Mobile Travel Apps Engagement: Measuring Tourists' Perception

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Abstract—Mobile travel apps have revolutionised the way people book flights, hotels, and excursions, as well as how travel firms contact clients. This study examines tourists' perception of mobile travel apps engagement in Pakistan. A field intercept survey was distributed to 500 respondents approached at tourism sites with a high flow of tourists in Northern Pakistan. Data were analyzed using exploratory factor analysis (EFA) via the Statistical Package for Social Sciences (SPSS) version 23 and confirmatory factor analysis (CFA) the Partial Least Square-Structural Equation Modeling (PLS-SEM) approach using Smart-PLS 3.0 software. The EFA analysis by using the principal component method of extraction and the varimax method of rotation yielded five factors. Respondents heavily emphasize item TS2 "I am very satisfied with the mobile travel apps" of tourist satisfaction factor. Likewise, this item emerged as the most dominant in the CFA analysis, followed by item TS3 "I am happy with the mobile travel apps", and item TS4 "I am satisfied with the way mobile travel app organizes the trip". The findings are vital to advancing extant mobile travel apps engagement research, while also guiding their developers to better design mobile travel apps to boost tourists' trust and satisfaction. Direction for further research is furnished.

Keywords—mobile travel apps, tourist satisfaction, service quality, system quality, information quality, trust, green behaviour

1 Introduction

Mobile travel apps have changed the way people travel and how travel companies reach their customers and their effect is irrefutable amongst millennials, voyagers, or experimenters [1]. Retailers rely on mobile apps to interact with customers and digitalize shopping journeys [2]. As an app helps, one is to practice a wireless digital environment through a user interface by touching on-screen or using buttons. Travel agencies are trying to create their own apps for mobile phones to gain a competitive advantage and improve tourism revenues through increased productivity [3]. Mobile travel apps are referred to the mobile applications that are mainly targeted at travellers and those used in a conventional travel context, e.g. Airbnb, Trip Advisor, Sky

scanner [4]. Such applications facilitate travellers searching for accommodation, planning tour activities, and flights and order to make reservations at any time [4–5].

Previous studies of mobile apps have only addressed issues related to users' intentions and initial adoption of a system [6–9], whereas the tourism sector was overlooked and unexplored [1]. Moreover, limited studies have been done in the area of mobile travel apps [4, 10]. Past scholars such as Izzah et al. [11] researched an android-based city tour app, Ali et al. [12] studied mobile apps for digitisation facilities management, and Ayyal Awwad [13] examined mobile location services. Indeed, Scopus database evidence that De Reuver et al. [14], Fang et al. [15], Ho et al. [16], Tian et al. [17], and Wu and Lee [18], were the leading scholars on mobile travel apps. However, none of this research focuses on mobile travel apps engagement in Pakistan. Thus, this research sought to answer the following research questions:

RQ1 What are tourists' perceptions of mobile travel apps engagement in Pakistan?

The findings are vital to advancing extant mobile travel apps engagement research, while also guiding their developers to better design mobile travel apps to boost tourists' trust and satisfaction.

2 Literature review

2.1 Past research on mobile travel apps

Research by Fang et al. [15] and gained the highest number of citations in the Scopus database (see Table 1). The study investigates how and to what degree two kinds of app qualities (design and performance) boost travel app engagement in a genuine travel app development project. The research findings show that app design characteristics (such as user interface attractiveness and privacy/security) and three app performance factors (such as compatibility, simplicity of use, and relative benefits) are major drivers of users' behavioural engagement with mobile travel applications. Plus, the interactions are also serially mediated by psychological engagement and three forms of benefit perception (hedonic, utilitarian, and social).

Table 1. Scopus's top 5 mobile travel apps publications in the Scopus database

Authors	Document Title	Publication Name (Source)	Times Cited
"Fang, J., Zhao, Z., Wen, C., and Wang, R. (2017)"	"Design and Performance Attributes Driving Mobile Travel Application Engagement".	"International Journal of Information Management"	132
"Wu, R., and Lee, Jh. (2017)"	"The Use Intention of Mobile Travel Apps by Korea-Visiting Chinese Tourists".	"Journal of Distribution Science"	15
"De Reuver, M., Haaker, T., Nikayin, F., and Kosman, R. (2015)"	"Designing Viable Multi-Sided Data Platforms: The Case of Context-Aware Mobile Travel Applications".	"Lecture Notes in Computer Science"	3
"Ho, RC., Amin, M., Ryu, K., and Ali, F. (2021)"	"Integrative Model for the Adoption of Tour Itineraries from Smart Travel Apps".	"Journal of Hospitality and Tourism Technology"	2
"Tian, Z., Shi, Z., and Cheng, Q. (2021)"	"Examining the Antecedents and Consequences of Mobile Travel App Engagement".	"PLoS One"	1

In addition, Wu and Lee [18] received the second-highest citations. The research examines Chinese visitors' usage of mobile travel apps in Korea. The findings show that the quality of information impacts Chinese visitors' satisfaction and performance expectations. The better the information quality, the greater the satisfaction and performance expectation. In addition, social influence significantly impacted user intention, therefore, mobile travel app owners must consider the impact of media and friends' recommendations, and optimise advertising.

