

The Mediating Role of Destination Image on the Effect of Smart Tourism Applications on Behavioral Intentions of Tourists to Aceh: Moderated by Information Search

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ABSTRACT

Keywords:

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Background: This research examines the influence of Smart Tourism Applications on tourists' Behavioral Intentions in Aceh, with Destination Image as a mediating factor and Information Search Behavior as a moderating variable.

Method: Using a quantitative approach, the research surveyed tourists who used smart tourism applications during their visit to Aceh.

Results: The results reveal that the Smart Tourism Application significantly influences Destination Image, positively affecting tourists' intention to visit or revisit the destination. Furthermore, the destination image is a key mediator that links the Smart Tourism Application to tourists' behavioral intentions. However, Information Search Behavior did not significantly enhance the connection between the application and tourists' behavioral intentions. This indicates that the quality of information offered by the application plays a more critical role in influencing tourists' perceptions and building their confidence. The practical implication of this study is the need to optimize smart tourism applications to support Aceh's Syariah-based tourism by providing comprehensive information about local culture, halal facilities, and religiously guided tourism.

Conclusion: This research contributes to the literature on technology in tourism, particularly in religious and cultural destination contexts, and offers insights for developing more effective destination marketing strategies.

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INTRODUCTION

Aceh, a province in Indonesia renowned for its natural and cultural richness, has excellent potential as a tourist destination (Herizal et al., 2021; Sitepu et al., 2024). With natural resources, including beaches, mountains, and historical sites, Aceh continues to enhance its appeal as a travel destination for both domestic and international visitors (Hariani & Hanafiah, 2024; Musa et al., 2021; Ulfa et al., 2021).

However, innovation in promotion strategies and management management is crucial to compete amid the rapid growth of global tourism (Hussein et al., 2024; Suryahani et al., 2024). One such innovation is the utilization of innovative tourism applications. This technology lets tourists get complete, up-to-date, and structured information to improve their travel experience (Benckendorff et al., 2019; Leung, 2022; Huang et al., 2017).

Numerous prior studies have demonstrated the advantages of technology within the tourism industry. Buhalis & Amaranggana (2013) and Gretzel, Reino, et al. (2015) for example, show how digital technology, including innovative tourism applications, can improve the tourist experience through features such as digital maps, tourist attraction information, culinary recommendations, and the latest weather conditions. However, their study primarily focuses on developed tourist destinations in rapidly developing countries. In the context of Aceh, the use of these technologies has yet to be fully explored, especially regarding their impact on tourist behavior.

This research fills a gap in the existing literature, as previous studies (e.g., Chung et al., 2015; Law et al., 2018) emphasized technology's role in traveler decision-making but rarely focused on smart tourism applications in emerging destinations like Aceh. Furthermore, the moderating role of information-seeking in the relationship between technology and tourist behavior, which was indirectly noted by D. Wang et al. (2014), has yet to be thoroughly investigated.

This study explores how destination image mediates and information-seeking moderates the impact of smart tourism applications on tourists' behavioral intentions toward Aceh. By offering new insights into the relationship between technology, information, and tourist behavior, this study adds valuable insights to the existing literature on emerging tourist destinations. Moreover, it lays a crucial foundation for formulating technology-driven tourism development strategies in Aceh.

To explain the research findings systematically, this research is organized in the following format: The first section functions as an introduction, while the second section explores the literature review and presents the development of research hypotheses. The third section describes the methodology, encompassing research design, data collection methods, and analytical techniques. The fourth section focuses on presenting the findings and discussing the results. Finally, the fifth section summarizes the conclusions, explores theoretical and practical implications, and suggests directions for future studies.

