabling users to feel more connected and involved in the experience. These feelings are particularly valuable in conservative societies like Oman, where physical mobility and traditional travel might be restricted due to cultural or safety concerns (Venn et al., 2023). In essence, digital literacy amplifies the positive effects of ease of use and usefulness by facilitating smoother interactions, reducing cognitive load, and enabling users to immerse themselves fully in the Metaverse tourism environment (Hao et al., 2025).

Adnan et al. (2024) and Choubey et al. (2025) highlight that digitally literate users can better exploit immersive features, resulting in heightened emotional responses and engagement. Bakker and Rickard (2018) suggest that digital literacy enhances the impact of usability and perceived benefits on user satisfaction and emotional involvement. This effect is even more critical for women in conservative societies, where the Metaverse presents an alternative, safe space to explore global cultures and destinations. Therefore, integrating digital literacy as a moderator aligns with TAM's premise that user characteristics influence the technology adoption process.

H_{4a}: User digital literacy positively moderates the effect of perceived ease of use on user emotional engagement.
H_{4b}: User digital literacy positively moderates the effect of perceived usefulness on user emotional engagement.

3-4. Moderating Role of Travel Risk Perception

Travel risk perception reflects females' apprehensions about various dangers inherent in physical mobility—ranging from personal safety, harassment, health risks, to societal disapproval—that may deter them from engaging in traditional tourism activities (Sharifpour et al., 2013; Williams & Baláž, 2015). When these risks are perceived as high, the attractiveness and emotional value of Metaverse tourism platforms increase, as these virtual environments offer a safe and culturally acceptable alternative (Mahmoud et al., 2025). As a result, emotional engagement with Metaverse tourism is likely to translate more strongly into satisfaction because the platform addresses a significant unmet need: safe access to global travel experiences without physical exposure to risk (Choubey et al., 2025; Fazio et al., 2023). In TAM framework, while emotional engagement drives satisfaction by fostering immersive and meaningful interactions, this connection is intensified or tempered by how users

perceive traditional travel risks (Tran, 2025). For many Omani women, concerns about safety, social restrictions, and cultural limitations shape their overall attitude toward tourism, making the perceived risk of physical travel a crucial contextual factor (Morakabati et al., 2012).

Himanshu et al. (2026) found that travelers with heightened risk perceptions report greater satisfaction with virtual or augmented tourism options as substitutes for physical travel. Khan et al. (2017) found that women's perceived travel risks strongly increase the preference for digital and virtual tourism platforms, as these platforms mitigate fears related to cultural and safety issues. Furthermore, perceived risks elevate the psychological value and satisfaction derived from safe alternatives (Belwal & Belwal, 2017; Williams & Baláž, 2015). This suggests that travel risk perception acts as a psychological amplifier, enhancing the positive effect of emotional engagement on satisfaction with Metaverse tourism. Therefore, it can be hypothesized that:

> **H_5:** Travel risk perception positively moderates the effect of user emotional engagement on satisfaction with the metaverse tourism.

4. Methodology

4-1. Sampling and Data Collection

Convenience sampling is used in this study due to the challenges of reaching a diverse population of women within Oman, particularly given cultural sensitivities and restrictions on women's mobility and technology use. Initially, a total of 729 potential participants were approached based on accessibility and willingness to engage with the study objectives, reflecting the practical constraints of recruiting women in a conservative socio-cultural context. Out of these, 279 women agreed to participate and completed the first wave of data collection, yielding a response rate that aligns with similar survey-based studies in digital tourism within restrictive cultural environments (Baruch, 1999). The final sample of 248 respondents who completed surveys in both waves represents a satisfactory retention rate, ensuring sufficient data quality and statistical power for structural equation modeling (SEM) analysis (Hair et al., 2020). The demographic statistics of the complete sample and participants of wave one, presented in Table 1, indicate that the sample is representative of women in Oman.

