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Influence of Emerging Service Attributes on Tourist Satisfaction and Retention

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ABSTRACT (150-250 words)

The emerging tech services transforming the adventure tour package services and considered critical to influencing tourists' expectations, perceptions, and travel intentions. This study examined the influence of AI and tourist privacy, virtual reality, and authenticity on tourists' satisfaction and retention in adventure tourism. An empirical research approach was adopted, where a quantitative survey of 250 adventure tourist in Delhi NCR was conducted, and SEM analysis was applied using multiple-regression. All the three emerging attributes significantly affect the customer satisfaction, but only AI and tourist privacy and true-to-ideal authenticity affect tourist retention. Virtual reality and other authenticity dimensions (true-to-fact and true-to-self) did not significantly influence retention. Statistically the sample was limited to only Delhi-NCR and lacks a cross-sectional design. Adventure tour operators should invest in AI-based trust mechanisms and align services with ideal standards rather than only realistic advertising. Academically, the study extends the technology acceptance model and authenticity theory to adventure tourism and demonstrates that the satisfaction and the retention have different influence.

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1. Introduction (FONT ARIAL-ROUNDED 12)

Intensive technological and globalization developments have brought tremendous growth to the tourism industry around the world. In many countries, it has the largest share in gross domestic product and in India, the sector contributed over contributes 9.1% to the country's GDP and provide 8% of total employment (Naik and Chanda 2025).

Tourism marketing promotes and sells travel packages and related services to potential tourists (Leung et al. 2022; Maggon and Chaudhry 2015) that includes a variety of approaches and techniques used to draw tourists to choose a specific package. Use of new technologies in adventure tourism companies have immersed to provide tourists with new automatic tools (e.g. chatbots, robots, ChatGPT, the metaverse, AI, and VR, amongst many others). These emerging attributes help to show case the package services and their worth and considered critical to influencing tourists' expectations, perceptions, and travel intentions (Azmi et al. 2025; Pillai, Sivathanu, and Dwivedi 2020).

Artificial intelligence represents automation and personalization of the services as per the demand and convenience of the tourists but the threats include cyber-attacks, erode of

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privacy, and unnecessary tracking. Virtual reality represents the immersive representation of available adventure tourism packages that helps in better experience and expectation transformation but has the potential to undermine the virgin experiences and the value. However, the virtue of goodness of emerging technologies is far enough and the influence intensity must be evaluated for better leverage. Authenticity represents the real and genuine delivery of experience and maintenance of one's own identity. These three attributes are conceptually distinct but complementary in services delivery, yet to the best of the authors knowledge no study has compared their relative influence simultaneously. This is the first study to compare the relative influence of AI and privacy, VR and authenticity on both satisfaction and retention in adventure tourism using a single integrated model.

The right use and creation of positive image may not only enhance competitiveness, but also strengthens tourists' sense of trust and reduces uncertainty in the travel process, thereby increasing satisfaction (Lambert, Bingham, and Zabinski 2020) and overall goodwill of the tour operator for continued and sustained businesses. Therefore, the objectives of this study were to:

1. To find out the influence of AI and privacy on the both tourists' satisfaction and retention.
2. To find out the influence of VR on the both tourists' satisfaction and retention.
3. To find out the influence of authenticity on the both tourists' satisfaction and retention.

Hence this study investigates the influence of artificial intelligence and tourist privacy, virtual reality, and authenticity in the adventure tour market of Delhi NCR to enhance tourist satisfaction, improve service delivery, and thereby retain valuable tourists. The structure of the paper is as follows: Section 2 presents the literature review and hypothesis development. Section 3 outlines the research methodology. Section 4 presents the discussion and conclusion and section 5 provides limitations and future suggestions.

2. Literature Reviews

Value creation and value capture are often used interchangeably in strategic management (Chiu, Won, and Bae 2019; Cronin et al. 2000; Zacharias, Nijssen, and Stock 2016). Value creation relates to benefits delivered to tourists, whereas value capture concerns how much of that value the firm retains as a profit or competitive advantage (Woratschek, Horbel, and Popp 2020). Tech development and outreach of the tourists, have made value creation and value capture both easy and difficult. The most difficult in particular is the representation of assimilated services of the package. However, the emerging technologies (AI, Robotics and VR) playing a powerful role in effective service development and efficient delivery.

2.1. AI and Tourist Privacy

AI elements, including ML, AIP, BDA, chatbots and virtual assistants, predictive analytics and natural language processing, have significantly transformed tourist behavior and information use to enhance their experiences in terms of time and a tailored services that cover their main needs and preferences (Wasudawan, Weissmann, and Nwobodo 2025).

Generative AI enables adventure tour operators to provide tailored services instantly. Continuous improvements in AI systems have enabled them to understand feelings, motives, intentions, emotions and expectations and they can interact socially. The idea of holistic marketing is therefore centred on tourists' preferences and reasons for making a purchase and repurchase, keeping service capacity and flexibility dynamics under control. AI capabilities gradually, enabling more robust and sophisticated solutions (Jackson et al. 2024). Notwithstanding, the effective integration between humans and AI requires an

ethical approach that complements rather than replaces human creativity and cognition (Roberts & Candi, 2024).

We commence by defining cognition as the sensory processes, general operations, and complex integrated activities involved in interacting with information. Sensory processes include vision, perception, and attention. General operations involve memory and recognition. Complex integrated activities include reasoning, judgement and decision making. Among these three primary areas of cognition, various elements can be handled by both human and artificial cognition. However, the right interaction capability can influence the behavior of the tourists.

