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Nexus between Digital Tourism 'Hackathon', Value Co-creation, Reward-based Crowdfunding and Destination Competitiveness in Post-Pandemic Tourism

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Abstract

Open innovation platforms are transforming global tourism by enhancing visitors experience, creating resilient destinations, mobilizing creativity and shared expertise across diverse stakeholders. The present research explores the impact of digital tourism hackathon, reward-based crowdfunding and value co-creation on destination competitiveness through an online survey of tourism industry professionals (N=479). Based on prominent theories (i.e., innovation diffusion theory, stakeholder theory and social exchange theory) and statistical estimations with partial least square structural equation modeling (PLS -SEM), the present study provides ground-breaking evidence that tourism value co-creation positively mediates the effects of digital tourism 'hackathon' and reward-based crowdfunding on destination competitiveness. In addition, the SEM-based findings also validate that destination competitiveness is significantly and positively influenced by digital tourism hackathon and reward-based crowdfunding. The practical implications include strategic insights for tourism policymakers and destination managers to leverage technology and innovation for sustainable tourism development. The present study highlights various approaches to foster collaboration and innovation, besides overcoming the challenges of implementing open innovation through governance frameworks and equitable partnerships for shared tourism benefits.

Keywords: Digital tourism hackathon, reward-based crowdfunding, destination competitiveness, value co-creation, innovation diffusion theory, stakeholder theory and social exchange theory, United Arab Emirates.

1. Introduction

Global tourism has seen substantial modifications in recent years, owing mostly to technological improvements and the widespread adoption of digital platforms (Li et al., 2023; Nam et al., 2021). These innovations have not only altered the way tourists plan and enjoy their vacations, but they have also presented new problems and opportunities for tourism destinations (Femenia-Serra & Ivars-Baidal, 2021). Understanding the role of digital innovation in boosting destination competitiveness has become a critical topic of

interest especially for tourism scholars and practitioners (Gretzel, 2022). Several studies have been conducted to investigate the impact of digital technologies on various elements of the tourism business, including online booking systems, social media marketing, and virtual reality experiences (Bilgili & Koc, 2021; Oncioiu & Priescu, 2022; Subawa et al., 2021). There is, however, a significant research gap in determining the specific processes by which digital tourism efforts, such as digital tourism hackathons reward-based crowdfunding, and value co-creation, contribute to destination competitiveness (Yuan & Gasco-Hernandez, 2021). This study seeks to address this void by investigating the connections between digital tourism hackathons, reward-based crowdfunding, tourism value co-creation, and destination competitiveness, with an emphasis on the UAE toursim.

Previous research has set the groundwork for a better understanding of the function of digital technologies in the tourism sector (Xiang et al., 2021). Chan et al. (2022), for example, evaluated the impact of online booking systems on destination competitiveness and discovered that digital platforms greatly improve a destination's competitiveness by providing tourists with ease and tailored experiences. Similarly, Tran and Rudolf (2022) investigated the impact of social media marketing on destination branding and emphasized the need of engaging with tourists via digital platforms in order to generate effective brand associations. While these studies offer insight on the overall influence of digital technologies on destination competitiveness, there has been little research into the effects of digital tourism hackathons, reward-based crowdfunding and value co-creation on destination competitiveness (Masciotta, 2021). Digital tourism hackathons, which bring together stakeholders from the tourism industry and the technology sector to generate creative digital solutions, have gained popularity as a way to foster collaboration and spur digital innovation in the tourism sector (Sufi, 2022). Furthermore, tourism value co-creation, in which tourists actively participate in the creation and distribution of value, has emerged as a crucial competitiveness driver (Melis et al., 2023).

Existing research has generally concentrated on broad elements of digital technologies and their impact on competitiveness, ignoring the distinctive contributions of digital tourism hackathons, reward-based crowdfunding and value co-creation (Hansen & Duran Sanchez, 2021; Kitsios & Kamariotou, 2023a). Despite the increased interest in digital tourism efforts, reward-based crowdfunding and value co-creation, there has been little research into the specific links and mechanisms through which these elements influence destination competitiveness (Dias et al., 2021). UAE has risen rapidly as one of the leading tourism destinations (Xie et al., 2021). The UAE government has aggressively promoted digital tourism projects to increase the country's tourism competitiveness (Yan et al., 2022). However, empirical research into the unique consequences of digital tourist hackathons, reward-based crowdfunding and value co-creation in the UAE setting has been rarely investigated (Osorno-Hinojosa et al., 2022). UAE's distinct cultural legacy, distinct landscapes, and growing international tourist arrivals make it a perfect location for studying the links between digital tourism initiatives, reward-based crowdfunding, value co-creation, and destination competitiveness (Ahn & Bessiere, 2023). Understanding how

digital tourism hackathons, reward-based crowdfunding and value co-creation contribute to improving destination competitiveness in UAE can provide significant insights for tourism policymakers, destination managers, and industry practitioners (Zeng et al., 2021). Hence, this research can help to establish focused policies and interventions that boost UAE's status as a competitive tourist destination by identifying the specific elements, tools and methods that drive competitiveness.

The primary goal of this research is to explore the impact of digital tourism hackathons and reward-based crowdfunding on destination competitiveness in UAE. The study's specific goals are as follows:

- The study examines the direct and indirect effects of digital tourism hackathons and reward-based crowdfunding on destination competitiveness.
- The study examines the mediating role of tourism value co-creation in the relationship between digital tourism hackathons and destination competitiveness.
- The study examines the mediating role of tourism value co-creation in the relationship between reward-based crowdfunding and destination competitiveness.
- The study offers groundbreaking empirical evidence and practical insights into the dynamics that affect destination competitiveness through digital tourism hackathons and reward-based crowdfunding.
- The study fills a critical research gap in understanding the unique consequences of digital tourism hackathons, reward-based crowdfunding and value co-creation for destination competitiveness, and significantly contributes to the current body of knowledge.

The study's conclusions have theoretical and practical consequences for the global tourism industry, governments, and destination managers. Theoretical implications include better understanding the function of digital tourism initiatives, reward-based crowdfunding and value co-creation in increasing destination competitiveness. The practical implications include providing policymakers and destination managers with concrete insights and recommendations for developing effective policies and interventions that utilize digital innovation and collaborative efforts to boost the competitiveness of tourism destinations.

2. Literature Review

The tourist business is undergoing fast alterations in today's digitally driven world, fueled by technological breakthroughs (Lee & Trimi, 2021). The combination of digital tourism hackathons and reward-based crowdfunding is one significant phenomenon that is gaining traction and has the potential to transform destination competitiveness (Kamariotou & Kitsios, 2022; Qu et al., 2022). These innovative ideas leverage the power of collaboration, technology, and online platforms to create new opportunities and boost tourism growth (Wei, 2022).

