

Effect of cultural heritage digitalisation on sustainable tourism: Mediating role of constructive authenticity and destination image

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Abstract

Tourism destinations face increasing pressure to demonstrate sustainability while competing in a digitally saturated information environment. This study investigates how cultural heritage digitalisation shapes sustainable tourism outcomes among Generation Z tourists through a sequential cognitive perceptual process involving constructive authenticity and destination image. Grounded in the Stimulus Organism Response framework, the study proposes that digital representations of cultural heritage act as external stimuli that shape tourists' subjective construction of authenticity, which in turn enhances destination image and ultimately drives sustainable tourism behaviour. Data were collected from 410 Gen Z tourists visiting major heritage destinations in Rajasthan, India, using a structured questionnaire, and analysed through PLS-SEM with destination image and sustainable tourism modelled as higher-order constructs. All hypothesised direct paths were supported, with cultural heritage digitalisation exerting the strongest effect on constructive authenticity ($\beta = 0.737$), and destination image emerging as the most powerful predictor of sustainable tourism ($\beta = 0.704$). The sequential mediation path through constructive authenticity and destination image was also significant ($\beta = 0.322$), explaining 75.2% of the variance in sustainable tourism. These findings advance authenticity theory by positioning digitalisation as a primary driver of constructive authenticity formation in developing heritage contexts, and offer actionable guidance for destination managers on designing digital content strategies that foster authenticity perceptions, strengthen destination image, and reinforce long term sustainability outcomes.

Keywords: Cultural Heritage Digitalisation, Constructive Authenticity, Destination Image, Sustainable Tourism, Generation Z Tourists, Stimulus Organism Response Framework, Sequential Mediation, Heritage Destination, PLS-SEM, Rajasthan

JEL Classification: Z32, Z33, O33

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1. Introduction

Tourism is one of the major drivers in economic development across the world, however its rapid expansion has intensified the concerns about socio-cultural impacts, ecological disturbance, displacement of local communities and uneven distribution of tourism benefits (Thullah, 2021; Varghese, 2024). Heritage tourism destinations are facing a dual challenge as it boosts local economies, jobs, infrastructure, business opportunities and also can fund conservation of heritage sites, but excessive tourism and tourism dependence can raise living costs, cultural and environmental degradation, forceful displacement and loss of authenticity (Chong, 2019; Yang, 2022; Cerisola, 2025). In this context, sustainable tourism has emerged as a way to keep destinations economically competitive while protecting their environmental and social foundations over the long term (Štreimikienė, 2020; Baloch, 2023). Despite its importance for long-term destination viability, understanding how tourists perceive and evaluate sustainability remains complex, as perceptions are shaped not only by actual practices but also by subjective interpretations and mediated experiences. The growing integration of digital tools in tourism has reshaped how trips are imagined, planned, lived, and evaluated. Tourism is currently operating in a space where online and on-site experiences are constantly interacting (Pencarelli, 2019; Rodrigues, 2022; Wu, 2024), enables a new form of value creation. Cultural heritage digitalisation, through tools such as social media, online content, and interactive platforms, has transformed how destinations present their cultural stories, moving beyond traditional static displays and brochures to offer more interactive, personalised and memorable experiences (Liu Y., 2020; Lian, 2024). Contemporary tourists, especially Gen Z, overwhelmingly depend on social media, official websites, online reviews, and maps rather than traditional agencies or print media (Horváth, 2025), as these sources fuel their imagination of a trip and help them experience and evaluate it. Different social media platforms are influencing these tourists, with credible influencers and peer content also playing significant roles in shaping visit intention and destination choice (Pricope, 2023; Setiawan, 2024). As a result, tourism experiences are increasingly influenced by these digital representations rather than direct engagement, raising an important question: how do these digital representations influence tourists' perceptions of a destination and its sustainability? Within this changing tourism environment, authenticity remains a central concept to influence travel motives, yet its meaning and formation have become increasingly complex. Tourism literature classifies authenticity into three categories: objective, constructive, and existential. Objective authenticity concerns whether destination information and content accurately reflect the actual condition, while existential authenticity concerns tourists' personal experiential state (Li J. P., 2024). Traditional approaches towards authenticity treated it as an inherent feature of the objects and experiences (Jones, 2010; Domínguez-Quintero, 2018), modern approaches, especially constructive authenticity, agree that authenticity is also constructed by tourists based on their expectations, beliefs and social influences (Zhu, 2022; Li J. P., 2024). These shifts suggest that authenticity is no longer discovered but actively constructed through an

interpretive process increasingly shaped by digital technologies. In the context of heritage tourism, digitalisation reinforces tourists' symbolic and emotional connections with destinations by shaping perceived meanings and experiences shared on digital platforms (Han, 2022). These digitally mediated experiences subsequently influence future tourists when seeking destination-related information and forming travel expectations (Kim, 2020). Despite the growing role of digitalisation in constructing authenticity, limited attention has been given to the developing tourism contexts, where digital exposure often substitutes for direct experiential knowledge.

At the same time, destination image is widely recognised as a key factor in shaping tourists' attitudes and behavioural outcomes. It is often treated as a mental picture that combines tourists' cognitive (knowledge/beliefs) and affective (emotions/moods) images of a destination, shaping how they perceive and interact with destinations (Marques, 2021). A favourable destination image can lead to various significant outcomes, including satisfaction, loyalty and sustainable tourism practices (Zakiah, 2023; Luong, 2023). However, most previous studies have treated authenticity either as a primary component in forming destination image (Marine-Roig, 2015; Jebbouri A, 2022) or assessed both as a predictor of tourists' behavioural intention and satisfaction (Rasoolimanesh, 2021; Carreira, 2022; Zhao, 2024), without adequately addressing how they interact within a digitally mediated environment. More importantly, the process by which digitalisation of cultural heritage influences sustainability through intermediate perceptual constructs remains underexplored. To address these gaps, this study proposes a sequential cognitive perceptual framework in which cultural heritage digitalisation influences sustainable tourism through the mediating roles of constructive authenticity and destination image. Specifically, this study argues that digitalisation shapes tourists' perceptions of authenticity, thereby enhancing destination image and ultimately driving sustainable tourism. This sequential mediation mechanism reflects the structural transformation from external stimuli (digital representation) to internal perceptions (authenticity and image), and finally to sustainability evaluation.

