Article

The Impact of Eatmarna Application Usability on Improving Performance Expectancy, Facilitating the Practice of Rituals and Improving Spirituality Feelings during Umrah Amid the COVID-19 Outbreak

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Abstract: The electronic tourism era has rapidly emerged during the explosive spread of the COVID-19 pandemic worldwide. The role of information technology was also evident in the religious tourism sector, and this facilitated the organization of religious events for Muslims, such as Hajj and Umrah. In the present study, we assessed the usability of a mobile application (Eatmarna) which provides permits to perform Umrah and other religious practices in Makkah and Madina in Saudi Arabia. We sought also to assess the impact of usability on the app effectiveness in improving Umrah experience. Pilgrims were asked to fill out an electronic survey distributed by the coordinators of Umrah service providers. Results showed that the perceived effectiveness was predicted by two domains of usability, namely system information arrangement ($\beta = 0.27$, 95% CI, 0.09 to 0.46, $p = 0.004$) and app usefulness ($\beta = 0.52$, 95% CI, 0.34 to 0.69, $p < 0.0001$). Both the usability domains were independently associated with all the subdomains of app effectiveness, including performance expectancy, facilitating the practice of rituals, and feelings of spirituality. The Eatmarna application was effective in providing a safe environment for pilgrims, which was accounted for by the app usability, and this facilitated the improvement of Umrah experience. National authorities can further integrate additional services in the app to improve pilgrims' perceptions.

Keywords: religious tourism; information and communication technology (ICT); Umrah; Eatmarna application; Saudi Arabia; COVID-19; technology

1. Introduction

The world has witnessed a number of major pandemics in the past 50 years, such as SARS, bird flu, Ebola, and others, yet there has been no pandemic similar to COVID-19 in its strength, its spread and its negative economic and social effects. This pandemic has imposed quarantine, restriction of movement, isolation and many measures such as physical distancing and wearing masks to prevent the spread of the virus (Sultana et al. 2020).

Zaman et al. (2020) explain that with the global response to the COVID-19 pandemic, the role of ICTs in building and spreading the societal awareness needed to effectively combat the COVID-19 pandemic through prevention, diagnosis and treatment has emerged. Therefore, it can be said now that the roles of information and communication technology were among the most important and effective methods and the most effective and globally used in combating this epidemic, as the countries of the world competed to present practical initiatives and ideas that depend mainly on the applications of information and communication technology. In particular, despite the many disadvantages of COVID-19,

"it gave us an opportunity to think deeply about the role and dimensions of e-tourism, and to discuss the transformational future outlook of tourism in the light of information and communication technology and e-tourism" (Gretzel et al. 2020).

Yasin et al. (2020) assures that especially religious tourism, which is an original and vital aspect of the travel and tourism industry around the world, as statistics indicate that it collects nearly 330 million international tourists, and "has many positive economic and social effects on religious tourism destinations". The impact of information and communication technology on religious tourism and pilgrimage is always under constant study and evaluation, but the reality indicates that information and communication technology have a strong impact on the experience of religious tourism, effects related to the details of religious sites and the customs, traditions and rituals associated with them. Religious tourists and pilgrims undoubtedly have a reliable travel companion in smartphones, whose role is not limited to guiding them to routes and information only, but can be described as enriching their religious journey in various ways (De Ascaniis and Cantoni 2016). There is no doubt that this role of information and communication technology in light of the CIVDI-19 pandemic has doubled and the research is about to evaluate it in Islamic religious rituals in the Kingdom of Saudi Arabia.

One area of particular interest is the implementation of information technology in organizing religious events, such as Hajj and Umrah. While Hajj (Pilgrimage) represents an annual gathering of Muslims on specific days of the year (from the first day to the middle of the last Hijri month), Umrah is a pilgrimage that is performed at any time beyond the Hajj season. Successful management of the spiritual and religious practices during Umrah is crucial, especially during Ramadhan (the ninth month of the Hijri calendar) due to the large numbers of pilgrims who visit the religious regions to ask for Allah's rewards. For this purpose, the Saudi government has historically been known for implementing almost all applicable methods of improved technology to facilitate undertaking Hajj and Umrah (Almuhrzi and Alsawafi 2017). The dedicated Ministry of Hajj and Umrah (MHU) in the Kingdom has been utilizing different technological advances in coordination with agencies of multiple specialties. Recently, in the context of the COVID-19 pandemic, the MHU has launched the Eatmarna application which aims to allow pilgrims to book Umrah permit or permit to undertake other religious and ritual practices, such as pray and Tawaf in Masjid Al-Haram, visit Roda Rasool and visit Riyaz ul Jannah in Madina. Permissions must be obtained to perform such practices via the mobile application. However, there is no current evidence regarding the usability of the application, and little is known about the extent at which application usability would influence its effectiveness on performing religious and spiritual practices during Umrah. In light of efforts aiming at improving the provided services, we sought to investigate Eatmarna mobile application usability among pilgrims, and to assess the impact of usability on application effectiveness on undertaking Umrah spiritual practices.

2. Literature Review

2.1. Impacts of COVID-19 on Tourism Industry

Kim et al. (2016) show that practical experiences and various studies have indicated that pandemics directly affect tourist demand around the world, which was indicated by studies that accompanied the emergence of pandemics such as SARS, H1N1, AIDS and others in the study of tourist demand, With the COVID-19 epidemic, research and studies began to follow on their impact on tourist demand, with recognition that this pandemic differs from the previous ones in the level of its spread and the severity of its effects (Haryanto 2020).

Kumar and Nafi (2020) state that By the end of 2019, the tourism industry was at its peak, as the number of tourists around the world reached more than 1.4 billion, with an annual growth rate of nearly 4%, and consequently, the doubling of tourism revenues. All these positive numbers led to the expectations of experts in the tourism and travel industry that the year 2020 will be a successful year in a series of global tourism success,

but unfortunately, the outbreak of the COVID-19 pandemic had another view that changed the scenario of this entire industry. Kampel (2020) adds that by April 2020, all tourist destinations in the world had imposed travel restrictions as a natural response to the outbreak of the COVID-19 epidemic.