METHOD

This quantitative research utilizes a survey approach to examine the impact of smart tourism applications on tourists' behavioral intentions, with an emphasis on the mediating influence of destination image and the moderating role of information-seeking behavior. Data collected from tourists in Aceh are analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The population consists of tourists visiting Aceh from May to September 2024, with purposive sampling selecting those who had used the smart tourism app during their trip. The survey had two main sections. The first focused on demographics and travel characteristics, including age, gender, nationality, travel frequency, and familiarity with the destination. The second section assessed perceptions of smart tourism applications using a 1-5 Likert scale, with 1 indicating strong disagreement and 5 indicating strong agreement.

Data was collected through an online questionnaire distributed via social media platforms and tourist information centers in Aceh. To measure the use of smart tourism applications as the independent variable, respondents were asked to assess their experiences with features such as interactive maps, digital guides, and mobile applications for trip planning. This measurement includes aspects of ease of use, benefits, and user satisfaction adapted from X. Wang et al. (2016). The mediating variable, destination image, was evaluated through tourists' perceptions of the destination's attractiveness, service quality, and overall experience in Aceh, using items adapted from Hosany et al. (2007). Similarly, the dependent variable, tourist behavioral intention, encompassed intentions to revisit Aceh, recommend the destination to others, and overall satisfaction. These measurements are based on Papadimitriou et al. (2015). In addition, information-seeking behavior as a moderating variable is measured by assessing the extent to which tourists actively seek information before and during the trip. That includes the frequency of access to websites, social media, online reviews, and travel blogs. This measure was adapted

from Xiang & Gretzel (2010), which evaluated information-seeking behavior within the context of digital tourism.

This study surveyed 300 respondents, adhering to Hair et al. (2019) to ensure valid and reliable results. Data analysis was conducted using SmartPLS 3, assessing construct validity through Average Variance Extracted (AVE), reliability through Composite Reliability (CR) and Cronbach's Alpha, and examining the structural paths for direct, mediating, and moderating effects. Bootstrapping was used to assess the significance of the relationships between variables, ensuring accurate analysis. This method provides insights into how smart tourism apps influence tourist behavior, with destination image acting as a mediator and information-seeking behavior serving as a moderator.

RESULTS AND DISCUSSION

Results

This study involved respondents with various demographic characteristics summarized in Table 1, which indicates that most of the respondents in this study were male, accounting for 172 individuals or 57.3% of the total sample. Meanwhile, female respondents amounted to 128 people, or 42.7%. That shows that men dominate the composition of the research sample.

Regarding age, the largest group is 18-30 years, and this group consisted of 121 individuals, representing 40.3% of the respondents. The second-largest group was those aged 31-45, with 89 individuals, or 29.7%. The 46-60 years group has 73 people or 24.3%, while the group above 60 years is the smallest, with 17 people or 5.7%. The data indicates that the majority of respondents fall within the productive age range of 18-45 years.

Regarding education, most respondents hold a Bachelor's degree, totaling 105 people or 35%. High school graduates and above comprise 92 people, or 30.7%, while 54 respondents, or 18%, have a Diploma. The least represented group is those with a Master's degree or higher, totaling 49 people or 16.3%. This indicates that most respondents have a relatively high level of education, with most having completed at least a Diploma.

For the category of travel purposes, almost half of the respondents, as many as 149 people or 49.7%, traveled for leisure purposes. Business trips were made by 95 people, or 31.7% of the total sample, while 56 people, or 18.6%, travelled to visit family or friends. This data shows that leisure purposes dominate respondents' travel motives, followed by business purposes.

Table 1. Demographic Profile of the Respondents

No.	Category	Range	Frequency	Percentage
1.	Gender	Male	172	57.3
		Female	128	42.7
2.	Age	18-30	121	40.3
		31-45	89	29.7
		46-60	73	24.3
		> 60	17	5.7
3.	Education	High School and Above	92	30.7
		Diploma	54	18
		Bachelor	105	35
		Master and Above	49	16.3
4.	Puspose Trip	Leasure	149	49.7
		Business	95	31.7
		Visit Friend/Family	56	18.6

Source: Processed primary data (SmartPLS)

