Received: 15 June 2023 | Revised: 10 May 2024 | Accepted: 26 May 2024

DOI: 10.1002/isd2.12339

RESEARCH ARTICLE

WILEY

Testing a modified information system success model in a mobile travel app context

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Abstract

The purpose of the study was to test a modified information system success model in the context of a mobile travel application in order to provide a richer explanation of the focal operating system and the psychological factors that leisure travelers regard as important for user engagement with mobile travel apps. The interrelationship among the basic constructs of DeLone and McLean's information system success model were also explored. A sample size of 219 mobile travel application users aged 18 years and older and who reside in South Africa was collected using purposive non-probability convenience sampling. A self-administered online survey was used for data collection. An exploratory factor analysis revealed the information quality and system quality dimensions to be a single dimension, which was named *information and system quality*. The results established *information and system quality* as a significant predictor of service quality. Information and system quality, involvement, and enjoyment also emerged as significant predictors of user engagement with mobile travel applications, while service quality is not. Furthermore, engagement significantly influences word-of-mouth. The study suggests that service providers of mobile travel applications should consider both the *information and system* characteristics of an application and the psychological factors of involvement and enjoyment if they are to have a better understanding of user engagement with mobile travel applications. The findings indicate that the modified DeLone and McLean's information system success model could be more applicable to exploring mobile travel application engagement in emerging economies, and could be applied to future related studies in other contexts in order to expand existing knowledge.

KEYWORDS
engagement, enjoyment, information quality, involvement, service quality, system quality

1 | INTRODUCTION

Mobile travel applications (apps) are among the most downloaded categories of app, attracting many smartphone users who are planning their travels (Adeola & Evans, 2019). About 60% of the 1.75 billion smartphone users worldwide have downloaded a travel-related app (Chivizhe, 2019), and 45% of travel app users frequently use them to organize trips (Douglas, 2019). As more and more people use mobile devices

to arrange and pay for their travel services (Liu et al., 2023), an increasing number of service providers are implementing mobile travel apps to help travelers to fulfill their travel needs (World Travel and Tourism Council, 2019). It is clear, then, that mobile travel apps are a potential tool for engaging customers and expanding market penetration.

Despite reports stating that around 90% of leisure travel app users prefer to research their vacations online (Andriopoulos, 2021), service providers still face difficulties in expanding their businesses through travel apps (Lim et al., 2022). These difficulties arise because 80% of users stop engaging with a new mobile travel app within 90 days of first using it, and because 51% of installed apps are either deleted or never used again (Ngubelanga & Duffett, 2021). This decline in the use of mobile travel apps suggests that travel app developers have a limited knowledge of the salient factors that drive user engagement; yet studies of this nature are scarce, particularly in developing countries that boast a wealth of attractions for tourists (Adeola & Evans, 2019).

To provide a better understanding of the salient factors that drive user engagement and word-of-mouth (WOM) with mobile travel apps, the current study drew on the three basic tenets of DeLone and McLean (2003) model of information system success (ISS), which incorporates the system characteristics of information quality, system quality, and service quality as fundamental principles of ISS. Similarly, this study considered the three aforementioned quality factors as prerequisites for successful mobile travel app engagement. In the context of this study, 'information quality' relates to content such as hotel packages, flight details, and payment options. 'System quality' includes the seamless navigation that encompasses several aspects, including the layout of the pages and the easy use of filters. 'Service quality' relates to the communication between service providers and other players involved in travel, such as airlines, taxis, and banks. These system characteristics are potential drivers of user engagement with mobile travel apps (Ali et al., 2021).

Despite the heavy influence of apps' system characteristics on user engagement, the literature related to mobile travel app engagement is generally inconclusive or fragmented, and focuses on the functionality of the app (Ali et al., 2021; Fang et al., 2017), ignoring the psychological elements of user engagement. The research in this domain has largely focused on the operating functionality of the mobile travel app (Ali et al., 2021; Lim et al., 2022; Ngubelanga & Duffett, 2021). Yet research has indicated that psychological factors are also important in predicting future app usage behavior (Al-Sharafi et al., 2022). This suggests that the success of a mobile travel app goes beyond the technical effectiveness of the operating system. Therefore, measuring ISS from both the technical standpoint and psychological perspectives is crucial in order to bridge the knowledge gap created by the scarcity of studies that combine the two perspectives.

Against this backdrop, this study argues that focusing solely on the technical features of an app may overlook the consumer's need to obtain information about the affective aspects of a travel experience, and suggests that the human element can also play a significant complementary role in determining user engagement with an information system. As reported by Huang et al. (2017), when planning an adventure, leisure travelers seek an app that allows them to anticipate a pleasurable experience. Therefore, leisure travelers may seek an app that not only functions optimally but is also enjoyable to use in a way that motivates them to immerse themselves in the process.

Based on the above, the study addressed the following research question: Which of the psychological elements and mobile travel app system characteristics best influence leisure travelers to be engaged with a travel app to the point of WOM sharing in the context of making travel arrangements for a high-involvement and pleasurable travel experience? The study attempted to answer the research question from two angles. First, the question was viewed through the lens of the three fundamental dimensions of DeLone and McLean (2003) updated ISS model – namely information quality, system quality, and service quality – as important determinants of ISS, which are the most frequently cited factors in information system studies (Al-Sharafi et al., 2022). Since smartphone applications are fundamentally information systems, this study proposes system quality, information quality, and service quality as antecedents of mobile app engagement. Second, given the complexity of consumer needs, DeLone and McLean (2003) ISS model alone may be inadequate to explain ISS fully, because – according to Urbach and Müller (2012) – the model omits important dimensions that are related to the affective aspects of planning a travel experience. Therefore, the model was expanded by incorporating the psychological factors of involvement and enjoyment. These factors are well-established predictors of user engagement in other contexts, such as online reviews (Thakur, 2018) and branded mobile apps (Stocchi et al., 2018), and therefore were important to our investigation into mobile travel apps.

Thus the main objective of this study was to assess the extent to which three of DeLone and McLean (2003) ISS model constructs (system quality, information quality, and service quality) and two psychological factors (involvement and enjoyment) impact travel app engagement and ultimately WOM. Specifically, the study examined the interrelationships between the system characteristics of information, system, and service quality. These system characteristics were then examined together with the psychological factors of enjoyment and involvement as antecedents of user engagement in the context of mobile travel apps for leisure travelers in a developing country.

The study focused on leisure travelers rather than business travelers because business and leisure travelers belong to two distinct sectors that "think, talk, and behave differently" (Zhang et al., 2019, p. 622). Business travelers prioritize hotel location, but leisure travelers prioritize pricing, and are more likely to consult online reviews and referrals from friends and family than are business travelers, who are mandated by management to travel (Zhang et al., 2019). Thus, the goal was to give service providers and app developer's precise data for the leisure market so that they could create workable solutions that boost user engagement.

The study aimed to make both theoretical and practical contributions. First, the study aimed to make theoretical contributions by determining both the mobile travel app system characteristics and the psychological factors that drive user engagement. Although the three dimensions of

DeLone and McLean (2003) ISS model have been used to examine ISS in prior research (Ali et al., 2021; Almaiah et al., 2022; Al-Sharafi et al., 2022), they have seldom been integrated with both involvement and enjoyment in a single study. Second, and to the best of the authors' knowledge, this study was the first to integrate DeLone and McLean (2003) three main determinants of ISS with both involvement and enjoyment in the context of mobile travel apps for leisure travel in a developing economy. Thus, the study considers both the psychological factors of involvement and enjoyment and information quality, systems quality, and service quality as important predictors in the novel context of mobile travel apps. Consequently, the study attempted to provide a richer theoretical foundation that shows how users engage with mobile travel apps in order to narrow the knowledge gap in studies of this nature in developing economies.