Users' intentions to shape a novel technology are influenced by tourist perceptions. The right perception eventually develops into preferences. In AI powered retail outlets, user attitudes towards AI, using perceived usefulness (PU) and perceived ease of use (PEU) were analysed and found to have a significant influence on purchase intention (Arachchi and Samarasinghe 2025) which are considered as a crucial cognitive response among users. The PU is defined as "the acceptance level of a tourist in a specific system". Studies have shown the importance of PU in terms of an individual's sentiment about a particular technology. Additionally, PU has been shown to correlate positively with attitudes toward new technologies. PEU is defined as "the free of efforts perception level for a specific system". Previous studies have shown a significant relationship between PEU and tourist' attitudes toward AI-technology (Schiavo, Businaro, and Zancanaro 2024). The significance of PEU reflects the extent to which an innovation is considered simple to understand, learn or operate (Zeithaml, Parasuraman, and Malhotra 2002). Limited research found in tourism businesses that the understanding of technological attitude influences on both tourist satisfaction and re-purchase intention.

AI integration into services offers efficiency, security, and scalability in terms of businesses performance. Studies have shown that AI enhances speed and precision (Zhai et al. 2021). The effectiveness of AI marketing strategies is highly context-dependent, requiring careful consideration of industry-specific dynamics, cultural nuances, and regulatory frameworks to optimize results and maintain tourist trust (Azmi et al., 2025; Dorotic et al., 2024).

However, despite these technological benefits, tourists' perceptions remain inconsistent (Nishant, Kennedy, and Corbett 2020; Xiao et al. 2024). Tourists' trust and behavioral adaptation to AI systems often lag because of the complexity and perceived impersonality of such services. Privacy plays an important role in the usage of digital platforms and devices (Ortakci and Seker 2024; Pillai, Sivathanu, and Dwivedi 2020). There are concerns among tourists regarding cybersecurity and data privacy when personal details are asked such as email, mobile number, and cookie acceptance. Protecting rights and autonomy and ensuring confidentiality may enforce privacy. Consequently, the perceived trust (PT) of a technology is a vital construct for its integrity.

This study examines whether the capability of AI and privacy in terms of perceived usefulness and perceived ease of use could affectively align the perceived trust of the tourist, indicating that AI and privacy is considered an independent factor influencing tourist satisfaction and re-patronage behavior.

Thus, integrating AI and tourist privacy by enhancing perceived usefulness (PU) and perceived ease of use (PEU), to enhance the perceived trust (PT) could foster a positive user experience building operators' capability and responsibility in the market. From a managerial perspective, this study offers evidence on the efficacy of operators, and in accordance with the above literature, the following hypotheses are proposed:

H₁: AI and tourist privacy (AI & TP) have a strong influence on tourist satisfaction.

H₂: AI and tourist privacy (AI & TP) strongly influence tourist retention.

2.2. Virtual Reality (VR)

New technologies in adventure tourism companies have been immersed to provide tourists with new automatic tools (e.g. chatbots, robots, ChatGPT, metaverse, AI, and DT). With the move towards digital platforms, the market has become more competitive and dynamic, forcing businesses to adapt or get out of fashion (Leung et al. 2022). VR technology is another revolutionary instrument that has changed travel experience. It allows travellers to experience locations, activities and lodging in advance of reservations by submerging them into virtual worlds (Wasudawan, Weissmann, and Nwobodo 2025). This technology allows adventure tour operators to digitally exhibit experiences such as strolling around adventure sites or visiting training places, which may have a substantial impact on tourist interest and engagement. When tourists perceive similarity between their real-world and virtual selves, this may enhance their sense of authenticity (Pimentel and Kalyanaraman 2022). Many studies have found that positive experiences directly affect tourists' intentions to continue using a virtual platform (Choi and Nam 2024; Huang et al. 2021; Zhao et al. 2024). The immersive nature of the virtual reality facilitates deeper tourist engagement, innovative experiences and enhances business with tourists. Virtual destination images refer to the overall impression and perception that tourists or potential tourists have of a particular adventure travel destination. This is a complex, and comprehensive concept that includes both cognitive and emotional aspects. When tourists encounter a plethora of travel information, such as enticing images of destinations, positive reviews, detailed travel guides, and trending topics on social media, the information makes them more likely to attract their limited attention (Carballo et al. 2022; Seo et al. 2025). The cognitive-affective system theory assumes that behavioral decisions are influenced by both rational cognitive processes and emotional experiences (Kim, Lee, and Jung 2020) and in tourism decision-making context, tourists' travel intentions are similarly influenced by both cognitive and affective factors (Li and Jiang 2025).

Cognition in virtual reality involves the reception, processing, and understanding of information, which help tourists evaluate and choose travel destinations (Wang et al., 2024). Emotional experiences refer to individuals' subjective feelings and evaluations of a destination, which can spark tourists' desire and interest in the destination, thereby influencing their cognition and evaluation of that destination. During the travel decision-making process, tourists first use cognitive processes to analyze and evaluate travel destinations, forming a basic understanding of the destinations (Amaro and Duarte 2015; Xiang, Magnini, and Fesenmaier 2015).

The impact of cognitive dissonance on user behavior in virtual environments may occur through several other psychological processes. For example, when users encounter high similarity, it may trigger social comparison processes that challenge their sense of uniqueness (Leonardelli, Pickett, and Brewer 2010). Developed perception of being too similar to others (negative elements), may prompt them to withdrawal of decisions (Esawe 2025). Perceived usefulness and pleasure, as cognitive and affective responses, determine travel decisions that influence tourist satisfaction and tourist retention.

Another factor is the balance between substitutes and supplements. Although VR may enhance trip experiences by providing immersive previews, it should serve as a supplement rather than a replacement (Kumar and Kushwaha 2025). Many studies have examined how a bond with Virtual reality positively influences the satisfaction of tourists engaging in virtual tourism and contributes to the transformation of the purposes and benefits derived from virtual tourism into the intention to visit the destination physically (Kim, Lee, and Jung 2020; Poorahmadi 2024.; Talawar, S, and Alathur 2024). This study examines whether the virtual reality encounters could amplify virtual tourism's efficacy in stimulating genuine travel intentions, indicating that attachment to virtual reality is

considered an independent factor influencing tourist satisfaction and the decision to visit the destination for a real experience.