This study is based on one of prominent historical and cultural destinations in India- Rajasthan, which is characterised by rich heritage and increasing digital promotion. Rajasthan has experienced rapid expansion in destination marketing through social media platforms, influencer-based promotion, and online cultural storytelling, making it a relevant context for examining how digitalisation shapes tourists' perceptions and behaviour. This study focuses on Gen Z tourists as this cohort shows the highest digital engagement and plays a crucial role in shaping future tourism trends. The collected data were analysed through partial least squares structural equation modelling (Smart PLS) to empirically assess the proposed relationships and sequential mediation effects. This study contributes to the tourism literature by extending the concept of constructive authenticity by positioning cultural heritage digitalisation as a primary driver in its formation. Furthermore, this study integrates constructive authenticity and destination image within a unified, sequential framework to offer a unique, process-based understanding of how perceptions and

practices of sustainable tourism are formed. This study provides empirical evidence from a developing tourism context, highlighting the role of digital platforms in shaping sustainable tourism among Gen Z tourists. The findings offer critical insights for destination managers and policymakers on advancing digital technologies to enhance authenticity, a favourable destination image, and, most importantly, sustainability for long-term viability.

This study is theoretically grounded in the Stimulus-Organism-Response (S-O-R) framework, which was developed by (Mehrabian, 1974), and has been widely used in tourism, digital marketing and consumer behaviour research (Baber, 2023; Sumardi, 2025) to explain how tourists process destination-related information and develop behavioural intention. In this study, cultural heritage digitalisation functions as an external stimulus; as tourists are increasingly exposed to digital representations of destinations through social media platforms, websites, and user-generated content (Gholamhosseinzadeh, 2023; Armutcu, 2023). These digital interactions shape tourists' internal evaluations and perceptions. Constructive authenticity and destination image represent the organism (O) component of the framework, as digital technologies can strongly influence a destination's authenticity and image (Kim, 2020; Sultan, 2020). Constructive authenticity reflects tourists' subjective interpretation of what is perceived as authentic, while destination image reflects cognitive and reflective evaluation formed towards a destination. Both of the study constructs reflect tourists' internal perceptual and emotional processing triggered by digital exposure. Sustainable tourism represents the response (R), as tourists' sustainable behavioural orientations emerged from these internal evaluations. Among Gen Z tourists, this evaluation process can intensify, as their pro-sustainable behaviour is driven by internal factors, such as awareness, responsibility, and personal norms, as well as external factors, such as social media engagement and online content (Salinero, 2025). Overall, this S-O-R framework is particularly relevant to the Gen Z tourist context, given their heavy reliance on digital information sources to evaluate a destination before travel. Their perceptions of a destination are increasingly shaped by online interactions rather than solely by direct physical experiences. By integrating constructive authenticity and destination image within an S-O-R framework, this study provides a process-based explanation of how digitalisation shapes sustainable tourism outcomes in cultural heritage destinations.

2. Literature Review and Hypotheses Development

2.1 Cultural Heritage Digitalisation and Constructive Authenticity

Cultural heritage digitalisation refers to the use of digital technologies to preserve documents and provide access to cultural heritage, which includes both tangible objects like destinations and intangible elements such as traditions and practises. The integration of digital technologies in tourism has significantly transformed how this cultural heritage is presented and experienced. Digital tools are enabling visitors to explore heritage sites with enhanced understanding, emotional connection and satisfaction (Liu Y. , 2020; Li H. &., 2023). Developed tourism destinations

increasingly use technologies such as AR and VR to enhance the tourist experiences. In developing regions like Rajasthan, India, however, the adoption of these technologies remains limited due to lower technological awareness and infrastructural constraints. As a result, many young tourists rely heavily on social media platforms to find information about destinations. Research in similar developing regions highlights that visual communication on social media platforms shapes perceptions of destinations, helps build a destination image, and influences tourists' decision-making (Aliyah, 2025). Digitalisation of cultural heritage enables destinations to communicate historical narratives, cultural meanings, and symbolic representations through value-based digital storytelling and interactive digital platforms. Studies highlight that these approaches help showcase the interconnected sociocultural values that extend beyond the physical sites and deepen visitors' understanding and contextualisation of the heritage (Shim, 2024; Nappi, 2024). According to (Wang, 1999), there are three types of authenticity in tourism experiences: objective, constructive and existential. Objective authenticity concerns the authenticity of the originals, and existential authenticity concerns a potential state of being, whereas in constructive authenticity, the realness of an object is projected by the tourists' own expectations and imagery. Studies highlight that constructive authenticity remains distinct from other authenticity dimensions as it focuses on the tourist's subjective construction of what feels authentic, which is often shaped by marketing strategies, media and staged cultural presentations (Zhang T. &, 2020; Lee S. K., 2022). Research suggests that, among Gen Z travellers, the pursuit of authenticity has not diminished; they hold higher standards despite their highly digitalised lifestyle (Nemec Rudež, 2023; Komarac, 2024; Seyfi S. V.-T., 2024). This generation values unique, personalised, and sustainable experiences aligned with their ethical and social values and often uses digital platforms to research and validate these experiences through peer recommendations and social media engagement.