Digital tourism hackathons act as innovation catalysts, bringing together diverse stakeholders to create cutting-edge solutions to tourist-related difficulties (Zeng et al., 2021). These hackathons provide an environment where creative ideas and problem-solving can bloom by encouraging collaboration among entrepreneurs, developers, government authorities, and tourism groups (Phi & Waldesten, 2021). Similarly, reward-based crowdfunding systems enable people and groups to communicate directly with potential tourists while also raising funds for tourism initiatives (J. Chan et al., 2022). This strategy not only allows tourist initiatives to be realized, but it also allows for a direct connection between producers and the public, allowing them to actively shape the tourism scene (Ivona et al., 2021).

2.1 Digital Tourism Hackathon

Digital tourism hackathons foster tourism sector innovation and collaboration (Sufi, 2022). These conferences bring together entrepreneurs, developers, tourism groups, and government agencies to solve problems and provide digital solutions to improve tourism (Lacarcel & Huete, 2023). Digital tourism hackathons use participants' skills and creativity to create new ideas and products (Yuan & Gasco-Hernandez, 2021). Furthermore, they provide a venue for knowledge sharing, networking, and the establishment of collaborations, all of which can help to the tourist sector's long-term growth and sustainability (Liu et al., 2022). According to research on digital tourism hackathons, they have the ability to inspire technology improvements, increase operational efficiency, and generate distinctive tourist experiences, hence increasing destination competitiveness (Georgescu Paquin & Risco, 2021).

The correctness, dependability, and relevance of information provided through digital platforms related to tourist hackathons are referred to as online information quality (Demirel et al., 2022). Online information quality is critical in attracting participants and encouraging effective collaboration in the context of digital tourism hackathons (Kitsios & Kamariotou, 2023b). High-quality material assists potential participants in understanding the hackathon's aims, requirements, and expected outcomes, allowing them to make educated judgments regarding their participation (Falk et al.). The ease of use and navigation of digital platforms that provide information and allow participation in digital tourism hackathons is referred to as user-friendly accessibility (Wang et al., 2022). The usefulness of these platforms has a significant impact on potential users' interest and involvement (Yang et al., 2022). Intuitive design, clear directions, and seamless interaction are examples of user-friendly accessibility (Bodker, 2023). Participants can quickly access information, register for the hackathon, and engage in collaborative activities when digital platforms are user-friendly (Temiz, 2021). A user-friendly interface lowers entry barriers and fosters inclusion, allowing people from all technology backgrounds to engage and contribute successfully (Yodchai et al., 2022).

Researchers and practitioners can acquire insights into the specific components that contribute to the success and efficacy of these creative events by emphasizing the

importance of online content quality and user-friendly accessibility within the context of digital tourism hackathons (Albaom et al., 2022). Understanding and resolving these sub-variables can assist organizers in optimizing their digital platforms, improving participant experience, and maximizing the potential for collaborative problem-solving and creativity (Dwivedi et al., 2022).

2.2 Reward-based Crowdfunding

Reward-based crowdfunding has received a lot of attention as a way to fund tourism initiatives and engage with potential travelers (Chan et al., 2022). Individuals and organizations can use online platforms to exhibit their tourist projects and solicit financial contributions from the public (Lewis et al., 2021). Backers receive perks or incentives based on their degree of support in exchange (Wessel et al., 2021). This method not only provides an alternate finance mechanism for tourism projects, but it also allows for direct interaction between project designers and potential guests (Grilli et al., 2021). According to research on reward-based crowdfunding in the tourism environment, it can mobilize financial resources, increase project visibility, and foster a sense of ownership and involvement among backers (Regner & Crosetto, 2021). Reward-based crowdfunding has the ability to provide unique and authentic experiences by allowing the public to actively engage in the development of tourism offers, thereby favorably improving destination competitiveness (Wang et al., 2022).

2.3 Tourism Value Co-creation

The active participation of visitors and other stakeholders in the co-creation of value during the tourism experience is referred to as tourism value co-creation (Kirova, 2021). It highlights the value of cooperation, involvement, and incorporating varied viewpoints in the design and delivery of tourism products and services (Walker et al., 2021). The concept recognizes that value is created not just by tourism operators, but also by exchanges and engagements with tourists themselves (Lin et al., 2022). Tourists can play a more active role in designing their experiences through tourism value co-creation, resulting to higher pleasure and loyalty (Jiang et al., 2021). Involving tourists in the co-creation process can also result in the creation of new and tailored solutions that respond to their specific requirements and interests (Font, English, et al., 2021). Tourism value co-creation research shows that it has the ability to improve overall tourism experience quality, promote destination branding, and develop long-term relationships with visitors (Simanjuntak, 2022). It is thought that through facilitating tourist value co-creation, the effects of digital tourism hackathons and reward-based crowdfunding on destination competitiveness will be reinforced (Mariani & Chatterjee, 2023).

The active involvement and engagement of tourists in the co-creation of value during their tourism experiences is referred to as participation behavior (Jiang et al., 2021). It includes a variety of types of participation, such as providing comments, exchanging

recommendations, and co-creating tourism offerings (Fusté-Forné & Jamal, 2021). When tourists actively participate in the process of value co-creation, they contribute their knowledge, preferences, and talents, impacting the development and customization of tourism products and services (Tao et al., 2022). According to research on participation behavior, it has a favorable impact on destination competitiveness (Tse & Tung, 2022). Citizenship conduct refers to travelers' voluntary efforts and contributions that go above and beyond their fundamental expectations and obligations (Li et al., 2022). It includes actions such as honoring local traditions and customs, protecting the environment, and assisting local populations (Nan et al., 2021). Citizenship behaviors by tourists exhibit ethical and sustainable tourism practices that benefit both the place and its stakeholders (Wu et al., 2022). These actions contribute to the destination's positive image and reputation, increasing its competitiveness (Cillo et al., 2021). Citizenship behavior research stresses its importance in creating destination sustainability and long-term competitiveness (Xu & Lu, 2023).

Researchers and practitioners can get insights into the precise behaviors that contribute to the co-creation process and ultimately effect destination competitiveness by investigating the sub-variables of participation behavior and citizenship behavior within the context of tourism value co-creation (Lan et al., 2021; Lee & Kim, 2021). Understanding and encouraging these behaviors allows destinations to capitalize on the potential of tourists as active contributors, assuring the sustainability and attractiveness of their tourism services (Hysa et al., 2022).

