EXPLORING THE DETERMINANTS OF USER ENGAGEMENT AND CONTINUANCE USAGE INTENTION OF TRAVEL APPLICATION

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BY

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A final year project submitted in partial fulfillment of the requirement for the degree of

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PREFACE

This final year project is completed and submitted in fulfilment of the requirements for the Bachelor of Marketing (Hons) at Universiti Tunku Abdul Rahman (UTAR). Following significant technological improvements, travel applications have become indispensable resources for travellers, enabling ease and personalized experiences. With the market becoming increasingly saturated, developers and marketers face the problem of keeping consumers interested and converting them into continuance usage intention. This research investigates the factors that influence user engagement and continuance usage intention in travel applications. Understanding the motivations behind travellers' use and recommendations of digital tools is crucial as they continue to seek more from their technology. The study examines aspects such as user interface (UI) (PU), relative advantage (RA), compatibility (COM), perceived incentives (PI), and user engagement (UE) with the application. Although travel application is becoming more important, there is not enough research on the factors that affect user engagement and continuance usage intention for this application. This research intends to bridge the gap by identifying the critical factors that increase user engagement and continuance usage intention for these applications. The objective is to offer insights that aid in creating application features and strategies that not only meet user expectations but also differentiate application in a competitive environment. The title of the study is " Exploring the Determinants of User Engagement and Continuance Usage Intention of Travel Application.

ABSTRACT

The advancement of technology and the rapid development of various applications have fostered significant growth in mobile applications usage. Among these, travel applications have grown significantly on a global scale, assisting in the seamless operation and recovery of tourism activities following the epidemic. Many travellers rely on travel applications during their trips, as these applications effectively consolidate multiple tourism-related functions into a single platform, thereby facilitating smoother communication and interactions within the tourism industry. As a result, it was necessary to investigate the elements influencing user engagement and long-term usage intentions for travel applications. In this research, S-O-R theory was applied as theoretical framework within variables user interface, relative advantages, compatibility and perceived incentives which influence user engagement and continuance usage intention towards travel applications. In addition, data from 371 respondents with prior experience in using travel applications will be collected and analysed using PLS-SEM. These findings offer insightful information for researchers, managers, developers and policymakers in the travel industry, thereby helping to enhance user experience and satisfaction with travel applications.

Keywords: travel application; S-O-R; compatibility; user engagement; continuance usage intention

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LIST OF ABBREVIATIONS

S-O-R	Stimulus-Organism-Response
TAM	Technology Acceptance Model
TPB	Theory of Plan Behaviour
VAM	Value-Added Model
UTAUT	Unified Theory of Accepyance and Use of Technology
DV	Dependent Variable
IV	Independent Variable
UI	User Interface
RA	Relative Advantage
COM	Compatibility
PI	Perceived Incentives
UE	User Engagement
CUI	Continuance Usage Intention
PLS-SEM	Partial Least Squares Structural Equation Model
CR	Composite Reliability
CV	Convergent Validity
AVE	Average Variance Extracted
HTMT	Heterotrait-Monotrait
VIF	Variance Inflation Factor
LM	Linear Mode

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CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This research strives to explore the determinants of user engagement and continuance usage intention of travel application. This chapter begins with Section 1.1 on the Research Background, followed by section 1.2 on the Research Problem, section 1.3 on the Research Questions, section 1.4 on the Research Objectives, section 1.5 on the Research Significance, and concludes with section 1.6.

1.1 Research Background

The rapid evolution of advanced technologies has greatly influenced how individuals obtain detailed information and spend their time, especially through online platforms and mobile devices. In Malaysia, the Malaysian Communications and Multimedia Commission reported that by 2021, 94.8% of the population owned smartphones, and internet usage reached 92.7% in 2022, an increase of 4% since 2020. This demonstrating the growing reliance on mobile technology. Alongside this technological progress, the use of smartphones and mobile applications has expanded significantly. Mobile applications, which are software programs installed on smartphones, allow users to complete specific tasks or perform functions (Tian et al., 2021). More recently, mobile applications have become a preferred method for accessing internet services, offering a quicker and more user-friendly experience compared to traditional web browsers (Albayrak et al., 2021). Nowadays, a variety of functions usually involve the use of these applications, including communication, shopping, accessing news, education, travel, and more (Tian et al., 2021).

The travel industry is increasingly embedded in the digital environment, which is no longer merely a trend but a defining feature of modern life. Among all economic sectors, tourism is particularly affected by digitalization, with its influence being especially profound (Stryzhak, 2022). As a consumer-driven industry, tourism has embraced mobile applications as a key tool in enhancing the overall travel experience. The widespread adoption of travel applications has significantly reshaped both tourist behaviour and the operational strategies of tourism-related businesses. These applications have not only revolutionized how people plan and experience their travels but have also transformed how companies connect with and serve their customers (Zhang, 2023). Today, mobile applications are a central part of the travel experience, serving multiple functions such as providing destination information, acting as digital travel agents and translators, offering entertainment, and facilitating tasks like airline check-ins (Çaylak et al., 2024).