Uğur and Akbıyık (2020) add that the fear caused by COVID-19 has led to widespread restrictions on freedom of movement, closure of borders, and the closure of all public and tourist facilities, whether accommodation, restaurants and recreational facilities used in tourism. The world's largest tourism organization, UNWTO, has forecast that the number of international tourists may fall by 80 percent this year. It also pointed out that approximately 100–120 million direct and indirect tourist jobs are at risk, in addition to huge financial losses in global tourism revenues (Kampel 2020). Moreover, Kumudumali (2020) indicates that the negative impact of the pandemic on tourism is compounded by the deterioration of other vital sectors related to it, such as building, construction, trade, transport, accommodation, food and beverages and others as complementary sectors to the tourism industry.

Mróz (2021) has recently investigated the impact of the pandemic on religious tourism and pilgrimage centers in selected shrines in Europe. Result showed a 90–95% reduction in tourism and pilgrimage movement during the first six months of the outbreak, and the effect was most significant on elderly pilgrims (aged > 60 years). Alternatively, pilgrims in distinct shrines were encouraged to participate in online services and to pursue virtual pilgrimages. Therefore, the intensive and rapid movements of the countries of the world to deal with the crisis, to combat and besiege the pandemic, and for economic and social recovery and stopping the bleeding of losses, and information and communication technology (ICT) had an effective and influential role during the pandemic and so far in the successive stages of recovery, which is what this study attempts to monitor.

2.2. Role of ICT during COVID-19 Crisis

UN Habitat (2020) points out that information and communication technology ICT has proven to be one of the most urgent and important tools to help countries combat the COVID-19 pandemic and to help them stop or slow the spread of the disease, and also for governments to continue to provide basic public services during the crisis, especially with restrictions on the movement of people and the work of institutions and the rules of physical distancing. Technology has had and continues to have a strong impact in managing the daily lives of citizens and helped them to access basic and health services and information, and to communicate with the relevant authorities on an ongoing basis.

According to Zaman et al. (2020) information and communications technology ICT has played and continues to play an effective role in helping the world to enhance public awareness of the pandemic in various stages, including "prevention, surveillance, diagnosis and treatment, and in coordinating the response to the pandemic between countries of the world" and between regions in the same country, where information and communications technology around the world has introduced a number of initiatives such as: developing public and health websites and portals to provide awareness information and updated statistical reports on the virus, including numbers, interactive maps, emergency contact information or hotline numbers. WHO (World Health Organization 2021) adds that the international organization and ministries of health in various countries of the world have also cooperated by entering into partnerships with various social media (such as Facebook, Instagram and WhatsApp . . . etc.) to provide Health information and alert messages, a number of countries have also used technologies such as "robots and drones to support medical staff, thermal imaging and temperature detection programs, applications and smart helmets to detect potential virus carriers". In that context, Singh et al. (2021) summarize the role of ICT in combating the COVID-19 pandemic in the axes (applications, portals and websites, and robots and assistive devices), which intervened in a number of stages: "(1) screening (2) testing (3) Contact Tracing (4) Propagation Analysis and Forecasting (5) Sterilization (6) closure, quarantine and self-isolation".

2.3. The Effectiveness of ICT in Tourism during COVID-19 Crises

Werthner et al. (2015) demonstrate that since the emergence of the Internet and its arrival in daily life, business and institutions, information and communication technology (ICT) has turned into one of the most important auxiliary factors in the travel and tourism industry, especially in our world today, as it has become an integral part of the fabric of the industry, and in all stages of travel and basic and subsidiary tourism operations as well. According to Neidhardt and Werthner (2018) e-Tourism includes "analyzing, designing, implementing and implementing solutions by means of information technology and e-commerce in the travel and tourism industry, and analyzing its impact on the market and economy of this industry". Gössling (2020) adds that from the perspective of tourists, information and communication technology (ICT) offers new and diverse opportunities, as it provides them with wide-choice comparisons of the level of services and the cost of tourism services, assistance in determining the most appropriate, for example, in hotel accommodation, the most widespread tourist and hotel services, as well as the most successful and attractive restaurants and rich tourist evaluations, in brief, technology and social platforms are shaping the cultures of tourists and affecting their preferences, desires, and thus their tourism decisions.

With the beginning of the spread of the COVID-19 pandemic, there were early and strong signs of a trend towards unlimited use of information and communication technology and reliance on it to manage and address daily problems and difficulties that began to arise due to the new conditions of the pandemic, both in human life in general and in tourism in particular, which is what appeared in technology solutions in travel, leisure and tourism business (UNWTO 2020). During the pandemic, the effectiveness of information and communication technology ICT appeared in many aspects related to the travel and tourism industry such as (electronic reservations, examination of travelers and tourists and tracking cases, entertainment during quarantine periods, including virtual reality tours, sterilization and disinfection technology for facilities and tourist and hotel sites, coordination of travel operations between countries. and others a lot), Moreover many hotels, resorts using promotion through social networking ensuring their abilities in safety during the pandemic, also many hotels and tourism establishments have resorted to live broadcasting technology to lure their customers back through hotel kitchen cooking parties, hotel room tours, live show weddings, and open discussions with the public about their services (Lau 2020). On the other hand, Gretzel et al. (2020) state that this great technological expansion raised a number of concerns for the digital divide between societies, issues of information privacy, misinformation, and the ethics of using technology, all of which will certainly affect the era of electronic tourism.

Xiang et al. (2019) report that the deep and complex impact of the COVID-19 pandemic and the widespread use of information and communication technology in general and in tourism in particular, requires us to understand now that "e-tourism" has two basic aspects: it is a rapidly changing and developing reality with unlimited dimensions, and it represents great challenges and opportunities at the same time. Which means that we, as researchers, in the field of tourism scientific research, must focus more on the issues of e-tourism and the role of technology in the future of tourism.