Furthermore, Scopus database evidence that De Reuver et al. [14] received a small number of citations. The article examines who should finance multi-sided data platforms that allow mobile context-aware travel apps and assesses end-user approval of revenue models. According to the findings, consumers who are prepared to share data with app developers are more likely to use data-driven mobile travel applications but are less likely to pay for them. This outcome explains why premium pricing and data monetization techniques may coexist.

Likewise, Ho et al. [16] also received small citations. The study investigates the effects of smart tour itineraries on travellers and explains what drives their continual use of them. The findings revealed that there is a substantial relationship between all UTAUT parameters except for the facilitating condition. Travellers' hedonic and utilitarian values in personal consumption greatly inspire them to employ smart tour itineraries.

2.2 Tourist satisfaction and perceived trust

Satisfaction is acknowledged as a robust element of continued usage of which mobile users might not stay with app services if they are dissatisfied [19–20]. Grounded on this, user satisfaction is the result of the complete quality provided by the service provider in the perspective of mobile apps [21]. Perceived trust refers to the person's instinct to believe in the truthfulness and conviction of other persons with whom they

are not familiar or in control [22–24]. Trust is an important predictor of satisfaction and satisfaction is an important factor of trust [25]. Preceding research avowed that satisfaction ultimately leads to trust [26].

2.3 Service quality, system quality, and information quality

Service quality refers to "the quality of the support which is received by the users from the IS department and IT support systems, such as responsiveness, dependability, conciseness, technical capability, and compassion of the staff [27–28]. Preceding literature has established a significant relationship between service quality and customer satisfaction [29]. Similarly, service quality has a positive direct and indirect effect on satisfaction and behaviour intentions [30–31]. System quality depends upon the elasticity, consistency, accuracy, online response time, and easiness to use of an information system [32]. System quality has positively influenced satisfaction [33]. Another study concluded in their study that there exists a positive relationship between system quality and satisfaction [34].

Information quality is comprised of various factors such as response time, sufficiency, and accuracy while striving to meet the requirements of the users [27–28, 35]. It is one of the most important constituents that significantly influence the behaviour of the users towards the use of technology. The satisfaction of tourists regarding the information system can evaluate the mechanism and quality of the system by analyzing the degree to which an information system tends to meet their information needs.

Figure 1 exemplifies the proposed theoretical framework on factors influencing tourists' satisfaction with mobile travel apps, namely service quality, system quality, information quality, and perceived trust.

Fig. 1. Proposed theoretical framework

3 Methods

A field intercept survey was distributed to 500 respondents approached at tourism sites with a high flow of tourists in Northern Pakistan, such as Altit Fort, Baltit Fort, Attabad Lake, Hunza Valley, Khunjrab National Park, K-2 Base Camp, Lake saif ul Malook, Shogran, and Siri Pye). Adult tourists who used mobile phones were the target population for this study. Systematic probability sampling was employed, whereby the survey questionnaire was distributed to every fifth tourist at the gate when they entered the sites. Of this, 60 responses were removed due to incomplete answers, resulting in a final sample of 340 participants, an effective response rate of 85%. Thus, this sample

size is adequate as it exceeds the minimum threshold of 200 samples suggested by Hair et al. [36]. Males comprised 57% of the participants, and females 43%. In terms of age, the average was 25.12 years, with 21% under the age of 21, 75% between the ages of 21 and 30, and 4% over the age of 31.

The survey is composed of two sections. Section A represents demographic information, whereas section B represents questions related to the constructs of the research model, namely service quality (4-item adapted from Urbach and Müller [37]), system quality (5-item adapted from Urbach and Müller [37]), information quality (6-item adapted from Urbach and Müller [37]), perceived trust (7-item adapted from McKnight et al. [38]), and tourist satisfaction (5-item adapted from Lee and Chung [39], and Wang et al. [40]).

Data were analyzed using a descriptive and exploratory factor analysis (EFA) via the Statistical Package for Social Sciences (SPSS) version 23. Measurement items with loading below 0.50 were discarded from further analysis. Ensuing that, a confirmatory factor analysis (CFA) was executed via the Structural Equation Modeling (SEM) approach using Analysis of Moment Structures (AMOS) software in order to confirm the measurement model.