Travel booking applications are digital platforms that enable users to conveniently purchase tourism services like hotels, accommodation and tickets via mobile devices (Tian et al., 2021). They have become essential tools for modern travellers, offering real-time access to travel information, bookings, and itinerary planning anytime, anywhere (Manos et al., 2024). Travel applications that combine all aspects of traveling into a single solution will be vital for boosting travel experiences and confidence (Andriopoulos, 2021). In Malaysia, widely used examples of such applications include Klook, Trip.com, and Agoda, which are commonly relied upon for travel-related needs. Travel applications rank among the most frequently downloaded application categories, drawing significant attention from smartphone users preparing for their trips. Around 60% of the world's 1.75 billion users of mobile have installed at least one travel-related application, and 45% of these users regularly utilize them to manage their travel plans (Dube & Humbani, 2024). Similarly, China accounted for 97.64% of online travel application users by December 2018, with 40.32 million users, illustrating that mobile booking has become the preferred method for arranging travel among Chinese consumers (Liu et al., 2023). These applications play a crucial role throughout the whole travel process, from the early stages of searching and booking to post-travel reviews and have a major impact on the acquisition of primary and additional tourism services (Kim et al., 2021). Travel applications offering easy-to-access, precise, and detailed data, enable travellers to share their travel experiences in the present time as well as remain informed on topics of interest. Thus, it is evident that travel applications are becoming increasingly vital in the travel experiences of today's global tourists.

tourists. However, in this rapid growth of these applications' environment, the long-term achievement of these applications depends not only on initial adoption but on users' continuance usage intention, which is their willingness to keep using the application after first experience (Foroughi et al., 2023).

Malaysia provides a relevant and diverse sample, given its high concentration of technology users and accessibility to digital services. In Malaysia, nearly 29 million people own smartphones (Yeh et al., 2024). Similarly, by 2021, there will be over 33 million smartphone users in Malaysia. Additionally, it was noted that millennials are more likely than earlier generations to own mobile phones (Mustaffa & Sailin, 2022). People aged 20 to 34 had the highest rate of mobile phone ownership (93.6%), as reported by Statista (2024).

1.2 Research Problem

Travel applications now enable users to search for destinations, book flights and accommodations, and access travel guides anytime and from anywhere. Despite their growing popularity, many users remain dissatisfied with their performance and overall experience. Lim et al. (2022) reported that travel providers face challenges in expanding their business through these applications, as they often fall short of expectations despite significant investment. A 2024 survey revealed that 40% of travellers were highly frustrated with unresponsive customer service, underscoring the urgent need for improved support in the travel industry (ETTravelWorld, 2024). Similarly, O'Halloran (2022) found that 37% of respondents considered travel applications ineffective in addressing common issues such as rebooking cancelled flights or finding accommodations, which often result in discontinuance of use. Ahmad et al. (2020) emphasized that user interface design should prioritize travellers' needs to reduce complexity, while Fang et al. (2017) reported that 38% of users abandon an application immediately when it performs poorly or fails to deliver on its promises. This indicates that usability and reliability are critical for retaining users, and that failing to meet user expectations

can lead to immediate disengagement and abandonment of travel applications. Thus, travel applications is one of the issues that need to be considered.

While travel applications are becoming a necessary tool for organizing and scheduling travel, many users discontinue use after initial adoption, with nearly 40% abandoning the application after a single session (Kim et al., 2013; Yoon & Rolland, 2015; Casquero et al., 2022). The user retention rate of travel booking mobile applications was 20% on the first day of download, but only 6% by day 30, demonstrating low user retention and low user loyalty to travel applications (Albayrak et al., 2021). In addition, poor customer service, usability issues, and failure to meet expectations contribute to high drop-off rates (Fang et al., 2017; ETTravelWorld, 2024). Most studies have focused on initial adoption factors such as perceives ease of use and perceived usefulness, while limited research has examined what drives continuance usage intention, a critical element for user retention and business success (Camilleri, 2023). Important factors such as usability, functionality, information quality, and compatibility with user preferences remain underexplored. Therefore, identifying the factors that influence continuance usage of travel applications is essential to improve user retention and ensure sustained business growth. As a result, this has led to a concern whereby a customer does not engage or does not have intention to use travel applications.

The uncertainty in retaining user interest presents a significant barrier to the widespread adoption of travel applications (Yin, 2024). Despite the increasing reliance on travel application, there aren't much empirical research to comprehend user engagement behaviours in this context. Furthermore, an extensive understanding of the causes and effects of user engagement with travel applications is lacking in the body of current research (Tian et al., 2021). This gap highlights the need for models that explain which application features encourage engagement and how they affect long term usage.

Poor user interfaces are a significant obstacle to using travel applications effectively, as inconsistent design and navigation make it difficult for users to understand and interact with the application, often leading to discontinuance (Komariah et al., 2023). Poor user interfaces cause plenty of applications lose users' interest over time, reduces the retention, as Durgekar et al. (2024) pointed out. These issues are brought to light via real-world examples. Users of Trip.com complained about an overly complex interface which led to harder to access important functions (Firzatullah, 2025). For example, British Airways faced criticism when a user

interface failure caused check-ins being disrupted during peak travel demand (Sherzad, 2025). In responses, this study investigates how user interface affects user engagement in travel applications.