2.4. Managing Religious Tourism in the Light of COVID-19

Yasin et al. (2020) define religious tourism as travel for experiences of a religious nature such as: religious rites, Hajj and Umrah, missionary travel, religious meetings and conferences, religious retreats or camps, and visiting religious attractions. Zamani-Farahani and Eid (2016) state that religious tourism is one of the oldest forms of tourism, as religious tourism offers many social, economic and spiritual benefits, despite the importance of religious tourism, it is still limited, which needs more research and studies. Ayorekire et al. (2020) add that the relationship between tourism and religion is an eternal one. The motives of religious tourism are a combination of heavenly teachings and cultural and spiritual values that motivate people to travel to holy and religious places, according to the

international tourism statistics in 2014, 300 to 330 million tourists visit the world's religious and sacred sites every year (UNWTO 2014).

Husain (2020) mentions that the spread of the COVID-19 pandemic has had a major negative impact on global tourism, including the impact on social and religious life and various business fields. Pavlović (2020) adds that the crisis particularly affected religious tourism in all its forms, making it very difficult for religious tourists and pilgrims of all faiths to travel to the holy sites. Rather, the negative impact also included their ability to perform daily religious and faith rites, all because of the dominance of the concept of "social distancing"; there has become a need to study the reactions and responses of religious communities to the restrictions of social distancing while performing religious rites.

For example: Fasting the blessed month of Ramadan for Muslims represents a basic religious ritual, as nearly two million Muslims travel to the Kingdom of Saudi Arabia to perform Umrah in this month in particular, other than traveling for Umrah throughout the year. However, due to the COVID-19 epidemic, Umrah and visiting the holy sites, including the Grand Mosque in Makkah and the Prophet's Mosque in Madinah, were stopped, so the two cities were subjected to a complete curfew during most of the year 2020 (Yasin et al. 2020). By the end of 2019, the number of Muslims performing Umrah reached about 19 million, in addition to 2.6 million pilgrims who performed the Hajj. The total number of visitors to the Kingdom of Saudi Arabia for religious tourism reached about 21.6 million for both Hajj and Umrah (statista.com 2019). Hajj and Umrah are among the most important and largest mass gatherings of Muslims, and with the outbreak of COVID-19, the challenge that facing the Ministry of Hajj and Umrah in the Kingdom of Saudi Arabia has become, how can Islamic religious rites be performed without turning into a great spreader of the pandemic, especially since it has a divine duty towards protecting Muslims while they perform religious rites, whether during Hajj or Umrah. So, the Ministry began to close completely and all mosques in the Kingdom for a stage of Time with following up on the situation of the pandemic within the Saudi Kingdom in general, then it began to put in place health and safety measures and procedures that are proven through international health and safety standards to accommodate large gatherings. Through which she was able to employ information and communication technology applications to organize the Hajj in the years 2020 and 2021 and to gradually return to the rituals of Umrah while controlling the outbreak of the pandemic (Raj and Bozonelos 2020).

In that context, the millions of Muslim pilgrims who gather in Mecca and Medina every year, the thousands of Christians around the Pope or the Hindu crowds on the Ganges are global examples of huge crowds traveling for spiritual and religious reasons. Therefore, the Internet and the widespread use of smartphones and social media applications have today become tools to facilitate communication and management of large-scale religious events (Narbona and Arasa 2016).

Hannam et al. (2014) explain that ICT, mobile technology and Wi-Fi have become an integral part of the "new mobility paradigm" that uses applications and technologies to facilitate and enrich the experience of travelers and tourists, by formulating new flexible relationships between factors: (people, time and space). For example, it has become possible through technology to collectively plan tour groups, coordinate schedules and visits, follow the physical movements of crowds (geo-location), and learn about their demands, needs and behaviors, all by staying connected at all times. Campbell and Kwak (2011) demonstrate that the use of smart phone applications in the tourist movement in general and the huge religious ones in particular can be divided into three areas: "logistical (such as organizing the trip, advance preparations, schedules, etc.); relational (consultation, exchange of photos, opinions, criticism etc.) and informative (knowledge of the area, nearby destinations, specials etc.)".

Intuitively, religious tourism in Saudi Arabia has the same characteristics of that in other regions. The interaction between different components of ICT should be meticulously assessed. Given the widespread use of smartphones, the interaction between usability and effectiveness is especially relevant in the mobile app environment (Overdijkink et al.