Thus, VR should be considered a promotional marketing tool in addition to an effective strategy for attracting and retaining tourists by improving every-time pre-trip planning and decisions. Therefore, operators can enhance their capabilities and responsibilities in the market. From a managerial perspective, this study offers evidence on the efficacy of tour operators and in accordance the above literature, the following hypotheses are proposed:

H₃: Virtual reality (VR) has a strong influence on tourist satisfaction.

H₄: Virtual reality (VR) has a strong influence on tourist retention.

2.3. Authenticity

Authenticity refers to the true reflection of oneself on other companions (Johansen and Gregersen 2024). It serves as a countermeasure to commodification and imitation and is understood as “real or genuine” and “in opposition to unreal or fake”. A precise definition of authenticity is rarely found in marketing research. According to psychology, higher levels of authenticity are driven by activities from the inside, and resist external influences (Kernis and Goldman 2006).

Authenticity arises from the identity of operators. To be authentic, operators must be consistent between what they say and what they are and, most importantly, what they do (Zhao et al. 2024). Impressions conveyed verbally must marry those conveyed visually. However, managerial guidelines rarely emphasize the importance of an operator’s commitment.

Business dynamics view operators as changeable constructs and suggest alternative views on how authenticity is created, and maintained. In the aviation industry, tourists may give an opportunity to choose the airline brand that they have good experiences with to make them trustworthy if they pay more attention to safety procedures in the airline business. The same perception should be evaluated for adventure tourism services also, as norms of safety and genuine experiences are considered prerequisites here. Operators who are highly motivated to fulfil a given function strengthen their attribution of authenticity. While credibility indicates real information exchange and persuasion, authenticity encompasses perceived realism and emotional connections. Authentic operators are more persuasive and have a significant impact on tourists’ trust, attitudes towards the operator, and purchase intentions (Poorahmadi 2024.; Ünalmış, Dirsehan, and Erdoğan 2024; Zniva, Weitzl, and Lindmoser 2023)

However, researchers have argued that multiple dimensions of authenticity constitute authentic experiences (Kim and Kim 2021; Le 2022). Thus, comprehensive research exploring the emerging attributes of authentic experiences and examining their influence on overall authenticity perceptions and tourist behavior is needed. In this regard, (Johansen and Gregersen 2024) recently proposed a conceptual model involving three types of authenticity which this study adopted to investigate their influences on adventure tourism services to judge the overall perceived authenticity of tourist satisfaction and revisit intention. The following subsections discuss the authenticity attributes examined in this study:

2.3.1. True-to-ideal

True-to-ideal authenticity is the extent to which tourists perceive that the attributes of a product or service correspond to socially determined standards (Koles et al. 2024). Tourists develop a true-to-ideal authenticity perception if an operator represents services that follow the competitive spirit a common standard. Accordingly, the same concept was evaluated in this study to understand true-to-ideal authenticity perceptions.

2.3.2. True-to-fact

True-to-fact authenticity focuses mainly on the comparison between marketing communication content and the actual quality of services (Koles et al. 2024). Tourists can assess an operator's true-to-fact authenticity through marketing offerings and comparisons. Furthermore, tourists rate their real experiences which serves as a genuine base for the operator's market. If real products are the same as advertised, tourists are more likely to develop true-to-fact authenticity perceptions (Kimeto 2021). Accordingly, the same concept was evaluated in this study to understand true-to-fact authenticity perceptions.

2.3.3. True-to-self

True-to-self-authenticity occurs when the operator is committed to its intrinsic value rather than being driven externally only by profit (Koles et al. 2024). Intrinsic motivations and principles follow one's true self. Tourists can perceive true-to-self-authenticity by experiencing different or unique services in combination with their natural forms.

This study examines whether the capability of AI and privacy in terms of perceived usefulness and perceived ease of use could affectively align the perceived trust of the tourist

Specifically, we argue that the three attributes of the authenticity served as a cue to evaluate whether the cognition of true-to-ideal and true-to-fact could affectively lay in true-self, indicating that authenticity is considered an independent factor influencing tourist satisfaction and tourist retention.

Thus, authenticity is a result of aligning the above attributes with operators' traits and services, to enhance their capability and responsibility in the market. From a managerial perspective, this study offers evidence on the efficacy of operators and in accordance with the above literature, the following hypotheses are proposed:

H₅: Authenticity (AT) has a strong influence on tourist satisfaction.

H₆: Authenticity (AT) has a strong influence on tourist retention.

Table 1. Expected Hypothesis summary table

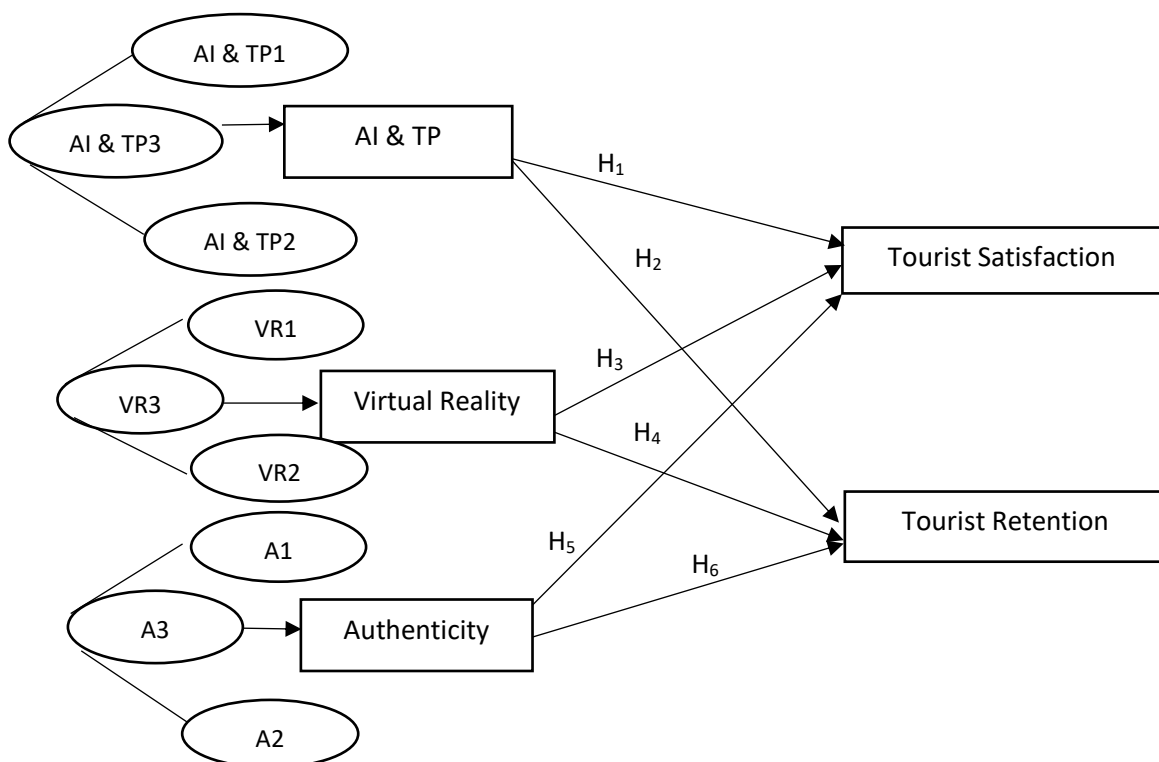
Hypothesis	Independent Variable	Dependent Variable	Expected Direction	Relationship
H ₁	AI and tourist privacy	Tourist Satisfaction	Positive	
H ₂	AI and tourist privacy	Tourist Retention	Positive	
H ₃	Virtual reality	Tourist Satisfaction	Positive	
H ₄	Virtual reality	Tourist Retention	Positive	
H ₅	Authenticity	Tourist Satisfaction	Positive	
H ₆	Authenticity	Tourist Retention	Positive	