On the other hand, travel applications offer various benefits to users. However, the fierce rivalry among travel applications has driven up user expectations, leading users to actively seek platforms that provide significant advantages over existing alternatives (Gao et al., 2023). Despite this, the benefits of travel applications are often similar, as many of them share essential features such as offline itinerary access, pricing comparison tools, and reward tracking (Camilleri et al., 2023). This overlap reduces the relative advantages of individual platforms. Nevertheless, users are more willing to interact with applications that operate flawlessly and deliver unique value, emphasizing the importance of user experience in a competitive market (Lim et al., 2022). These dynamic underscores the critical role of relative advantage in shaping adoption, engagement, and continuance intention (Tiwari et al., 2023).

Most earlier studies on travel applications have focused on components such as perceived usefulness, perceived value, perceived ease of use, and privacy (Liu et al., 2023; Huang & Suo, 2024; Yin, 2024). However, two important aspects remain relatively underexplored, which are compatibility and perceived incentives. Compatibility is crucial because applications that fail to align with users' preferences and behaviours risk disengagement and abandonment, even if they are technically functional. When users perceive low compatibility, they feel the application does not fit their travel planning style, resulting in weaker attitudes and lower continuance intentions (Lim et al., 2022). Therefore, understanding and enhancing compatibility is crucial, as it has a crucial function in sustaining user engagement and fostering continuance usage of travel applications.

In addition, perceived incentives, such as discounts, coupons, and rewards have received limited attention in the travel application literature, despite being recognized as influential in other digital commerce contexts (Bennett et al., 1988). Well-designed incentive programs that emphasize long-term relationship building over short-term financial inducements can strengthen user engagement (Choi et al., 2018). This is especially relevant for cost-conscious consumers, for whom incentives significantly enhance engagement and continuance usage (Atulkar & Verma, 2021; Atulkar & Singh, 2021). Our knowledge of how these incentives impact user engagement and application continuation are constrained by this gap.

This problem is particularly relevant in Malaysia, where the smartphone ownership is notably high. With 127.7 mobile connections per 100 people, internet penetration rate in the nation in 2023 was 96.8%, indicating that Malaysia, particularly its urban areas has evolved into a mobile first, digitally related society (Kemp, 2023). Given these challenges and research gaps, this study seeks to investigate how factors such as user interface, relative advantage, compatibility, and perceived incentives influence user engagement and continuance usage of travel applications within this context.

1.3 Research Questions

RQ1: Do user interface, relative advantage, compatibility, and perceived incentives influence user engagement?
RQ2: Does user engagement influence user's continuance usage intention in travel application?

1.4 Research Objectives

Building on the issues and gaps outlined in the research problem, this study aims to examine the determinants that influence user engagement and continuance usage of travel applications in the context of Malaysia. Specifically, the objectives of this research are:

RO1: To examine the relationship between user interface, relative advantage, compatibility, perceived incentives and user engagement.
RO2: To examine the relationship between user engagement and user's continuance usage intention in travel application.
The research objective is to examine the determinants that influence users' continuance intention to use travel applications.

1.5 Research Significance

1.5.1 Academic Significance

This study approach benefits academics and researchers in tourist management and information systems since it gives comprehensive knowledge on the reasons for user engagement and continued use intentions in travel applications. The S-O-R model will be developed further in this study to indicate its relevance and efficacy in understanding user behaviour in travel application situations. The S-O-R model uses travel applications to examine the impact of environmental stimuli and internal moods in shaping behavioural responses. This study examines the relationship between stimulus (user interface, relative advantage, compatibility, perceived incentives), organism (user engagement), and response (continuance usage intention) to gain a better understanding of what drives user intention toward travel applications. This comprehensive methodology can assist in understanding and predicting user involvement and desire to continue using travel applications. As a result, academics and researchers in this sector will profit from the study's detailed findings.

1.5.2 Practical Significance

In supporting the growth of the travel applications sector, this study may help designers and managers by provides valuable insight into the S-O-R factors, which assist in constructing user-friendly and functional travel applications. This enables developers to enhance the overall user experience by prioritizing features that match user preferences and demands, resulting in increased user engagement. Furthermore, this research emphasizes the importance of implementing strong security measures when designing travel applications to increase user confidence and happiness, resulting in better engagement and continued usage intention.

This research can also help policymakers and regulators identify and solve the privacy and security vulnerabilities that travel applications bring. Given the growing concerns about data privacy and security in the digital age, our research can assist them in developing robust policies and standards to secure user data and maintain trust in the travel application ecosystem.