2018). By modulating the factors that influence app effectiveness in facilitating Umrah practices, national authorities would ensure that pilgrims would be greatly satisfied with their experience while crowds are effectively managed. Application usability is the most relevant parameter that can be modulated to change the levels of effectiveness. However, little is known about such an interaction for Eatmarna application. Nonetheless, this interaction has not been assessed so far. We hypothesized that Eatmarna usability would positively influence app effectiveness in improving different domains of Umrah experience (Hypothesis 1, H1); this is also applicable to the three constructs of usability, including ease of use (H1a), system information arrangement (H1b) and app usefulness (H1c). Furthermore, we hypothesized that the three usability constructs had positive effects on the three measures of effectiveness as illustrated in Figure 1.
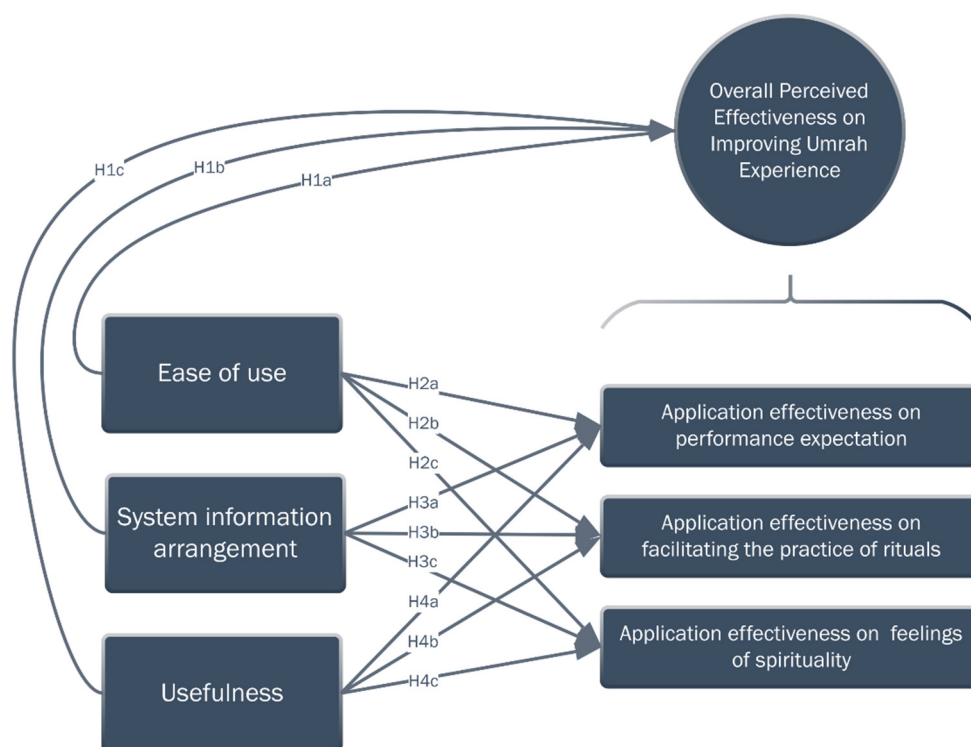
Figure 1. The hypothesized research model.

3. Research Methods

3.1. Sample and Procedures

The study sample comprised pilgrims at Makkah who had sought to perform Umrah during the period between April and August 2021. A structured questionnaire was developed by the study team. Survey items were compiled from previous validated studies (Siyal et al. 2021; Zhou et al. 2019) such that they express participants' perceptions regarding app usability and effectiveness in improving Umrah practice. These items, along with their responses, were uploaded on Google Forms, and a survey link was created and distributed by the coordinators of dedicated Umrah service providers across different areas in the Kingdom. Pilgrims were voluntarily approached (a convenient sampling method), and they provided a consent prior to participation. Data collection was performed in the designated timeframe. The collected data was used for the purpose of the current research, and they were kept confidential.

3.2. Eatmarna App

As mentioned above, the Eatmarna app was launched to enable pilgrims to request the issuance of permits to perform Umrah and entering the Grand Mosque in Makkah and the Prophet's Mosque in Madina. These visits are organized and approved by the Ministry

of Hajj and Umrah to ensure a good spiritual environment while maintaining adequate health precautionary measures. The permits are allowed on the basis of ensuring the safety because the app system is integrated with the "Tawakkalna" application, which verify the infection status of the applicant within the Kingdom.

From the app main menu, pilgrims would be able to request the permits to perform Umrah, pray in the Grand Mosque, perform Tawaf, pray in the Noble Rawdah (for men or women) and Prophet visit (Figure 2A). To book Umrah, for example, the pilgrim selects the date of Umrah, specifies the number and identity of companions (if any), and selects an assembly point (gate) at which the transportation service will arrive at (Figure 2B,C). The pilgrim has to confirm that he/she has carefully read the instructions of visiting the religious destinations as well as the instructions of Umrah program transfer center. Finally, a permit request is submitted, and the pilgrim can track the request status via relevant screens (Figure 2D). The pilgrim can also pay for the transportation service via the app.
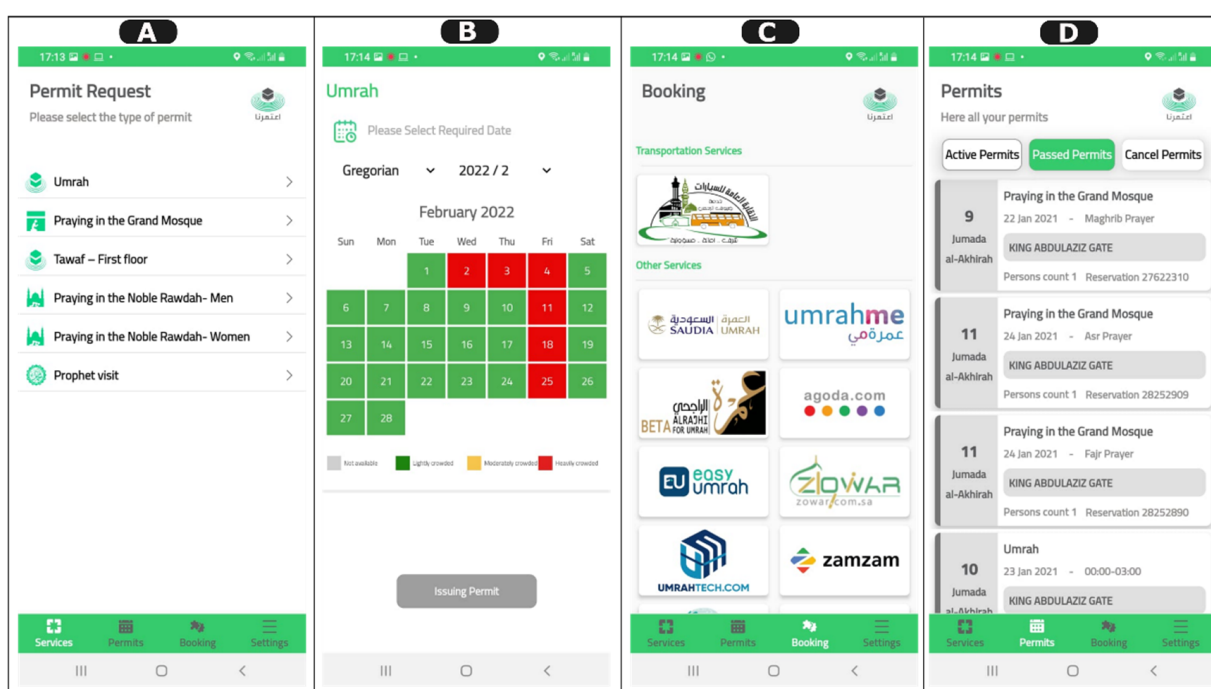
Figure 2. Eatmarna application interfaces for permit requests (**A**), date selection (**B**), booking of additional requests (**C**) and tracking the permit statuses (**D**).

