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# Revitalizing Tourism and Hospitality Industry Through Smart Tourism Application (Beautiful Kenyir): A Case Study of Kenyir Lake, Malaysia

Wan Anis Aqilah Megat Zambri[1], Ahmad Syakir Salman Salleh @ Abdul Latif[1], Dzaa Imma Abdul Latiff[1], Suhaila Kamal[1] & Arifha Mohamad[2]

[1]Faculty of Communication and Media Studies, Universiti Teknologi MARA, Cawangan Negeri Sembilan, Kampus Rembau, [2]Faculty of Technology Management and Business, Universiti Tun Hussein Onn, Johor

Corresponding Author Email: wanisaqilah@uitm.edu.my

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**Abstract**

The COVID-19 had caused RM1mil loss for local Kenyir Lake tourism industry due to travel restrictions and interstate travel by domestic tourists. Kenyir Lake is located at Terengganu, one of the tourist destinations with multiple attractions that is rich with nature, beautiful islands and conservation and preservation of animals. Kenyir Lake is known as an ecotourism destination which has many attractions and activities such as fishing, caving, jungle trekking, houseboat overnight rides, and many more. Kenyir Lake has a huge potential to be known globally if the information of the Kenyir Lake is properly organized. To regenerate and revitalize our local tourism industry, a Smart Tourism mobile application named "Beautiful Kenyir" has been developed to encourage and promote the domestic tourism industry to the tourists. This research aims to identify the feedback on the importance of smart tourism application use on mobile phone. This smart tourism application is designed to attract locals and travelers to choose Kenyir Lake as one of the must-visit destinations. A cross-sectional survey of the 14-items instrument was adapted and distributed online to a total of 196 smartphone users in Klang Valley during the first week of April 2023. Most of the users responded with a high positive response toward this product. The findings supported the idea that smart tourism application can influence the intention to use. The result of the survey also improved our understanding and knowledge that this product can be one of the approaches to promote and market Kenyir Lake as a tourism destination. This smart tourism application provides brief information of the places of attractions, activities, restaurants, facilities booking, transportation, duty free shops, reviews, and rating just within one application. This study is beneficial for researchers, tourism agencies, ministries, local businesses, application developers and the public to engage in smart tourism while traveling.

**Keywords:** Smart Tourism, Application, Kenyir Lake, Terengganu, Smartphones

## Introduction

The COVID-19 pandemic has caused big losses to the tourism industry and business owners due to travel restrictions as well as the closure of businesses. Tourism business owners, operators, agencies, and entrepreneurs in Kenyir Lake (*Tasik Kenyir*), Terengganu has lost more than RM1 million when houseboat and speedboat bookings were canceled due to the third wave of COVID-19 (Bakar, 2020). Kenyir Lake is an artificial lake with an area of 38,000 hectares (Lembaga Kemajuan Terengganu Tengah, n.d.) and The *Kelah* Sanctuary at Kenyir Lake was recognized as the Best Eco-Tourism initiative (Said, 2021). Kenyir Lake is not only an ideal destination for fishing expeditions, but it is also an ideal location for various attractions such as water sports, houseboats, caving, jungle walking, duty free goods and waterfall activities. The spread of rumors that artificial lake would burst due to rainfall has worsen the tourism industry of Kenyir Lake which causes less tourists to come and spend the weekend there (Zolkiply & Harun, 2022). Therefore, tourism transformation is needed to harness the competitiveness of Malaysia's tourism industry in revitalizing the tourism economy and hospitality in accordance with the National's Tourism Policy 2020 -2030 in embracing digitalization to drive innovation and competitiveness towards sustainable and inclusive development (Ministry of Tourism, Art and Culture Malaysia, 2020).

Malaysia's tourism industry is remained in a comfort zone and the existing tourism products and facilities are becoming unattractive due to the lack of creativity and innovation. Poor destination management and over reliance on traditional marketing and promotion has left Malaysia behind in terms of embracing Smart Tourism (Ministry of Tourism, Art and Culture Malaysia, 2020). According to Ministry of Economy Department of Statistic Malaysia (2022), Malaysia's domestic tourist arrivals and tourism expenditures continued to decline in 2021 due to interstate border restrictions and COVID-19 lockdowns which recorded a total of 66 million visitors representing a negative growth of 49.9%, compared to last year. It is also reported that Terengganu state was not listed among the Top 5 preferred destinations (Selangor, Kuala Lumpur, Sarawak, Negeri Sembilan and Pulau Pinang state) of domestic visitors. Hence, to regenerate the tourism industry of Terengganu state, the "Beautiful Kenyir" Smart Tourism application has been developed to help the tourism industry of Kenyir Lake of Terengganu, Malaysia. This research aims to gather the feedback on the importance of smart tourism application use on smartphones.