In this regard, cultural heritage digitalisation positively influences constructive authenticity and fosters a positive tourist attitude; however, this depends on how well digital technologies align with destinations' characteristics (Li Y. J., 2024). Previous studies, mostly conducted in developed regions, highlight how augmented, virtual, and mixed reality are shaping tourists' perceptions of authenticity and are crucial for showcasing a destination's cultural heritage. In developing regions, where most tourists are unaware, and destinations lack advanced AR/VR infrastructure, social media and user-generated content are playing a crucial role in shaping tourists' perceptions and decision-making for cultural heritage destinations. These social media platforms promote intangible cultural heritage by enhancing tourists' perceptions of authenticity and encouraging preservation intentions (Hua, 2024; Zhang M., 2021). This is especially relevant to Gen Z tourists, whose perceptions are strongly influenced by digital content. Accordingly, cultural heritage digitalisation is expected to significantly influence the formation of constructive authenticity in Rajasthan tourism.

H1: Digitalisation of cultural heritage positively influences constructive authenticity.

2.2 Constructive Authenticity and Destination Image

Destination image refers to the psychological perceptions, impressions, and evaluations of a destination held by tourists, which influence their behaviour and travel decisions (Martín, 2008; Marques, 2021). In tourism research, destination image is often measured by two major components- cognitive and affective image. Cognitive destination image includes beliefs and knowledge about destination attributes, such as attraction, service quality, price, and safety, while affective destination image relates to emotions and feelings about a place, such as pleasant, exciting, or boring. (Chu, 2022) stated that destination image is influenced by individual factors (travel motivations, cultural background, demographics, memorable experiences) as well as information sources (official promotional materials, social media, news, on-site experiences and perceived authenticity/value). Studies also suggest that a stronger destination image is a basic condition for influencing tourists' destination choice and behaviour, particularly in a historical and cultural heritage context, where destinations perceived as historical are seen as much more attractive than other destinations (Szubert, 2021; Pramanik, 2023). The formation of destination image is a complex process influenced by various informational and experiential factors, and constructive authenticity plays a crucial role, especially in cultural heritage destinations. Constructive authenticity plays a crucial role in shaping a destination's image by influencing how tourists interpret their meaningful cultural experiences. Studies suggest that it positively affects tourists' perceptions of a destination and contributes to building a favourable destination image, which is crucial for the long run (Huang, 2023; Uslu, 2024). Studies also highlight that when a tourist perceives a heritage destination as original and authentic, they tend to form more favourable images of destination attributes such as cultural resources, experiential environment and services (Zuo, 2024). Destinations where authenticity is defined as maintaining cultural uniqueness shape tourists' overall perceptions of destination image and lead to higher satisfaction levels (Zhao, 2024). (Jebbouri A, 2022) treated authenticity as one of the core components in forming a destination image, while (Carreira, 2022) highlighted the role of both object-based authenticity and existential authenticity in forming a destination's image based on the on-site stage.

Among Gen Z tourists, authenticity is a central expectation, as they seek destinations that align with their social, cultural, and sustainability values (Sjuhada, 2024; Chen Y. &, 2025). Constructive authenticity also improves both cognitive image (beliefs about culture, heritage, and sustainability) and affective image (emotional attachment), leading to higher revisit intention, recommendations, and online engagement among young tourists. Rajasthan, one of the most prominent tourist destinations, offers authenticity on a large scale. Its historical forts, buildings, cuisines, dance, music and attire have a special place in the travel world. Rajasthan has one world heritage city (Jaipur), seven individual monuments and forts listed as world heritage sites (including Jantar Mantar as a scientific monument), one national park listed as a world heritage site, and one cultural element (kalbeliya dance) as an intangible world heritage. This large-scale

tourism offering offers authentic cultural and heritage experiences, enhancing the destination's image and attracting more visitors. On this basis, this hypothesis is formed-

H2 Constructive authenticity positively influences destination image.

2.3 Destination Image and Sustainable Tourism

Sustainability at the destination level refers to managing tourism in a way that balances economic, environmental, and socio-cultural factors to ensure long-term viability and benefits for the destination and its stakeholders. It involves developing mutual understanding between destination managers and various stakeholders about sustainable development. They ensure that sustainable development is understood in their specific context and can be personalised through strategies, policies, and projects (Albrecht, 2021; Haid, 2021). Maintaining sustainability at the destination level requires a multistage approach that involves awareness, agenda-setting, and monitoring. Destination management organisations play a central role in these processes and coordinate stakeholders (d'Angella, 2025). It involves environmental conservation and resource management, protecting cultural and heritage assets, achieving equitable economic distribution and long-term strategic planning that aligns tourism development with sustainability goals. Recent research among Gen Z travellers about sustainable tourism, (Seyfi S. M., 2025) stated that these tourists can be pioneers of a more sustainable tourism future, as their digital fluency helps them improve their activities and engagement. However, their sustainable behaviour depends not only on individual choice but also on access, affordability, cultural norms, and institutional support. A destination perceived as clean and environmentally responsible triggers a sense of care and encourages environmentally sustainable purchasing and responsible behaviour. Research suggests that a positive destination image, formed through information (images, stories, and videos), improves tourists' destination selection, encourages sustainable travel behaviour, and influences them to act accordingly (Liu C. J., 2021). Effective marketing strategies can enhance a destination's image, shape tourists' impressions towards the destination and lead to sustainable tourism actions. Another study suggests that a destination's image can be defined around the three sustainability dimensions- cultural, socioeconomic and environmental images. These sustainable destination images increase tourist satisfaction and further lead to destination loyalty, which is crucial as loyal visitors provide more stable and long-term revenue and support for economic and social sustainability (Lee S. W., 2020).