2.4 Destination Competitiveness

The capacity of a location to attract and keep visitors in the face of competition from other destinations is referred to as destination competitiveness (Xu & Au, 2023). It includes several characteristics, such as the distinctiveness of tourism offers, destination image and branding, infrastructure, accessibility, service quality, and overall visitor happiness (Rejikumar et al., 2021). The competitiveness of a destination is critical in setting its market position, attracting investments, and maintaining long-term tourism growth (Nematpour et al., 2022). Several factors that contribute to destination competitiveness have been identified through research, including the development of innovative products and services, effective marketing and branding strategies, collaborative efforts among stakeholders, and the provision of exceptional visitor experiences (Font, Torres-Delgado, et al., 2021). Researchers and practitioners can gain valuable insights into how to foster innovation, engage stakeholders, and improve the overall competitiveness of tourism destinations by understanding the impact of digital tourism hackathons and reward-based crowdfunding, as mediated by tourism value co-creation (Cappa, 2022).

The availability of facilities and activities is an important factor in determining a destination's competitiveness (Moradi et al., 2022). It refers to the many infrastructure, amenities, and experiences available to tourists (Zhang et al., 2022). Destinations that offer a diverse range of amenities and activities cater to tourists' diverse interests and

preferences, boosting their overall experience and pleasure (Le et al., 2022). The provision of amenities and activities is important in attracting and maintaining tourists, according to research (Jocom et al., 2021). The unique and appealing characteristics of a destination's cultural heritage, traditions, landscapes, and biodiversity are referred to as cultural and natural attractiveness (Zhang et al., 2022). A destination's cultural richness and natural beauty are important factors in its competitiveness (Akin et al., 2022). Destinations with distinct cultural characteristics, such as historical monuments, festivals, art, music, and cuisine, can set themselves apart from competitors and attract travelers looking for authentic experiences (Marin-Pantelescu et al., 2022). Similarly, areas endowed with spectacular natural environments, such as mountains, beaches, woods, and wildlife, attract nature lovers and adventure seekers (Wood, 2021).

Tourist service quality is a critical predictor of destination competitiveness (Font, Torres-Delgado, et al., 2021). It includes the hospitality, professionalism, responsiveness, and efficiency displayed by tourism businesses and service providers (Mao et al., 2021). The level of service provided has a considerable impact on tourists' contentment, loyalty, and overall perception of a place (Li, 2021). According to research, providing outstanding service experiences is critical for gaining a competitive advantage (Darmawan & Grenier, 2021). Destinations that focus service personnel training and development, establish a culture of hospitality, and maintain consistently excellent service standards can differentiate themselves from competition (Kuo et al., 2022). The quality of infrastructure is critical to the competitiveness of a destination (Chan et al., 2022). It concerns a destination's transportation, housing, communication, and other important services' dependability, efficiency, and safety (Etminani-Ghasrodashti et al., 2021). Infrastructure improves accessibility, convenience, and comfort for tourists (Sunandar et al., 2022). The impact of infrastructure quality on tourist satisfaction and a destination's overall competitiveness has been studied (Zeng et al., 2021). Efficient transportation infrastructure, such as airports, roads, and public transportation, ensure smooth travel experiences and allow for exploration of the destination (Sigler et al., 2021).

2.6 Theories in Support of Hypotheses Development

Innovation Diffusion Theory, Stakeholder Theory, and Social Exchange Theory provide comprehensive frameworks for understanding the dynamics of digital tourism hackathons and reward-based crowdfunding (Amini & Jahanbakhsh Javid, 2023). Innovation diffusion theory, as outlined by Safri and Musa (2022), highlights the factors influencing the adoption of novel approaches, such as digital tourism hackathons and reward-based crowdfunding, while stakeholder theory, as proposed by Strazzullo et al. (2022), underscores the importance of aligning the interests of various stakeholders to enhance outcomes. Additionally, social exchange theory, as described by Yuan and Gasco-Hernandez (2021), elucidates the motivations driving participation in these initiatives, emphasizing perceived rewards and social interactions. Considering these theories, tourism

organizations can effectively engage stakeholders and optimize outcomes by leveraging the inherent qualities of these innovative practices and understanding the diverse motivations and expectations of participants (Stafford & Kuiper, 2021).

2.7 Hypotheses

H1: There is a direct positive relationship between the level of participation in digital tourism hackathons and destination competitiveness.

H2: There is a direct positive relationship between the utilization of reward-based crowdfunding and destination competitiveness.

H3: The relationship between the level of participation in digital tourism hackathons and destination competitiveness is mediated by tourism value co-creation.

H4: The relationship between the utilization of reward-based crowdfunding and destination competitiveness is mediated by tourism value co-creation.

These hypotheses propose that involvement in digital tourism hackathons and reward-based crowdfunding have direct correlations with destination competitiveness (see figure 1). Furthermore, the hypotheses show that the level of tourist value co-creation mediates the influence of these variables on destination competitiveness. Researchers can explore the direct and indirect effects of digital tourism hackathons, reward-based crowdfunding, and tourist value co-creation on destination competitiveness by investigating these hypotheses.

The conceptual model of the study is shown in Figure 1.

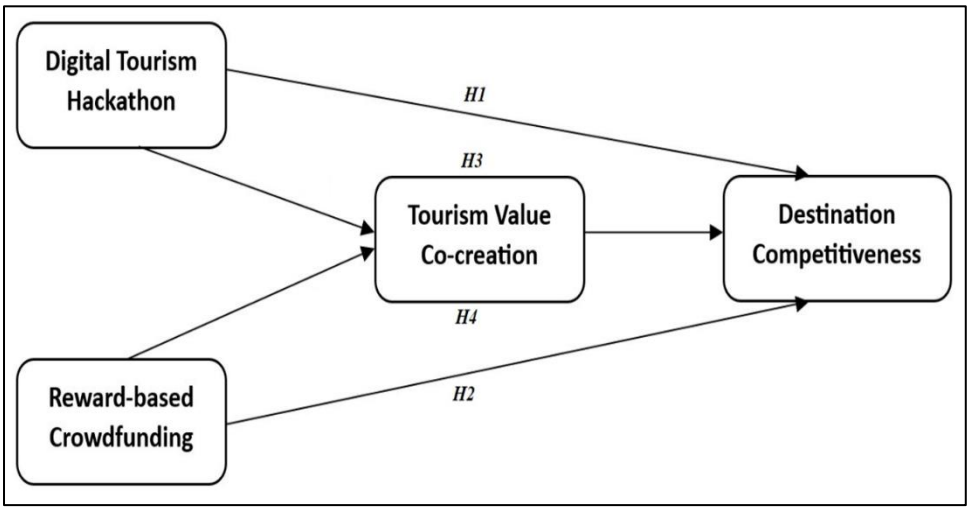

Figure 1: Conceptual Model

3. Methods

Data for this study were gathered from 479 tourist guides and practitioners working in Dubai and Abu Dhabi. These two Emirati states were chosen because they are popular touristic destinations in UAE, with a wide variety of tourism experiences. Purposive sampling was used to choose participants for this study, assuring participation from various tourist guide associations and organizations in both provinces. The data was gathered by delivering online surveys to the chosen tourist guides, who were asked to respond based on their experiences and perceptions of digital tourism hackathons, reward-based crowdfunding, tourism value co-creation, and destination competitiveness. To ensure the reliability and validity of the obtained data, the survey contained validated scales and items.