## Literature Review

*Smart Tourism Application (Beautiful Kenyir)*

Beautiful Kenyir is a prototype of smart tourism application that was developed to serve as a platform to promote Kenyir Lake, an ecotourism destination in Terengganu, Malaysia. Terengganu state is rich in nature such as islands and preservation and conservation of animals. The smart tourism application has compiled several attractions at Kenyir Lake, nearby Terengganu attractions, the activities, restaurants, shops, accommodation, transportations, and emergency services at Kenyir Lake to facilitate and speed up the process of information searching by tourists and domestic visitors. Past study (Smirnov et al., 2014) has been conducted on the impact of using mobile applications in specific tourist destination and research found that the use of mobile apps have greatly impacted the smoothness of the travel experiences (Brennan et al., 2018). The app is not only intended for tourists but can

also be used by local business owners to promote their goods and services through the application. It is also to encourage the tourism operators and owners to use the technology and smart tourism application as an initiative to support the National Tourism Policy of Malaysia. Other than that, this application allows visitors and users to book accommodation and transportation within the same application. The users of the application may also leave their reviews of the places they visited to attract more people and promote goods and services. This application is interactive and effective for the visitors as it has global positioning system (GPS) added in the app to make the navigation process easier for the tourists. In a nutshell, Beautiful Kenyir smart tourism mobile application offers a hassle -free information obtain for the users.

*Diffusion of Innovation Theory*

Innovation is the "idea, objects or process that perceived as new by individuals or society" while diffusion explains "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 1961). Diffusion of innovation theory analyzes how members of society accept new and innovative ideas and how they make decisions towards the information. According to Rogers (2003) the adaptability and implementation of the innovation is necessary to attain development and sustainability. Adoption means that a person does something different than before (e.g.; buys or uses a new product, acquires and performs a new behavior, etc.) and the key to acceptance is that the person must perceive the idea, action, or product as new or innovative (Wayne & LaMorte, 2022). People inclined to adopt new technology if they want new experiences that are simple, convenient, fun, and easy to use in the market. As shown in figure 1, the dependent variable (intention to use) is influenced directly by the independent variables which are represented by a) relative advantage, b) ease of use (complexity), c) compatibility and d) trialability. The "observation" has been excluded in this research because Beautiful Kenyir is a prototype application and has never been exposed to the public except for the respondents during the trial period.

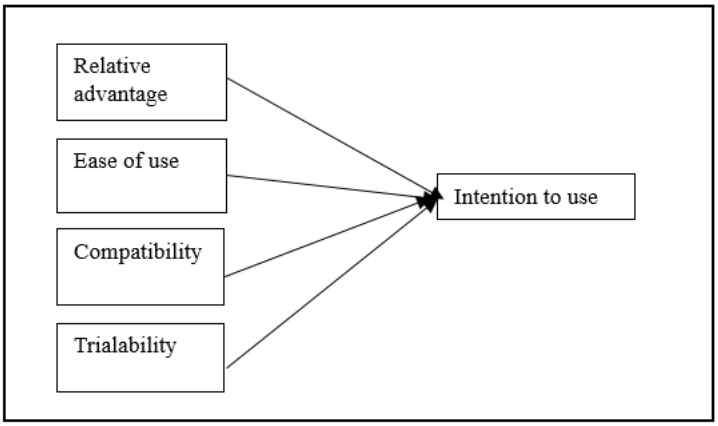


Figure 1: Research Framework

*Relative Advantage*

Relative advantage is the degree to which an innovation is perceived as better to the ideas it replaces (Rogers, 1961). Technology plays crucial role in tourism marketing as it helps connect businesses with potential customers and allows businesses to share information about their

products and services. Users choose and use the application that gives a relative advantage to them especially in information searching.