3. Research Methods

An industry specific service quality index should be developed for measuring service quality effectively because every industry has its unique characteristics and appealing nature to tourists (Lew 2008), accordingly the authors identified three service attributes to be emerging by a review of related literature and conducting focus group interviews with academicians and industrial managers. The outcome of this exercise was used to conceptualize the research models with a specific number of emerging attributes, that is

virtual reality (VR), AI and tourist privacy (AI & TP) and authenticity (AT) to the dependent variables of tourist satisfaction and tourist retention. As cited by many researchers, a common approach to enhance tourist satisfaction is to divide the service process into its constituent key attributes and to elicit the opinion of tourists on the performance with respect to each of these attributes (Bhattacharya et al. 2023; Hu, Kandampully, and Juwaheer 2009) and compare the gaps to enhance quality or eliminate waste. There are other techniques to determine where an organization's satisfaction level ought to be in the tourists' perception such as linear regression and path models. This study adopted multiple regression analyses to determine the relative importance of these emerging attributes in influencing tourist satisfaction and ultimately their retention. The following Fig. 1, provide the hypothesized model of the study.

Figure. 1. Hypothesized model by the authors.



3.1. Sampling Approach and Profile

Data were collected from professional service providers in the Delhi NCR, choosing the most concentrated area of tourism service providers that exclusively advertise them as adventure tourism service providers. Delhi NCR is a major outbound adventure tourism due to its strategic connectivity to Himalayan regions, availability of competitive work-force, and favourable market sponsorship from both private and government stakeholders. The high concentration of adventure tour operators made the region appropriate for a convenience sampling approach. The method helped to meet the key players of the firms, including managing executives and sales managers. A detailed questionnaire of 250 copies was given to both key stakeholders to be filled out by the targeted tourists. The cover page of the questionnaire strictly indagated the privacy concerns and use of the data only for research purposes, and also explained the significance of the collected data information. Recurring follow ups and pity gifts were employed to encourage the participation.

The questionnaire for the survey aimed to measure the perceptions of tourists on the performance of the emerging attributes using a 5-point Likert scale, ranging from 1 (= poor) to 5 (= excellent). It was also designed to elicit overall satisfaction ranging from 1 (= not at all satisfied) to 5 (= extremely satisfied); and for tourist retention ranging from 1 (= certainly no) to 5 (= certainly yes).

The pilot test was conducted with 25 convenient samples before the main survey to ensure the easy understandability of the questionnaire and improve the validity and reliability of the research instrument. Of the 250 questionnaires distributed for the main survey, only 66 per cent of them were deemed appropriate for the study. Ethical approval was deemed unnecessary because the study used a non-intrusive quantitative approach with anonymized data. No personal or sensitive information was gathered and confidentiality was maintained. Participation was voluntary, informed consent was obtained, and the survey posed minimal risks. The data collected through social media and offline methods involved straightforward questions that were unlikely to cause discomfort. Hence, approval from the formal ethics committee was not required.

The quantitative approach allows for the use of statistical tools to analyze and interpret data objectively. The approach allows to test the hypothesized relationship statistically and the generalization of the result within the study context. Table 2 shows the reliability of the variables for each emerging attribute was represented by Cronbach's alpha (typically if alpha is 0.70 or higher) to determine whether the items selected for the questionnaire measure the target construct. Excellent Internal consistency is indicated by Cronbach alpha value greater than 0.9; good internal consistency is indicated by a value between 0.8 and 0.9; values greater than 0.7 and less than 0.8 are acceptable values and lower than 0.7 are not good (Churchill and Peter 1984).

Table 2. Reliability test results

<i>Emerging Attributes</i>	No. of Constructs	Cronbach's Alpha
<i>AI and Tourist Privacy</i>	3	0.90
<i>Virtual Reality</i>	3	0.92
<i>Authenticity</i>	3	0.88
<i>Tourist Satisfaction</i>	1	0.90
<i>Tourist Retention</i>	1	0.86

Regression analysis was conducted to understand how the typical value of the dependent emerging attributes changes when any one of the independent attributes varies. It indicates the concurrent combination of multiple attributes to assess how and to what extent they affect a certain outcome. The author used regression and path models to investigate the causal relationship between dependent variables, such as tourist satisfaction and retention and the independent variables represented by the emerging service attributes.