The software Partial Least Squares Structural Equation Modeling (PLS-SEM) 4.0 was used to evaluate the gathered data. The study employed PLS-SEM software due to its suitability for analyzing complex relationships within theoretical frameworks like Innovation Diffusion Theory, Stakeholder Theory, and Social Exchange Theory. PLS-SEM facilitates the examination of latent constructs and their relationships, providing robust insights into the intricate dynamics of digital tourism hackathons and reward-based crowdfunding (Shaikh et al., 2023). Its ability to handle small sample sizes and non-normal data aligns well with the nature of this study, offering a reliable method for exploring stakeholder interests, motivations, and expectations (Hair et al., 2017; Hair et al., 2009). PLS-SEM is a reliable statistical tool for exploratory investigations with a limited sample size. It enables the evaluation of both the measurement model and the structural model at the same time. PLS-SEM was used for this study because of its capacity to manage complex interactions between variables and provide insights into the direct and indirect impacts of the studied variables. Several processes were engaged in the analysis, including assessing measurement model reliability and validity, evaluating the structural model, examining direct and indirect impacts, and testing hypotheses.

Based on extensive review of prominent tourism research, multiple instruments were employed to measure the studied constructs. The present study developed the scales to assess reward-based crowdfunding and digital tourism hackathon participation behavior (Amedomar & Spers, 2018; Majeed et al., 2020). To measure the tourist value co-creation (Mariyudi & Matriadi, 2018) and destination competitiveness (Kozak et al., 2010), the widely recognized scales were adapted. The reliability, validity, and relevance to the research setting were used to choose these adapted scales. A pilot study was done prior to data collection to test the clarity and comprehensibility of the survey items. The pilot research participants' feedback was used to develop the survey items and guarantee the instruments' applicability for the target group. These adjustments were incorporated into the final survey questionnaire, which was used for data collection.

This study aimed to gain insights into the relationships between digital tourism hackathon participation, reward-based crowdfunding utilization, tourism value co-creation, and

destination competitiveness by collecting data from 479 tourist guides and practitioners in Dubai and Abu-Dhabi and analyzing it using PLS-SEM 4.0. The use of established measurement devices increased the rigor of the investigation and ensured the reliability and validity of the data acquired.

4. Statistical Analysis and Results

The study's findings imply that the measured constructs have good internal consistency. Cronbach's alpha coefficients were calculated to test the scales' reliability. Cronbach's alpha coefficients ranged from 0.702 to 0.915 for facility availability, citizenship behavior, cultural and natural attractiveness, digital tourism hackathon, online information quality, perceived behavior, infrastructure quality, service quality, reward-based crowdfunding, tourism value co-creation, and user-friendliness. These coefficients indicate that the scales used to assess the constructs had good internal consistency, implying that the items within each construct were highly correlated and reliably measured the same underlying notion.

The construct of destination competitiveness has the greatest Cronbach's alpha coefficient of 0.915, indicating excellent internal consistency. This suggests that the questions used to assess destination competitiveness were very trustworthy and had strong inter-item correlations. Similarly, Cronbach's alpha coefficients for the constructs of citizenship behavior, digital tourism hackathon, reward-based crowdfunding, and tourist value co-creation were 0.857, 0.854, 0.850, and 0.869, respectively. These coefficients imply that the items measuring these constructs were internally trustworthy and consistently captured the constructs' intended features (Elshaer, 2024).

Overall, the findings show that the assessment scales utilized in this investigation were trustworthy and appropriate for assessing the constructs of interest (see table 1). The high Cronbach's alpha coefficients indicate that the items within each construct had great internal consistency, offering confidence in the data's dependability for further analysis and interpretation.

Table 1: Values of Cronbach's Alpha

Latent Constructs	Cronbach's Alpha
Availability of Facilities	0.776
Citizenship Behavior	0.857
Cultural and Natural Attractiveness	0.702
Destination Competitiveness	0.915
Digital Tourism Hackathon	0.854
Online Information Quality	0.737
Perceived Behavior	0.804
Quality of Infrastructure	0.844
Quality of Service	0.838
Reward-Based Crowdfunding	0.850
Tourism Value Co-Creation	0.869
User Friendliness	0.777

The study findings show the composite reliability and average variance extracted (AVE) values for each factor in the measurement model. The composite reliability shows the concept's internal consistency and reliability, whereas the AVE reflects the amount of variance recorded by the construct in relation to measurement error (Guenther et al., 2023). With a rating of 0.893, the reward-based crowdfunding architecture displayed high composite dependability, indicating robust internal consistency. The average variance recovered for reward-based crowdfunding was 0.625, indicating that its indicators explained 62.5% of the variance in the construct. Similarly, the tourism value co-creation construct demonstrated excellent composite reliability (0.891), showing great internal consistency. However, the average variance recovered for tourism value co-creation was 0.542, indicating that its indicators explained approximately 54.2% of the variance in the construct.

The composite dependability for citizenship behavior was 0.888, showing strong internal consistency (see table 2). The construct had an average extracted variance of 0.573, indicating that its indicators explained approximately 57.3% of the variance in civic behavior. The perceived behavior construct has a composite reliability of 0.856, indicating acceptable internal consistency. The average variance extracted for perceived behavior was 0.510, indicating that its indicators explained roughly 51.0% of the variance in the construct.

The destination competitiveness construct revealed high composite reliability (0.927), indicating great internal consistency. However, the average variance retrieved for destination competitiveness was 0.517, indicating that its indicators explained

approximately 51.7% of the variance in the construct. The constructs of facility availability, cultural and natural attractiveness, infrastructure quality, service quality, online information quality, and user-friendliness all showed good composite reliability values ranging from 0.850 to 0.892, indicating satisfactory internal consistency. The average variance extracted values for these constructs ranged from 0.503 to 0.673, indicating that their indicators explained approximately 50.3% to 67.3% of the variance in these constructs.