*Ease of Use*

Ease of use in Technology Acceptance Model and complexity in Diffusion of Innovation Theory investigates the same perception but opposite direction (negatively correlates). Thus, ease of use will be used in order to have the same effect direction. Ease of use (complexity) can be a powerful barrier to adoption. Complexity negatively impacts innovation acceptance rates (Rogers, 1961). The ease of use of the innovation motivates people to adopt the innovation while the high complexity of the innovation keeps the users away. The complexity of the innovation is the important variable in intention to innovation adoption. Beautiful Kenyir is a mobile friendly smart tourism application to use as the application uses simple and understandable Graphical User Interface (GUI), icons, layouts, labels, and information. Ease of use can also be viewed as consumer perceptions of a product, specifically whether the product is easy to learn and use, and whether it reduces memory load and satisfaction (Xiong et al., 2020).

*Compatibility*

Compatibility in innovation describes how well it aligns with people's values, experiences, and needs and the compatibility level determines the behavioral changes required to adopt the innovation (Rogers, 1961). Prakarsa et. al (2020) referred compatibility leads to how consistent an innovation is considered and aligned with existing values, previous experience and needs of potential users.

*Trialability*

The perceived trialability of an innovation is the extent to which it can be tested and experimented (Rogers, 1961). Trialability innovations in action is a powerful way to reduce uncertainty about innovations. Therefore, testability is positively correlated with innovation acceptance rate. Beautiful Kenyir allowed the users to test and navigate the smart tourism mobile application within certain period. Trialability is an important element in innovations which helps to reduce the uncertainties of the users about the new idea and product implementations. Thus, this variable is crucial as it can clarify the Beautiful Kenyir adoption rate at the early stage before its smart tourism application launching and implementations.

H1: Relative advantage of using Beautiful Kenyir application has a positive and significant effect on intention to use.
H2: Ease of use of using Beautiful Kenyir application has a positive and significant effect on intention to use.
H3: Compatibility of using Beautiful Kenyir application has a positive and significant effect on intention to use.
H4: Trialability of using Beautiful Kenyir application has a positive and significant effect on intention to use.

## Methodology

### Sample and Statistical Procedure

A link that brings to Beautiful Kenyir's prototype application has been attached to the survey. Respondents were advised to click the link and experience the wonderful and uniqueness of this application before responding to the survey. The online survey was conducted among smartphones respondents using convenient sampling technique in Klang Valley during the first week of April 2023. The data collection process took about a month and managed to obtain 196 questionnaires using Google form. The data were entered and analyzed using SPSS version 24. As for the data analysis, the researcher used descriptive analysis to measure the mean and standard deviant. Meanwhile, a multiple regression analysis was also conducted to predict the relationship between innovation attributes of Beautiful Kenyirs's application and the user's intention to use.

### Instruments and reliability

There are 14-item survey instruments adapted from the past research studies on media and technologies adoption. The questionnaire included demography items and respondents' experienced regarding Beautiful Kenyir's application based on variables such as relative advantage, ease of use, compatibility and trialability. However, variable of observation will not be included because the application is a prototype and has never been used in public before. Therefore, it is irrelevant to observe this prototype through friends, family, relatives of salesperson and advertisement.

Table 1 shows the division of instruments, items, reliability test, standardized item loadings, average variance extracted (AVE), composite reliability (CR), and Cronbach alpha (CA). The items used four Likert scales. The instruments were adopted from Chan-Olmsted & Chang (2006); Rogers (1989) for items such as Relative Advantage and Compatibility; Davis et al (1989); Venkatesh et al (2003) for item Ease of Use; Moore & Benbasat (1991) and Rogers (1989) for item Trialability and lastly Venkatesh et. al (2003); Wu & Wang (2005) for item Intention to use. The pre-test had been conducted among 30 Diploma students. The results of the reliability analysis were presented in Table 1 to show that the reliability test is met after some adjustments or reworded have been made to avoid misunderstanding when the respondents attempted the questionnaire. The researchers also seek help from the experts to confirm that the items of an assessment or instrument are appropriate to the targeted study and objectives. The factor loading for each item should be .6 or higher and must be positive. It is essential to conduct Average Variance Extracted (AVE) for each construct to measure the validity. Most of the factor loadings were larger than .6. The AVEs for all constructs exceed .5 and CRs exceed .6.