3.3. Measures

In general, the questionnaire consisted of three main domains: demographic characteristics of pilgrims, app usability, and app effectiveness in improving pilgrimage experience amid the COVID-19 pandemic. Firstly, demographic characteristics included participants' age, gender, educational level, employment status and income level. Secondly, app usability comprised of three subdomains: (1) ease of use (five items), including perceptions about whether the app was easy to use, easy to learn how to use the app, easy to display the interface, and the amount of time involved in using the app; (2) system information arrangement (five items), including whether the app could provide and acknowledge information updates, the speed of recovery after performing a mistake in the app, consistent navigation across the menus, and the existence of expected functions and capabilities; (3) usefulness (five items), including the usefulness of the app to book Umrah and prayer trips, access improvement to Umrah auxiliary services, easy access to Umrah and prayer services in the Prophet's Mosque, and being confident that the shared information on the app would be received by the system. A five-point Likert grade system was used to express participants' responses (from strongly disagree to strongly agree).

Thirdly, application effectiveness, defined as the capacity of the application to meet users' demands to complete a specific goal (iso.org 2018), was assessed using three items. These included an item to assess performance expectancy (the application is effective in helping pilgrims in the availability of a lot of services such as accommodation airlines reservation and Zamzam water), an item to assess the effectiveness in the practice of rituals (the application is effective in helping pilgrims to simplify the rituals of the tawaf and the say) and an item to assess the effectiveness in improving the feelings of spirituality (the application is effective in helping pilgrims in improving the feelings). The responses of the effectiveness construct were collected on a five-point Likert scale (from not effective to extremely effective).

3.4. Statistical Analysis

Statistical analysis was carried out using R software (RStudio 4.1.1). Variables were presented using descriptive statistics, including frequencies and percentages for categorical data and means and standard deviation for continuous data. The convergence, discriminant validity and convergence of the survey domains were assessed by conducting a confirmatory factor analysis, and the correlations between these domains were investigated using the Pearson's correlation coefficients. The inter-related correlations between latent variables were explored by a structural equation modelling method (SEM), and the model fit was assessed using the relevant indices, including the comparative fit index (CFI), Tucker-Lewis's index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Multiple linear regression models were constructed to assess the independent associations between the effectiveness items (each item was entered as a dependent variable in a separate model) and app usability domains (as independent variables). The analysis was adjusted for demographic variables, including gender, age, income employment status and education levels. The outcomes of the regression models were presented as unstandardized coefficients (β) and 95% confidence intervals (95% CIs). A p of <0.05 was considered statistically significant.

4. Results

4.1. Demographic Characteristics of the Participants

The responses of 308 participants were analyzed in the present study. The majority of the respondents were females (77.6%), and they aged 18–30 years (82.1%). More than half of the respondents had obtained a Bachelor's degree (74.0%) and were working in the education sector (53.9%). Approximately one-third of the respondents had an income ranged between 5000–10,000 SAR (34.1%) and 1000–5000 SAR (26.6%, Table 1).

Table 1. Demographic characteristics of the participants (n = 308).

Parameter	Category	Frequency	Percentage
Age	18–30	253	82.1
	31–50	45	14.6
	51–65	10	3.2
Gender	Male	69	22.4
	Female	239	77.6
Education	No degree	7	2.3
	Bachelor's degree	228	74.0
	Master's degree	50	16.2
	Doctoral degree	22	7.1

Table 1. *Cont.*

Parameter	Category	Frequency	Percentage
Employment	Student	3	1.0
	Education sector	166	53.9
	Academic sector	31	10.1
	Commercial sector	24	7.8
	Health sector	14	4.5
	Security sector	13	4.2
	Other	51	16.6
Income (SAR)	<1000	73	23.7
	1000–5000	82	26.6
	5000–10,000	105	34.1
	10,000–50,000	43	14.0

SAR: Saudi Riyals.

4.2. Confirmatory Factor Analysis

In the applied SEM approach, a maximum likelihood (ML) method was used as a discrepancy method for the numerical variables, since the ML method produce consistent outcomes and symptomatic efficiency results, particularly in studies with large sample sizes (Bollen 1989). The significant loadings of observable indicators to their factors were checked, and the indicators with cross-loadings were omitted from the SEM model. As such, we excluded two items from the ease-of-use domain, one item from the system information arrangement, and one item from the usefulness domain.

In general, the confirmatory factor analysis model showed a good fit to the data (χ^2 = 287.79, degree of freedom [df] = 123, $p < 0.0001$, CFI = 0.956, TLI = 0.948, SRMR = 0.069, RMSEA = 0.067). The internal consistency of questionnaire items ranged between 0.90 and 0.91 as indicated by the composite reliability and between 0.90 and 0.91 as revealed by the Cronbach's alpha test (Table 2). Moreover, the items were significantly loaded into the respective domain. An average variance extracted (AVE) was also computed, and the values were above the standard value of ≥ 0.50 (Fornell and Larcker 1981).

Table 2. Results of the confirmatory factor analysis of different domains.