From a practical perspective, a better understanding of the relationships could provide travel firms' management with invaluable insights into user expectations and levels of engagement in order to adjust their marketing strategies. The findings could be useful to app developers because they could implement these findings when designing mobile travel apps with crucial system characteristics in mind, including information quality, system quality, and service quality. The findings may also give some indication of how users' psychological engagement could be improved by apps that focus on involvement and enjoyment. Thus service providers could focus on increasing user involvement and enjoyment by incorporating necessary measures, such as service product evaluation and increased feedback in order to engage with users more meaningfully. Furthermore, the combined effect of three of DeLone and McLean (2003) ISS basic dimensions and psychological factors could further facilitate developing tangible strategies for expanding the mobile travel app market. According to Ojo (2017), understanding ISS would help to highlight the system's worth, and could act as a foundation for later decisions involving similar systems.

The next section of this study describes its theoretical foundation and the conceptual model and research hypotheses it used. This is followed by the research method it used. Thereafter the results of the analysis are presented. The study ends with a discussion of its theoretical and practical implications and with a conclusion, that states the study's limitations and directions for future research.

2 | LITERATURE REVIEW

2.1 | Theoretical foundation, conceptual framework, and hypotheses

Although there are various approaches to assessing the success of an information system, the most validated measure is DeLone and McLean (2003) ISS model (Ojo, 2017). The original DeLone and McLean model was proposed in 1992, and has been one of the most prominent streams and cited research on ISS (Nguyen et al., 2015; Urbach & Müller, 2012). Because the original model was composed of the two dimensions of information quality and system quality, it was criticized as being insufficient to understand system success fully. The criticism prompted DeLone and McLean to update the model to include the service quality dimension; and since then it has been considered the most influential theory in information system research (Al-Khasawneh et al., 2023; Nguyen et al., 2015). A fairly recent study that applied the updated DeLone and McLean model in the tourism environment (Ali et al., 2021) reported that the three dimensions are indeed significant contributing factors in the success of an information system. In order to validate the updated ISS model in the context of a developing country, the current study posited that the three quality aspects – namely system, information, and service quality – act as predictors of users' engagement with mobile travel apps.

However, research applying the model in the context of mobile travel apps in developing countries is limited. To fill this knowledge gap, this study was grounded in the updated DeLone and McLean (2003) model (Figure 1) for several reasons. First, the model's principal constructs and their relationships have been investigated in a broad spectrum of settings, such as the fashion industry (Trivedi & Trivedi, 2018), e-wallets (Abbasi et al., 2022), learning environments (Hsu, 2023), and higher education (Khand & Kalhoro, 2020), suggesting that the model is highly versatile and

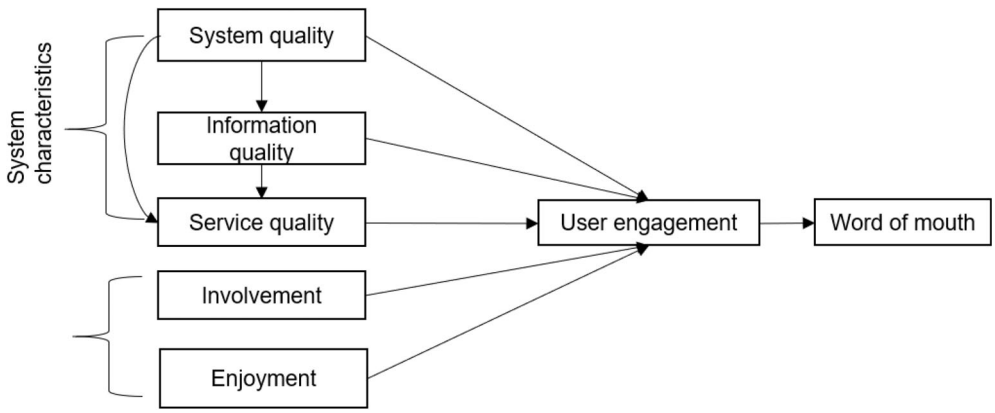

FIGURE 1 Conceptual framework of user engagement and WOM.

applicable to different settings. Thus, the model could be useful in evaluating the success of a mobile travel app. Second, the model has been updated in tandem with new developments in information systems by integrating new empirical work that investigated the model's propositions in the growing e-commerce world; and so the service quality dimension was incorporated (DeLone & McLean, 2003). The upgraded model, which combined the various components of ISS into a single conceptual framework, more effectively explains the predictors of information system 'success' and has contributed to a more thorough understanding of the indicators of ISS (Sharma et al., 2023). As a result, this model is regarded as a useful framework for evaluating the success aspects of mobile travel apps. Third, the ISS model was chosen over other popular models, such as the technology acceptance model (Davis, 1989) because it captures both the technical aspects of the information system (information quality and system quality) and the commonly ignored human element of the service quality offered by the service provider (Trivedi & Trivedi, 2018). Although the ISS model includes other constructs, such as actual use, user satisfaction, individual impact, and organizational impact, these were excluded in this study in order to focus only on the systems quality, information quality, and service quality variables, which are regarded as the leading determinants in understanding system success (Ali et al., 2021; Hsu, 2023).

As alluded to earlier, this study argues that psychological factors are also important determinants of user engagement with mobile travel apps. According to Al-Sharafi et al. (2022), psychological aspects are linked with compliance and adherence in characterizing consumer behavior and predicting future behavior. Against this backdrop, the current study incorporated enjoyment and involvement into the DeLone and McLean (2003) model of ISS to explain the system characteristics and the internal and individual characteristics that could influence users' propensity to use mobile travel apps. Incorporating enjoyment into the ISS model is not new. Won et al. (2023) incorporated enjoyment into DeLone and McLean's model to address the hedonic aspect of using branded sport apps, and found that enjoyment was the most significant predictor. Chan et al. (2022) developed a model to predict the adoption of mobile shopping in South Korea, and included enjoyment with the technological characteristics of system quality and information quality. They established enjoyment as the most important driver of user intention. Given the hedonic nature of mobile travel apps, it would be prudent to include enjoyment together with the three fundamental dimensions of DeLone and McLean's model of ISS in order to reach a better understanding of user engagement with mobile travel apps.

Since involvement is a sign of the user engagement that arises when users become invested in a product or service, it was also included in the model (Chakraborty et al., 2022). Liu et al. (2022) posited that involvement significantly influences positive attitudes towards the use of new technologies. Cheung and To (2021) also established involvement as a significant predictor of ISS. Therefore, a better understanding of consumer behavior toward mobile travel apps could be fostered by gaining insights into users' level of involvement. Thus, without including both enjoyment and involvement in the same research model, gaining a better understanding of mobile travel app engagement may remain elusive. To advance this topic, this study assessed the combined effect of the mobile travel app characteristics (information quality, system quality, and service quality) and the selected psychological factors (involvement and enjoyment) to reach a better understanding of user engagement with mobile travel apps.

Consequently, the proposed conceptual framework (Figure 1) incorporates the psychological factors of involvement and enjoyment. Therefore, in the framework, system characteristics and psychological factors are predictors of engagement, which in turn influences verbal reviews and recommendations, also referred to as 'word-of-mouth behavior' or simply 'word-of-mouth' (WOM). Based on this framing, the study discusses each predictor, and proposes several hypotheses about their relationship in relation to the two outcomes of engagement and WOM.