Among Gen Z tourists, a positive, authentic cultural, heritage and green destination image strongly shapes how they perceive a destination and whether they intend to visit, act sustainably or support heritage preservation (Nowacki, 2023), and among Indian Gen Z tourists, several factors, including material, social, and personal factors, play a more crucial role in their attitudes towards sustainable destinations. In the context of Rajasthan tourism, they projected their attributes and cultural heritage through various platforms; however, sustainable practises at destinations remain uncertain. A study on Rajasthan's prominent intangible cultural heritage- Kalbeliya dance and

songs (Ranwa, 2022) stated that tourism leads to the commodification of these heritages, and excessive tourism is causing negative impacts, but these performances are a major part of portraying Rajasthan's cultural heritage and attracting tourists to different destinations, which can vary among young travellers. This study suggests that a positive destination image influences sustainability practices and perceptions among young travellers, especially those who receive destination information through various digital platforms. On this basis, this hypothesis is formed-

H3 Destination image positively influences sustainable tourism.

2.4 Cultural Heritage Digitalisation and Sustainable Tourism

Digital tools such as social media, websites, and smart technologies are shaping how tourists access information, how service providers and tourists communicate, and how effectively responsible practices are promoted in tourism. Digital media improves access to information about various social and environmental initiatives through destination, city, or service provider websites and social platforms; this two-way online communication enhances trust and stakeholder engagement in responsible practices and can also be designed to highlight these sustainability initiatives efforts (Camilleri, 2018; Cahyani, Digital Storytelling in Cultural Tourism: A Sustainable Communication Approach at the Lasem Heritage Foundation, 2023). These social networking sites help tourists self-educate, prepare, and behave, and then share their experiences and recommendations; this way, tourists are positively influenced to adopt sustainable and responsible travel behaviour across all tour stages (Shen, 2020). Digitalisation also helps plant the perception that being digital is sustainable; increasing tourists' use of this technology and related perceptions help boost environmental sustainability and willingness to pay for sustainable options (Jiang, 2023). In cultural and heritage tourism, digital platforms now shape how tourists discover, understand and act to support sustainable and preservation efforts. These platforms foster ecological trust, access, and mutual dialogue, reinforcing cultural values and environmental sustainability. Instagram and other websites are within reach of new-generation tourists seeking unique and authentic experiences, enhancing their cultural experiences (Cahyani, 2023). User-generated content is also a crucial tool for information sharing and shapes tourists' expectations and behavioural intentions regarding the preservation of cultural heritage (Hua, 2024). At the world heritage sites, credible information sources (including new technologies and social media) enhance tourists' experiences and future behavioural intentions within a sustainable development context (Folgado-Fernández, 2024). In Rajasthan, social media and user-generated content highly promote its destinations, forts, festivals and culture. State government's various social media handles, along with many influencers and pages, are highly engaged in promoting Rajasthan's tourism offerings, showcasing various sustainability initiatives, and providing tourists a space to participate. On this basis, this hypothesis is formed-

H4 Cultural heritage digitalisation positively influences sustainable tourism.

2.5 Sequential Mediation Of Constructive Authenticity And Destination Image

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Previous studies have examined the impact of authenticity on destination image in various ways; however, limited attention has been given to its sequential mediation in shaping sustainable tourism. (Huang, 2023) examined the role of different types of authenticity, including constructive authenticity, on different types of destination image. (Zuo, 2024) In his study, he assessed how a cultural heritage destination's authenticity perception influences tourists' perceptions of the destination's cognitive and emotional images. Constructive authenticity is also used as an objective authenticity measure to assess its impact on a destination's image and on the extent to which it leads to tourist satisfaction (Zhao, 2024). (Uslu, 2024) also examined how authenticity influences destination image and satisfaction, but it conceptualises authenticity as a mix of objective and existential dimensions. (Jebbouri A, 2022) uses authenticity as a primary component, along with local community participation and access to local products, in forming a destination's image, which leads to tourist satisfaction and trust. On the other hand, many studies examined the role of destination image in influencing sustainable tourism directly or indirectly. (Liu C. J., 2021) uses both antecedent and consequences models and explained how destination image, which is influenced by different psychological factors, affects overall travel behaviour and its consequences, as destination impression influences sustainable tourism. (Lee S. W., 2020) in his study, developed a destination image based on the cultural, environmental and socioeconomic sustainability dimensions of a destination and its role in influencing tourist satisfaction and destination loyalty. (Qiu, 2023) explains the role of a destination's cognitive and affective image in tourists' environmentally responsible behaviour through place attachment. A destination image is influenced by many factors, such as e-marketing and information quality, and shapes how tourists perceive a destination, which, in turn, influences their intention to visit and affects destination sustainability (Rodrigues, 2023). Both tour-operator-generated and user-generated content enhance a destination's cognitive and affective image, which influences tourists' motivation to select sustainable destinations (Sultan, 2020).

Overall, studies on authenticity and destination image have examined their individual roles, but how these two interact when a destination strengthens its digital presence to shape sustainable tourism has been overlooked. This study proposes that cultural heritage digitalisation influences sustainable tourism through a sequential cognitive-perceptual process. Digitalisation helps destinations present their attributes in unique ways, shaping tourists' perceptions of authenticity. These perceptions of authenticity contribute to the formation of destination image, which influences the sustainable tourism outcomes. In a historically and culturally relevant destination like Rajasthan, these sequential mechanisms reflect how effectively an external force, such as digitalisation, influences a tourist's internal perception of the destination and shapes its sustainability outcomes. As research suggests that a higher youth ratio promotes more tourism consumption (Chen F. M., 2024), in a country like India, where approximately 377 million Gen Zers are reshaping its tourism market, these processes are particularly relevant to them, as they heavily rely on digital content to evaluate destinations. Therefore, the sequential mediation role of

constructive authenticity and destination image is expected to form a significant mechanism linking digitalisation and sustainable tourism.