Constructs and Factors	SFL	AVE	CR	Cα
Ease of use		0.75	0.90	0.91
The app was easy to use	0.97			
It was easy for me to learn to use the app	0.93			
Easy to display application interface	0.66			
System information arrangement		0.70	0.90	0.90
Whenever I made a mistake using the app, I could recover easily and quickly	0.92			
The app adequately acknowledged and provided information update	0.78			
The interface of the application allowed me to use all the functions (such as services for booking accommodation, ticketing, transportation, obtaining permits and viewing information) that the application provides	0.83			
This app has all the functions and capabilities I expect it to have	0.82			
Usefulness		0.73	0.91	0.91
The application was useful for booking the Umrah and prayer trip in the Prophet's Mosque during covid 19 pandemic	0.85			
The application improved my access to the services accompanying my Umrah trip during covid pandemic	0.86			
The application made it easy for me to obtain Umrah and prayer services in the Prophet's Mosque	0.94			
I felt confident that any information I sent to my provider using the app would be received	0.75			

Table 2. *Cont.*

Constructs and Factors	SFL	AVE	CR	Cα
Umrah experience		0.75	0.90	0.90
The application is effective in helping pilgrims in the availability of a lot of services such as accommodation airlines reservation and Zamzam water	0.90			
The application is effective in helping pilgrims in simplifying the rituals of the tawaf and the say	0.90			
The application is effective in helping pilgrims in improving the feelings	0.80			

AVE: Average variance extracted; CR: Composite reliability; Cα: Cronbach's Alpha; SFL: Standardized factor loading.

To further explore the discriminant validity, we computed the square root of AVE and constructed a correlation matrix between different constructs. Results indicated that the square values of AVE were greater than the correlation coefficients, which corroborates the statistical uniqueness of constructs (Table 3).

Table 3. A correlation matrix of different constructs.

Variables	1	2	3	4
1. Ease of use	1			
2. System information arrangement	0.71 **	1		
3. Usefulness	0.71 **	0.74 **	1	
4. Umrah experience	0.64 **	0.70 **	0.74 **	1
AVE	0.75	0.70	0.73	0.75
Square root of AVE	0.86	0.84	0.85	0.87
Mean	3.52	3.50	3.71	3.66
SD	1.15	1.12	1.08	1.11

** $p < 0.001$.

*4.3. Analysis of Participants' Responses to Eatmarna Application Usability*

Focusing on the responses regarding the ease-of-use, more than half of participants agreed or strongly agreed that the application had an easy-to-display interface (56.5%) and it was easy to learn how to use the application (54.2%). Regarding the system information arrangement construct, the majority of respondents agreed or strongly agreed that the application has adequately provided information updates during the Umrah (58.1%). Conversely, 23.1% of the participants disagreed or strongly disagreed that the interface of the application facilitated the use of all the functions. The most frequently agreed items in the usefulness domain were that the participants felt confident about the receipt of sent information by the provider (64.6%) and the perceived improvement in the access to Umrah services during the pandemic (63.0%, Figure 3).
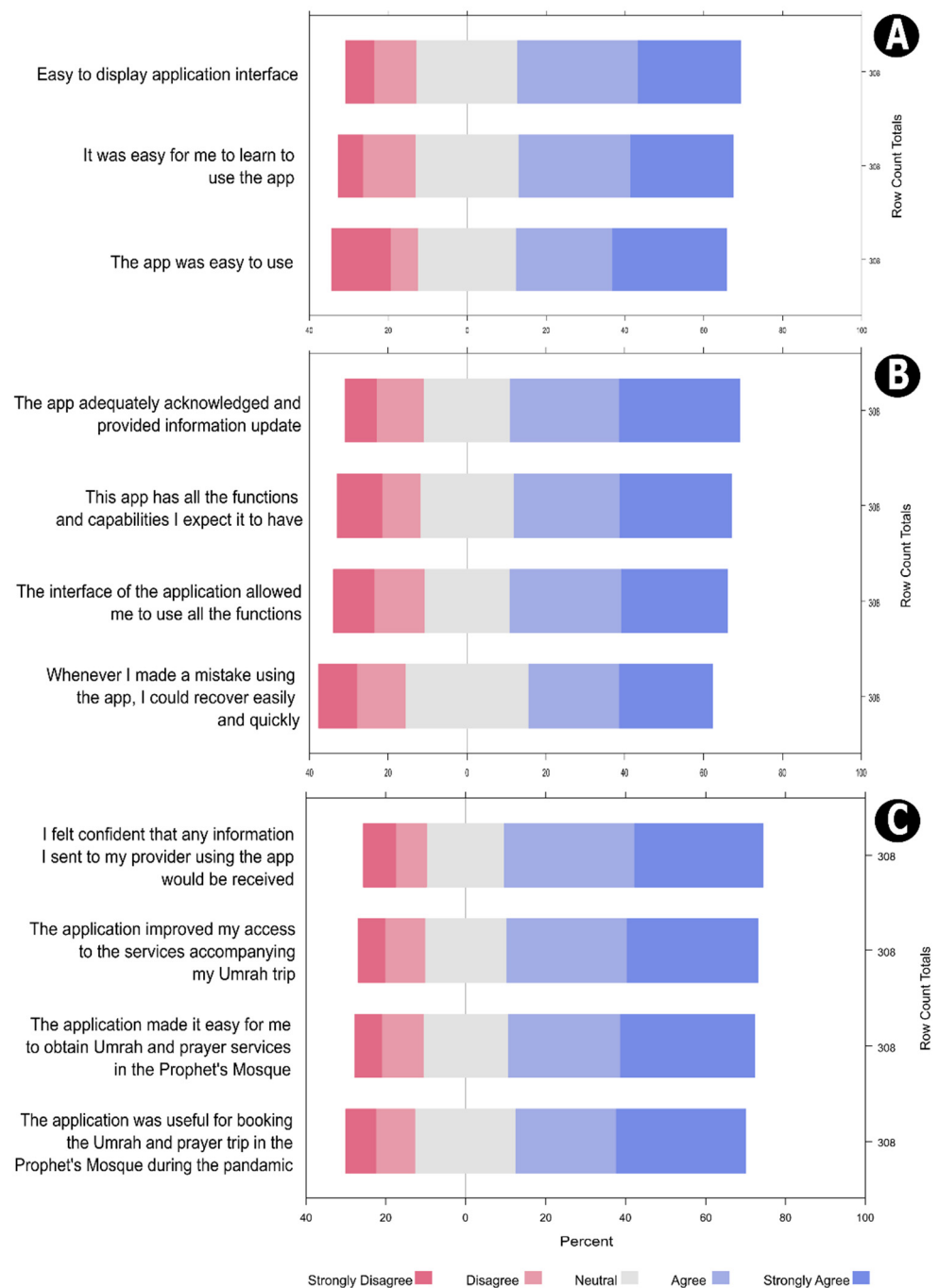
Figure 3. Participants responses regarding different Eatmarna application usability domains, including ease of use (**A**), system information arrangement (**B**) and usefulness (**C**).