2.2 | Engagement with mobile travel apps

The concept of engagement has attracted considerable attention among scholars, particularly in the fields of social psychology, marketing, and information systems (Fang et al., 2017; Hsieh et al., 2023; Zhang et al., 2023). Although scholars concurred that consumer engagement is associated with behavioral intention, loyalty, and WOM (Hollebeek et al., 2023; Hsieh et al., 2023; Tak & Gupta, 2021; Tian et al., 2021), there seems to be no universally accepted definition of user engagement because of different dimensions and operationalisations of engagement in the literature. Stocchi et al. (2018) described engagement as a psychological state resulting from experiences with a product or service. Some studies operationalized engagement from emotional, cognitive, and behavioral perspectives (Fang et al., 2017; Islam et al., 2019). Other scholars, such as Tak and Gupta (2021) considered the three factors of absorption, identification, and interaction to operationalize engagement. Thus, the way in which consumer engagement has been implemented in past studies has resulted in inconsistent results. This prompted O'Brien et al. (2018) to conduct a study in which they re-operationalized engagement as unidimensional, which was subsequently adopted by scholars in various contexts (Hsieh et al., 2023; Moriuchi & Takahashi, 2023), including this study.

Despite these different dimensions/operationalisations, the literature has contended that engagement relates to functional needs, activities, involvement, hedonic, and emotional values (Tak & Gupta, 2021) in order to suggest that both system characteristics and psychological factors could better explain user engagement with mobile travel apps. For instance, Tak and Gupta (2021) reported that the visual design of the mobile travel app, the quality of its content and of its information, and the interactive nature of the app are vital cues that trigger user engagement. Therefore, in the context of this study, engagement is also operationalized as unidimensional in order to describe the interactive process between the potential traveler and the mobile travel app. Thus, the term 'engagement' in this, study describes the relationship that leisure travelers have with mobile travel apps and how they interact with them to plan leisure trips. The definition suggests that users' entire leisure travel experience and engagement are enhanced if a mobile travel app makes it easy to search for and book flights and accommodation to suit their travel needs.

In fact, the literature has suggested that mobile travel app attributes provide utility and convenience to the consumer, and are therefore important antecedents of user engagement (Hsieh et al., 2023; Tian et al., 2021). Consequently, Tian et al. (2021) emphasized attributes such as product performance, product appearance, and product communication as antecedents of engagement. In the context of mobile travel apps, it could be argued that the quality aspects such as informativeness, the interactivity of the app, and service quality influence engagement. These aspects are closely related to DeLone and McLean (2003) main dimensions of information quality, system quality, and service quality. Thus, this study proposes that the mobile travel app system characteristics of information quality, system quality, and service quality and the psychological factors of involvement and engagement have the potential jointly to stimulate user engagement with the mobile travel app.

2.3 | Word-of-mouth

According to Meilatinova (2021), WOM is the most widely used and most important channel for customers to seek information. It is also used to distribute customers' knowledge and experiences (Coves-Martínez et al., 2022). According to Barlas et al. (2020), the scope of electronic WOM has been expanded by the rise of online platforms and social media. Simply reading a social media post or following a certain personality on social media is one thing, but choosing to share publicly a comment or opinion in response to a post is entirely different, and shows that one is more invested in, aware of, and attentive to (i.e., more engaged with) the material (Wu et al., 2018). The WOM intention is defined as the propensity of customers to share their product or service experiences with other consumers (Coves-Martínez et al., 2022), and is nine times more effective in the rapid distribution of information than print and media communications (Meilatinova, 2021). Customers who want to spread positive WOM may share past experiences of their engagement with a mobile travel app and recommend previously used apps (Zhang et al., 2017). Consequently, consumers with the same travel interests can easily identify one another to establish regular interactions.

2.4 | Mobile travel app system attributes

2.4.1 | System quality and service quality

As system quality relates to the ease of use of the system, system flexibility, system reliability, and system response time (Tak & Gupta, 2021); the failure of a system to live up to these expectations require users to seek technical support from the service provider (service quality) (Ali et al., 2021). Tak and Gupta (2021) investigated several attributes that stimulate users to engage with mobile travel apps, and reported that the collaboration design aspect, which comprises alliances between travel mobile apps and the hotels and airlines (service quality), help consumers to use mobile travel apps effectively. This implies that, if the mobile travel app system (system quality) allows users to contact taxi/bus service providers, airlines, and banks for a seamless travel experience, users will be impressed with the service quality. It is possible that users may not know how to use the mobile travel app functions; in that case, they would require the services of the support personnel to execute their tasks effectively (Sharma et al., 2023). Thus, it could be hypothesized that:

Hypothesis 1. There is a positive relationship between system quality and service quality.

2.4.2 | System quality and information quality

A system that uses user-friendly and modern technologies (such as graphical user interfaces) can present information to users in an easy-to-understand format, enabling them to use information systems effectively (Tak & Gupta, 2021). A well-integrated system provides complete and accurate information so that its information outputs are useful for users' daily tasks and relevant for decision-making purposes (Gorla et al., 2010). According to Al-Mamary et al. (2014), the above arguments imply that a high level of system sophistication (i.e., modern technology and being user-friendly and well-integrated) leads to a high information format (i.e., easy-to-understand and consistent outputs) and high information content (i.e., complete, accurate, and relevant to decision-making). Based on the above, it was hypothesized that:

Hypothesis 2. There is a positive relationship between system quality and information quality.

2.4.3 | Information quality and service quality

According to Barreda et al. (2015), a quality and effective system delivers complete, accurate, and simple-to-understand information, resulting in favorable behaviors among users. Therefore, in the context of this study, high information quality benefits users who wish to obtain information

related to planning their travel journey using a mobile travel app, and to receive advice on a particular topic relating to their travel needs. Degirmenci (2020) asserted that information quality plays an essential role in lowering users' information and processing costs, which benefits service providers. Consumers seek optimal information when using a mobile travel app so that they can make informed decisions (Tak & Gupta, 2021). Thus, it was hypothesized that:

Hypothesis 3. There is a positive relationship between information quality and service quality.

2.5 | Factors that influence engagement

2.5.1 | System quality

As previously alluded to, 'system quality' refers to the usability, availability, reliability, adaptability, and response time of an information system (DeLone & McLean, 2003; Sharma et al., 2023). In this study, 'the information system' is referred to as 'the mobile travel app'. 'Usability' can be described as the ease with which a user can operate the mobile travel app. 'Availability' refers to the mobile travel app's ability to allow users to access information in the correct format (Trivedi & Trivedi, 2018). Both usability and availability influence user engagement. Availability may present problems for service providers because users may experience intermittent internet connections, depending on their location. The same could be said for reliability (that is, the ability of the app to perform well when needed), especially in areas with poor network coverage or when the user is traveling, which can result in dissatisfaction with the app. 'Adaptability' may be described as the degree to which an information system adapts to changes as needed and expected by app users (Petrevska Nechkoska, 2015). In this study, for users to be engaged with the app they must have mobile smartphones with high random-access memory, as some mobile travel apps may require more storage space in order to download. 'Responsiveness' refers to the time it takes the mobile travel app to process input and respond, which is usually expressed in seconds (Trivedi & Trivedi, 2018). Users typically expect mobile travel apps to be efficient in this regard so that they can complete their travel arrangements timeously.