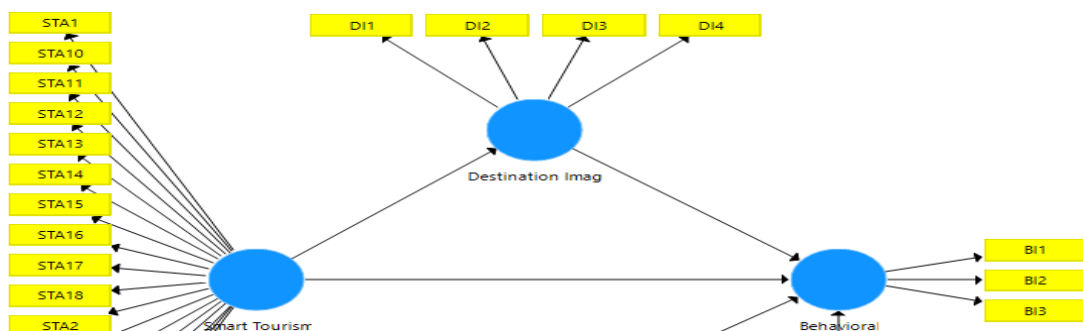


Figure 1. Initial Model for PLS Analysis

Assessment of the Measurement Model (Outer Model)

Validity and reliability tests will assess the effectiveness of the measurement model. The study will evaluate the constructs' validity to confirm their appropriateness for future research. Reliability, along with validity and convergent validity, will be measured using a reflective measurement model.

Convergent Validity

Convergent validity assesses the strength of the association between reflective indicators and their corresponding latent variable. Indicators with loading factors above 0.7 are considered valid, reflecting a substantial and significant contribution to measuring the variable. Higher loading factors indicate more significant influence and dominance in representing the construct.

Table 2. Convergent Validity Value

Variable	Indicator	Loading Factor	Results
Behavioral Intention	BI1	0,873	Valid
	BI2	0,929	Valid
	BI3	0,928	Valid
Destination Image	DI2	0,821	Valid
	DI3	0,887	Valid
	DI4	0,850	Valid
Information Search Behavior	ISB1	0,729	Valid
	ISB2	0,815	Valid
	ISB5	0,730	Valid
	ISB6	0,855	Valid
Smart Tourism Application	STA10	0,828	Valid
	STA11	0,706	Valid
	STA12	0,704	Valid
	STA13	0,745	Valid
	STA14	0,765	Valid
	STA3	0,799	Valid
	STA4	0,783	Valid
	STA8	0,729	Valid
STA9	0,747	Valid	
ISB*STA	ISB*STA	2,301	Valid

Source: Processed primary data (SmartPLS)

Table 2 confirms that all indicators for the variables in this study are valid, with loading factor values surpassing 0.7.

Discriminant Validity (Cross Loading)

Discriminant validity is evaluated using cross-loading values, which compare an indicator's loading on its intended construct against its loadings on other constructs. This assessment ensures that the research instrument accurately reflects the targeted latent variable.

Table 3. Cross loading value

Variable Indicator	Behavioral Intention	Destination Image	ISB*STA	Information Search Behavior	Smart Tourism Application
BI1	0,873	0,345	-0,351	0,533	0,639
BI2	0,929	0,361	-0,534	0,674	0,592
BI3	0,928	0,394	-0,458	0,613	0,606
DI2	0,260	0,821	-0,298	0,440	0,577
DI3	0,346	0,887	-0,323	0,525	0,700
DI4	0,407	0,850	-0,311	0,632	0,719
ISB1	0,399	0,642	-0,317	0,729	0,783
ISB2	0,608	0,292	-0,691	0,815	0,564
ISB5	0,418	0,826	-0,346	0,730	0,828
ISB6	0,609	0,396	-0,692	0,855	0,706
STA10	0,418	0,826	-0,346	0,730	0,828
STA11	0,609	0,396	-0,692	0,855	0,706
STA12	0,695	0,389	-0,634	0,756	0,704
STA13	0,574	0,395	-0,511	0,671	0,745
STA14	0,689	0,418	-0,502	0,664	0,765
STA3	0,544	0,592	-0,335	0,627	0,799
STA4	0,399	0,642	-0,317	0,729	0,783
STA8	0,366	0,857	-0,326	0,551	0,729
STA9	0,361	0,725	-0,271	0,509	0,747
ISB*STA	-0,492	-0,364	1,000	-0,690	-0,565