Table 1
*Instruments, standardized item loadings, CA values AVE, and CR*

| Factor | Instrument | Item | Item loadings ≥.60 | CA ≥.70 Pilot Test n(30) | CA ≥.70 Field Test n(196) | AVE ≥.5 | CR ≥.6 |
|---|---|---|---|---|---|---|---|
| Relative Advantage (RA1, RA2, RA3) | Chan-Olmsted & Chang (2006); Rogers (1989) | RA1<br>RA2<br>RA3 | .86<br>.82<br>.80 | .82 | .86 | .68 | .87 |
| Ease of use (EU1, EU2, EU3) | Davis et al (1989); Venkatesh et al., (2003) | EU1<br>EU2<br>EU3 | .89<br>.77<br>.63 | .82 | .87 | .60 | .81 |
| Compatibility (CO1, CO2, CO3) | Chan-Olmsted & Chang (2006); Rogers (1989) | CO1<br>CO2<br>CO3 | .73<br>.82<br>.65 | .89 | .88 | .54 | .78 |
| Trialability (TR1, TR2, TR3) | Rogers (1989) | TR1<br>TR2<br>TR3 | .71<br>.71<br>.80 | .76 | .89 | .55 | .79 |
| Intention to use (IN1, IN2) | Venkatesh et. al (2003); Wu & Wang (2005) | IN1<br>IN2 | .86<br>.82 | .75 | .90 | .71 | .83 |

***** Cronbach alpha (CA), average variance extracted (AVE) and composite reliability (CR)

## Results

### Profile of the Beautiful Kenyir's Application user

Table 2 shows the profile of respondents based on the survey. Most respondents are female (59%), with most of the age between 26 to 35 years old (34%). Malays are among the highest rate (46%) where most of them are married (51%). Meanwhile, the highest education levels are among the degree holders (34%) with executives having the highest response rate (29%). Most of them earned between RM1,001 to RM2,000 (31%).

Table 2
Distribution of Beautiful Kenyir's Application user by profile (n=196)

| Profile | Frequency | Percentage (%) | Profile | Frequency | Percentage (%) |
|---|---|---|---|---|---|
| ***Gender*** | | | ***Status*** | | |
| Male | 80 | 41 | Single | 86 | 44 |
| Female | 116 | 59 | Married | 99 | 51 |
| | | | Divorce | 11 | 5 |
| ***Age*** | | | | | |
| 16-25 | 32 | 16 | ***Education*** | | |
| 26-35 | 67 | 34 | Certificate/PMR /SPM | 49 | 33 |
| 36-45 | 57 | 29 | Diploma | 35 | 23 |
| 46-55 | 31 | 16 | Degree | 51 | 34 |
| 55-65 | 9 | 5 | Master/PhD | 15 | 10 |
| ***Race*** | | | ***Occupation*** | | |
| Malay | 91 | 46 | Professional | 22 | 11 |
| Chinese | 54 | 28 | Executive | 57 | 29 |
| Indian | 42 | 21 | Non-executive | 40 | 20 |
| Other | 9 | 5 | Students | 52 | 27 |
| | | | Self employed | 15 | 8 |
| ***Income*** | | | Unemployed | 10 | 5 |
| >1000 | 25 | 17 | | | |
| 1001-2000 | 46 | 31 | | | |
| 2001-3000 | 20 | 13 | | | |
| 3001-4000 | 28 | 19 | | | |
| 4000 above | 31 | 21 | | | |

Overall, this study received positive responses and respondents strongly agreed that Beautiful Kenyir's application programme is an effective platform for smart tourism applications. Respondents' feedback on the relative advantage of Beautiful Kenyir's application was measured by three questions (RA1-RA3, Table 3). RA2 "My satisfaction with BK App is higher than the other search engine that available on Internet" showed majority of them agreed (65%) with the highest mean (M=3.27, SD=.56), RA1 "fits with my lifestyle" (64%) and RA3 "fulfill my needs better" (63%).

Meanwhile, the ease of use of Beautiful Kenyir's application (EU1-EU3) has proven to be user friendly and majority of respondents agreed that EU1 "Learning to use the content of BK App is easy for me" with the highest mean (M=3.43, SD=.49). Most of them agreed that EU2 "easy to use the content" and EU3 "easy for me to become skilled" showed 62 percent respectively.

Furthermore, majority of them agreed that Beautiful Kenyir's application CO3 "would fit well with the way I like to work" (72%) with the highest mean (M=3.19, SD=.66). Followed by CO1 "compatible with most of my work" (66%), and CO2 "fits with my work style" (63%).