According to Sharma et al. (2023), if the interface design of a mobile app is complex and the functions are not easy to use, users are likely to find it difficult to operate. Similarly, if the mobile travel app has a longer loading time for pages, that leads to disengagement. In contrast, a high-quality mobile travel app that provides convenient, secure, and quick access to information is likely to increase engagement (Tak & Gupta, 2021). Based on prior studies that indicated that system quality is a significant predictor of user engagement (Silver & Johnson, 2018; Tak & Gupta, 2021), it could be hypothesized that:

Hypothesis 4. System quality has a positive influence on engagement with a mobile travel app.

2.5.2 | Information quality

According to DeLone and McLean (2003), 'information quality' refers to the content dimension of the information system. In this study, the expected accuracy, usefulness, and timeliness of the information to be generated by the mobile travel app in use were used to operationalize information quality (Sharma et al., 2023). The information provided by an app should be relevant, complete, and easy to understand (Tarute et al., 2017). According to Meilatinova (2021), service providers should streamline the information they provide to users so that only relevant and useful information about their travel needs is received. If service providers are unsuccessful in this, users may be dissatisfied with the app, leading to their disengagement. In essence, the information that the mobile travel app generates in respect of payment and accommodation options, or when exploring information about costs and discounts, should be adequate, complete, and relevant in order to ensure user engagement. According to Tak and Gupta (2021) and Meilatinova (2021), information quality and functionality are related to consumer engagement. Therefore, the following hypothesis was formulated:

Hypothesis 5. Information quality has a positive influence on engagement with a mobile travel app.

2.5.3 | Service quality

'Service quality' is described by DeLone and McLean (2003) as the extent of the responsiveness, assurance, and empathy offered by the information system's support system, such as the help-desk personnel. According to a recent report, nearly half (49%) of American consumers who use apps daily on their smartphones indicated that they thought that brands disregarded in-app customer care (PR Newswire, 2022). These findings

suggest that mobile travel app customer support is critical for engaging users. For instance, users may be frustrated when responses on the app are delayed, especially if they have to wait several hours or days before receiving a response or when the process of using the app is overly time-consuming (Trivedi & Trivedi, 2018). Thus improved app support could engage users. A fairly recent study described service quality from a collaborative perspective (Tak & Gupta, 2021) as reflecting the tie-up of the app with complementary service providers, such as banks linking users' credit/debit cards and hotels and airlines for ease of booking accommodation and flights. These aspects of service quality enhance consumer engagement with a mobile travel app. Prior studies reported a positive relationship between service quality and engagement with mobile apps (Sharma et al., 2023; Tak & Gupta, 2021). Based on the above, it could be hypothesized that:

Hypothesis 6. Service quality has a positive influence on engagement with a mobile travel app.

2.5.4 | Involvement

A limited number of studies have investigated the influence of involvement in the context of mobile travel apps. However, Huang et al. (2017) reported that using self-service technologies, such as mobile travel apps demands higher levels of consumer involvement, participation, and responsibility in order to avoid the associated risks of using these apps, such as system failure (Ngubelanga & Duffett, 2021). Although the concept of involvement may have been advanced by the proponents of social judgment theory over seven decades ago (Sherif & Cantril, 1947), it is still widely used in the marketing literature, suggesting its continued relevance. According to social judgment theory (Sherif & Cantril, 1947), people find it harder to accept an opposing viewpoint on any subject in which they are personally involved. When confronted with a viewpoint similar to their own, people are inclined to engage more with the holder of that viewpoint, and they demonstrate this by expressing it more strongly (Shankar et al., 2020). In the leisure literature, involvement is conceptualized as personal relevance (Kyle et al., 2007; Stocchi et al., 2018). According to the research on leisure, an activity is deemed personally involving if the participant believes that it will help them to achieve their goals (Kyle et al., 2007). Thus Cheung and To (2021) posited that 'user involvement' refers to individuals' perception of the significance of any object that is influenced by their own values and needs; and this perception is, therefore, a necessary precondition of user engagement. In the light of the above, this study operationalizes involvement from the leisure literature perspective as the perceived importance that a leisure traveler places on a mobile travel app in the light of their individual travel requirements, interests, values, and choices.

Cheung and To (2021) posited that an effective way to delight customers would be to involve them in important activities that would improve a service's attributes. Similarly, in the current study, user involvement included the user trying to evaluate a mobile travel app in the process of making travel arrangements. If the mobile travel app provided useful information that users desire, such as finding appropriate accommodation, booking flights, and paying for the trip using the app, they would be likely to increase their engagement with the app. Recent research has found that involvement is a focal psychological variable that impacts users' engagement with a brand (Chakraborty et al., 2022; Cheung & To, 2021), but empirical investigations of this relationship in the mobile travel app context are limited. In the context of the current study, if users of the mobile travel app were highly involved with making their own travel arrangements, they would search more information and spend more time on the app, and thus would be likely to increase their interaction with the app. Therefore, firms could engage consumers more effectively by offering mobile travel apps as a platform for interactions that relate to their relevant travel needs. Based on the above, it could be hypothesized that:

Hypothesis 7. User involvement has a positive influence on engagement with a mobile travel app.

2.5.5 | Enjoyment

Mobile commerce apps are also designed for entertainment purposes, which is why perceived enjoyment is considered an essential psychological influence on engagement with such apps (Ngubelanga & Duffett, 2021).

The concept of enjoyment has long been studied. For example, Langeard et al. (1981) indicated that some individuals enjoy tinkering with certain kinds of machines, and therefore may like self-service technologies, such as mobile travel apps, that allow them to satisfy their inquisitive impulses. According to Bhattacharjee et al. (2023), enjoyment is an emotion that can be experienced while or after using a product or a service, and can be influenced by factors, such as app navigation, graphics, content, and safety. McLean (2018) found that the greater the enjoyment from using a mobile app, the more that interaction with the app increases. Similarly, if a mobile travel app provided a seamless experience by delivering important travel information, including the holiday destination, weather conditions, or information about other attractions, users would be more inclined to interact with the app. Thus in this study 'enjoyment' is the extent to which users believe that the activity of using a travel mobile app to make travel arrangements is perceived to be enjoyable. Although several studies have investigated enjoyment as a mediating variable in the tourism sector (Oliveira et al., 2020; Zhou et al., 2022), other studies have found enjoyment to be a positive significant predictor of engagement (Al-Khasawneh et al., 2023; Bhattacharjee et al., 2023; McLean, 2018). As a result, the following hypothesis could be stated:

Hypothesis 8. Enjoyment has a positive influence on engagement with a mobile travel app.

2.5.6 | Relationship between engagement and word-of-mouth

The concept of WOM is a common feature in the consumer engagement literature (Al-Khasawneh et al., 2023; Anastasiei et al., 2023; Barlas et al., 2020). Proponents of consumer engagement have suggested that consumer engagement goes beyond mere product purchase, but extends to customer interactions (WOM), which ultimately affect purchase decisions.

WOM was described by Al-Khasawneh et al. (2023) as the continuing and dynamic information that is shared between people about a product, service, or brand; and Anastasiei et al. (2023) described WOM as the sharing of opinions, experiences, and recommendations about products and services through online platforms. A recent study described WOM as a behavioral consequence of engagement (Al-Khasawneh et al., 2023). These conceptualizations apply equally to the current study because more and more travelers are using online travel communities to complete travel-related tasks, from looking for travel advice and information to making new travel friends (Oliveira et al., 2020).