Data collection was conducted in two waves to capture both baseline characteristics and post-experience responses. In Wave 1, participants provided data on their digital literacy levels, travel risk perceptions specific to conventional physical mobility, and demographic information. This initial wave was critical for establishing participants' readiness and contextual factors influencing their interaction with Metaverse tourism. During Wave 2, respondents were given the opportunity to engage with Metaverse tourism activities three times within a week. This repeated exposure aimed to simulate a realistic and immersive experience, increasing the ecological validity of the study by allowing participants to form informed perceptions regarding the platform's ease of use, usefulness, emotional engagement, and satisfaction.

The virtual tourism activities provided to the participants included virtual tours of cultural landmarks in Oman and other notable destinations around the world, designed to reflect both local and international experiences. These virtual tours allowed participants to explore iconic Omani landmarks such as the Grand Mosque and the Bahla Fort, as well as famous global destinations like the Eiffel Tower in Paris and the Great Wall of China. These culturally relevant and immersive experiences were specifically curated to engage the participants emotionally, offering them a chance to experience global and local cultures from the comfort of their homes. Following these interactions, participants completed the second survey, providing post-experience data on perceived ease of use, perceived usefulness, emotional engagement, and satisfaction with the metaverse tourism.

The two-wave design strengthens the methodological rigor by temporally separating the measurement of predictor variables and outcome variables, thereby reducing common method bias and enhancing causal inference (Podsakoff et al., 2003). Ethical approval was obtained from the University's Ethics Review Committee, ensuring adherence to research ethics standards. Participation was voluntary, with respondents informed of their right to withdraw at any time, which respects participant autonomy and aligns with culturally appropriate research practices. Overall, the sampling and data collection approach balances practical constraints with methodological robustness, providing a valid and reliable basis for examining Omani women's engagement with Metaverse tourism.

Table 1. Demographic Characteristics of the Sample and Participants in Wave 1

		Full Sample = 248		Only Wave 1 = 279	
Characteristics	**Category**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Age	18-25 years	74	30	85	30
	26-35 years	87	35	94	34
	36-45 years	62	25	66	24
	46 years and above	25	10	34	12
Level of Education	Secondary School or less	52	21	67	24
	Diploma	67	27	74	27
	Bachelor's Degree	104	42	109	39
	Postgraduate Degree	25	10	29	10
Employment Status	Employed	129	52	139	50
	Housewife	119	48	140	50
Location	Urban	198	80	208	75
	Rural	50	20	71	25

4-2. Measurement

Data for this study were collected using a structured questionnaire employing a 7-point Likert scale, where respondents indicated their level of agreement with each statement, ranging from 1 (strongly disagree) to 7 (strongly agree). The key constructs measured in this study were adapted from validated instruments established in prior research to ensure both theoretical rigor and empirical reliability. The process of adapting these instruments involved both translation and cultural/contextual adaptation to ensure their relevance to the Omani context and Metaverse tourism experiences. The original items were translated into Arabic to ensure language accessibility for the participants. The adaptation process included discussions with local experts, pilot testing with a small sample of Omani women, and adjustments based on feedback to ensure that the items were understood in a way that reflected the participants' cultural and societal context. These steps were crucial to maintain the validity of the instruments in the specific socio-cultural setting of this study.

Perceived usefulness and ease of use were each measured using four items developed by Davis (1985). These items are tailored to assess the degree to which respondents found Metaverse tourism platforms valuable and easy to interact with. Sample items include “I find it easy to interact with Metaverse tourism platforms” and “Metaverse tourism is a valuable tool for discovering new locations.” Digital literacy was measured as a first-order construct using 10 items adapted from Ng (2012), which capture individuals’ self-assessed digital skills and confidence in handling technology-related tasks. Sample items include “I have the technical skills to use digital technologies for working/learning.” Travel risk perception was evaluated based on a 4-item scale developed by Sharifpour et al. (2013), with a specific focus on female respondents’ perceptions of risks associated with traveling alone. Sample items include “Travelling alone, I am afraid of being a crime victim.” Emotional engagement was measured using five items adapted from Khairani and Fachira (2022), capturing the affective dimension of users’ interaction with Metaverse tourism. Sample items include “I feel excited about the destination by engaging in metaverse tourism.” Satisfaction with Metaverse tourism was assessed using three items derived from DeLone and McLean (2016), focusing on respondents’ overall contentment and perceived value of Metaverse tourism experience. Sample items include “I believe that Metaverse tourism is worthwhile.”