H5 Constructive authenticity and destination image sequentially mediate the relationship between cultural heritage digitalisation and sustainable tourism.

3. Methodology

This study adopts a quantitative research design to examine the relationships among cultural heritage digitalisation, constructive authenticity, destination image, and sustainable tourism. A structured questionnaire-based survey was conducted in November and December 2025 at major destinations in Rajasthan to collect responses from Gen Z tourists, yielding 410 valid responses for analysis. These young tourists were focused because of their greater reliance on digital platforms for gathering destination-related information and decision-making, as well as their relevance to examining digitally mediated tourism experiences. Data were collected through purposive sampling to ensure that participants were from the Gen Z cohort and were outside Rajasthan. Selecting these respondents from outside Rajasthan ensures that their perceptions and actions reflect tourist evaluations rather than resident familiarity or bias. As a study area, Rajasthan offers a rich combination of tangible and intangible cultural heritage, including historical forts and sites, traditional art forms, festivals, music, and cuisine. The state represents a context of high baseline authenticity, where cultural richness is already well established and has been promoted digitally through official government platforms and social media influencers, bloggers, and content creators, making this a relevant and meaningful context for examining the role of digitalisation in shaping tourists' perceptions of authenticity rather than its existence.

All study constructs were measured through well-established scales, and minor modifications were made to best fit the study context. Data were collected on a 5-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Scales of cultural heritage digitalisation focus on measuring how digital platforms in a cultural heritage setting influence tourists' understanding and engagement, and the constructive authenticity scales are based on tourists' subjective perceptions of authenticity, showing the extent to which cultural experiences are perceived as meaningful, genuine, and aligned with expectations. Scales of both items were adopted from the recent study of (Li Y. J., 2024). Destination image is conceptualised as a second-order construct with cognitive and affective image as its dimensions; scale items for both dimensions were adopted from (Tasci, 2022). Sustainable tourism is also conceptualised as a higher-order, action-based construct encompassing economic, socio-cultural, and environmental sustainability, scale items for sustainable tourism were adopted from (Trišić, 2023). Data were primarily processed in SPSS 25 to generate descriptive statistics and provide insights into respondent demographics. The study employed SmartPLS version 3 to assess the constructs' validity, reliability and hypothesised relationships. SmartPLS was chosen for its suitability for complex models involving multiple latent constructs measured by various indicators, including both formative and reflective

measurement models (Sarstedt M. &, 2019). Data analysis was conducted in two steps: first, the measurement model's reliability and validity were confirmed; then, the structural model was analysed to test the hypothesised relationships (Hair J. F., 2019). Multicollinearity in both the inner and outer models was also assessed using VIF values, with a suggested threshold of 3.3 (Kock, 2015).

4. Results and Discussion

4.1 Sample Characteristics

The demographic information of the respondent (gender, education qualification, working status and their type of travel) is shown in Table 1.

Table 1. Demographic analysis of respondents

Demographic Information	N=410	%
<i>Gender</i>		
Male	222	54.1
Female	188	45.9
<i>Educational Qualification</i>		
High School	39	9.5
Intermediate	80	19.5
Graduation	112	27.3
Post Graduation	91	22.2
PhD and others	88	21.5
<i>Working Status</i>		
Student	159	38.8
Job	206	50.2
Self-employed	45	11
<i>Type of Travel</i>		
Solo	115	28
Friends and family	240	58.5
Professional	55	13.4



Results suggest that male Gen Z tourists outnumbered female Gen Z tourists, with male tourists accounting for 54.1% of the sample (222) and female tourists accounting for 45.9% (188). These tourists have a good educational background: only 9.5% (39) have a high school degree, and 19.5% (80) have an intermediate degree. The largest group of these Gen Z tourists has a bachelor's degree (27.3%, 112), while 22.2% (91) have a master's, and the remaining 21.5% (88) hold a PhD or other degrees. 159 of the total respondents are pursuing their studies, with 38.8 % representation. Most respondents (206, 50.2%) were employed in the government or private sector, while 45 (11%) were self-employed. A total of 115 (28%) tourists came solo to visit Rajasthan; the largest group, 240 (58.5%), came with friends and family; and the remaining 55 (13.4%) came on a professional trip.

4.2 Measurement Model

The measurement model was evaluated to assess the internal consistency, reliability, and validity of study constructs. Internal consistency was primarily measured through Cronbach's alpha and composite reliability.

Table 2. Reliability and validity results

Construct	α	CR	AVE	ADI	CDI	CHD	COA	EC	EV	SC
DI	0.864	0.898	0.595							
ST	0.938	0.947	0.643							
ADI	0.767	0.865	0.682	0.826						
CDI	0.820	0.893	0.735	0.679	0.858					
CHD	0.775	0.855	0.596	0.616	0.660	0.772				
COA	0.790	0.877	0.704	0.586	0.552	0.737	0.839			
EC	0.858	0.913	0.779	0.754	0.705	0.656	0.554	0.882		
EV	0.806	0.885	0.720	0.749	0.721	0.673	0.577	0.805	0.849	
SC	0.854	0.902	0.696	0.766	0.709	0.656	0.568	0.828	0.840	0.834