Furthermore, Anastasiei et al. (2023) stated that WOM interactions are a key outcome of customer engagement, thus supporting the notion that engaged customers influence others through WOM. In fact, Kumar et al. (2019) described consumer engagement as an interactive concept. According to the definition of user engagement in this study, involved consumers using enjoyable mobile travel app features are expected to behave in a way that maintains relationships with their peers, family, and friends within their social circles. Specifically, if the travel app allowed users to make their trip as seamless as possible by delivering important information, such as accommodation, discovering top attractions, adding interesting routes and tours, finding restaurants, accessing weather reports, security advice, and nightlife areas, they would be likely to spread positive WOM about the travel app. The current study posited that mobile travel app users in South Africa are highly motivated and involved, and therefore that social interactions would likely generate travel-related WOM. Against this backdrop, this study proposed that consumer engagement is an important antecedent of leisure travelers' WOM. Thus, it was hypothesized that:

Hypothesis 9. User engagement has a positive influence on WOM.

3 | RESEARCH METHOD

3.1 | Sample and data collection

Using a convenience purposive sampling approach, the study targeted users of mobile travel apps who were well positioned to respond proficiently to the questions. The purposive sampling technique is better suited when the researcher is clear about what needs to be known, and sets out to find people who are willing to provide the required information on the basis of their knowledge and experience (Etikan et al., 2016). Specifically, the study targeted smartphone users aged 18 years and older who had downloaded a mobile travel app and used it for leisure travel prior to the study. From a sample of 254 participants who responded to the online questionnaire, a realized sample size of 219, representing an 86% response rate, was considered acceptable for the study, as similar research studies have used sample sizes ranging from 200 to 400 (Stocchi et al., 2018; Tak & Gupta, 2021; Thakur, 2018). To justify the sample size further, a lead was taken from Kline (2005), who provided recommendations for sample size for the analysis of structural equation models, and established that a sample of 100 is small; a sample of 100 to 200 is medium; and a sample of over 200 is large. Thus, the sample size of 219 was deemed large enough for the current study.

The data were gathered through a structured self-administered online survey for a period of 4 weeks in July and August 2022. The survey was designed on Qualtrics, an online survey template for personal use that generates, edits, and stores documents and spreadsheets for further analysis. An online survey was deemed the most appropriate procedure for this research, as surveys are a practical way to collect essential data on any subject from a diverse audience (Al-Khasawneh et al., 2023). The hyperlink to the Qualtrics questionnaire was sent via WhatsApp groups and posted to Facebook pages.

3.2 | Measures

A survey instrument that was developed on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) was used for the data collection. The questionnaire had four sections. Section A was a brief explanation of the purpose of the study, and a working definition of a mobile travel app was provided. Section B contained screening questions to guarantee respondents' appropriateness to participate in the study. Section C measured the constructs of the study. Section D gathered demographic information. Before collecting the data, a pre-test of the questionnaire was conducted among 20 participants from the study population to determine the average completion time and to assess the suitability of

the survey questions, question format, wording, and order. In their feedback after the pretesting, participants felt that the questionnaire, with 47 items to measure constructs (excluding the demographic questions) was too long, and took them more than 10 min to complete. Therefore, a decision was made to reduce the number of items with the guidance of subject experts who had theoretical questionnaire knowledge and practical experience, as recommended by Elangovan and Sundaravel (2021). Specifically, after specifying the purpose of the construct, five items were taken from the original engagement scale, which had 12 items, as "user engagement is highly context dependent: each digital environment features unique technological affordances that interact with users' motivations to achieve some desirable end" (O'Brien et al., 2018, pp 29). After the questionnaire had been altered, the survey instrument was fielded. Streamlining the engagement scale items was in line with Hsieh et al. (2023) and Moriuchi and Takahashi (2023), who also investigated engagement as a unidimensional construct measured with five items. Therefore, a decision was made to follow the same procedure to measure engagement with five relevant items in the context of the study. However, items were taken from three dimensions that made up the original engagement scale, namely focused attention, reward, and esthetic appeal (O'Brien et al., 2018).

The survey was organized in a way that guaranteed understanding on the part of the respondents. The wording of the questions was adapted to be concise and accurate, and clear definitions were provided for unfamiliar constructs before pre-testing the survey instrument. The respondents were also guaranteed anonymity and confidentiality in the introductory part of the survey in order to dissuade them from providing socially desirable responses.

The questionnaire items used in this study are outlined in Appendix A. Items to measure information quality, system quality, and service quality were adapted from Ahn et al. (2004). Enjoyment was measured using four items taken from Lu et al. (2017), and involvement was measured using five items, four of which were adapted from Stocchi et al. (2018), and one was taken from Morosan and DeFranco (2016) because of its relevance to the context of the study and its high item loading of 0.923. Five items adapted from the focused attention, esthetic appeal, and reward dimensions of the engagement construct of O'Brien et al. (2018) were used to measure engagement. Last, WOM was measured using four items adapted from Meilatinova (2021). The study used reliable and valid measures, as the Cronbach alpha coefficients were within the range of 0.7–0.9, and the factor loadings of scale items were above 0.5.

4 | RESULTS

4.1 | Demographic profile of respondents

Of the 254 questionnaires distributed online via Qualtrics, 219 were considered suitable for data analysis, representing a response rate of 86%. First, an analysis of the rate of mobile travel app usage was conducted. The respondents were asked to indicate how many times they had used a typical mobile travel app in a year to make their leisure travel arrangements. Most of them (63.5%) indicated that they had used a mobile travel app more than three times a year; 9.1% had used a travel app three times a year; 11.4% had used an app twice; and 16% indicated that they had used an app only once at the time of the survey.

Second, an analysis of the respondents' demographic profiles was conducted (Table 1). Most of the respondents were fairly educated, holding a university degree or a diploma (58.4%). Slightly more than half of the total number of respondents (51.1%) were aged from 18 to 31 years old.

TABLE 1 Demographic profile of respondents and app usage.

Variable	Response options	Percentage
Gender	Male	53
	Female	47
Education	Secondary	20.5
	Diploma/degree	58.4
	Postgraduate	21
Age	18–31	51.1
	32–52	41.1
	53 and older	7.8
Mobile travel app usage per year	Once	16
	Twice	11.4
	Three times	9.1
	More than three times	63.5

4.2 | Assessment of the measurement model

The underlying factor structure was determined through a measurement model by testing the internal consistency reliabilities and convergent validity of the constructs using AMOS version 28. The adequacy of the measurement model was tested using confirmatory factor analysis. On inspecting the model fit, the results of the analysis (CMIN/DF = 1.916; incremental fit index [IFI] = 0.820; Tucker-Lewis index [TLI] = 0.804; comparative fit index [CFI] = 0.818) were considered lower than the threshold recommended by Hair et al. (2019). However, the root mean square error of approximation (RMSEA) equalled 0.065 and the standardized root mean residual (SRMR) equalled 0.071, which met the criteria (Hair et al., 2019). The internal consistency reliability of the constructs all met the Pallant (2016) criterion, as the coefficients ranged between 0.727 and 0.871 and the composite reliability coefficients ranged between 0.751 and 0.875. The average variance extracted (AVE) of some constructs (information quality, system quality) was lower than the recommended threshold of 0.5 (Hair et al., 2019). Items with loadings of less than 0.5 (engagement 1 and 2; involvement 2 and 4) were deleted.