Statistical analysis was performed using Statistical Software Package for Social Science (SPSS) and the Analysis of Moment Structure (AMOS 21) to investigate the relationship of the independent emerging attributes, namely authenticity (AT), artificial intelligence and tourist retention (AI&CP), and virtual reality (VR), with the tourist satisfaction (CS) and tourist retention (CR) as dependent variables.

3.2. Results of Regression Analysis on Tourist Satisfaction (Model 1)

The ANOVA results shown in Table 5, reveals that the regression models developed are statistically significant from the fact that the p-level (0.001) indicates the significance of the F-value at a confidence level of 0.95; thus, it can be concluded that the three independent emerging service attributes of adventure tour services together predict tourist satisfaction.

Table 3 Test of internal consistency and convergent validity (Model 1)

Constructs	Details	Mean	SD	Loadings	AVE	CR
AI & TP	AI and Tourist Privacy	3.95	1.03		0.89	0.96
AI & TP1	Perceived usefulness	3.89	1.17	0.94		
AI & TP2	Perceived ease of use	4.00	1.02	0.94		
AI & TP3	Perceived trust	3.88	0.92	0.95		
VR	Virtual Reality	4.15	0.65		0.71	0.88
VR1	Cognitive influence	4.29	0.72	0.85		
VR2	Emotional influence	4.21	0.76	0.90		
VR3	Transformational tool	3.88	0.86	0.77		
A	Authenticity	3.79	0.72		0.77	0.91
A1	True-to-ideal	3.91	0.84	0.89		
A2	True-to-fact	3.72	0.83	0.90		
A3	True-to-self	3.74	0.80	0.84		

Table 4. Fornell-larcker criterion (Model 1)

Constructs	AI and Tourist Privacy	Virtual Reality	Authenticity	Tourist Satisfaction
AI and Tourist Privacy	0.943			
Virtual Reality	0.486	0.842		
Authenticity	0.521	0.578	0.877	
Tourist Satisfaction	0.701	0.642	0.671	0.912

Table 5. Result of ANOVA (Model 1)

Model 1	Sum of Square	Degree of Freedom	Mean Square	F	Sig
Regression	442.811	9	49.20122	24.9	.001
Residual	306.169	156	1.96262		
Total	748.980	165			

In Table 6, the summary of the regression analysis given, where R^2 indicates the proportionate variance in the dependent variable and adjusted R^2 value which was **59.1%** of the variance in tourist satisfaction. On average, the predictions of the regression model deviated from the observed values by approximately **1.405 units** (SEE) of the dependent variable.

Table 6. Modal summary (for tourist satisfaction)

Model	R	R^2	Adjusted R^2	Std. error of the estimates
Model 1	.769 ^a	0.5913	0.5625	1.405

^a Predictors: (intercept), A1, A2, A3, AI & TP1, AI & TP2, AI & TP3, VR1, VR2, VR3

In the regression analysis between the three constructs of artificial intelligence use and tourist privacy and tourist satisfaction the correlations found were as follows: AI & TP1 ($\beta = 0.458$); A2 ($\beta = 0.180$); and A3 ($\beta = 0.098$). Therefore, the hypothesis H₁ was well supported as all constructs have positive influence.

In the virtual reality constructs, the regression analysis between all the three attributes and tourist satisfaction were as follows: VR1 ($\beta = 0.399$); VR2 ($\beta = 0.445$); and VR3 ($\beta = 0.387$). Therefore, the hypothesis H₃ was well supported as all constructs have a positive influence.

Regression analysis revealed a positive correlation between all three constructs of authenticity and tourist satisfaction were as follows: A1 ($\beta = 0.502$); A2 ($\beta = 0.358$); and A3 ($\beta = 0.216$). Therefore, the hypothesis H₅ was supported.

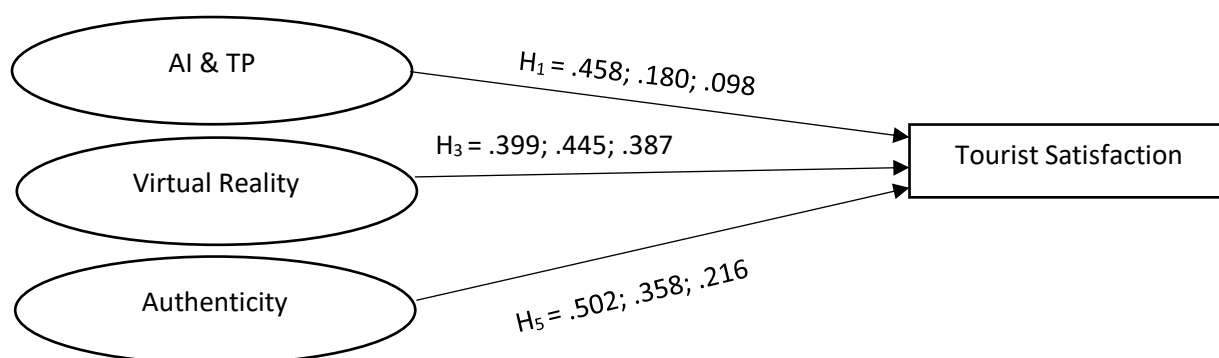
After analyzing the standardized beta coefficients of the independent variables, the following regression model was developed for tourist satisfaction and the tabular and visual representation of the same is given in Table 7 and Fig. 2 respectively:

Regression equation $Y_{CS} = 1.190 + 0.458X_1 + 0.180X_2 + 0.098X_3 + 0.399X_4 + 0.445X_5 + 0.387X_6 + 0.502X_7 + 0.358X_8 + 0.216X_9$

Table 7. Regression coefficient (model 1 for CS)

Construct	Beta <u>Unstandardized Coefficient</u>	Std. Error	β <u>Standard Coefficients</u>	t	Sig
AI & TP1	0.331	0.069	0.458	4.80	0.000
AI & TP2	0.408	0.127	0.180	3.21	0.001
AI & TP3	0.356	0.074	0.098	4.81	0.000
VR1	0.388	0.075	0.399	5.17	0.000
VR2	0.421	0.119	0.445	3.54	0.000
VR3	0.365	0.095	0.387	3.84	0.000
A1	0.410	0.085	0.502	4.82	0.000
A2	0.380	0.096	0.358	3.96	0.000
A3	0.390	0.065	0.216	6.00	0.000
Intercept	1.190	0.126		9.44	0.000

Figure 2. Regressed model of tourist satisfaction for three emerging attributes.