1.6 Conclusion

This section concludes with a summary of the research problem and an overview of the study. The significance, objectives, and research questions have been outlined to frame the investigation. The upcoming chapters will review relevant literature, introduce the S-O-R framework, and present the proposed research model, followed by the development of hypotheses to support the study.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter reviews the study's underlying theories and explains each variable. The proposed framework and hypotheses are also discussed to examine the determinants of user engagement and continuance usage intention of travel application. This chapter will include the literature review, comprising Section 2.1 Underlying Theories, Section 2.2 Review of Variables, Section 2.3 Hypothesis Development, Section 2.4 Proposed Conceptual Framework, and Section 2.5 Conclusion.

2.1 Theoretical Foundations

2.1.1 Stimulus-Organism-Response (S-O-R)

Mehrabian and Russell (1972), who created the Stimulus-Organism-Response (S-O-R) framework, proposed that environmental stimuli influence individuals by eliciting cognitive and emotional reactions such as perceptions and experiences which in turn shape their attitudes and behavioural responses. Accordingly, research conducted by Dahri et al. (2025) and Sivasothey et al. (2024), it emphasises that the S-O-R model is a widely recognised structure for understanding user behaviour, as it suggests that external stimuli (S) affect an individual's internal states (O), which in turn shape behavioural responses (R). For example, Tak and Gupta (2021) applied the S-O-R framework in the context of travel applications and found that collaborative features, information quality, and visual design strongly affect user engagement.

Similarly, Tian et al. (2021) confirmed that S-O-R effectively shows how individuals respond to digital environmental stimuli.

Despite its significance, the S-O-R model has been less widely applied in studies on travel applications compared to other frameworks such as Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Value-Added Model (VAM), and Unified Theory of Acceptance and Use of Technology (UTAUT) (Zhu et al., 2022; Murrar et al., 2025; Ghorbanzadeh et al., 2025). These traditional models predominantly focus on behavioural intention and technology adoption, with response variables such as intention to use or actual usage. While TAM and UTAUT remain robust in explaining technology acceptance, scholars argue that they may oversimplify complex adoption processes by concentrating primarily on perceived ease of use and perceived usefulness (Kruger & Steyn, 2024). This cognitive focus, although foundational, limits their ability to capture nuanced and context-rich environments, particularly in the rapidly evolving era of the Fourth Industrial Revolution (4IR). Study such as Bayaga and Du Plessis (2023) have therefore encouraged extending or blending models to address these limitations.

In contrast, the S-O-R model offers a more holistic perspective by incorporating both external environmental stimuli and internal psychological reactions, which include cognitive, affective, and emotional dimensions (Yaqub et al., 2024). This provides a richer understanding of user engagement and behavioural outcomes that are often missing in TAM or UTAUT. Travel applications similarly provide diverse and immersive stimuli, making S-O-R particularly suitable for investigating this context.

Drawing upon this theoretical lens, the present study applies the S-O-R model to explore how travel applications attributes (e.g., user interface, relative advantage, compatibility, and perceived incentives) function as stimuli. These stimuli are cognitively and emotionally processed by users (the organism), leading to responses such as engagement, satisfaction, loyalty, and continuance usage intention in travel applications. By adopting the S-O-R framework, this study extends beyond traditional adoption models to capture both rational and emotional aspects of user behaviour in the travel applications environment.

2.2 Review of Variables

2.2.1 User Interface (UI)

Green (1985) described the interface as the layer between users and computer systems, enabling interaction with underlying functionalities, while also shaping how people engage with digital platforms. Building on this, attractiveness refers to a travel application's visual appeal, which is generated from design elements including colour schemes, and layout (Fang et al., 2017). In line with this perspective, it has been framed as the science of designing graphical layouts for websites and applications, emphasizing its role in visual communication and usability (Hidayanti et al., 2023). More recently, it has been defined as an interactive bridge that allows users to directly experience and interpret a system's features and performance (Fan & Yang, 2025). Collectively, these perspectives highlight that interface design is not only technical but also experiential, merging functional efficiency with user-cantered aesthetics. Accordingly, in this study, user interface refers to users' viewpoint of the visual appeal of a travel application, originated from design elements such as colour, layout, buttons, and icons.

2.2.2 Relative Advantage (RA)

Relative advantage describes the level to which an invention is superior to the alternative. Initially described by Rogers (1962) as the perceived improvement of a new product over its predecessor, he later refined the definition as "the degree to which an innovation is perceived as being better than the idea it overtakes" (Rogers, 1983). In the context of travel applications, relative advantage has been associated with personalization, functionality, and overall user

experience. Similarly, it has been defined as the extent to which users believe a particular travel applications to be better than other travel applications currently available (Fang et al., 2017). This superiority may stem from features such as booking tickets, comparing prices, or accessing navigation tools that make travel planning more convenient and efficient (Tiwari et al., 2023). Moreover, relative advantage has also been defined as the perceived benefits users gain from using travel applications (Gao et al., 2023), while others highlight its role in reflecting how digital services outperform substitute technologies in terms of convenience, performance, and functionality (Japutra et al., 2022). Collectively, these perspectives indicate that relative advantage plays an important role in influencing users' adoption and continued use of travel-related digital platforms. Accordingly, in this study, relative advantage refers to the degree of which users perceive a precise travel application as superior to other current applications, particularly in terms of the benefits it provides such as convenience and time savings.