Hair et al. (2019) recommended that, when certain items are removed, the confirmatory factor analysis should be run again to determine the model's goodness and fit. The results of the second test showed improved model fit indices (CMIN/DF = 1.733; IFI = 0.907; TLI = 0.900; CFI = 0.906, RMSEA = 0.058; SRMR = 0.062). Based on the criteria outlined by Hair et al. (2019), the measurement model demonstrated adequate fit.

An assessment of the correlations between the constructs was done, and multicollinearity was observed between two of the exogenous constructs, namely information quality and system quality. An exploratory factor analysis using principal axis factoring combined with varimax rotation was subsequently conducted for the two system characteristics. The data were deemed appropriate for factor analysis, with all the Kaiser-Meyer-Olkin (KMO) values being above 0.6 and the Bartlett's test of sphericity being significant ($p < 0.05$) (Pallant, 2016). The results confirmed a one-dimensional structure, as the information quality and system quality items loaded onto a single factor. Therefore, it was decided to merge information quality and system quality into one factor, which was then named the *information and system quality* dimension.

Although merging two or more factors is not a common phenomenon in the marketing literature, ignoring cross-loadings if they are substantial can lead to biased estimates and incorrect statistical inferences (Steenkamp & Maydeu-Olivares, 2023). Humbani (2021) empirically tested the relationship between perceived risk factors and the adoption of proximity mobile payments in South Africa. There was evidence of high multicollinearity between the two factors of psychological risk and security risk. After realizing that the scale items for both factors all measured the risk relating to loss of esteem owing to possible loss of information, the decision was made to merge the two factors into the renamed item *psychological insecurity*. Similarly, items measuring system quality and information quality exhibited the technical and functional aspects of the information system, including its timeliness, accuracy, usefulness, and relevance. Thus, it could be inferred that the two factors were conceptually similar, leading to their being combined and renamed *information and system quality*. Hypotheses 1 and 2 were adjusted accordingly, leading to a reconfiguration of the hypotheses in the conceptual model to the following: H1: Information and systems quality >> Service quality; H2: Information and systems quality >> Engagement, H3: Service quality >> Engagement; H4: Involvement >> Engagement; H5: Enjoyment >> Engagement; and H6: Engagement >> WOM.

Reliabilities and convergent validity were then tested again on the system characteristics of the newly created item of information and system quality and of the service quality dimensions. The results indicated adequate internal consistency reliabilities of 0.866 and 0.837 respectively. Although the AVEs for some of the variables were slightly below 0.5, they were retained for further analysis, as their composite reliabilities were above 0.6, which is considered acceptable in exploratory research (Hair et al., 2019). The discriminant validity was assessed using the Fornell and Larcker (1981) criterion, the results of which are indicated in Table 2.

To determine discriminant validity, the square root of the AVE (the diagonal values in bold) should be greater than the correlations among the variables (the off-diagonal values) (Fornell & Larcker, 1981). As shown in Table 2, the Fornell and Larcker (1981) criterion indicated a lack of discriminant validity between information systems and engagement and between information and systems quality and service quality. According to Henseler et al. (2015), Fornell and Larcker's criterion may be ineffective in some situations, which may indicate a potential weakness in the most often applied discriminant validity criterion. Following the recommendations of Voorhees et al. (2016), the heterotrait-monotrait ratio value for the information systems and engagement pair was 0.707. For the information and system quality and service quality pair, the heterotrait-monotrait value was 0.708. As the heterotrait-monotrait criterion for a lack of discriminant validity was a value above 0.85, the conclusion was that both pairs of constructs showed discriminant validity between the constructs (Voorhees et al., 2016).

4.3 | Structural model

The final step before the hypotheses could be tested was to assess the structural model. The structural model parameters satisfied the required limits for acceptable psychometric qualities (X2/df = 1.809, CFI = 0.900; IFI = 0.901; RMSEA = 0.061) (Hair et al., 2019).

4.4 | Results of hypotheses testing

As shown in Table 3, five structural regression coefficients out of the six proposed in the conceptual model were statistically significant. An assessment of the paths revealed that information and system quality ($\beta = 0.683$, $p < 0.01$) was a significant predictor of user engagement, providing support for hypothesis 2. Contrary to a prior study's findings (Trivedi & Trivedi, 2018), there was not a statistically significant relationship between service quality and user engagement ($\beta = -0.144$, $p < 0.01$) to refute hypothesis 3. However, the psychological determinants of involvement ($\beta = 0.381$, $p < 0.01$) and enjoyment ($\beta = 0.280$, $p < 0.01$) emerged as statistically significant predictors of user engagement to support hypotheses 4 and 5 respectively. The study also tested the relationship between user engagement and WOM, and the results ($\beta = 0.640$, $p < 0.01$) confirmed the relationship in support of hypothesis 6. Information and system quality, involvement, and enjoyment explained 74.3% of the variation in user engagement, and user engagement predicted 54.5% of the variance in users' WOM intentions. These values point to the process of the interpretation and prediction of user engagement and WOM being reliable.

5 | DISCUSSION AND IMPLICATIONS

The purpose of this study was to extend DeLone and McLean (2003) ISS model in the context of mobile travel apps by incorporating psychological factors to determine the extent of the explanatory power of the extended model. The results challenge some of the basic assumptions of DeLone and McLean's ISS model, as the information quality and system quality scale items loaded together to form a single factor. Therefore, it could be inferred that users of mobile travel apps consider the correctness, usefulness, and timeliness of the mobile travel app (information quality) and the immediate response time, flexibility, and perceived ease of use (system quality) as similar dimensions.

This research ascertained that *information and system quality* has a positive influence on service quality, thus supporting hypothesis 1. Although there is no clear evidence that this relationship has been tested before in similar contexts, the results imply that the usability and reliability of the app (system quality) and its accuracy, usefulness, and timeliness in providing information (information quality) lessen the need for

TABLE 2 Discriminant validity.

	Infosys[a]	Servq[b]	Engage[c]	Enjoy[d]	Involve[e]	WOM
Information & system quality	**0.649**					
Service quality	0.710	**0.683**				
Engagement	0.694	0.505	**0.675**			
Enjoyment	0.367	0.538	0.497	**0.798**		
Involvement	0.427	0.356	0.590	0.655	**0.729**	
WOM	0.475	0.352	0.617	0.612	0.654	**0.790**

Abbreviations: engage, engagement; enjoy, enjoyment; Infosys, information and system quality; involve, involvement; Servq, service quality.
[a]The term *information system* is indicated by the abbreviated term *infosys* on both axes. This abbreviation is used to refer to this variable in tables throughout the article.
[b]The term *service quality* is indicated by the abbreviated term *servq* on both axes. This abbreviation is used to refer to this variable in tables throughout the article.
[c]The term *engagement* is indicated by the abbreviated term *engage* on both axes. This abbreviation is used to refer to this variable in tables throughout the article.
[d]The term *enjoyment* is indicated by the abbreviated term *enjoy* on both axes. This abbreviation is used to refer to this variable in tables throughout the article.
[e]The term *involvement* is indicated by the abbreviated term *involve* on both axes. This abbreviation is used to refer to this variable in tables throughout the article.

TABLE 3 Results of hypotheses testing.

Alternative hypothesis	SRW	*P* value	Result
H_1: Information & system quality → Service quality	0.743	<0.001**	Supported
H_2: Information & system quality → Engagement	0.563	<0.001**	Supported
H_3: Service quality → Engagement	−0.145	0.180	Not supported
H_4: Involvement → Engagement	0.376	<0.001**	Supported
H_5: Enjoyment → Engagement	0.209	0.024**	Supported
H_6: Engagement → WOM	0.742	<0.001**	Supported

customer support from service providers' technical personnel. According to Tak and Gupta (2021), if the system provides sufficient information, especially to connect users with collaborators in the ecosystem, including flights, taxis, and buses, the system quality of the mobile travel app is enhanced. This assertion was corroborated by Meilatinova (2021) and Trivedi and Trivedi (2018), who concurred that the proficiency and functionality of the app in generating pertinent information needed by the traveler enhanced their use of the app, which also enhanced perceived service quality.