3.3. Results of Regression Analysis on Tourist Retention (Model 2)

The ANOVA results shown in Table 10, reveal that the regression models developed are statistically significant and explained a substantial proportion of the variance in the outcome, with $R^2 = 0.609$ and adjusted $R^2 = 0.593$. The p-level (0.001) indicates the significance of the F-value at a confidence level of 0.95. Thus, it can be concluded that the three independent emerging service attributes of adventure tour services predict tourist retention.

Table 8. Test of internal consistency and convergent validity (Model 2)

Constructs	Details	Mean	SD	Loadings	AVE	CR
AI & TP	AI and Tourist Privacy	3.79	0.72		0.76	0.90
AI & TP1	Perceived usefulness	3.91	0.84	0.89		
AI & TP2	Perceived ease of use	3.72	0.83	0.90		
AI & TP3	Perceived trust	3.74	0.80	0.84		
VR	Virtual Reality	2.15	0.65		0.41	0.68
VR1	Cognitive influence	2.29	0.69	0.66		
VR2	Emotional influence	2.21	0.66	0.65		
VR3	Transformational tool	2.88	0.70	0.60		
A	Authenticity	2.79	0.80		0.54	0.78
A1	True-to-ideal	2.91	0.89	0.83		
A2	True-to-fact	1.72	0.75	0.70		
A3	True-to-self	2.34	0.70	0.72		

Table 9. Fornell-larcker criterion (Model 2)

Constructs	AI and Tourist Privacy	Virtual Reality	Authenticity	Tourist Retention
AI and Tourist Privacy	0.871			
Virtual Reality	0.431	0.640		
Authenticity	0.388	0.344	0.734	
Tourist Retention	0.677	0.301	0.587	0.744

Table 10. Result of ANOVA (Model 2)

Model 1	Sum of Square	Degree of Freedom	Mean Square	F	Sig
Regression	424.652	9	47.18355	27.01	<.001 **
Residual	272.559	156	1.74717		
Total	697.211	165			

** Significant at $p < .001$

In Table 11, the summary of the regression analysis given, where R^2 indicates the proportionate variance in the dependent variable, and the adjusted R^2 value was 60.9% of variance in tourist retention.

Table 11. Modal summary (for tourist retention).

Model	R	R^2	Adjusted R^2	Std. error of the estimates
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Model 2	.781 ^a	.609	.593	1.325
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^a Predictors: (Intercept), A1, A2, A3, AI&CP1, AI&CP2, AI&CP3, VR1, VR2, VR3

The regression analysis revealed that AI & TP1 ($\beta = 0.376$, $t = 3.08$, $p = .003$), AI & TP2 ($\beta = 0.295$, $t = 2.72$, $p = .007$), and AI & TP3 ($\beta = 0.249$, $t = 2.81$, $p = .006$) and A1 ($\beta = 0.446$, $t = 3.02$, $p = .003$), were significant positive predictors. No other predictors were statistically significant ($p > .05$).

Therefore, hypothesis H₂ was well supported in this study as all constructs have a positive influence, hypothesis H₆ was accepted as one of the three constructs indicates a positive influence on tourist retention and hypothesis H₄ was rejected since all three constructs seem to have no significant influence on tourist retention.

After analyzing the standardized beta coefficients of the independent variables, the following regression model was developed for tourist retention and the tabular and visual representation of the same is given in Table 12 and Fig. 3 respectively:

Regression equation $Y_{CR} = 2.167 + 0.376X_1 + 0.295X_2 + 0.249X_3 + 0.446X_7$

Table 12. Regression coefficient (model 2 for tourist retention)

Construct	Beta <u>Unstandardized Coefficient</u>	Std. Error	β <u>Standard Coefficients</u>	t	Sig
AI&CP1	.329	.107	.376	3.075	.003 **
AI&CP2	.286	.105	.295	2.724	.007 **
AI&CP3	.256	.091	.249	2.813	.006 **
VR1	.070	.083	.088	0.843	.400
VR2	.129	.101	.045	1.277	.204
VR3	.112	.077	.087	1.455	.148
A1	.365	.121	.446	3.01	.003 **
A2	.056	.077	.061	0.727	.468
A3	.023	.059	.026	0.390	.697
Intercept	2.167	0.110		19.700	<.001 **

* Significant at $p < .05$

** Significant at $p < .01$

Figure. 3. Regressed model of tourist retention for three emerging attributes.