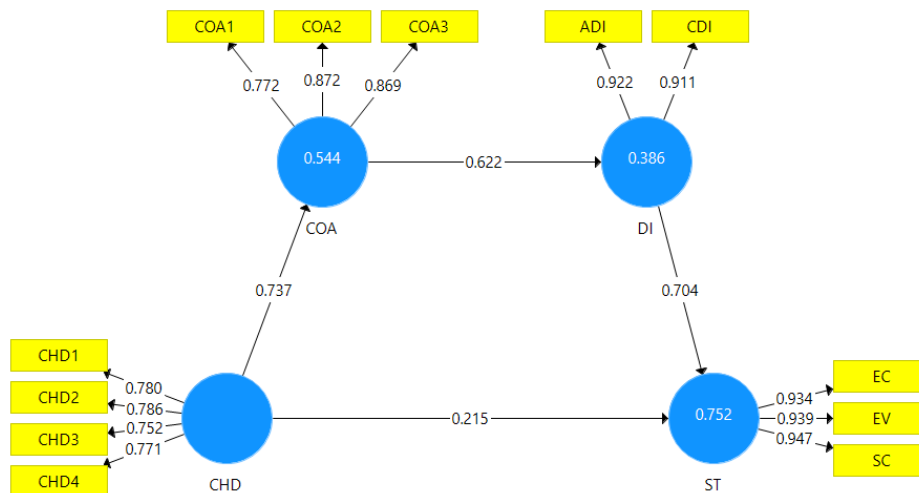
As suggested by (Hair J. F., 2019); result shows that values for both indices should exceed 0.70 and be below 0.95; all study constructs lie between 0.767 and 0.938 for Cronbach's alpha and 0.855 and 0.947 for composite reliability, showing high internal consistency. To establish convergent validity, (Cheung, 2024) suggested that both the first and second order constructs' AVE should

not be lower than 0.50. The analysis results indicate that all AVEs exceed 0.50, suggesting that all study constructs are valid. The Fornell-Larcker criterion, widely used to assess discriminant validity, was employed to ensure that the study constructs are distinct and not highly correlated. As suggested by (Fornell, 1981), for well-established discriminant validity, the AVE's square root must exceed the inter-construct correlation; the results showed in Table 2 suggest that every construct's square root of AVE is higher than its correlation with other constructs. However, higher-order constructs were not considered in the discriminant validity analysis, as violations are expected due to the use of the same indicators across higher- and lower-order constructs (Sarstedt M. H., 2019). To detect multicollinearity, the variance inflation factor (VIF) is one of the most common diagnostic tools. As suggested by (Kock, 2015), ideally, VIF values below 3.3 indicate no multicollinearity in the data; the results show that the highest VIF for both the inner and outer models is 3.171, suggesting no multicollinearity issues. Successful measurement model assessment and multicollinearity check provide a solid empirical foundation for structural model evaluation. The results suggest that the data are reliable, valid, and distinct, and that the measurement model is fit for structural evaluation.

4.3 Structural Model Assessment

The structural model was evaluated to test the hypothesised paths among cultural heritage digitalisation, constructive authenticity, destination image and sustainable tourism.

Figure 1. Structural Model



Destination image was used as an HOC consisting of two dimensions- cognitive image and affective image, whereas sustainable tourism is an HOC of socio-cultural, environmental and economic sustainability, using an embedded two-step approach. This approach involves repeatedly using indicators of lower-order constructs as indicators of higher-order constructs, allowing the

modelling of a higher-level abstract by aggregating its more concrete sub-dimensions, thereby facilitating the specification, estimation and validation of a hierarchical model (Sarstedt., 2019).

Table 3. Hypothesis testing results

Path	Aspect	β	St. Dev.	T Statistics	P Values	Effect size (f^2)	Explained Variance (R^2)	Remarks
CHD -> COA	Direct	0.737	0.027	27.704	0.000	1.192	COA: 0.544	Supported
COA -> DI	Direct	0.622	0.032	19.703	0.000	0.630	DI: 0.386	Supported
DI -> ST	Direct	0.704	0.042	16.623	0.000	1.028	ST: 0.752	Supported
CHD -> ST	Direct	0.215	0.052	4.166	0.000	0.096		Supported
CHD -> COA -> DI	Mediation	0.458	0.033	13.701	0.000			Significant
COA -> DI -> ST	Medation	0.437	0.035	12.600	0.000			Significant
CHD -> COA -> DI -> ST	Seq. Mediation	0.322	0.030	10.873	0.000			Supported

The structural model was assessed in two steps: (i) All lower-order constructs and their higher-order construct were assessed collectively, and the latent scores of all LOC were collected, (ii) the latent scores of LOC were used as an indicator of HOC and the full model was assessed. Bootstrapping with 5,000 resamples was conducted to test the significance of path coefficients. Indicator loadings for the constructs, which show the relationships between latent constructs and their respective variables, should be above 0.708 (Hair J. F., 2021); results show that all indicator loadings are between 0.752 and 0.947 for both the lower- and higher-order constructs, indicating strong relationships (**Error! Reference source not found..** Results indicating that all paths were supported, as all the p-values are 0.000 (Table 3). The influence of cultural heritage digitalisation on constructive authenticity is the highest in the study ($\beta=0.737$, $t=27.704$, $p<0.001$), indicating that constructive authenticity is highly shaped by well-cultured and heritage representation and supporting hypothesis 1. Regarding the influence of constructive authenticity on destination image, the effect is found significant and highly contributing ($\beta=0.622$, $t=19.703$, $p<0.001$), thus fully

supporting hypothesis 2. The results also show that a well-represented destination image highly influences sustainability actions, as the effect of destination image on sustainable tourism is highly positive and significant ($\beta=0.704$, $t=16.623$, $p<0.001$), supporting hypothesis 3. The direct effect of cultural heritage digitalisation on sustainable tourism is lower than the other relationships in the study, but is positive and significant, supporting hypothesis 4 ($\beta=0.215$, $t=4.166$, $p<0.001$).