2.2.3 Compatibility (COM)

Rogers (1983) defined compatibility as the extent to which an innovation aligns with individuals' existing values, beliefs, habits, and past experiences. This is consistent with the view that compatibility reflects how well an innovation fits with users' current values, prior experiences, and needs (Tian et al., 2021). In the travel context, compatibility specifically refers to the degree to which a travel application aligns with users' travel interests (Gao et al., 2023). Similarly, it has been described as the consistency of a product with users' lifestyles, needs, and cultural norms (Gumasing, 2025), as well as its ability to integrate with consumers' daily life patterns (Chang & Ku, 2023). In the context of this study, compatibility refers to the extent to which a travel application aligns with users' travel needs, preferences, and lifestyle, thereby supporting engagement and continuance usage intention.

2.2.4 Perceived Incentives (PI)

Locke (1968) broadly defined an incentive as an external factor that motivates or stimulates an individual to take a specific action. In marketing contexts, incentives are typically designed to encourage consumer behaviour by offering rewards such as discounts or bonuses (Abbasi et al., 2021). These incentives often take the form of monetary benefits, including discount vouchers, cashback offers, promotional sales, referral rewards, and loyalty points (Atulkar & Singh, 2021). Beyond monetary rewards, incentives may also include non-financial motivators that influence decision-making or persuade individuals to prefer one option over another (Cudjoe et al., 2024). Specifically in the context of travel applications, perceived incentives often relate to the financial benefits users gain from using the applications, such as exclusive mobile deals or last-minute discounts. Price competitiveness is also a key incentive, as many users perceive that applications provide the best available prices (Choi, 2018). Collectively, these perspectives highlight the strategic role of incentives in enhancing consumer engagement and driving desired behaviours. Accordingly, in this study, perceived incentives refer specifically to monetary benefits, including discounts, promotion codes, rewards, loyalty points, and exclusive deals that are offered to loyal users of travel applications.

2.2.5 User Engagement (UE)

O'Brien and Toms (2008) described user engagement as a component of user experience that encompasses elements such as challenge, positive affect, persistence, aesthetic and sensory appeal, attention, feedback, novelty, interactivity, and a sense of control. In addition, user engagement has been defined as the emotional, cognitive, and physical involvement of a customer with a product or service (Ali et al., 2021). It can also be viewed as a multidimensional experience involving users' emotional, cognitive, and behavioural interactions with a technological resource over time (Shi & Zhang, 2025). Similarly, user engagement reflects the

extent to which users are cognitively, emotionally, and physically connected to service-providing organisations (Hsu, 2023). Therefore, in our context, user engagement refers to the beliefs and familiarity of users about travel application on how it fits with users live.

2.2.6 Continuance Usage Intention (CUI)

Bhattacherjee (2001) explained that a continuance decision resembles a consumer's repurchase decision, as both occur after initial adoption or purchase, are influenced by prior usage experiences, and may lead to a revision of the original decision. Accordingly, continuance intention is largely determined by users' satisfaction with their previous information system (IS) experience. It also reflects user loyalty, characterised by the consistent and repeated use of a technology without switching to alternative services over time (Ferreira et al., 2021). In this sense, continuance intention refers to users' intention to continue using an application in the future (Sun & Yuan, 2024), and more broadly, to their ongoing intention to use an information system over time, typically shaped by prior usage satisfaction (Rahi et al., 2025). Therefore, in our context, continuance usage intention refers to the extent to which users of travel applications plan to keep using the application in the future, influenced by their past experiences.

2.3 Hypothesis Development

2.3.1 The Relationship Between User Interface and User Engagement

Numerous studies have highlighted the essential role of user interface design in boosting user engagement. For instance, Liu et al. (2024) demonstrated that an adaptive user interface capable of adjusting in real time to user behaviour and preferences can significantly improve both engagement and satisfaction. Likewise, Tuch et al. (2012) emphasized that visual elements such as colour palettes, layout balance, and overall attractiveness influence users' initial impressions, which are crucial in determining continued application use. In the specific context of travel booking platforms, Huang and Suo (2024) identified a strong positive correlation between interface design and customer engagement. Katiniou (2023) further supported this perspective by highlighting how psychologically informed user interface design can deepen user engagement. Given these findings, it is reasonable to cuser interface plays an influential role in shaping user engagement. In this study, the user interface is anticipated to enhance user engagement, as a simple and attractive interface design encourages positive attitudes and behaviours toward the travel application.

Thus, we propose the following hypotheses:

H1: User interface positively influences user engagement in travel application.

2.3.2 The Relationship Between Relative Advantage and User Engagement

While numerous studies have shown that relative advantage significantly influences continuance intention (Wu, 2022; Chen et al., 2022), it is also closely associated with user engagement. For instance, Jaidev and Shekhar (2021) found that users who perceived mobile wallet applications as more functional and convenient were more likely to engage with them actively. Similarly, travel applications that offer clear advantages, such as greater efficiency, ease of use, or exclusive features, over traditional booking methods or competing applications are likely to foster more frequent and meaningful user interactions. Lim et al. (2022) emphasized that when users perceive greater benefits from making purchases via travel applications compared to other platforms, they are more inclined to continue using them for future transactions. Supporting this, Fang et al. (2017) suggested that a higher perceived relative advantage can lead to deeper psychological engagement with the application.