Furthermore, the study hypothesized that *information and system quality* and service quality would have a positive relationship with user engagement with mobile travel apps. The findings confirmed that *information and system quality* directly influence engagement, thus supporting hypothesis 2. These results are consistent with those of Ali et al. (2021), who found that information system quality (data richness, accuracy, usefulness) and system quality (system usability, availability, reliability) were significant determinants of user engagement with smartphone travel apps. Similarly, Tarute et al. (2017) reported that the design aspects of system quality and information quality were significant predictors of engagement with smartphone apps. Although Fang et al. (2017) considered interface attractiveness, privacy, and security as system quality attributes, they reported similar findings. Thus, in line with the findings of Hsu (2023) and Meilatinova (2021), the findings of the current study give credence to the importance of the *information and system quality* dimension in assessing ISS, as this was proven to be significant in a mobile travel app context. According to Tak and Gupta (2021), a system's information design and navigational design are crucial indicators that stimulate users' interest in using a mobile travel app. They highlighted key factors that affect customer engagement with mobile travel apps, including the app's functionality and usability, content quality, navigation, and esthetic design, all of which are elements of the information and system quality dimension. Similarly, the app's quality of information about hotels, flights, and vacation packages, along with its simple navigational design characteristics (usability, availability, and reliability), work as motivators for users to engage with mobile travel apps.

As shown in Table 3, service quality did not emerge as a significant predictor of user engagement with mobile travel apps for leisure travelers. Therefore, hypothesis 3 was not supported. Although these findings contradict reports by Ali et al. (2021) and Al-Khasawneh et al. (2023), Alksasbeh et al. (2019) also reported service quality to be a less critical factor, albeit in the e-learning environment. Thus, in the context of this study, the mobile travel app's customer support is not an important consideration in determining ISS. A plausible explanation is that leisure travelers' main interests lie in the functionality of the app rather than in the quality of the service assistance provided by the service provider (Zhang et al., 2019). In fact, Won et al. (2023) argued that app users seldom contact service personnel for help when using mobile apps, suggesting that leisure travelers want to feel in control of their own travel experiences, rather than asking service personnel for assistance. Since scholars have agreed that mobile apps provide reliable information (Al-Khasawneh et al., 2023), it could be argued that leisure travelers can successfully make their own travel arrangements without consulting service providers, thus rendering service quality insignificant in predicting user engagement. Despite this anomalous finding, service quality should be given due consideration when designing successful mobile travel apps, as an immense body of the literature supports its influence on ISS in various contexts (Ali et al., 2021; Al-Khasawneh et al., 2023; Hsu, 2023).

The study also investigated the influence of the psychological factors of involvement and enjoyment on user engagement with mobile travel apps. The results confirmed that the entertainment value (enjoyment) and the extent of user involvement in making personal travel arrangements were pertinent factors determining user engagement. Thus, hypotheses 4 and 5 were supported. Although studies that have investigated the relationship between enjoyment and user engagement with mobile travel apps are rare, the findings of the current study concur with those of Won et al. (2023), who found enjoyment to be the most influential predictor of a branded sport app users' intention. Chan et al. (2022) also reported a significant link between enjoyment and intention to adopt mobile shopping in Malaysia. In fact, in Chan et al. (2022) study, enjoyment emerged as the most significant predictor over and above the system characteristics of information quality, system quality, and service quality, thus suggesting its relevance. Thus, in the context of the current study, the instant delight and pleasure (enjoyment) of using mobile travel apps to plan a leisure adventure could help to explain mobile travel app success.

The findings of this study also corroborate those of Cheung and To (2021), who reported involvement to be an important predictor of user engagement in the co-creation of services. Chakraborty et al. (2022) found involvement to be an important moderating variable between the values of an information system – including its functional and emotional value – and the adoption of mobile payment services. Similarly, Shankar et al. (2020) established that the link between the quality of the argument, consistency, and volume of positive eWOM on the one hand and intention to embrace mobile banking on the other was moderated by consumer involvement. Similarly, it could be argued that customer involvement is a key determinant in evaluating the success of a mobile travel app. Thus, the psychological dimensions that were incorporated into the ISS model were validated.

User engagement emerged as a significant predictor of WOM sharing, thus supporting hypothesis 6. The finding corresponds with those of Coves-Martínez et al. (2022) and Meilatinova (2021). This implies that the propensity of the user to share their own experiences with a service product is a function of how deeply invested in, aware of, and attentive to the material or app the user is.

5.1 | Theoretical contributions

The first theoretical contribution of this study is in the development of an extended version of DeLone and McLean (2003) ISS model to explain user engagement with mobile travel apps and the resultant positive WOM. The study theorized that user engagement with mobile travel apps is a

function of information and system quality and of the psychological factors of enjoyment and involvement. Because some of the relationships in the original DeLone and McLean ISS model were not confirmed, the modified model of information success could be a more applicable model to use to explore mobile travel app engagement in emerging economies than the original DeLone and McLean ISS model. These findings underscore the call continually to validate Western-based theories in order to determine their applicability in other settings (Humbani & Wiese, 2019; Ojo, 2017).

Furthermore, the literature indicated that the outcomes of using DeLone and McLean (2003) ISS model in emerging economies have been erratic, producing inconsistent results in South Africa (Ojo, 2017), Malaysia (Chan et al., 2022), and Taiwan (Hsu, 2023). These inconsistencies suggest that some Western theories may not apply in the context of emerging economies, as suggested by Humbani and Wiese (2019), who reported that individuals in different countries differ in their personality traits and their acceptance of a new technology. Therefore, the study identified the knowledge gap in order to validate the three fundamental tenets of the model in the context of South Africa, where 90% of adults own a smartphone (Humbani, 2021), thus suggesting an immense potential market for mobile travel apps. Against this backdrop, the study enriches the literature on mobile travel apps by confirming the predicting role of the psychological factors over and above the information system characteristics that are commonly investigated in the literature.

Second, the study contributes to the growing number of studies on mobile travel technologies in emerging economies such as South Africa, which is characterized by high-speed internet and enhanced 4G and 5G coverage that is widely available in towns and cities (Humbani, 2021), thus making it a prime market for mobile apps, such as mobile travel apps.

5.2 | Practical contribution

The ultimate goal of the service provider is to prompt desirable behavior from consumers, such as engaging with the mobile travel app. To ensure that this key imperative becomes a reality, it is important to focus on the technical aspects of the operating system. In the context of mobile travel apps, these technical aspects include the information system quality dimension and the psychological elements of involvement and enjoyment, which may result in an enhanced understanding of user engagement and positive WOM.

The study showed that consumer expectations when using mobile travel apps lean more toward the technical aspects of the operating system (information and system quality) than toward the service quality aspect of the app. Service providers and mobile travel app developers should continually improve their apps' design and functionality in order to enhance user engagement and positive WOM. In agreement with Tak and Gupta (2021), this study found that users prefer mobile travel apps that provide accurate, useful, and timely information (such as in-app booking, in-app payment, currency conversion, and weather forecasts) in a way that helps them to execute their travel plans efficiently. Therefore, it is recommended that service providers make regular updates to the information relating to travel products or packages on their communication platforms.