5. Results

5-1. Measurement Model Validation

The data analysis was performed in SmartPLS 4.0. The results reported in Table 2 show reliability and validity estimates for the model. The factor loadings for all items in the measurement model were above the threshold of 0.60, confirming the convergent validity of the model. All values of Cronbach’s Alpha and composite reliability exceeded the recommended threshold of 0.70, indicating satisfactory internal consistency for all constructs (Hair et al., 2020). Discriminant validity was assessed by examining the Average Variance Extracted (AVE) and the inter-construct correlations. The AVE values for all constructs except travel risk perception exceeded 0.50, and the square root of the AVE (diagonal values in Table 2) was greater than the inter-construct correlations, supporting the discriminant validity of the measurement model (Hair et al., 2020). Although the AVE for travel risk

perception is below the commonly recommended threshold of 0.50, it remains acceptable because the construct demonstrates acceptable composite reliability and discriminant validity, as suggested by Hair et al. (2020). The results of Harman's Single Factor Test showed that the first factor accounted for only 28% of the total variance, which is well below the 50% threshold (Podsakoff et al., 2003). This suggests that common method bias is not a significant concern in this model, further validating the robustness of the measurement model.

Table 2. Reliability and Discriminant Validity Estimates

Variables	CA	CR	AVE	VIF	PU	PEOU	EME	DL	TRP	SMT
PU	0.860	0.905	0.70	1.7	*0.840*					
PEOU	0.846	0.897	0.68	1.8	0.645	*0.827*				
EME	0.891	0.920	0.69	1.4	0.630	0.668	*0.835*			
DL	0.901	0.920	0.54	1.9	0.467	0.427	0.433	*0.734*		
TRP	0.602	0.735	0.38	2.0	0.245	0.305	0.361	*0.262*	*0.616*	
SMT	0.843	0.906	0.76	1.7	0.550	0.559	0.670	*0.563*	*0.211*	*0.873*

Note. Values italicized and bold in the diagonal are the square root of AVE and are greater than other column values representing inter-construct correlation, thereby supporting discriminant validity.
CA = Cronbach's Alpha, CR = Composite Reliability, AVE = Average Variance Extracted, PEOU = Perceived Ease of Use, PU = Perceived Usefulness, EME = Emotional Engagement, DL = Digital Literacy, TRP = Travel Risk Perception, SMT = Satisfaction with Metaverse Tourism

5-2. Path Analysis

The results of the SEM, as presented in Table 3, show the path estimates for each hypothesis along with their statistical significance. The values of R^2 show that the model explains 56% of the variance in emotional engagement and 54% of the variance in satisfaction with Metaverse tourism. These values indicate a moderate-to-strong explanatory power, suggesting that the model is able to account for a substantial portion of the variation in these key outcome variables, making it a robust representation of the factors influencing engagement and satisfaction in Metaverse tourism.

The values of path estimates PEOU → SMT = 0.17 and PU → SMT = 0.13 are statistically significant, supporting H_{1a} and H_{1b}. It suggests that both PEOU and PU have a positive impact on user satisfaction with the metaverse tourism experience. The statistically significant values for path estimates PEOU → EME = 0.49 and PU → EME = 0.30 indicate that users' perceptions of ease of use and usefulness both positively influence their emotional engagement with metaverse tourism, supporting H_{2a} and H_{2b}. Additionally, the f^2 values are comparatively higher for these relationships, suggesting large effect sizes of PEOU and PU on EME in Metaverse tourism. Moreover, the statistically significant value of the path estimate EME → SMT = 0.53 indicates that emotional engagement has a positive effect on satisfaction with Metaverse tourism, thereby supporting H_{2c}.