Together, these results emphasize the vital importance of relative advantage in boosting user engagement and sustained usage. In this study, the relative advantage of travel application enhances user engagement, as the benefits users gain from the application encourage them to use it regularly. Thus, the following hypothesis is proposed:

H2: Relative advantage positively influences user engagement in travel application.

2.3.3 The Relationship Between Compatibility and User Engagement

Travel applications provide various functions to meet its users' needs such as location-based services that provide personalized recommendations for attractions, restaurants, hotels, and flights. They also serve as platforms for booking accommodation, air tickets, and entrance passes to scenic sites (Tian et al., 2021). When such functions align with users' preferences and requirements, the perceived compatibility of the applications increases. Prior research indicates

that cross-platform compatibility positively influences game sales and user engagement. This is because cross-platform compatibility allows users to seamlessly access the game across different devices and engage with a broader network of players, which enhances convenience, social connectivity, and ultimately increases user engagement (Zhai, 2026). Similarly, previous study found that compatibility has a favourable impact on application participation. This studies on different types of applications back the connection between compatibility and customer engagement with travel applications (Kim & Baek, 2018). Therefore, in the context of travel application, anticipate that compatibility enhances travel application engagement, as when the application's features match users' needs and preferences, they are more inclined to deem it valuable and enjoyable, leading to increased engagement. Thus, we propose the following hypotheses:

H3: Compatibility positively influences user engagement in travel application.

2.3.4 The Relationship Between Perceived Incentives and User Engagement

The study conceptualizes rewards as perceived incentives, motivational drivers shaped by individuals' interpretation of the value and attainability of offered benefits consistent with prior research (Hendijani & Steel, 2022; Frankort & Avgoustaki, 2021). Findings revealed that reward perception is a key factor influencing engagement, with a strong positive relationship between engagement and users' belief in the value of rewards (Hossain & Magar, 2025). Evidence from organizational contexts, such as the Port Harcourt Electricity Distribution Company, shows that both monetary and non-monetary incentives can enhance commitment, while the absence of such programs reduces motivation (Liang et al., 2018; Ohiare & Amah, 2023). Similarly, in consumer contexts, incentives play a critical role, with coupons and other benefits proving most effective when consumers already have a relationship with the brand. Additionally, the presence of a coupon in an advertised applications positively influences user

engagement with the applications after installation (Wohllebe et al., 2020). Thus, we propose the following hypotheses:

H4: Perceived incentives positively influence user engagement in travel application.

2.3.5 The Relationship Between User Engagement and Continuance Usage Intention

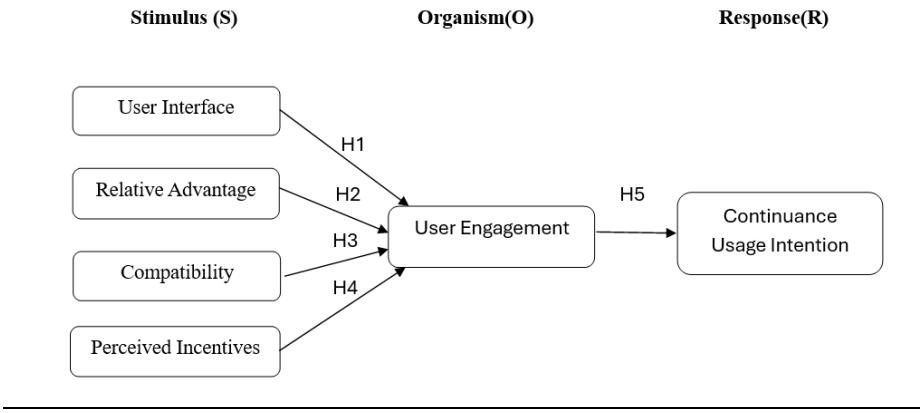
Hsieh et al. (2022) disclosed that user engagement is a key factor in the continuance usage intention of travel applications. Without engagement, an application is unable to attract continuance usage intention or build lasting relationships with user. For example, in the context of gamified travel applications, user engagement can further enhance this relationship, thereby increasing users' likelihood of continuing to use the application (Kaur et al., 2024). Similarly, user engagement can engender sustained usage of branded applications (Seridaran et al., 2024). Numerous studies have found a positive relationship between user engagement and continuance usage intention (Mclean, 2018; Qing & Haiying, 2021). Additionally, higher engagement enhances application satisfaction and emotional attachment, which further strengthens users' intention to reuse the applications (Wiyata et al., 2024). Therefore, in the context of travel applications, we expect that user engagement positively contributes to continuance usage intention because engaged users are more satisfied, emotionally attached, and motivated to reuse the applications. Thus, we propose the following hypotheses:

H5: User engagement positively influences continuance usage intention

2.4 Proposed Conceptual Framework

Exploring the determinants of user engagement and continuance usage intention in travel applications

Figure 1.1: Conceptual Framework



The Figure 1.1's conceptual framework grounded by S-O-R model include user interface, relative advantage, compatibility and perceived incentives as stimulus. The organism here is shown as user engagement, and response refers to continuance usage intention to use travel applications.