In summary, the analytical results show that the measurement model has strong internal consistency and dependability. All constructs' composite reliability scores are over the acceptable level (Dash & Paul, 2021), indicating that the indicators within each construct are highly associated. Furthermore, the average variance extracted values show that the indicators explain a significant amount of variance in the constructs, offering confidence in the measurement model's validity.

Table 2: Factor Loadings and Reliability Statistics

	Factor	**Original Sample**	**Composite Reliability**	**Average Variance Extracted**
Reward-Based Crowdfunding	CF1	0.831	0.893	0.625
	CF2	0.780		
	CF3	0.769		
	CF4	0.836		
	CF5	0.732		
Tourism Value Co-Creation			0.891	0.542
Citizenship Behavior	CCCB1	0.712	0.888	0.573
	CCCB10	0.562		
	CCCB2	0.580		
	CCCB3	0.577		
	CCCB4	0.693		
	CCCB5	0.742		
	CCCB6	0.779		
	CCCB7	0.775		
	CCCB8	0.723		
	CCCB9	0.737		
	CCCB10	0.568		
Perceived Behavior	CCPB2	0.657	0.856	0.510
	CCPB3	0.746		
	CCPB4	0.663		
	CCPB6	0.587		

	CCPB8	0.671		
	CCPB9	0.673		
Destination Competitiveness			0.927	0.517
Availability of Facilities	AFA3	0.547	0.850	0.541
	AFA4	0.774		
	AFA5	0.767		
	AFA6	0.810		
	AFA7	0.812		
Cultural and Natural Attractiveness	CNA1	0.615	0.780	0.515
	CNA2	0.628		
	CNA3	0.615		
	CNA4	0.679		
	CNA6	0.681		
Quality of Infrastructure	QI1	0.757	0.889	0.615
	QI2	0.772		
	QI3	0.800		
	QI4	0.788		
	QI5	0.803		
Quality of Service	QS1	0.773	0.892	0.673
	QS2	0.857		
	QS3	0.851		
	QS4	0.798		
Digital Tourism Hackathon			0.885	0.503
Online Information Quality	OIF2	0.651	0.835	0.561
	OIF3	0.766		
	OIF4	0.799		
	OIF5	0.770		
User Friendliness	UF1	0.749	0.849	0.529
	UF2	0.711		
	UF3	0.708		
	UF4	0.757		
	UF5	0.711		

The discriminant validity of the constructs in the study was assessed using the Fornell-Larcker criterion. The diagonal elements reflect the square root of the extracted average variance (AVE) for each construct, whereas the off-diagonal portions represent construct correlations. To demonstrate discriminant validity, the criterion specifies that a construct's AVE should be greater than its correlations with other constructs.

The diagonal elements show the square root of the AVE for each construct based on the results. The construct of destination competitiveness had the greatest AVE of 0.916, followed by the construct of quality of service, which had an AVE of 0.856. Other constructs with quite high AVE values ranged from 0.669 to 0.907. These included online information quality, facility availability, cultural and natural appeal, and infrastructure quality. These results imply that the indicators explain a considerable portion of the variance in these constructs. When the off-diagonal elements, or correlations between constructs, are examined, the correlations are found to be smaller than the square roots of the AVEs. As their AVE values are larger than their correlations with other items, this shows that the constructs have discriminant validity.

However, there are a few cases where the correlations between constructs are quite strong. The link between service quality and infrastructure quality, for example, is 0.856, and the correlation between digital tourism hackathon and user friendliness is 0.742. These significant correlations may imply a potential overlap or shared variation between these constructs, indicating the need for additional research or refinement in future studies. Overall, the Fornell-Larcker criterion supports the discriminant validity of the majority of the constructs studied (see table 3). The high AVE values and low construct correlations imply that the measures utilized in this study capture distinct and unique elements of the underlying components (El Maalmi et al., 2022).

Table 3: Fornell-Larcker Criterion

	1	2	3	4	5	6	7	8	9	10
Availability of Facilities	0.735									
Citizenship Behavior	0.598	0.688								
Cultural and Natural Attractiveness	0.667	0.649	0.644							
Destination Competitiveness	0.916	0.647	0.763	0.646						
Digital Tourism Hackathon	0.720	0.462	0.502	0.773	0.681					
Online Information Quality	0.644	0.445	0.478	0.669	0.907	0.749				
Perceived Behavior	0.337	0.465	0.582	0.385	0.242	0.219	0.678			
Quality of Infrastructure	0.650	0.439	0.531	0.856	0.688	0.547	0.226	0.784		
Quality of Service	0.856	0.620	0.615	0.933	0.737	0.641	0.295	0.730	0.821	
Reward-Based Crowdfunding	0.502	0.258	0.375	0.633	0.753	0.649	0.152	0.723	0.545	0.791
User Friendliness	0.672	0.401	0.447	0.742	0.938	0.705	0.225	0.701	0.705	0.746

The Heterotrait-Monotrait Ratio (HTMT) was used in the study to measure the discriminant validity between components. In the table, the HTMT values show the ratio of heterotrait (correlation between distinct constructions) to monotrait (correlation between the same constructs). To demonstrate discriminant validity, the HTMT values should be less than a specified threshold (e.g., 0.85), according to the criterion.

When the findings are analyzed, it is clear that the HTMT values are often lower than the threshold, showing discriminant validity between constructs. For example, the HTMT value between facility availability and citizenship behavior is 0.745, indicating that these two entities are separate. Similarly, the HTMT value between cultural and natural beauty and online information quality is 0.785, showing that both categories have discriminant validity. Furthermore, the HTMT values between perceived behavior and other categories, such as online information quality, infrastructure quality, and service quality, range from 0.308 to 0.884. This suggests that perceived behavior is distinct from these variables, lending credence to its discriminant validity.

However, certain HTMT levels are near or beyond the threshold. Service quality and infrastructure quality have an HTMT value of 0.868, while user friendliness and online information quality have 0.875. These data suggest that these domains may share variance, requiring further research to confirm their discriminant validity. Overall, the HTMT analysis supports the discriminant validity of the study's components (see table 4). The bulk of the HTMT values are lower than the threshold, showing that the measures for these constructs capture different features of the underlying structures.