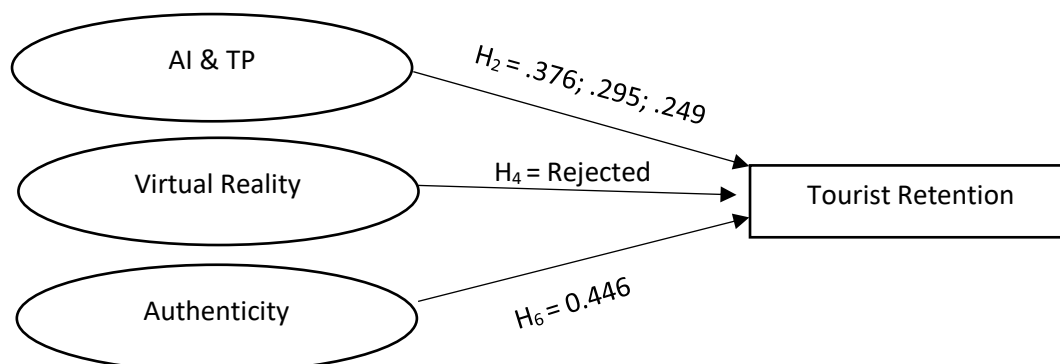


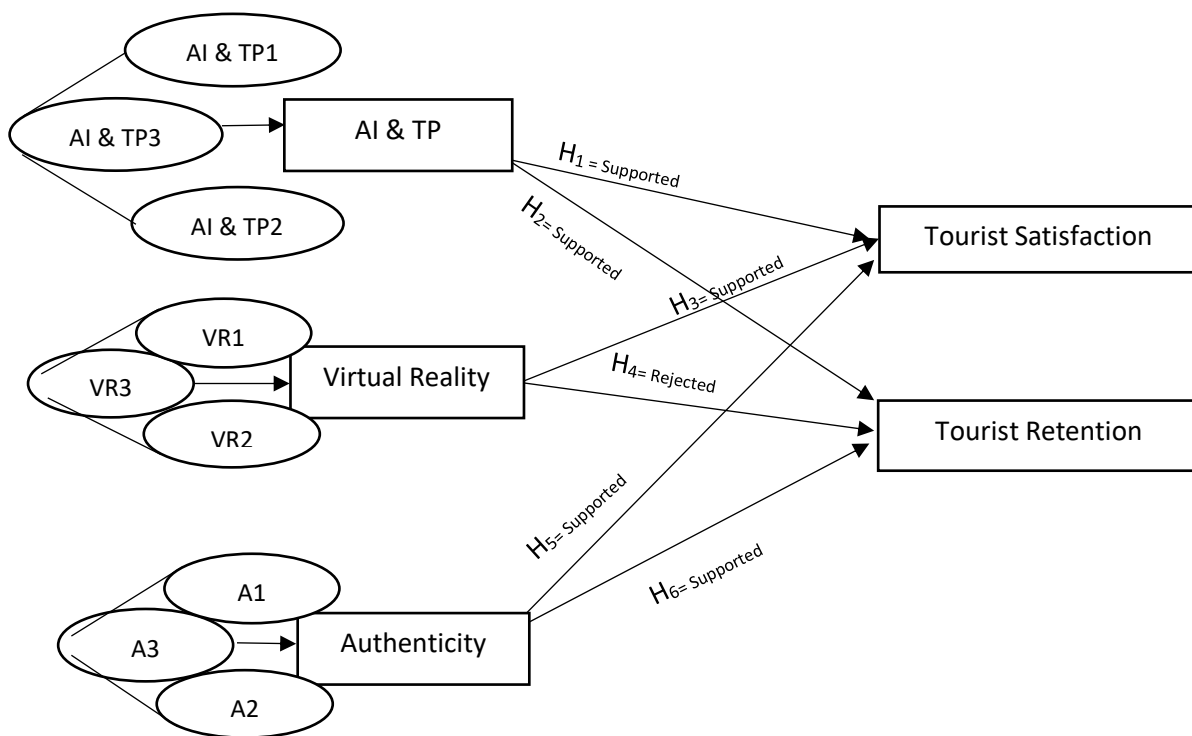
Table 13. Estimated hypothesis path summary table

Hypothesis	Relationship	Decision	t-values	Standardized estimate
H ₁	AI&TP → TS	Supported	4.273	0.245
H ₂	AI&TP → TR	Supported	2.870	0.306
H ₃	VR → TS	Supported	4.183	0.410
H ₄	VR → TR	Rejected	1.191	0.073
H ₅	A → TS	Supported	4.183	0.358
H ₆	A → TR	Supported	1.375	0.177

Goodness-of-fit statistics: $\chi^2(298) = 749.450$, $p < 0.000$, IFI = .910; CFI = .910; RESEA = 0.77

Note: H: Hypothesis; * $p < 0.05$; IFI: incremental fit index; CFI: comparative fit index; RMSEA: root mean square error of approximation.

Figure 4. Hypothesized model result by the authors.



4. Result and Discussion

This study, an empirical effort to directly examines the influence of emerging service attributes in concert with tourist satisfaction and tourist retention in the adventure tour context based on the Delhi NCR. The results unravelled an important influencing relationship between the three emerging attributes (evaluated on nine factors, with three indicating each) and two dependent variables that are discussed from a managerial perspective.

The results of the regression analysis in the case of model-1 reveals that all nine independent constructs evaluated have a positive influence on tourist satisfaction and in the case of model-2 only four of the nine constructs had a significant positive influence on tourist retention and the rest were found to be insignificant. The nine cases were as follows:

In first case, the perceived usefulness of AI and tourist privacy had a strong positive influence among tourists on both satisfaction and retention, therefore AI should be

integrated into the overall business. Tourists' readiness to adopt innovative technology applications can enhance their AI attitudes and further penetration. It is argued that AI is becoming a general tool in tourists' lives owing to the rapid spread of Industry 4.0 technology (Arachchi and Samarasinghe 2025; Wang et al. 2024).

In second case, perceived ease of use of AI and tourist privacy had positive influence among tourists on both satisfaction and retention, but required more capacity building and refinement for better convenience. Multi-lingual interpretation, accurate voice recognition, multi-payment options and related assistance are considered for ease of use (Wasudawan, Weissmann, and Nwobodo 2025; Xiang, Magnini, and Fesenmaier 2015).

In third case, perceived trust in AI and attached tourist privacy norms, although the influence was positive among tourists upon both satisfaction and retention but marginally low respectively, in comparison to other perceived factors. Operators can enhance their service efficacy by including unbiased and comparative responses, decrease the likelihood of fraud, and avoid unnecessary access to tourists' devices (Esawe 2025; Jackson et al. 2024).

In forth case, of the cognitive influence in VR representation had a positive influence on tourist satisfaction but found to be insignificant upon tourist retention. Most tourists prefer to experience the virtuality before choosing a package as a satisfactory condition but revisit is rejected. Operators should pay attention to the cognitive responses of tourists if they want potential tourists to develop the intention to visit attractions presented in the VR (Choi and Nam 2024). The revisit intentions are mainly generated by the overall service experience that required professionalism at each delivery as per developed expectations. Therefore, employing VR only for tourists is not sufficient. Employees should also be encouraged to transform their behaviors as per the set norms and take lessons from virtual experiences for tourist handlings and establish standards for service delivery. The case operators advised updating their strategies for more synergetic developments otherwise they may lose their tourists to competitors.