According to Meilatinova (2021), service providers could provide real-time travel information before and during a trip, giving app users the option to change their trips based on their travel needs. For instance, if travelers were able to change their travel plans using the mobile travel app, their engagement with the app would increase. More importantly, the travel app should be easy to use so that users could perform tasks without difficulty. The findings of the current study indicated that those elements are more important to users than the customer support offered by help-desk personnel, especially given that mobile travel apps generally function optimally. In addition, service internet connections that are unreliable can lead to displeasure, frustration, and loss of interest in using the app. Thus, it is advisable for service providers to partner with mobile network operators in order to enhance overall connectivity so that travelers are not inconvenienced.

Similarly, the psychological aspects of the consumer experience, such as enjoyment and involvement, also take precedence in fostering user engagement. It seems as though travelers prefer to use mobile travel apps to gain a sense of power over their own travel plans, in the hope of having a more personalized travel experience. For this reason, some establishments have introduced check-in apps that allow guests to select their preferred rooms on their own. These check-in apps use digital floor plans that can be downloaded onto mobile devices so that the employees of the service provider can focus on providing a higher level of service (Zhang et al., 2019).

To increase user involvement, service providers should enhance their value propositions by offering more benefits to mobile travel app users. In line with Zhang et al. (2019), such benefits could include mobile travel apps that are easily accessible, simplified transactions, the ability to create real-view pictures and videos of destinations, customized and improved services, and the ability of the app to build excitement and anticipation with sneak peeks and highlights. These attributes are likely to enhance engagement with the mobile travel app and the generation of positive WOM as the desirable outcomes for service providers in the travel industry.

Furthermore, the relationship between user engagement and WOM indicated that the more users are engaged with the mobile travel app, the more they share their positive experiences with other consumers. Therefore, a mobile travel app designed with a focus on information and system quality, enjoyment, and involvement could greatly influence user engagement, leading to the generation of positive WOM.

6 | CONCLUSIONS

In conclusion, understanding the psychological motivations together with the technical aspects of the system could help service providers to customize their mobile travel apps to suit user expectations by focusing on both the technical and the psychological elements of the app. Although mobile technology is important for the success of a business, adopting a scattergun approach could result in wasted time and resources. Targeting a specific segment of the market would likely yield better results. This study targeted leisure travelers who, for the most part, make their own travel decisions, rather than business travelers, who may be mandated by management to travel and to perform a specific duty. Drawing on the extended DeLone and McLean (2003) ISS model, the study shed some light on how the interplay between system characteristics and psychological factors influences user engagement, which ultimately determines ISS for mobile travel apps involving leisure travelers, except for service quality. Based on the findings, it could be concluded that information and system quality, involvement, and enjoyment have a direct influence on user engagement, which consequently influences users' willingness to spread positive WOM. The study emphasized that, for effective engagement and positive WOM, service providers should develop mobile travel apps that not only function with optimum efficiency but also ensure that users are fully involved by offering a seamless and enjoyable experience.

6.1 | Limitations and directions for future research

The study has some limitations that are worth noting. First, the study examined user engagement from a broader perspective, and did not focus on a particular travel app. Therefore, the findings may not be applicable to a particular travel app. Future studies could employ the modified model used in this study to examine user engagement with different types of app, such as virtual reality applications, augmented reality applications, and robotic applications (El-Said & Aziz, 2021).

Second, the study sample comprised leisure travelers, whose interpretations of the study's constructs may differ from the interpretations of business travelers. As a result, future studies could apply the study model with a double focus on business and leisure travelers in order to gain a broader understanding of user engagement and the generation of WOM from both perspectives.

Third, the study was conducted in South Africa, meaning that the findings cannot be generalized to other emerging economies and other culturally distinct economies. For example, South Africa, Nigeria, and Egypt are the only three emerging economies that support 5G network access (GSMA, 2022). Therefore, the use of mobile travel apps could be different in countries where technological advancements are not progressing at the same pace as in the above-mentioned economies. Consequently, future studies could employ the modified model in other regions in order to strengthen and validate the findings in different settings.

Fourth, although a limited number of studies have investigated the interrelationships among the fundamental dimensions of information quality, system quality, and service quality (Al-Mamary et al., 2014; Gorla et al., 2010), for the most part these studies have focused on the dimensions as critical factors to improve organizational performance. Future studies could explore the interrelationships among the three quality dimensions to extend knowledge of ISS, particularly in the mobile travel app context.

Last, a majority of the study's respondents were from the Black/African ethnic group; therefore, future studies could employ a quota sampling technique to ensure a more accurate representation of the entire sample population. Furthermore, this study adapted only five items from the original engagement scale, which contained 12 items. It is recommended, therefore, that future studies replicate this study using all 12 items to measure engagement in order to determine whether similar results could be obtained.

ACKNOWLEDGMENTS

We would like to acknowledge the valuable input we received from Karien Hurter for the proofreading of the manuscript.

CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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How to cite this article: Dube, N., & Humbani, M. (2024). Testing a modified information system success model in a mobile travel app context. *The Electronic Journal of Information Systems in Developing Countries*, *90*(6), e12339. https://doi.org/10.1002/isd2.12339

APPENDIX A: A Questionnaire items

Information quality (adapted from Ahn et al., 2004)

- The mobile travel app provides complete information.
- The mobile travel app provides detailed information.
- The mobile travel app provides accurate information.
- The mobile travel app provides timely information.
- The mobile travel app provides reliable information.
- The mobile travel app has sufficient content that I expect to find.

System quality (adapted from Ahn et al., 2004)

- The mobile travel app has an easy navigation to information.
- The mobile travel app has fast response and transaction processing.
- The mobile travel app keeps transactions secure from exposure.
- I can use the mobile travel app when I want to use it.
- The mobile travel app has an appropriate design style.
- The mobile travel app has a good functionality relevant to the app type.

Service quality (adapted from Ahn et al., 2004)

- The support staff anticipates and responds promptly to a user's requests.
- The support staff can be depended on to provide whatever is promised.
- The support staff instills confidence in users and reduces uncertainty.
- The support staff understands and adapts to the user's specific needs.
- The support staff provide follow-up services to users.
- The support staff give a professional and competence image.

Involvement (adapted from Stocchi et al., 2018; Morosan & DeFranco, 2016)

- Because of my personal values, I feel that mobile travel apps ought to be important to me.
- It gives me pleasure to download and use mobile travel apps.
- I am particularly involved with mobile travel apps to meet my travel needs.
- Mobile travel apps help me express who I am.
- I rate my mobile travel apps as being of high importance to me.
- I can think of instances where a personal experience was affected by the way I used mobile travel apps.

Enjoyment (adapted from Lu et al., 2017)

- Using mobile travel apps brings me pleasure.
- Using mobile travel apps makes life fun.
- Using mobile travel apps makes me feel happy and relaxed
- Using mobile travel apps is exciting

Engagement (adapted from O'Brien et al., 2018)

- I lose myself in this experience.
- The time I spent using mobile travel app just slipped away.
- The mobile travel app is esthetically attractive.
- Using mobile travel apps is worthwhile.
- My experience is rewarding.

Word of mouth (adapted from Meilatinova, 2021)

- I would share with others positive things about mobile travel apps.
- I would provide others with information on mobile travel apps.
- I am likely to recommend the mobile travel app to friends or acquaintances.
- I am likely to encourage others to consider using mobile travel apps.