Table 4: HTMT Criterion

	1	2	3	4	5	6	7	8	9
Availability of Facilities									
Citizenship Behavior	0.745								
Cultural and Natural Attractiveness	0.748	0.785							
Online Information Quality	0.835	0.556	0.524						
Perceived Behavior	0.480	0.541	0.884	0.308					
Quality of Infrastructure	0.786	0.518	0.537	0.679	0.276				
Quality of Service	0.637	0.735	0.631	0.802	0.358	0.868			
Reward-Based Crowdfunding	0.597	0.292	0.364	0.830	0.181	0.850	0.639		
User Friendliness	0.854	0.497	0.440	0.825	0.292	0.867	0.875	0.808	

The model fit statistics in Table 5 provide vital insights into the proposed model's prediction ability. These statistics aid in determining the model's quality in terms of its ability to predict the outcome variables. First, the Q2predict value of 0.871 suggests that the model is highly predictive. This score indicates that the independent variables in the model can explain and properly predict about 87.1% of the variance in the dependent variables. A higher Q2predict value indicates that the model has better predictive performance.

The RMSE (Root Mean Square Error) score of 0.059 thus offers an estimate of the model's average prediction error. This result indicates that the model's predictions differ from the actual values by around 0.059 units on average. A lower RMSE number indicates that the model's predictions are more accurate and precise. Furthermore, the MAE (Mean Absolute Error) value of 0.075 reflects the average absolute difference between anticipated and actual values. This figure is another indicator of the model's predictive performance, with a lower MAE indicating a reduced average prediction error.

Overall, the model fit statistics show that the suggested model does a good job of predicting the outcome variables (see table 6). The high Q2 predict value, when combined with the low RMSE and MAE values, indicates that the model is successful in capturing the relationships between the independent and dependent variables, resulting in accurate predictions. These findings give reason to believe in the model's capacity to explain and forecast the variables of interest.

Table 5: Model Fit Statistics

Q^2 (Predictive Relevance)	RMSE	MAE
0.871	0.059	0.075

Table 6's R-square statistics show the model's variables' variance explanations. These statistics quantify the percentage of dependent variable variation explained by the model's independent variables. The findings show that various factors explain well. The availability of facilities variable has an R-square value of 0.839, suggesting that the other factors in the model explain 83.9% of its variation. Citizenship behavior has a high R-square value of 0.847, indicating that independent factors explain 84.7% of its variation. Online information quality, service quality, and user friendliness had high R-square values of 0.823, 0.870, and 0.879, respectively. These values imply that the model's other variables explain a large part of these variables' variation.

Tourism value co-creation and cultural and natural appeal had lower R-square values of 0.210 and 0.583. The model's other variables explain less of these variables' variation. R-square statistics reveal the model's variables' explanatory strength. Variables with higher R-square values explain more variation in the dependent variable than those with lower values (see table 6).

Table 6: R-Square Statistic

Variable	R-square
Availability of Facilities	0.839
Citizenship Behavior	0.847
Cultural and Natural Attractiveness	0.583
Destination Competitiveness	0.720
Online Information Quality	0.823
Perceived Behavior	0.599
Quality of Infrastructure	0.734
Quality of Service	0.870
Tourism Value Co-Creation	0.210
User Friendliness	0.879

The F-square statistics in Table 7 give information on the strength of the relationships between the independent and dependent variables in the model. These statistics calculate the percentage of variation in the dependent variable that can be explained by each independent variable separately.

Several notable findings can be made after reviewing the results. First, an F-square value of 5.211 indicates that the availability of facilities variable considerably contributes to the explanation of destination competitiveness. This shows that the availability of amenities has a significant impact on the destination's competitiveness. Second, as indicated by an F-square value of 1.397, citizenship behavior has a considerable influence on destination competitiveness. This suggests that the behaviors associated with being a responsible and involved citizen in the tourism context have a significant impact on the destination's overall competitiveness.

Furthermore, in regard to the digital tourism hackathon, the F-square values for online information quality and quality of service are 4.636 and 6.718, respectively. These results imply that the quality of online information and the availability of high-quality services have a significant impact on the outcomes of a digital tourism hackathon. Furthermore, as evidenced by F-square values of 7.270 and 5.538, user friendliness has a substantial association with both digital tourism hackathon and tourist value co-creation. This shows that user-friendly experiences are critical to the success of digital tourism hackathons and the enhancement of tourism value co-creation activities.

In summary, F-square statistics shed light on the individual contributions of independent factors to explaining variances in dependent variables (see table 7). The significant relationships discovered in this analysis highlight the importance of various factors in

shaping destination competitiveness, digital tourism hackathon outcomes, and tourism value co-creation efforts, such as facility availability, citizenship behavior, online information quality, quality of service, and user friendliness.

Table 7: F-Square Statistic

	AOF	CB	CNA	DC	OIQ	PB	QOI	QOS	TVCC	UF
Destination Competitiveness	5.211		1.397				2.753	6.718		
Digital Tourism Hackathon				0.279	4.636				0.184	7.270
Reward-Based Crowdfunding				0.053					0.018	
Tourism Value Co-Creation		5.538		0.416		1.494				

Notes: Availability of Facilities (AOF); Citizenship Behavior (CB); Cultural and Natural Attractiveness (CNA); Destination Competitiveness (DC); Online Information Quality (IOQ); Perceived Behavior (PB); Quality of Infrastructure (QOI); Quality of Service (QOS); Tourism Value Co-Creation (TVCC); User Friendliness (UF)

Table 8 presents the path analysis results, which provide valuable insights into the linkages between factors and their effects on destination competitiveness. To begin, a T-statistic of 6.574 and a p-value of 0.000 reveal a substantial positive link between digital tourism hackathons and destination competitiveness. This implies that digital tourism hackathons have a significant impact on destination competitiveness. Second, with a T-statistic of 2.929 and a p-value of 0.002, the path from reward-based crowdfunding to destination competitiveness also shows a significant positive association. This suggests that reward-based crowdfunding helps to improve destination competitiveness.

Furthermore, a T-statistic of 4.166 and a p-value of 0.000 indicate a strong positive link between the indirect path from digital tourism hackathon to destination competitiveness via tourist value co-creation. This shows that the impact of the digital tourism hackathon on destination competitiveness is mediated in part by the tourist value co-creation process. Finally, the indirect path from reward-based crowdfunding to destination competitiveness via tourism value co-creation reveals a strong, albeit negative, relationship. The T-statistic of 2.240 and the p-value of 0.013 imply that reward-based crowdfunding has a minor negative indirect influence on destination competitiveness via tourism value co-creation.