4　Results

4.1　Reliability and validity analysis

The internal reliability consistency of the constructs was evaluated through Cronbach's alpha. In this study, the readings of Cronbach's alpha ranged between 0.709 and 0.920, all-surpassing the threshold of 0.700 recommended by Hair et al. [36]. These findings signify that all constructs were internally consistent. Prior to that item IQ2 "The information provided by mobile travel app is understandable" of the construct information quality was deleted due to low loading. Additionally, convergent validity was examined using factor item loadings, whereby Hair et al. [36] avowed that factor item loadings should be greater than 0.70 for a satisfactory measurement model. Table 2 details that these criteria were all met as the readings for factor item loadings ranged between 0.701 and 0.868. The results confirmed an adequate convergent validity of the construct measures employed. The next section particulars the results of the exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) for each construct.

4.2　Exploratory factor analysis

The exploratory factor analysis (EFA) of the 26 statements regarding tourists' perception of mobile travel apps' engagement was performed by using the principal component method of extraction and the varimax method of rotation. Initially, item IQ2 which as deleted for low reliability. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy index for this study is 0.887, and Bartlett's test of sphericity is 10068.66 (df = 373), and is significant at the 0.000 level, signifying that the assumption of multivariate normality is achieved. Hair et al. [36] suggested that factor loading beyond 0.500 infers that the factor extracts sufficient variance from that variable. Table 2 shows the EFA results yielded five factors of the final 24 items that fulfilled the

aforesaid requirements. Anterior to that, the other two items of factor 'perceived trust' namely, item PT6 "Mobile travel app is genuine", and PT7 "Mobile travel app keeps its commitments" were eliminated for not meeting the criteria. The first factor is termed "service quality" encompasses four items with loading ranging from 0.734 to 0.782.

Table 2. Construct reliability and validity

Statements		EFA	CFA
Service Quality (CA = 0.776)			
SQ1	"The responsible service personnel are always highly willing to help whenever I need support while using mobile travel app".	0.744	0.765
SQ2	"The responsible service personnel provide personal attention when I experience problems while using mobile travel app".	0.782	0.799
SQ3	"The responsible service personnel provide services related to the mobile travel app at the promised time".	0.745	0.705
SQ4	"The responsible service personnel have sufficient knowledge to answer my questions regarding the use of mobile travel app".	0.734	0.781
System Quality (CA = 0.817)			
SYQ1	"Mobile travel apps are easy to navigate".	0.712	0.777
SYQ2	"Mobile travel apps allow me to easily find the information I am looking for".	0.744	0.771
SYQ3	"Mobile travel apps are well structured".	0.726	0.791
SYQ4	"Mobile travel apps are easy to use".	0.733	0.783
SYQ5	"Mobile travel apps offer appropriate functionality".	0.739	0.742
Information Quality (CA = 0.860)			
IQ1	"The information provided by mobile travel app is useful".	0.714	0.794
IQ3	"The information provided by mobile travel app is interesting".	0.703	0.773
IQ4	"The information provided by mobile travel app is reliable".	0.756	0.799
IQ5	"The information provided by mobile travel app is complete".	0.813	0.807
IQ6	"The information provided by mobile travel app is up-to-date".	0.799	0.817
Perceived Trust (CA = 0.849)			
PT1	"Mobile travel app acts in my best interest".	0.789	0.809
PT2	"If I require help (for organizing trips) mobile travel app would do its best to help me".	0.762	0.798
PT3	"Mobile travel app is concerned about my wellbeing not just its own".	0.703	0.743
PT4	"Mobile travel app is truthful in its dealings with me".	0.757	0.770
PT5	"I would characterize mobile travel app as honest".	0.802	0.815
Tourist Satisfaction (CA = 0.915)			
TS1	"I am generally pleased with the mobile travel apps".	0.818	0.845
TS2	"I am very satisfied with the mobile travel apps".	0.877	0.913
TS3	"I am happy with the mobile travel apps".	0.821	0.850
TS4	"I am satisfied with the way mobile travel apps organizes the trip".	0.854	0.872
TS5	"Overall, I am satisfied with the mobile travel apps".	0.813	0.840

Note: EFA = Exploratory factor analysis; CFA = Confirmatory factor analysis; CA = Cronbach's alpha.

The second factor is named "system quality" with five items having loadings ranging between 0.712 and 0.744. The six-item of the third factor, "information quality" has loadings ranging between 0.703 and 0.813. The fourth factor, "perceived trust" has loadings between 0.703 and 0.802 for its five items. The final factor is referred to as "tourist satisfaction", which involves five items and their loading ranging from 0.813 to 0.877. Overall, item loadings ranged between 0.703 and 0.877. The first refers to item IQ3 "The information provided by mobile travel app is interesting", and the latter refers to item TS2 "I am very satisfied with the mobile travel apps".