Source: Processed primary data (SmartPLS)

Table 3 shows that all cross-loading values exceed the threshold, indicating high reliability and confirming that the factors effectively represent the underlying latent variables.

Composite Reliability

Composite reliability, measured using Cronbach's Alpha and the interdependence of indicators, evaluates the reliability of a construct. A construct is considered reliable if its Cronbach's Alpha is greater than 0.6 and its composite reliability exceeds 0.70.

Table 4. Composite Reliability and Cronbach's

Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Behavioral Intention	0,896	0,896	0,935	0,828
Destination Image	0,813	0,825	0,889	0,727
ISB*STA	1,000	1,000	1,000	1,000
Information Search Behavior	0,798	0,821	0,864	0,615
Smart Tourism Application	0,907	0,910	0,924	0,574

Source: Processed primary data (SmartPLS)

As detailed in Table 4, all variables exhibit Cronbach's Alpha and composite reliability scores exceeding 0.7, alongside AVE values above 0.5. These results confirm the constructs' reliability and appropriateness for structural model evaluation.

Assessment of the Structural Model (Inner Model)

After validating the outer model, the inner or structural model can be tested to evaluate the relationships between constructs, their significance, and the R-squared values. Figure 2 illustrates the structural model employed in this study.

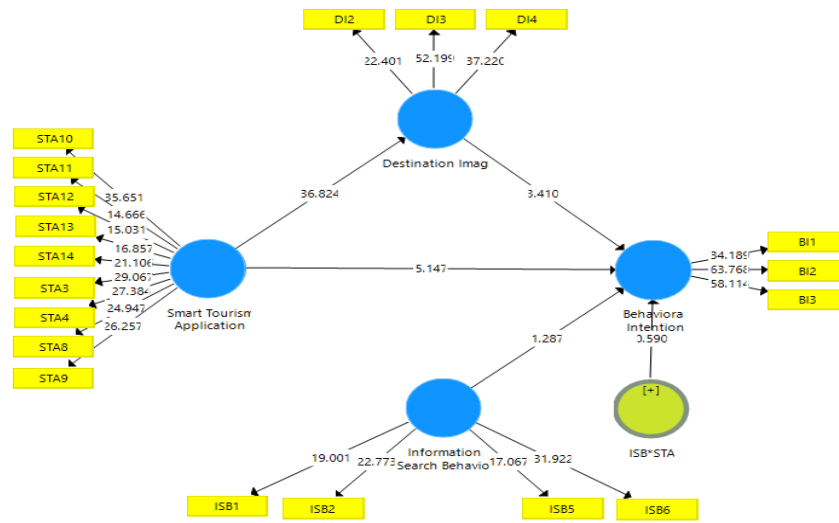


Figure 2. Hypotheses Testing Via PLS

R-Squared

Partial Least Squares (PLS) provides precise R-squared estimates, as demonstrated in Table 5. This metric evaluates the structural model's predictive accuracy, indicating how much exogenous latent variables influence endogenous ones. According to Ghozali (2016), R-Square values of 0.67, 0.33, and 0.19 signify strong, moderate, and weak models, respectively.