Trialability of Beautiful Kenyir's application (TR1-TR3) confirmed that majority of respondents TR2 want "to be permitted to use BK App, on a trial basis long enough to see what it can do" (67%) with the highest mean (M=3.29. SD=.5). Majority of them agreed that TR1 "able to properly try out BK App" (65%) and TR3 "on a trial basis (63%).

Additionally, items of intention to use Beautiful Kenyir's application (IN1-IN2) were gauged to check on respondents' attitudes to use. They look forward to using this app frequently (70%) with the highest mean (M=3.17, SD=.67) and IN2 "become a heavy user of Beautiful Kenyir's applications" showed 60 percent agreed.

Table 3
*Users attitude on Beautiful Kenyir's Application.*

| Item | Mean | SD |
|---|---|---|
| RA1. BK App fits with my lifestyle | 3.26 | .56 |
| RA2. My satisfaction with BK App is higher than the other search engine that available on Internet. | **3.27** | .56 |
| RA3. BK App fulfils my needs better than the other search engines that are available on Internet. | 3.20 | .55 |
| EU1. Learning to use the content of BK App is easy for me | **3.43** | .49 |
| EU2. It is easy to use the content of BK App | 3.36 | .50 |
| EU3. It is easy for me to become skilled at using the content of BK App. | 3.35 | .54 |
| CO1. BK App would be compatible with most aspects of my work. | 3.16 | .50 |
| CO2. BK App would fit my work style. | 3.11 | .59 |
| CO3. BK App would fit well with the way I like to work | **3.19** | .66 |
| TR1. I want to be able to properly try out BK App. | 3.28 | .55 |
| TR2. I want to be permitted to use BK App, on a trial basis long enough to see what it can do. | **3.29** | .50 |
| TR3. I want to be able to use BK App on a trial basis. | 3.28 | .57 |
| IN1. I intend to use BK App frequently | **3.17** | .67 |
| IN2. I intend to be a heavy user of BK App system. | 3.13 | .58 |

*BK=Beautiful Kenyir; 4-Likert scale

A multiple regression analysis using the enter method was conducted to examine whether a) relative advantage b) ease of use c) compatibility and d) trialability of smart tourism Beautiful Kenyir's application have a positive and significant effect on the intention to use. Overall, the model was significant, $F(4,191) = 114.015$, $p<0.001$, explaining 70.5% ($R^2 = .71$) of the variance in the outcome variable. Thus, table 4 shows that all variables of the Beautiful Kenyir's application reported positive and have a significant effect on the intention to use. Therefore $H_1$, $H_2$, $H_3$ and $H_4$ are supported.

Table 4
*Results of multiple regression analysis*

| **Variables** | **Unstandardized Coefficient** | | **Standardized Coefficient** | **t** | **Sig** | **$R^2$** | ***F*** |
|---|---|---|---|---|---|---|---|
| | *B* | SE | Beta | | | | |
| Constant | .36 | .16 | | 2.07 | .04 | .71 | 114.015 |
| Relative Advantage | .15 | .06 | .15 | 2.58 | .01* | | |
| Ease of use | .19 | .06 | .18 | 3.21 | .00* | | |
| Compatibility | .14 | .06 | .14 | 2.27 | .02* | | |
| Trialability | .44 | .05 | .54 | 9.81 | .00** | | |

**p>0.001, *p>0.05

**Discussion**

The study shows that majority of respondents in Klang Valley have good responses towards Beautiful Kenyir's Application, especially on smartphones. Most of them stated that this application satisfies their needs higher than other search engines that are available on the Internet. Besides, learning to use this application to stream the content is easy for them. They also request to use this application on a trial basis to observe what the application can do and intend to use it frequently.

As specified in Table 4, the results of the hypotheses show a positive and significant relationship. Hypothesis 1 shows a positive and significant relationship (β= .15, p<.05) between the relative advantage of Beautiful Kenyir's application and respondents' intention to use. The results are found significantly aligned with the previous study by Latiff et. al (2017) which found that relative advantage is the strongest predictor of Internet TV adoption in enhancing students' learning experience. This indicates that satisfaction from smart tourism Beautiful Kenyir's application is higher and fits their needs and lifestyles, thus, improved respondents' intention to use. The higher users perceive relative advantage, the higher users adopt.