In fifth case, the emotional influence of VR showed positive affection among tourists in the case of tourist satisfaction which was considered good for business but found insignificant upon tourist retention. This again is a serious concern, towards the case operator's emotional connection with tourists. Tourists' cognitive response to tourism-related VR activities contributes to their affective responses to their VR tourism experiences. Although positive cognition is the primary factor in attracting tourists, but their personal care, relatable services with unique or special activities may be conducive to establishing emotional connections, allowing them to feel a sense of belonging and happiness during their journey. After the journey services should also be adequately developed as per the feedback of the tourists keeping their benefits as priority, only then the operators could increase their retention level (Curras-Perez et al. 2017; Kumar and Kushwaha 2025). The adventure tourism industry should deeply explore and emphasize the social and personal value of tourists as it is always difficult to deliver emotional matches.

In sixth case, the VR was considered as transformational tool for the generation of genuine travel intention that showed a positive influence on satisfaction but the retention factor was rejected. The crafting of VR content that balances reality and virtual infotainment, in addition to encouragement from the perspective of authentic experience leads to better tourists' engagement and purchase intention. However, the development of revisit intentions involves additional effort (Kadagidze 2023). The insignificant influence of VR on tourist retention suggests that adventure tourists may perceive VR primarily as a pre-consumption experience that facilitates destination evaluation and decision-making rather than as a substitute for the actual adventure experience. Adventure tourism is inherently associated with physical participation, uncertainty, challenge, risk perception,

and personal achievement, non-strategic uses of VR, may dilute the relevant experiences. Therefore, while VR can strengthen tourists' expectations and satisfaction by reducing information gaps and increasing experiential familiarity, actual participation remains a critical determinant of revisit intentions and long-term retention. Tour operators should focus on innovative modifications in VR applications by incorporating dynamic adventure scenarios, personalized difficulty levels, and risk or challenge categorization within both inter-package and intra-package VR offerings. Such customization can enable tourists to visualize different adventure intensities and select experiences aligned with their individual preferences, thereby improving perceived control and confidence before participation. Additionally, integrating VR with other emerging technologies, such as artificial intelligence-based personalization, real-time feedback mechanisms, and interactive storytelling, may enhance the experiential value of virtual previews. However, operators should ensure that VR functions as an experiential enhancer rather than a replacement for authentic adventure participation. The findings imply that while VR is a powerful strategic tool for improving immediate satisfaction and engagement, building tourist retention requires complementary strategies involving service quality, destination attachment, emotional connection, personalized experiences, and continuous innovation throughout the tourist journey.

In seventh case, the true-to-ideal authenticity had a positive significance among tourists in terms of both satisfaction and retention. Following the competitive standards of the services as per the market, they were found to be a natural factor and must be followed seriously for continue businesses.

In eighth case, the true-to-fact authenticity had a positive influence among tourists on satisfaction but retention was rejected. We conclude that tourists who gave a positive satisfactory assessment of true-to-fact authenticity could compare their real experiences with advertised. However, the operator must go extra miles to meet or exceed the tourist's perceived subjective expectations. Stated differently, the operators could evolve some hidden services into the package and highlight the same during the journey, which may comprise the profit a little but could yield retention. Hence, operators must play a strategic role to generate a consequential impact on tourists to have re-visit intentions (Choe, Baek, and Kim 2023).

In ninth case, the true-to-self authenticity had a positive influence on tourists upon tourist satisfaction but the retention factor was rejected. True-to-self-authenticity involve unique services combined with their natural forms that can be showcased only through a true passion for business (Koles et al. 2024). Since the effect of true to-self-authenticity among tourists observed, but the operators are required to create an impression among tourists about their love in providing adventure tour services. They must keep in mind that in doing so, the particular tourist should feel unique to the operator and could also get the impression that the operator is always highly enthusiastic and committed to every tourist. This balance may prove to be a game changer for operators and can yield retention.

The regression models (Y_{CS} and Y_{CR}) developed in this study could be referred to as effective strategy decisions by the case operators for nurturing service adaptation, their continued refinements, valuation, and right delivery for effective performance. The study has thrown insights into under-estimated areas and revealed inefficient service categories that will help operators to redefine their strategies to manage and improve their overall performance, enhancing tourist satisfaction and ultimate retention.

Retention is not just about meeting the generated expectations, but also involves consistent meeting and exceeding expectations through exceptional experiences. In the competitive era of adventure tourism, personalized responses, investing in an adequate quantity of service quality, and showcasing of ethical behaviors can foster long-term engagement. Ultimately, tourist retention is driven by trust, value, and emotional

connection, making it essential for service providers to stay responsive and innovative in every aspect of their operations.

5. Limitations and Future Recommendations

The study was conducted in specific region of the New-Delhi NCR and may not be generalized, but the replication of the research in other geographical locations would provide more confirmation for the research findings. Moreover, an increase in of sample size in relation to the current study (has limited sample impact) or longitudinal sampling may enhance reliability. Other relative sectors of tourism such as MICE, medical and wellness, are recommended to evaluate on the same pattern for more empirical insights into the influence of emerging tourism services and the tourism industry as a whole to fully understand tourists' opinions, reviews and acceptance. The proposed hypothesis of this study has shown strong influence on tourist satisfaction but has provided mixed results in the case of tourist retention, therefore the models can be further expanded by incorporating other critical independent attributes such as metaverse, AR, personal ethics etc. which are not considered here to deepen the research further. This study describes the direct influence of independent attributes ignoring the indirect relationship through any third intervening attribute as a mediator on dependent variables, which is also a critical way to obtain more sophisticated analysis of the result. Last but not the least all tour operators aspire to have loyal tourists who emotionally connect to their brand and services as engaged tourists tend to be risk-averse and contribute a longer lifetime value. However, this study did not evaluate the loyalty factor and only limited to retention level.

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