Table 5. R-Square Value

Dependent Variable	R Square	R Square Adjusted
Behavioral Intention	0,511	0,504
Destination Image	0,619	0,618

Source: Processed primary data (SmartPLS)

As shown in Table 5, the R-Square value for Path Model I is 0.511, indicating that the Smart Tourism Application explains 51.1% of the variance in the Behavioral Intention variable (moderate), with the remaining variance attributed to factors not considered in this study. Similarly, the R-Square value for Path Model II is 0.619, meaning the Smart Tourism Application accounts for 61.9% of the Destination Image variable (moderate), while other factors influence the rest.

Hypothesis Testing

The bootstrap resampling method in PLS was used to assess the hypothesized relationships. H_a is accepted, and H_o is rejected if the t-value exceeds 1.650 or the p-value is less than 0.05.

Table 6. Hypothesis Testing Results

Variables	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P-Values
Smart Tourism Application -> Behavioral Intention	0,712	0,703	0,138	5,147	0,000
Smart Tourism Application -> Destination Image	0,787	0,788	0,021	36,824	0,000
Destination Image -> Behavioral Intention	0,289	0,282	0,085	3,410	0,001
Smart Tourism Application -> Destination Image -> Behavioral Intention	0,227	0,223	0,068	3,359	0,001

ISB*STA -> Behavioral Intention	-0,037	-0,070	0,063	0,590	0,556
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Source: Processed primary data (SmartPLS)

The findings of the first hypothesis of this study, Table 6 demonstrates that smart tourism applications significantly influence behavioral intention in Aceh ($p = 0.000 < 0.05$), confirming hypothesis 1. This aligns with prior studies (Chung et al., 2018; Kim et al., 2021; D. Wang et al., 2014) and highlights the role of these applications in enhancing tourist visits or recommendations by providing accessible information, convenience, and personalized experiences. Additionally, the applications significantly impact destination image ($p = 0.000 < 0.05$), supporting hypothesis 2, consistent with previous research (Echtner & Ritchie, 1993; Tavitiyaman et al., 2021; D. Wang et al., 2014; Xia et al., 2018). That suggests that the use of smart tourism apps can effectively improve Aceh's destination image in the eyes of tourists. This application provides relevant, accurate, and interesting information about tourist attractions, supporting facilities, as well as cultural values and religious tourism, so as to form positive perceptions of the destination.

Destination image significantly influences behavioral intention ($p = 0.001 < 0.05$), confirming Hypothesis 3. This aligns with prior studies (Afshardoost & Eshaghi, 2020; Prayag et al., 2017; Styliadis et al., 2017), showing that a positive destination image enhances tourists' likelihood to visit or recommend Aceh. Favorable perceptions, including cultural appeal, natural beauty, and supporting facilities, increase the chances of repeat visits and positive word-of-mouth.

Destination image serves as a key mediator linking smart tourism applications to behavioral intention ($p = 0.001 < 0.05$). Hypothesis 4 is accepted. That shows that smart tourism applications not only directly influence tourists' behavioral intention but also indirectly through improving destination image. In other words, the use of smart tourism apps can strengthen tourists' positive perceptions of Aceh as a tourist destination, which in turn encourages their intention to visit or recommend the destination. This mediating role emphasizes the importance of developing application features that can enhance the visual and informational appeal of the destination, such as the presentation of interactive content, user reviews, and relevant tourist guides. With the optimization of smart tourism applications, Aceh destinations can more effectively build emotional relationships with tourists, thus supporting the improvement of the sustainability and competitiveness of the tourism sector in the region. This supports Tavitiyaman et al. (2021), who emphasize the mediating role of destination image in the link between smart tourism applications and behavioral intention.