Besides all direct effects, both indirect paths CHD \rightarrow COA \rightarrow DI ($\beta=0.458$, $t=13.701$, $p<0.001$) and COA \rightarrow DI \rightarrow ST ($\beta=0.437$, $t=12.60$, $p<0.001$) were found highly positive and significant. The sequential mediation path between cultural heritage and sustainable tourism through constructive authenticity and destination image, and also hypothesised as H5, was found to be positive and significant ($\beta=0.322$, $t=10.873$, $p<0.001$). The results show that all paths are highly positive and significant, and all hypotheses were supported. R^2 value of all the endogenous constructs, which indicates the variance explained and is a measure of the model's explanatory power and is suggested by (Hair J. F., 2019), that values of 0.75, 0.50 and 0.25 are substantial, moderate and weak. The results suggest a r^2 value of constructive authenticity (0.544), which suggests that 54.4% of its variance is explained by cultural heritage digitalisation; whereas both cultural heritage digitalisation and constructive authenticity explained only 38.6% of destination image ($r^2=0.368$). The r^2 value for sustainable tourism (0.752) is the highest in the study and indicates that cultural heritage digitalisation, constructive authenticity, and destination image together account for a substantial portion of its variance. The effect size f^2 values were also calculated, and the results show that the f^2 value for cultural heritage digitalisation on constructive authenticity was 1.192, indicating a large effect size; however, for sustainable tourism, the f^2 value was 0.096, suggesting a small effect size. This shows that cultural heritage digitalisation has a substantial impact on constructive authenticity, but comparatively has only a very small impact on sustainable tourism. The f^2 values for constructive authenticity in the destination image (0.630) and for the destination image's f^2 on sustainable tourism (1.028) indicate substantial impact on their respective dependent constructs.

5. Conclusion, Implications, Limitations and Future Research Directions

This study examined how cultural heritage digitalisation influences sustainable tourism through the sequential mediation of constructive authenticity and destination image among Gen Z tourists in Rajasthan, India. All five hypothesised relationships were supported. Cultural heritage digitalisation demonstrated the strongest direct effect on constructive authenticity, confirming that digital platforms are a primary driver of how this cohort constructs perceptions of genuine and meaningful heritage experiences. Constructive authenticity, in turn, significantly enhanced destination image, which emerged as the most influential predictor of sustainable tourism outcomes in the model. While the direct effect of digitalisation on sustainable tourism was also significant, it was comparatively modest, indicating that its influence on sustainability operates largely through these perceptual pathways. The sequential mediation path from digitalisation

through constructive authenticity and destination image to sustainable tourism was positive and significant, with the full model explaining 75.2% of the variance in sustainable tourism. Taken together, the results confirm that sustainability outcomes in cultural heritage tourism are not shaped solely by digitalisation but are the product of a structured cognitive-perceptual process in which authenticity and destination image serve as essential intermediate mechanisms.

5.1 Theoretical Implications of the Study

This study examines how cultural heritage digitalisation influences sustainable tourism through a sequential cognitive perceptual process involving constructive authenticity and destination image. The findings provide strong empirical support for this mechanism and offer several theoretical implications.

First, the result indicates that cultural heritage digitalisation has a strong and significant influence on constructive authenticity. This finding strengthens the modern argument that authenticity is no longer a fixed, inherent quality of an object but a subjective experience shaped by various factors, including digital technology (Zhu, 2022; Lee S. K., 2022; Li Y. J., 2024). Various digital platforms, including social media and user-generated content, not only communicate information about heritage sites; tourists' engagement with digital content also influences their understanding of a destination's authenticity and historical significance (Kim, 2020; Li J. P., 2024; Hua, 2024; Li Y. J., 2024). This active construction of authenticity through digital channels is particularly relevant for Gen Z tourists, who rely heavily on digital content as a primary source of seeking information about a destination. The strength of this relationship in the study suggests that digitalisation serves as a primary driver of authenticity construction in a developing cultural heritage region, extending existing authenticity theory into a digitally mediated context.

Second, the study confirms that the constructive authenticity significantly enhances a destination's image. These findings support the view that authenticity is a core element in shaping both the cognitive and affective components of a destination image (Chu, 2022; Huang, 2023; Uslu, 2024). When tourists perceive cultural experiences or a cultural destination as authentic and meaningful, they tend to develop favourable beliefs and emotional responses towards the destination, which actively shape their intention to visit. Most importantly, this relationship highlights that destination image is not formed solely by objective attributes but is highly influenced by subjective interpretations of authenticity (Kim, 2020; Carreira, 2022). This strengthens future research by indicating that authenticity acts as a perceptual filter through which destination attributes are evaluated and that it helps build a destination image.