2.5 Conclusion

This chapter examines S-O-R model, and a total of five hypotheses were developed to investigate the relationships between the variables.

CHAPTER 3: METHODOLOGY

3.0 Introduction

The research methodology is presented in this chapter, including Section 3.1 on Research Design, followed by Section 3.2 on Sampling Design, Section 3.3 on Data Collection Methods, Section 3.4 on the Proposed Data Analysis Tools, and Section 3.5 on the Conclusion.

3.1 Research Design

According to Hunziker and Blankenagel (2021), research design can be defined as a set of decisions that guide a study toward developing a particular argument. It functions as a tool to achieve desired outcomes (Sakeah et al., 2023). Furthermore, research design aims to transform abstract concepts into structured investigations that address the central research question (Singh, 2024).

3.1.1 Quantitative Research

In this study, a quantitative research approach was adopted, which utilises numerical data collected through surveys to measure and describe the observed phenomena (Taherdoost, 2022). This design uses organised techniques and large-scale samples to ensure reliability and generalisability (Price & Lovell, 2018; Creswell & Creswell, 2023). In quantitative research, large-scale samples are used with organized tools such as surveys or questionnaires. Based on Jamieson et al. (2023), the quantitative research approach offers valuable opportunities to improve the depth of data analysis. It facilitates the examination of human behaviour by converting aspects of the social environment into measurable variables, such as frequencies or rates (Rashid & Sipahi, 2021) and applies statistical methods to explore the relationship between independent and dependent variables (Lim, 2024).

3.1.2 Descriptive Research

Next, this study adopts a descriptive research design, which helps researchers gain deeper insights into a specific population (Siedlecki, 2020). Takona (2023) explain that descriptive research focuses on observing and documenting characteristics or behaviours without exploring causality or testing theories, with the aim of providing an accurate representation of the phenomenon under study. Accordingly, this approach is useful for analysing data collected from respondents to better explain the variables and hypotheses in this research.

3.2 Sampling Design

The sample design specifies the methods used to select population units, and the determination of sample size significantly impacts the precision of the results (Clark & Steel, 2022). The main aim of sampling is to offer reliable estimates of population parameters and to facilitate hypothesis testing. Sampling is widely valued because it saves both time and financial resources while still enabling the collection of comprehensive and accurate data. (Kabir, 2016; Zyoud et al., 2024).

3.2.1 Target Population

Target population refers to a certain subgroup. within the greater population that is the mainly focus of a study, intervention, or marketing strategy. It represents individuals who share certain traits or meet defined criteria (Willie, 2023). In this study, the target population includes adults aged between 20 to 60, as they demonstrate greater independence in travel decision-making and higher engagement with applications. A study on tourism applications found that only about 10% of respondents were below 20 years old, and the majority users are 20-30 years old (Hamouda, 2021). This data implies those under aged 20 use travel applications far less frequently compared to older demographics. Prior studies also indicate that younger and middle-aged adults are more active users of mobile technologies, whereas older adults (above 60) often face barriers in adopting new applications (Beneito-Montagut et al., 2022). Therefore, selecting the 20-60 age group ensures that the study focuses on individuals who are both technologically engaged and financially capable of making independent travel decisions, aligning closely with the objectives of a travel application.

3.2.2 Sampling Location

Malaysia is considered a suitable context for this study due to its high level of mobile phone penetration and internet accessibility. Mobile phone ownership among individuals reached 98.4% in 2023, with usage rates as high as 99.4% (Department of Statistics Malaysia [DOSM], 2023). Both urban and rural areas recorded usage levels exceeding 98%, indicating that mobile technology is widely adopted across different geographical regions. This widespread access suggests that most of the population is familiar with mobile devices, making Malaysia a relevant setting for studies related to smartphone usage, applications, or digital behaviour. Furthermore, several states reported internet access rates above 99%, reflecting a highly developed digital infrastructure. Therefore, Malaysia provides a suitable and reliable sample for examining technology-related behaviours, as the high penetration and usage rates minimise accessibility bias and ensure that respondents are likely to have sufficient exposure to mobile and internet technologies.

3.2.3 Sampling technique

In survey research, selecting the suitable sampling technique and figuring out the sample size are important tasks duo to each comes with its own set of benefits and drawbacks (Rahman et al., 2022; Ahmed, 2024). The sampling methods include probability sampling and non-probability sampling. Probability samples are usually favoured as they enhance precision and facilitate inferences or generalizations regarding the population. Nonetheless, they tend to be pricier and are not always feasible since they necessitate a comprehensive list of every units of analysis within the population (Haute, 2021). Conversely, non-probability sampling is usually achievable in a quicker timeframe and at a reduced cost compared to probability sampling methods (Rahman, 2023).