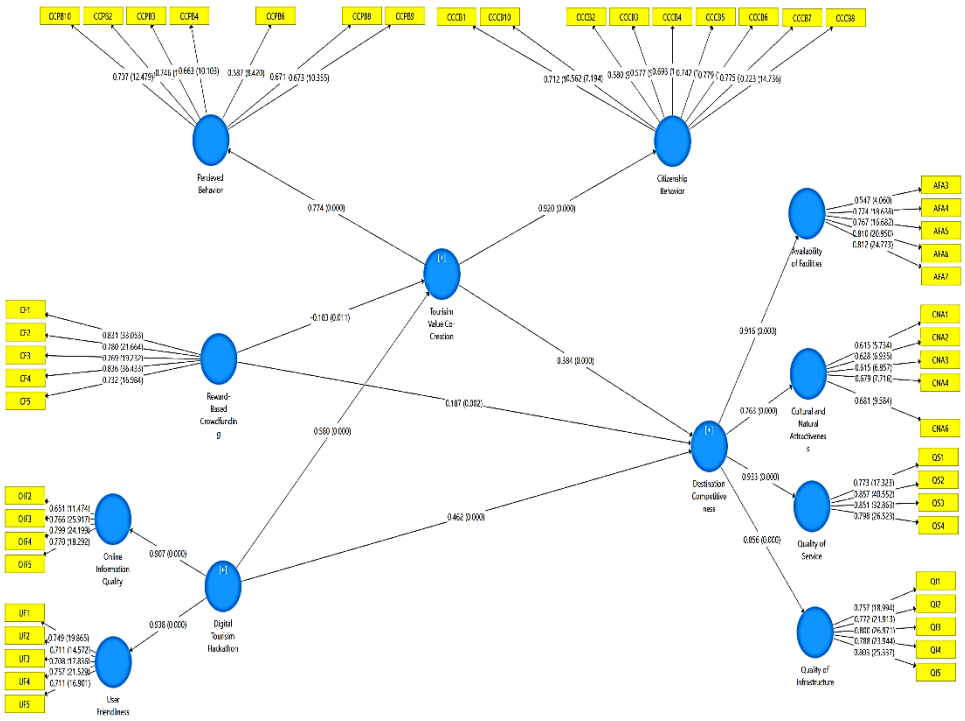

Figure 2: Structural Model Path Analysis

In summary, the path analysis results corroborate the study's hypotheses (see figure 2). Destination competitiveness is strongly influenced by digital tourism hackathons and reward-based crowdfunding. Furthermore, through the mediation of tourist value co-creation, the digital tourism hackathon indirectly affects destination competitiveness. The indirect path from reward-based crowdfunding to destination competitiveness via tourism value co-creation, on the other hand, has a modest negative effect (see table 8).

Table 8: SEM Path Analysis of Hypotheses

	Original Sample	Standard Deviation	t-Statistics	P-values
Digital Tourism Hackathon -> Destination Competitiveness	0.462	0.070	6.574	0.000
Reward-Based Crowdfunding -> Destination Competitiveness	0.187	0.064	2.929	0.002
Digital Tourism Hackathon -> Tourism Value Co-Creation -> Destination Competitiveness	0.223	0.053	4.166	0.000
Reward-Based Crowdfunding -> Tourism Value Co-Creation -> Destination Competitiveness	-0.070	0.031	2.240	0.013

5. Discussion

This study's discussion section seeks to provide an in-depth analysis and explanation of the findings, combining pertinent theories and literature findings. The current findings are compared to other studies in order to detect similarities, differences, and potential contributions to the body of knowledge. The study's first key finding is the impact of a digital tourism hackathon on location competitiveness. The findings supported the innovation diffusion theory by revealing a substantial positive association with digital tourism hackathon and destination competitiveness. These findings are similar with previous studies by Szromek et al. (2022) and Abuelenain (2021), who discovered that digital efforts, such as hackathons, have an important impact in increasing destination competitiveness. The current study adds to this body of knowledge by concentrating on the setting of tourism in UAE.

The second discovery concerns the impact of reward-based crowdfunding on destination competitiveness. The findings show a strong positive association, implying that crowdsourcing can help destinations improve their competitive positioning. This finding is consistent with stakeholder theory, which emphasizes the necessity of involving all stakeholders, including tourists, in destination planning and promotion. It also lends support to the findings of Kuo et al. (2022) and Cillo et al. (2021), who discovered that crowdfunding has a similar favorable effect on destination competitiveness. However, the amount of the effect in the current study was lesser than the direct impact of the digital tourism hackathon, implying that other factors may also contribute to destination competitiveness.

Furthermore, the role of tourism value co-creation as a mediator between digital tourism hackathon and destination competitiveness was investigated. The findings indicated that tourism value co-creation somewhat mediates the association between digital tourism hackathon and destination competitiveness. This finding is consistent with the social exchange hypothesis, which holds that value co-creation activities involving tourists and other stakeholders can improve destination competitiveness. These findings are congruent with those of Deng et al. (2021) and Lan et al. (2021), who both discovered evidence of the mediating effect of tourist value co-creation.

Several similarities and contrasts arise when comparing the findings of this study to earlier research. In terms of direct consequences, prior research has found that digital tourism hackathons and reward-based crowdfunding have a favorable impact on destination competitiveness. The current study, on the other hand, gives more particular insights by looking at the underlying mechanisms via the perspective of tourist value co-creation. This provides a fuller knowledge of the variable's intricate relationships. It should be noted that the current study discovered a minor negative indirect effect of reward-based crowdfunding on destination competitiveness via tourist value co-creation. This finding differs from earlier research, which focused on the positive outcomes of crowdsourcing. Possible explanations for this disparity include contextual factors such as research sample

characteristics or the specific implementation of crowdfunding campaigns in the UAE tourism industry. Future study should go deeper into this exciting discovery to acquire a better grasp of the underlying processes.

Overall, this research advances theoretical and practical understanding of digital tourist efforts, crowdfunding, and destination competitiveness. The findings emphasize the importance of digital tourism hackathons and reward-based crowdfunding in increasing destination competitiveness, while also underlining the role of tourist value co-creation as a mediating factor. The findings give useful insights for destination management organizations, politicians, and industry practitioners looking to leverage digital platforms and new techniques to boost tourism destination competitiveness.

5.1 Theoretical and Practical Implications

This research has theoretical ramifications in that it advances our understanding of numerous fundamental theories in the realm of digital tourism and destination competitiveness. To begin, the findings contribute to the theory of innovation diffusion by emphasizing the importance of digital tourism hackathons as a catalyst for innovation adoption and diffusion within the tourism industry. This study presents empirical evidence that digital tourism hackathons can effectively encourage the adoption of new practices and technology, hence improving destination competitiveness.

Second, this study contributes to the body of knowledge on stakeholder theory by emphasizing the importance of involving diverse stakeholders in the co-creation of tourism value, such as tourists, local communities, and industry participants. This study emphasizes the importance of collaborative efforts in destination development and competitiveness by proving the mediating effect of tourism value co-creation. It explains how stakeholders may help to create unique and authentic experiences that distinguish a destination and attract tourists.