Furthermore, the involvement of the moderating variable information search behavior does not play a moderating role in the smart tourism application on behavioral intention ($p = 0.556 > 0.05$), which is in line with Sharma et al. (1981) what states that the moderator variable (Z) is correlated with the criterion (Y) and predictor (X). However, the moderator variable (Z) does not correlate with the predictor (X), as shown in quadrant I. Hypothesis 5 is rejected. This suggests that tourists' information-seeking behavior has no significant impact on the relationship between smart tourism apps and their behavioral intentions. In other words, regardless of the intensity of information searches by tourists, the effect of smart tourism applications on behavioral intentions remains consistent. This result indicates that smart tourism applications are practical enough to have a direct impact on tourists' behavioral intentions without requiring intervention from the level of information search. Therefore, application developers can focus more on improving relevant and interesting application features and content without relying too much on tourists' preferences in seeking information from other sources. That also opens up opportunities to promote the app as the primary source of information for tourists who want to explore Aceh's destinations.

Discussion

This study investigates the impact of smart tourism app usage on tourists' behavioral intentions, focusing on destination image as a mediator and information-seeking behavior as a moderator. The results showed a significant effect of engagement in smart tourism applications on tourists' behavioral intentions, and the results of this study align with previous findings. As stated by D. Wang et al. (2014), smart tourism applications increase accessibility and convenience, creating a more informed and personalized experience, thus encouraging tourists to visit or return to the destination. The same thing is also confirmed by Kim et al. (2021), who pointed out that these applications make it easier for tourists

to make decisions through the provision of relevant and detailed information, which ultimately increases the value of the tourism experience. In addition, Wang dan Xiang (2012) finding that smart tourism apps increase tourists' perceived behavioral control is also relevant, where app features allow tourists to plan trips more flexibly and responsively to changes.

The findings indicate that in Aceh, smart tourism applications are instrumental in shaping the destination's image by delivering precise and engaging information, as highlighted by (D. Wang et al., 2014). However, field results show that the implementation of smart tourism apps in Aceh still faces several obstacles, such as limited technological infrastructure, lack of data integration between tourism actors, and low levels of digital literacy among local communities and tourists. In addition, although the app has provided essential information related to Halal facilities and religious tourism destinations, some users reported that the available content is not entirely accurate, complete, or regularly updated. These constraints indicate the need for closer collaboration between local governments, app providers, and tourism industry players to ensure the development of apps that are more responsive to tourists' needs. Thus, the great potential of smart tourism apps in promoting sharia tourism in Aceh can be effectively optimized to enhance the attractiveness and tourist experience in the region.

Furthermore, the results indicated a significant impact of involvement in destination image on behavioral intention. Consistent with prior studies, which show that destination image is crucial in predicting tourists' behavior, overall and affective images strongly influence behavioral intention (Afshardoost & Eshaghi, 2020). This suggests that a positive image of Aceh, particularly its cultural uniqueness, natural beauty, and Sharia values, is vital in motivating tourists to visit or revisit the destination. However, conditions in the field during the study showed that tourists' perceptions of some aspects of destination image, such as environmental cleanliness and the quality of supporting facilities, still require attention. Some tourists revealed that although they were impressed by the culture and hospitality of the Acehnese people, the lack of adequate public facilities, as well as inconsistent information across various digital sources, posed challenges for them.

This situation underscores the importance of improving destination marketing strategies that not only highlight Aceh's strengths but also address negative perceptions that may hinder traveler intentions. With measures such as improving the quality of tourist infrastructure, hygiene management, and providing accurate information, Aceh's image as a top tourist destination can be strengthened, thus contributing directly to an increase in the number of tourist arrivals.

The engagement research results show that destination image effectively mediates the relationship between smart tourism applications and behavioral intention. That confirms that smart tourism applications indirectly influence tourists' behavioral intentions by improving destination image. The results showed that the use of this application helped strengthen tourists' perceptions of Aceh's uniqueness and attractiveness, such as Sharia-based cultural, religious, and culinary tourism. However, conditions in the field show that the effectiveness of the mediating role of destination image is still influenced by the quality of information presented in the application.

Some tourists revealed that incomplete or outdated information in the app may reduce their confidence in Aceh's positive image, even though the app has provided benefits in terms of navigation and trip planning. Therefore, optimization of app content, such as the addition of interactive features, real-time reviews, and attractive visual presentation, is necessary to enhance the tourist experience while strengthening the role of destination image in mediating the relationship between apps and tourists' behavioral intentions. That is expected to encourage sustainable tourism growth in Aceh.