Table 3. Structural Path Estimates in SEM

Variables	Hypothesis	Estimates	95% CI	f^2	Status
PEOU → SMT	H_{1a}	0.17***	[0.09-0.25]	0.03	*Supported*
PU → SMT	H_{1b}	0.13***	[0.06-0.20]	0.02	*Supported*
PEOU → EME	H_{2a}	0.49***	[0.41-0.57]	0.28	*Supported*
PU → EME	H_{3a}	0.30***	[0.22-0.38]	0.11	*Supported*
EME → SMT	H_{2c}	0.53***	[0.45-0.61]	0.35	*Supported*
PEOU → EME → SMT	H_{2b}	0.26***	[0.19-0.33]	--	*Supported*
PU → EME → SMT	H_{3b}	0.16***	[0.10-0.22]	--	*Supported*
PU*DL → EME	H_{4a}	0.04	[-0.04-0.12]	0.00	*Not Supported*
PEOU*DL → EME	H_{4b}	0.11	[-0.01-0.23]	0.01	*Not Supported*
EME*TRP → SMT	H_5	0.15***	[0.08-0.22]	0.02	*Supported*

*p < 0.05, **p < 0.01, ***p < 0.001, R^2 EME = 0.56, R^2 SMT = 0.54

The indirect effects of PEOU → EME → SMT = 0.26 (H_{2b}) and PU → EME → SMT = 0.16 (H_{3b}) were estimated using 5000 bootstrapped samples. The values are statistically significant, suggesting that emotional engagement acts as a mediator between PEOU, PU, and satisfaction with metaverse tourism, further reinforcing the significance of emotional engagement in shaping user satisfaction. On the other hand, the path estimates for the moderating effect of digital literacy, PU*DL → EME = 0.04

and PEOU*DL → EME = 0.11, were statistically insignificant, not supporting H_{4a} and H_{4b}. It suggests that digital literacy does not significantly moderate the relationship between perceived ease of use, perceived usefulness, and emotional engagement. However, the moderating effect of travel risk perception in path estimate EME*TRP → SMT = 0.15 was found statistically significant, thereby supporting H_5.

6. Discussion

This study diverges from the predominant focus of existing Metaverse tourism literature on technological marvels, destination marketing, and the consumption patterns of general tourists (Buhalis et al., 2023; Miao et al., 2024). Instead, it answers calls to investigate how emerging technologies can serve marginalized groups (Hemmings-Jarrett et al., 2025; Yang & Wang, 2025). It extends TAM to explore the drivers of satisfaction with Metaverse tourism among a previously understudied group: Omani women. While TAM has been widely applied in various digital platforms (Davis, 1985; Liu & Park, 2024; Venkatesh et al., 2023), its application to Metaverse tourism is novel. The findings confirm the robustness of TAM's core constructs, perceived ease of use and usefulness, in this novel context, while highlighting the pivotal mediating role of emotional engagement. The findings are consistent with those of Inmor et al. (2025), who demonstrated that emotional engagement mediates the relationship between ease of use and satisfaction in virtual tourism environments.

The emotional connection users feel when engaging with the platform is particularly important for women in conservative societies, as it allows them to interact with global destinations in a manner that is culturally sensitive and personally fulfilling (Cheung et al., 2024; Shamim et al., 2025). It suggests that, for Omani women, the pathway to satisfaction is not merely cognitive but profoundly affective. The platform's utility and usability spark feelings of excitement, enjoyment, and personal involvement, which in turn are the primary drivers of overall contentment. This underscores a limitation of traditional TAM applications in highly immersive environments such as the Metaverse, which are explicitly designed to elicit emotional responses. Our study therefore integrates a crucial psychological mechanism into the model, explaining not only whether technology is accepted but also how it evolves into a meaningful experience.