Third, destination image emerges as the most influential factor in shaping sustainable tourism, indicating that tourists' responses to sustainability are strongly influenced by their overall evaluation of a destination. The findings suggest that sustainability is not assessed independently but is evaluated through a complex interplay of cognitive and affective impressions of a destination (Sultan, 2020; Rasoolimanesh, 2021). As sustainability is crucial for destinations in the long run,

a favourable destination image appears to enhance tourists' confidence in a destination's environmental, socio-cultural, and economic sustainability (Liu C. J., 2021; Rodrigues, 2023). From the tourists' perspective, this study strengthens the idea that sustainability is a perception-driven outcome rather than a purely objective condition (Qiu, 2023; Folgado-Fernández, 2024). Additionally, cultural heritage digitalisation has a weaker but significant impact on sustainable tourism, indicating that while digital platforms shape tourists' perceptions and motivations for sustainable tourism, their influence is largely indirect. This outcome supported the argument that digitalisation alone is insufficient to shape sustainability outcomes unless it first influences different perceptual constructs (Liu C. J., 2021; Pricope, 2023; Nappi, 2024), like in this study, it is shaped through constructive authenticity and destination image. One of the most significant contributions of this study is the confirmation of a sequential mediation mechanism, where cultural heritage digitalisation influences sustainable tourism through constructive authenticity and destination image. These results indicate that digitalisation initiates a structured transformational process in a cultural heritage tourism context: it first shapes how tourists perceive the authenticity of heritage destinations, which, in turn, influences the formation of destination image in their minds and leads to sustainable behaviour. These findings move beyond traditional tourism models that examine the direct or parallel relationship, focusing instead on a process-based understanding of tourists' sustainability outcomes resulting from perceptual formation (Sultan, 2020; Uslu, 2024). These sequential pathways are crucial as they indicate that sustainability outcomes can be highly shaped through layered cognitive and affective processes. By empirically validating these relationships, this study provides a nuanced understanding of how digital tools can strengthen sustainable tourism in cultural heritage destinations toward a better future. Finally, this study contributes to the growing research on Gen Z tourists by empirically demonstrating how this cohort relies heavily on digital platforms to construct authenticity and evaluate destinations. By showing how the digital environment leads to better responsible action at the destinations by this cohort, and by highlighting the need to reconsider traditional tourism theories that question this generation's attitude towards sustainable practices.

5.2 Practical Implications of the Study

The findings of the study provide several practical implications for destination managers, tourism stakeholders and policymakers by highlighting how digitalisation is crucial for strengthening sustainable tourism through improved authenticity and destination image. The strongest relationship in this study indicates that digital tools should be treated as a core element in building an authentic impression of a destination and used as an interpretive tool rather than merely a promotional channel. Destination marketing organisations should move beyond generic advertising content and should focus on content that showcases the destination's cultural meaning, history and local narratives. This may involve developing digital content that explains why these destinations matter culturally. Using local artists, performers, and community members to shape pre-visit digital experiences, and creating digital content such as story-based reels, short

documentaries, and short advertisements that foster deep, meaningful authenticity can be useful for visibility and attracting these young travellers. Destinations like Rajasthan, which are not just famous for their historical monuments but also host many colourful festivals that attract tourists from around the world, should promote these events in ways that showcase their history, cultural roots, and meanings. The impact of a favourable destination image in shaping sustainable tourism is one of the most crucial outcomes for marketers and policymakers. This suggests that when tourists perceive a destination as authentic and form a favourable image of it, they feel more responsible towards it. Marketers should focus on digital content that not only promotes a destination but also builds an authentic narrative that helps these young tourists connect with it. Embedding sustainability initiatives in digital content can also help to make tourists feel more responsible towards it. However, the promotion efforts should align with on-the-ground reality, as any mismatch can affect the destination's credibility and lead to a negative destination image.

The study's findings highlight a critical risk: digitalisation can either strengthen or undermine authenticity. Over-commercialised, exaggerated, or staged representations of destinations may create higher expectations, and if these expectations are not met at the destination, authenticity gaps arise, leading to reduced trust and a negative destination image. To avoid such situations, tourism stakeholders must ensure consistency between digital representation and the real experience. Nowadays, a viral reel or piece of content can drive unexpected tourism flows, so destination managers need to be prepared before promising any offering in this type of content. The coordination among tourism boards, local communities, and content creators must be ensured, as authenticity is fragile and once perceived as artificial, it negatively affects both destination image and sustainability efforts. As the study indicates, Gen Z tourists rely heavily on digital platforms, and destinations should treat these young travellers not just as passive consumers but also as active co-creators of destination meanings. Encouraging user-generated content that reflects real experiences and creating interactive campaigns, such as storytelling challenges, hashtags, or experience-sharing, can lead to greater engagement from this cohort. Collaborating with micro-influencers who produce more relatable, authentic, and credible content than large influencers, and facilitating on-site digital engagement, such as QR-based storytelling or live-sharing opportunities, can also be useful for shaping these young minds. Gen Z tourists trust peer-generated authenticity more than official communication, and their content directly influences future tourists' perception of the destination, which means that destinations must manage these ecosystems more efficiently.

The results show that cultural heritage digitalisation indirectly influences sustainable tourism through constructive authenticity and destination image, their direct effect on sustainable tourism is also significant. So, digitalisation not only shapes sustainable tourism but does so directly and indirectly, suggesting that marketers promote sustainability initiatives through digital promotion as well as through embedded authentic experiences. These cultural heritage destinations should design an end-to-end digital journey that educates, engages, and reinforces sustainability among

these young tourists, as their youth provides them with opportunities to revisit these destinations many times. As sustainable intentions are not just shaped on the ground, they are highly constructed in tourists' minds through digitally mediated experiences. Marketers should focus on authenticity formation during the pre-visit and encourage tourists to digitally share their authentic experiences, which can be crucial for future tourists.

5.3 Limitations of the Study and Future Research Directions

Despite its significant contribution, like every study, this study also has several limitations. This study focuses on Gen Z tourists in a single geographical context; future research could examine different age groups, such as senior citizens, or conduct cross-sectional comparisons to predict and compare their behavioural outcomes. The cross-sectional nature of the study also limits its ability to establish causality, as future studies could use longitudinal studies for deeper insight into the relationships. The study uses cultural heritage digitalisation as a single independent variable; future studies can use multiple independent variables to examine how perceptions and actions change in that context.

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