The moderating variable of information search behavior does not influence the effect of smart tourism applications on behavioral intention. While information search is crucial in supporting tourists' decision-making, it does not directly moderate the impact of these applications on behavioral intention in the Aceh tourism context. This differs from studies by Lu et al. (2016) and Gursoy and McCleary (2004), which suggest that information-seeking strengthens the relationship between digital technologies and tourists' behavioral intentions. However, in Aceh, tourists' search for additional information does not significantly moderate the effectiveness of smart tourism applications in influencing behavioral intentions.

This fact could be due to two main possibilities. First, the information provided by smart tourism apps may be sufficient, so tourists do not feel the need to seek additional information outside the app.

Second, tourists in Aceh may rely on first-hand experience or recommendations from local parties, such as tour guides or communities, thus reducing the significance of the role of digital information search in shaping their intentions.

Thus, these findings provide new insights that in some contexts, such as Sharia-based tourism in Aceh, the moderating role of information search is not always relevant. That underscores the importance of understanding the characteristics and needs of local travelers in designing digital strategies. The practical implication is that app developers need to focus on improving the quality of information available directly in the app without relying on the level of traveler engagement in searching for additional information. In addition, integration with interactive features that promote recommendations based on user preferences and local culture may be a more effective strategy to increase tourists' behavioral intentions.

CONCLUSION

This study reveals that smart tourism applications significantly impact both the destination image and tourists' behavioral intentions in Aceh. Destination image acts as a key mediator in the relationship between these applications and behavioral intentions, confirming that enhanced tourism experiences through digital apps can improve tourists' perceptions of the destination and increase their intention to visit. However, the study also shows that information search behavior does not significantly moderate the influence of smart tourism apps on behavioral intentions. In the context of Aceh tourism, the reliability of the information provided in the app is more important than tourists seeking additional information. The practical implication is that the development of smart tourism apps in Aceh should prioritize improving the quality of relevant information, particularly related to Sharia tourism, local culture, and Halal facilities. Moreover, digital technology can be leveraged to offer a more personalized and informative experience, enhancing promotional strategies for Aceh's tourism. This research contributes to understanding the role of digital technology in Sharia-based tourism development in Aceh and provides a foundation for future studies on factors influencing tourists' behavioral intentions in the digital age.

This research focuses on tourists visiting Aceh as the target population. While the data collection process has been comprehensive, the sample size may not fully represent all segments of the population, such as non-Muslim tourists or those who do not use smart tourism applications. This limitation may restrict the generalizability of the findings to broader populations or regions outside of Aceh. The results likely reflect the perceptions and behaviors of Muslim tourists in Aceh, which may not apply to other tourist groups or destinations with different cultural contexts.

This study utilized surveys to collect self-reported data, which may be prone to biases like social desirability, where participants give socially acceptable responses instead of reflecting their true thoughts or behaviors. This limitation could influence the accuracy of the findings, particularly regarding variables such as the perceived usefulness of the smart tourism application and behavioral intentions.

The inclusion of "information search" as a moderating variable complicates the analysis. Differences in how respondents interpret and engage with information search activities may cause inconsistencies, affecting the reliability of the moderation analysis and making it harder to draw clear conclusions about its impact on the relationship between smart tourism apps and tourist behavioral intentions.

This study is specific to Aceh, a region with distinct cultural and religious traits. While this focus enriches the study, it limits the generalizability of the findings to other regions with different socio-cultural dynamics, restricting the study's broader contribution to tourism research.

The rapidly changing nature of smart tourism applications and technologies may mean that some features or functionalities discussed in this research become outdated or less relevant over time. This limitation may reduce the long-term applicability of the findings, particularly in addressing future technological advancements in smart tourism.

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