Next, hypothesis 2 shows a positive and significant relationship (β=.18, p<.05) between the ease of use of Beautiful Kenyir's application and respondents' intention to use. This study shows a compatible result with the past study done by Latiff et. al (2019) in the study regarding smart tourism application Lets Go to Rembau. The study has found that perceived ease of use is a significant factor that affects students' intention to use Internet TV for their learning experience. Nunkoo and Ramkissoon (2013), also supported in their study regarding developing the usefulness of online tourism shopping. Thus, the more users identified learning Beautiful Kenyir's application become competent, the more users adopt to this application.

Next, hypothesis 3 reported a positive and significant relationship (β=.14, p<.05) between the compatibility of Beautiful Kenyir's application and intention to use. This study is consistent with the previous study done by Chen et. al (2002) which encountered that compatibility has been positively affected by new technologies adoption. Meanwhile, Qazi et. al (2018) also supported that compatibility does influence consumers' intentions to adopt e-books and has a significant impact on adopting e-books.

Lastly, hypothesis 4 confirmed that trialability of Beautiful Kenyir's application gives a positive and significant relationship (β=.54, p<.001) towards intention to use. Putteeraj et. al

(2021) found that trialability is an important predictor influencing people to use e-Health. The high trialability of Beautiful Kenyir's application, especially on a trial basis influences the users to adopt this application.

**Implication and Conclusions**

This study applied the theory of innovation diffusion by Rogers (2003) in developing the smart tourism application prototype in order to attract more visitors or travellers to Kenyir Lake. In sustaining Kenyir Lake tourism development, the researchers have examined the variables in this theory to measure the effectiveness of this application. Rogers (2003) explained that "technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving the desired outcome" (p. 13). Indeed, the greater adoption or rejection of innovation was an important factor in diffusion and adoption research and the diffusion of innovations was fundamental to explaining human behaviour change. This application can together be complemented and reinforced in distributing sustainable tourism development and its ideas. Theoretically, this study offers new approaches to examine the use of smart tourism Beautiful Kenyir's application in the tourism industry. In addition, this model helps other researchers in modelling their future research models in more reliable ways. Moreover, the combination of variables from the Technology Acceptance Model such as ease of use successfully suggested a positive and significant relationship to adoption. This research opens new ways to investigate the use of mobile technology in the tourism industry, and the integrative framework may help researchers in developing future research models in stronger and robust ways.

The study also contributes to social implications by investigating the visitors' or tourists' intention and emphasizing the dynamics of assessing this application for tourism development. The mobile interactive usage for this objective can be considered a social benefit that will influence societies, communities, travellers, and individuals today. Therefore, the increase in knowledge or information on specific places might encourage travellers to Kenyir Lake. In addition, this contributes to the increase of technology adoption in the tourism industry. Ultimately, Beautiful Kenyir's application can be proved or verified as an economic technology and thus, becoming an instrument of social change due to its contribution to economic growth.

In conclusion, the Smart Tourism Application of Beautiful Kenyir is believed to be an innovative change in the tourism perspective. It has an interactive format in which most users depend on smartphones or any devices to check on tourism-related information. The existing results might be helpful to construct strategies to encourage more consumers to use Beautiful Kenyir's application and hence, it will be an added value to the tourism commercials and other related organizations such as tourism services such as hotels, airline companies, restaurants, food, shopping places, souvenirs, rental-car services and more. Indirectly, it may also create job opportunities for local people and thus, increase the economic sectors. The Malaysian government especially the Minister of Tourism, Arts and Culture Malaysia (MOTAC), may utilize and develop the outcomes of this study in a better way to publicize Kenyir as the next cultural tourism and travel destination in Malaysia.

Academic research can benefit greatly from this study, particularly when considering the theoretical implications. In the current study, the researchers used the Diffusion of Innovation theory from the field of new media and technology to assess the usefulness of the smart tourism. It has been demonstrated that Roger's Diffusion of Innovation is the suitable

model to use and research on users' adoption of new media technologies. The results demonstrated a favorable and substantial impact on all the criteria, including relative advantage, trialability, compatibility, and simplicity of use. Additionally, a good combination of factors from the Technology Acceptance Model (TAM), such ease of use, revealed a favorable and substantial association between adoption and the variables. As mobile technology is developing very quickly, this study also contributes to tourism and hospitality sector particularly in developing countries. The research framework may aid future researchers in creating models in a more comprehensive manner.

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