4.4. Results of the Hypothesized Main Path

An increased effectiveness of the app on Umrah experience was positively and independently associated with higher levels of perceived system information arrangement (β = 0.27, 95% CI, 0.09 to 0.46, *p* = 0.004) and an increased level of the perceived application usefulness (β = 0.52, 95% CI, 0.34 to 0.69, *p* < 0.0001) irrespective of participants' demographic variables (Figure 4). The ease-of-use domain was not a significant predictor of the effectiveness.
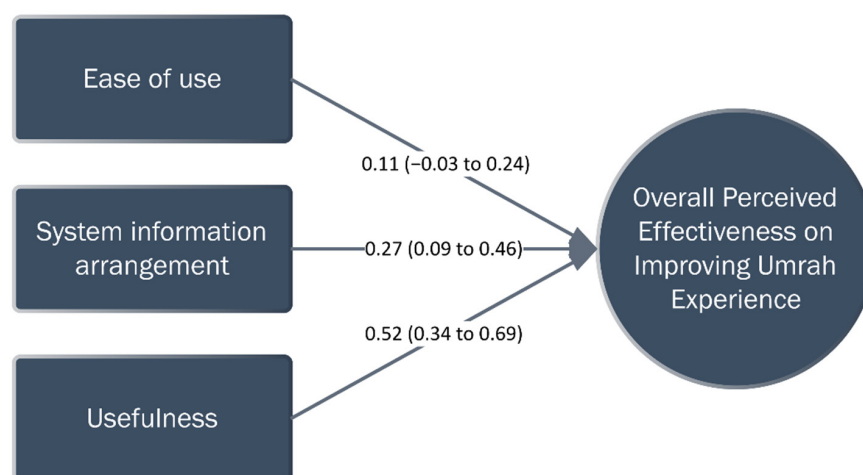
Figure 4. The impact of Eatmarna application usability on the overall effectiveness on improving Umrah experience.

4.5. The Effects of Eatmarna Application Usability on Different Domains of Effectiveness in Improving Umrah Experience

The outcomes of regression models which were used to assess the impact of Eatmarna usability on performance expectancy, facilitating the practice of rituals and the feelings of spirituality are demonstrated in Table 4. In general, independent variables explained more than 50% of the total variation in the dependent variables as indicated by the adjusted R^2 statistics. System information arrangement and application usefulness were significant antecedent predictors of greater application effectiveness on Umrah performance expectancy (β = 0.31, 95% CI, 0.16 to 0.46, *p* < 0.0001 and β = 0.46, 95% CI, 0.31 to 0.61, *p* < 0.0001, respectively) and the feelings of spirituality (β = 0.35, 95% CI, 0.21 to 0.49, *p* < 0.0001 and β = 0.42, 95% CI, 0.27 to 0.56), *p* < 0.0001, respectively). However, the ease-of-use did not influence such domains of Umrah experience. Nevertheless, an improved practice of rituals was independently associated with the three constructs of usability, including the ease-of-use (β = 0.19, 95% CI, 0.06 to 0.31), *p* = 0.004), system information arrangement (β = 0.20, 95% CI, 0.06 to 0.34), *p* = 0.004), and the usefulness (β = 0.44, 95% CI, 0.30 to 0.58), *p* < 0.0001).

Table 4. The results of multiple linear regression analysis to assess the impact of three smartphone usability domains on improving Umrah experience.

Predictor	β (95% CI)	t-Value	*p*	Result
Dependent Variable: Performance expectancy; Model: F(8,293) = 39.33, R^2 = 0.518, Adjusted R^2 = 0.505				
Ease-of-use	0.12 (−0.01 to 0.26)	1.77	0.079	Not supported
System information arrangement	0.31 (0.16 to 0.46)	4.15	<0.0001	Supported
Usefulness	0.46 (0.31 to 0.61)	5.97	<0.0001	Supported
Dependent Variable: Facilitating the practice of rituals; Model: F(8,293) = 41.14, R^2 = 0.529, Adjusted R^2 = 0.517				
Ease-of-use	0.19 (0.06 to 0.31)	2.94	0.004	Supported
System information arrangement	0.20 (0.06 to 0.34)	2.90	0.004	Supported
Usefulness	0.44 (0.30 to 0.58)	6.22	<0.0001	Supported
Dependent Variable: Feelings of spirituality; Model: F(8,293) = 39.67, R^2 = 0.520, Adjusted R^2 = 0.507				
Ease-of-use	0.09 (−0.04 to 0.21)	1.30	0.196	Not supported
System information arrangement	0.35 (0.21 to 0.49)	4.85	<0.0001	Supported
Usefulness	0.42 (0.27 to 0.56)	5.67	<0.0001	Supported

All the analyses were adjusted for demographic variables, including participants' gender, age, income and education levels.