Moreover, travel risk has been identified as a significant barrier to tourism, particularly for women in conservative cultures (Ghaderi et al., 2026; Sharifpour et al., 2013). This research demonstrates that Metaverse tourism can overcome these barriers by offering a virtual environment that removes the physical and safety risks associated with traditional travel. This aligns with the work of Chen (2025), who argued that the Metaverse offers a safe and empowering alternative for women in restrictive societies. The findings suggest that as the perceived risks of physical travel are removed, emotional engagement with the Metaverse experience is heightened, leading to greater satisfaction. This result highlights the potential of digital platforms to address gender-specific travel concerns, thereby providing an opportunity for women to engage in global tourism experiences without the constraints imposed by physical travel limitations.

The non-significant moderating role of digital literacy is a particularly interesting point of contrast. Contrary to studies suggesting that digital literacy is a primary barrier (Lim et al., 2025; Venn et al., 2023), our results indicate that, for Metaverse tourism satisfaction, the platform's design (ease of use) and its emotional payoff are more decisive than pre-existing digital skills. This finding suggests that well-designed immersive platforms can remain accessible to users with moderate levels of digital literacy, provided that the experience is perceived as valuable and engaging. This has important implications for developers and policymakers seeking to promote digital inclusion, as it indicates that intuitive design can help mitigate disparities in users' digital skills.

7. Conclusions

This study makes a significant contribution to the literature on Metaverse tourism by extending the TAM to include emotional engagement and travel risk perception. The findings offer a comprehensive understanding of the factors influencing the adoption and satisfaction with Metaverse tourism among Omani women. These results not only advance theoretical knowledge but also provide practical insights for developing digital tourism platforms that promote empowerment and inclusion in conservative societies. Future research could explore the long-term impact of Metaverse tourism on

women's empowerment and examine how other socio-cultural factors, such as social norms and family support, influence the adoption of these platforms.

8. Implications

This study makes a significant theoretical contribution by successfully extending the TAM into the novel domain of Metaverse tourism. The findings validate the core TAM relationships but, more importantly, demonstrate that in immersive, experiential technologies, cognitive assessments of ease of use, and usefulness are channeled through emotional pathways to drive satisfaction. By identifying emotional engagement as a strong mediator and travel risk perception as a significant moderator, this research provides a more psychologically grounded framework for understanding technology acceptance. This extends beyond TAM's traditional cognitive focus by providing a robust model that can be applied to other affective technologies, particularly those that offer alternatives to activities constrained in the physical world.

The direct effects of perceived ease of use and usefulness on satisfaction are a clear mandate for developers. They should create Metaverse platforms with intuitive navigation, minimal technical friction, and low learning curves. Furthermore, the content must be explicitly valuable—virtual tours should be rich, informative, and effectively serve clear user goals like destination discovery, cultural education, and trip planning. This functional value is the foundational driver of adoption. Moreover, the mediating role of emotional engagement indicates that user satisfaction will be highest when the experience is not just easy and useful but also genuinely enjoyable and moving. The results strongly support the digital inclusion and economic empowerment goals of Oman Vision 2040. Policies can encourage the development of local Metaverse content that showcase Omani heritage to a global audience while providing citizens, particularly women, with a low-risk means to explore the world.

9. Limitations and Future Research Directions

One limitation of this study is its focus on a single demographic group—Omani women—within a specific cultural context, which may limit the generalizability of the findings to other regions or groups. Future research could explore the adoption of Metaverse tourism across different cultural contexts, comparing how various socio-cultural factors influence technology acceptance and emotional engagement. Future studies could also investigate how different forms of digital literacy (e.g., functional vs. critical) may impact user engagement and satisfaction, particularly in varying levels of technological environments. Furthermore, examining the role of social influence, family support, and peer groups in shaping women's decisions to adopt Metaverse tourism platforms would offer valuable insights into the social dynamics of technology acceptance. Finally, future research could explore the potential of integrating Metaverse tourism with other emerging technologies, such as augmented reality and artificial intelligence, to further enhance the immersive experience and its role in promoting sustainable tourism practices.

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