Third, the findings add to social exchange theory by emphasizing the reciprocal interactions that exist between tourists and places. The favorable impact of reward-based crowdfunding on destination competitiveness suggests that when tourists contribute to a destination's growth through crowdfunding, they anticipate to receive important experiences and benefits in return. This research emphasizes the significance of encouraging positive social exchanges and value co-creation between tourists and destinations, which leads to increased competitiveness and sustainability.

This research has practical significance for destination management organizations, governments, and industry practitioners involved in the development and promotion of tourist destinations. To begin, the findings underscore the necessity of investing in digital tourism hackathons to stimulate innovation and boost destination competitiveness. Organization of hackathons allows destination administrators to tap into the creative

potential of technology specialists, entrepreneurs, and local communities to produce unique solutions and experiences that differentiate their destination.

Second, because of the favorable association between reward-based crowdfunding and destination competitiveness, destinations should look into crowdfunding platforms as a way to engage tourists and other stakeholders in destination development. By asking tourists to contribute financially to specific projects or initiatives, locations can increase their desirability, provide unique experiences, and build stakeholders' sense of ownership and pride. This method has the potential to result in long-term tourist development and greater destination competitiveness.

Furthermore, tourism value co-creation's mediating role emphasizes the significance of actively involving tourists and local communities in value co-creation. Platforms and methods that enable meaningful interactions, cooperation, and co-design between tourists, local communities, and tourism firms should be made available by destination managers. Destinations may ensure that the resultant tourist products and experiences correspond with the expectations and aspirations of visitors by incorporating stakeholders in the planning and decision-making processes.

Overall, this study's theoretical and practical implications underscore the potential of digital tourism hackathons, reward-based crowdfunding, and tourist value co-creation in increasing destination competitiveness. Destinations can differentiate themselves in the competitive tourism industry by adopting digital technologies, cultivating collaborative partnerships, and involve stakeholders in the co-creation of value. These findings can help destination managers, politicians, and industry practitioners design and promote competitive and sustainable tourist destinations.

5.2 Limitations and Recommendations

This research has limits, despite its usefulness. First, this study used data from Dubai and Abu-Dhabi, which may limit its applicability to other locations. To make results more applicable, future studies should cover more destinations. Second, tourist guides self-reported their data, which may induce response biases and social desirability effects. Although participants were kept anonymous and confidential, bias may have influenced the outcomes. Future study could use objective measurements and alternate data sources to overcome these constraints. Cross-sectional data limits causal linkages between variables. Longitudinal or experimental research could show the causal effects and temporal dynamics of digital tourism hackathons, tourist value co-creation, and destination competitiveness. This study also examined destination competitiveness sub-variables such facility availability, cultural and natural appeal, service quality, and infrastructure quality. Environmental sustainability, social inclusiveness, and destination branding were ignored. These new dimensions could be studied to better understand destination competitiveness.

This study's shortcomings suggest various potential research directions. First, comparative research across regions and destinations would help determine the generalizability and

contextual variations of digital tourism hackathons, tourist value co-creation, and destination competitiveness. This could illuminate the elements that affect these tactics' success in different environments. Qualitative research methods like in-depth interviews or focus groups can supplement quantitative findings by revealing stakeholders' perspectives on digital tourism hackathons, reward-based crowdfunding, and tourism value co-creation. Qualitative studies can reveal these practices' methods, motivations, and problems. Future studies could examine how artificial intelligence, virtual reality, and blockchain affect digital tourism hackathons and destination competitiveness. Both academia and business are interested in using these technologies to generate unique tourism experiences, facilitate value co-creation, and boost destination competitiveness. Finally, given the tourist industry's dynamic character, longitudinal studies of digital tourism hackathons, reward-based crowdfunding, and tourism value co-creation on destination competitiveness might be useful. This would show how these strategies last. This study helps us comprehend digital tourism hackathons, tourist value co-creation, and destination competitiveness, however it has limits. Scholars and practitioners may promote digital tourism and help tourist places flourish and compete by addressing these limitations and pursuing the suggested future research directions.

5.3 Conclusion

The study's findings shed light on the impact of digital tourism hackathons and reward-based crowdfunding in shaping destination competitiveness. The findings show that digital tourism hackathons have a considerable positive influence on destination competitiveness, demonstrating their potential as effective tools for destination management and promotion. Furthermore, the favorable association between reward-based crowdfunding and destination competitiveness emphasizes the necessity of including tourists and other stakeholders in destination creation and enhancement.

The function of tourism value co-creation as a mediator between digital tourism hackathon and destination competitiveness emphasizes the importance of collaborative efforts and value co-creation in the tourist sector. This research implies that encouraging tourists' and stakeholders' active participation and involvement in the destination development process can lead to greater competitiveness and sustainability. It also corresponds with social exchange theory, highlighting the necessity of reciprocal interactions between tourists and locations.

This study's theoretical implications include expanding our understanding of innovation diffusion theory, stakeholder theory, and social exchange theory in the context of digital tourism and destination competitiveness. This work contributes to the applicability and relevance of these theories in the tourism area by empirically confirming the links provided by these theories. The findings also offer light on the methods by which digital initiatives and crowdfunding might impact destination competitiveness, allowing for a more nuanced view of the underlying processes.

The conclusions of this study have practical consequences for destination management organizations, policymakers, and industry practitioners. The favorable impact of digital tourism hackathons and reward-based crowdfunding indicates that investing in digital innovation and leveraging crowdfunding platforms might boost tourist destinations' competitiveness. These findings can help to shape strategic efforts and policies targeted at stimulating innovation, involving stakeholders, and improving the overall tourism experience.

While the findings of this study add to the current literature, significant limitations must be acknowledged. To begin, the research was done in specific places (Dubai and Abu-Dhabi), which may limit the findings' generalizability to other contexts. Future study should look into broadening the sample to encompass a broader range of places. Second, the study relied on self-reported data, which is prone to method bias. To collect more thorough and objective data, future studies could use a combination of qualitative and quantitative methodologies.

Finally, this study emphasizes the importance of digital tourism initiatives and crowdfunding in increasing destination competitiveness. The findings emphasize the importance of digital tourism hackathons and reward-based crowdfunding in altering the tourism environment and encouraging destination development. This study gives useful insights into the collaborative processes that contribute to destination competitiveness by stressing the mediating function of tourism value co-creation. This study's theoretical implications and practical recommendations can guide future attempts to leverage digital technology and crowdfunding platforms to improve the competitiveness and sustainability of tourist destinations.

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