5. Discussion

This study was carried out with the intention of providing deep insights into the main usability factors that could influence Eatmarna app users' perceptions regarding their personal experience with Umrah during the COVID-19 pandemic. Therefore, a SEM model was implemented to ascertain the validity of different constructs and to account for the potential effects of confounding variables on causal relationships. In the present study, we focused on pilgrims' experience with Umrah as a primary outcome after mandating the use of Eatmarna application to acquire permissions in order to perform several activities during Umrah. We found that the perceived application effectiveness on Umrah experience was independently associated with two usability domains, including system information arrangement and the perceived usefulness of the application. Both the usability constructs were also positively associated with all subdomains of the perceived effectiveness, including performance expectation, facilitating the practice of rituals, and feelings of spirituality.

The current research has adopted the three main domains of usability as recommended by the formal ISO definitions (iso.org 2018). Findings retrieved from validated questionnaires of mobile application usability help identify the target domain reliably to improve the quality of services provided by the software. The average scores of usability subdomains ranged between 3.5 and 3.7, indicating that the perceived usability was generally acceptable. Since application use is mandatory for pilgrims, usability assessment is a critical aspect of quality control plans development. Application usefulness had the greatest usability score, which reflects the importance of application use in Umrah. Moreover, the independent association between the application usefulness and the perceived effectiveness to perform and facilitate and practice of rituals would support the efforts made by national authorities to develop and enhance the services provided by Eatmarna application.

The findings of the current study supported also the app effectiveness to help pilgrims perform Umrah rituals without compromising their spiritual feelings and practice. Application effectiveness was positively influenced by two usability domains, and this reflects a positive impact on the patterns of practice to control the spread of infection in a highly contagious environment. Our study adds to the existing studies which investigated religious apps for Muslims. Those earlier, pre-pandemic studies were primarily designed for the purpose of providing educational, awareness, and reference backgrounds for Muslims, whereas other apps provide a basic teaching platform via language translation, recorded lectures and recitations (Campbell et al. 2014). Apps oriented around facilitating religious practices have been designated for other religions, with no available apps for Muslims to date. More specifically, ritual apps usually provide users with the required guidance, instructions or visual props that replicate the actual religious artifacts for the subsequent use in recognized practices (Wagner 2013). Within the context of the COVID-19 pandemic, multiple Churches have restricted or suspended their services (Sulkowski and Ignatowski 2020). The organization of religious practices has changed considerably while maintaining the contact with believers in several ways (Sulkowski and Ignatowski 2020). To the best of our knowledge, based on earlier studies, religious practice organization among Muslims has not been officially organized via a smartphone-based method before the pandemic. The current study confirms the uniqueness of exploiting digital technology in controlling and organizing the religious practices of Umrah. National authorities should support the app effectiveness via tailoring additional services and exploiting pilgrims' engagement to connect with them whenever possible.

6. Strengths and Limitations of the Study and Opportunities for Further Research

To the best of our knowledge, the present study was the first to investigate the role of ICT in Umrah experience via an application-based approach. Additionally, the current study has taken a step into investigating the effectiveness of the application, a matter which paves the way for additional studies that assess pilgrims' satisfaction and other behavioral domains that express personal spiritual experience. Importantly, the SEM and linear regression analyses were adjusted for the potential demographic confounders, which might

support the independent associations among distinct variables. Similar studies would also be required to follow-up pilgrims regarding their perceptions after the implementation of technical modifications in the app.

Despite these strength points, the current study has some limitations. First, there might be additional confounding variables which have not accounted for by, such as participants" nationality and ethnic backgrounds; these variables might be considered in future research. Second, the self-reported responses of pilgrims remain subject to recall bias; therefore, future studies based on objective tests of usability, effectiveness and satisfaction with the app are required. Third, the majority of participants belonged to the middle-age group (<30 years) and females predominated males; thus, the distribution of such demographic groups was not generally representative of the whole population. At the time of the study conduct, the national authorities did not give permits to the elderly population to reduce the risk of grasping the COVID-19 infection in crowded areas, and this may explain the demographic shift towards middle-aged participants in our study. Importantly, future studies might include older pilgrims after re-opening. This is crucial giving that the elderly population is the main group who perform religious rituals, and they may face difficulties while using new technological platforms. Therefore, the assessment of their satisfaction might be a matter of further investigation.

7. Conclusions and Implications

Within the drastic measures provided by the national authorities in Saudi Arabia, the Ministry of Hajj and Umrah has launched Eatmarna application to organize and facilitate the practice of Umrah rituals. Application usability was highly acknowledged by the pilgrims as indicated by the agreement scores which ranged between 3.5 and 3.7 (on a five-point Likert scale). Two domains of application usability, namely system information arrangement and application usefulness, were independently associated with the application capacity to perform well during Umrah, facilitating the practice of rituals and supporting the feelings of spirituality.

Given the approved effectiveness and usability, the services of the Eatmarna application can be further integrated into other touristic and hotel-based services within the Kingdom. Additionally, passengers on international airlines who come from Islamic countries can be offered to acquire permits to perform Umrah and also obtain permits for other services, such as visiting the Prophet's Mosque and praying in the Grand Mosque. The present analysis would also provide invaluable insights into the national efforts aiming at alleviating the challenges associated with Umrah and Hajj, particularly in the organizational aspects relating to preventing the spread of infection. Whenever applicable, the national authorities would be able to assign quotas for pilgrims based on their permits and schedules while maintaining social distancing and other infection control measures. The application can also be utilized as a tracking and monitoring system; hence, it would facilitate the interaction between pilgrims and the authorities (Mohandes 2011). In essence, the authorities can propose voluntary postponement of Umrah visits and religious practices for elderly individuals and those with chronic diseases during the peaks of outbreak waves until virus spread is under control. Another important consideration is to add multiple languages to the app interface. This is because the app is currently available in English and Arabic languages, and it is necessary to meet the cultural and biological diversity of the Muslim population worldwide.

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