4.3   Confirmatory factor analysis

Subsequent to EFA analysis, CFA analysis was performed on the five factors. Table 2 details the standardized item loadings ranging from 0.705 to 0.913. At this stage, factor item loadings surpassing the cut-off point of 0.70 were retained for analysis [36]. The first factor "**service quality**" includes four items with loading ranging from 0.705 to 0.799. The first refers to item SQ3 "The responsible service personnel provide services related to the mobile travel app at the promised time", while the latter refers to item SQ2 "The responsible service personnel provide personal attention when I experience problems while using mobile travel app". The second factor is named "**system quality**" with five items with item SYQ3 "Mobile travel apps are well structured" has the highest loadings (i.e. loadings = 0.791), followed by item SYQ4 "Mobile travel apps are easy to use" (loadings = 0.783), and item SYQ1 "Mobile travel apps are easy to navigate" (loadings = 0.777).

The six-item of the third factor, "**information quality**" has loadings ranging between 0.773 and 0.817. Item IQ3 "The information provided by mobile travel app is interesting", trailed by item IQ6 "The information provided by mobile travel app is up-to-date". Respondents also noted that "The information provided by mobile travel app is complete" with high loadings of 0.807. The ensuing factor, "**perceived trust**" is composed of five items. Two items have loadings of more than 0.800, namely PT1 "Mobile travel app acts in my best interest" (loadings = 0.809), and PT5 "I would characterize mobile travel app as honest" (loadings = 0.815). The latter represents the most important item perceived by the respondents. Moreover, they expressed favourable views on "If I require help (for organizing trips) mobile travel app would do its best to help me" with loadings 0.798, and "Mobile travel ap is truthful in its dealings with me" with loadings 0.770.

Moreover, all item loadings in the fifth component, "**Tourist satisfaction**" exceeded the threshold value of 0.700. Among the five items in this factor, item TS2 "I am very satisfied with the mobile travel apps"(loadings = 0.913) emerged as the most dominant. This is followed by TS4 "I am satisfied with the way mobile travel app organizes the trip" (loadings = 0.872), and TS3 "I am happy with the mobile travel apps" (loadings = 0.850). Additionally, they also emphasize positively item TS1 "I am generally pleased with the mobile travel apps" (loadings = 0.845), and item TS5 "Overall, I am satisfied with the mobile travel apps" (loadings = 0.840).

5 Discussion

This study examined tourists' perception of mobile travel apps engagement in Pakistan. The EFA analysis and the CFA analysis were carried out, and the results yielded five factors: service quality, system quality, information quality, perceived trust, and tourist satisfaction. With regards to the aspect of service quality, tourists expressed that when using a mobile travel app, they discover the responsible service personnel pay personal attention to their travel requests. Indeed, responsible service personnel are well-equipped to address inquiries about the use of mobile travel apps. The meaningful findings are consistent with forgoing service quality studies [29–31].

On the subject of system quality, tourists stated that mobile travel apps are well structured and easy to use for having adequate functionality. The respondents acknowledge that the platform is also easy to navigate, permitting them to easily find travel information, and book flights, hotels, and excursions. The positive discoveries are aligned with the findings of Petter et al. [34] that there is a positive linkage between the quality of the system and customer satisfaction.

In view of tourists' perception of the information quality of the mobile travel apps, they reported that the information provided by mobile travel apps is up-to-date, reliable, and useful. This is in accordance with discoveries of past scholars [27–28, 35]. Concerning the element of perceived trust, tourists consider the mobile travel app is trustworthy. They stated that if they require assistance (with trip planning), the mobile travel app contains all of the trusted travel-related information. When asked about the issue of tourist satisfaction with mobile travel apps, they specified that they are satisfied with the way mobile travel apps organize the trip. In a similar vein, Sharma and Sharma [21] asserted that satisfaction and intent to use are important indicators of actual usage.

6 Conclusion

In a nutshell, tourists are pleased with their mobile travel app engagement experience because the information provided by mobile travel apps is current and trustworthy. They do admit that the apps are well-organized. When they encounter issues while using mobile travel apps, the responsible service personnel is available to offer personal attention. This study's findings supplement previous research on mobile app engagement. Practically, the input would help travel agency managers strategize their marketing strategies and marketing activities to encourage more use of mobile travel apps to facilitate travel-related bookings. However, additional research is required to increase the sample size and investigate different geographical areas outside of Pakistan in order to improve current understanding. Further research into the relationships between the five factors is strongly encouraged. Furthermore, further research into the moderating effect of demographic characteristics is suggested.

7 References

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