In this study, non-probability sampling is employed because the absence of an entire list of individuals meeting the study criteria. Specifically, the study will utilize judgmental sampling, also known as purposive sampling method, a technique in which the researcher chooses subjects for the sample through critical and logical reasoning, excluding the use of statistical or other methods (Shukla, 2023). Participants were selected according to three criteria:

1. Users of travel applications
2. Residents of Malaysia
3. Aged between 20 and 60 years

3.2.4 Sampling size

Sampling size calculation aims to address the query, “How many participants or observations should be incorporated in this research?” (Althubaiti, 2022). In this study, the sample size was determined using G Power version 3.1 (see Figure 2.1). Since the research aims to examine the effect of five independent variables on one dependent variable (continuance usage intention in travel applications), the appropriate statistical technique is multiple regression analysis. By setting a medium effect size ($f^2 = 0.15$), $\alpha = 0.05$, and power = 0.95, the analysis indicated a minimum of 138 respondents. At the same time, we also use Morgan table to calculate the sample size. The study population was defined as residents of the Malaysia, Population of Malaysia, was estimated at 24.1 million. Based on age distribution information reported, approximately 59.1% in the age range between 20 to 60, the population of this range was estimated at ≈ 20 million (Pyramids, 2025). The Morgan's Sample Size Table calculate the required number of respondents is 384 (see Figure 2.2).

Figure 2.1 G Power Calculation

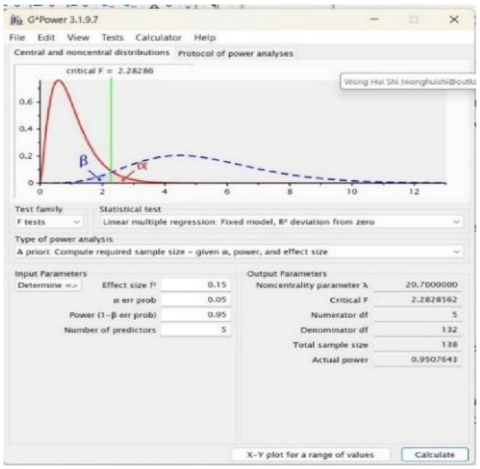


Figure 2.2 Morgan's Table Sample Size

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.
Source: Krejcie & Morgan, 1970

3.2.5 Sampling Frame

A complete list of sample units from a population is typically referred to as a sampling frame. A population is broader than a sample frame, which is more detailed (Rahman et al., 2022). Since a complete sampling frame of individuals meeting the study criteria is unavailable, this study adopts a non-probability judgmental (purposive) sampling technique (Asiamah, 2022). In non-probability sampling, respondents are selected based on the researcher's judgment and specific inclusion criteria. For this study, the target respondents are individuals aged 20 to 60 years old residing in the Malaysia who use travel applications. Therefore, the researcher will directly approach and select respondents who meet these criteria without relying on a complete list of the population, making the use of a sampling frame unnecessary.

3.3 Data Collection Method

3.3.1 Primary Data

Primary data is the information that collected directly by the researcher as first-hand through the questionnaire which more specific to research (Yin, 2024). In this study, the online questionnaire created based on research needs by utilizing Google Form which an online survey testing tool and distributed to population target respondents. We will send out the online survey via emails, social media like Instagram, WhatsApp, and QR codes. As a result, we were able to acquire the enormous amount of data needed more easily.

3.3.2 Questionnaire Design

The questionnaire was distributed via Instagram, WhatsApp, and QR codes using Google Forms in English. It consists of three sections: Section A includes screening questions, Section B collects demographic information such as gender, age, location, educational level, employment status, income level, frequency of travel applications usage, and the travel applications used and Section C contains 20 questions that explore the determinants of user engagement and continuance usage intention of travel applications, focusing on both independent and dependent variables that using a seven-point Likert scale (1=strongly disagree to 7=strongly agree).

Table 1.1 Source of Measurement Items

Variables	Items		Sources
User Interface	UI 1	The design of mobile travel app looks clean.	(Fang et al., 2017)
	UI 2	The design of mobile travel app is simple.	
	UI 3	The user interface design of mobile travel app is fascinating.	
	UI 4	The design of mobile travel app is attractive.	
Relative Advantage	RA 1	This mobile travel app enhances my traveling experience.	(Fang et al., 2017)
	RA 2	This mobile travel app helps me understand the destination easily.	
	RA 3	The mobile travel app saves my times.	
	RA 4	The mobile travel app makes traveling more effective.	
Compatibility	COM 1	I find the mobile travel app is compatible with my travel preferences.	(Gao et al., 2023)
	COM 2	I find that the mobile travel app suits my travel needs.	
	COM 3	I find the mobile travel app fits well with my travel needs.	
Perceived Incentives	PI 1	I receive offers from the mobile travel app.	(Choi, 2018)
	PI 2	I receive rewards from the mobile travel app.	
	PI 3	I receive special deals from the mobile travel app.	

User Engagement	UE 1	I feel motivated when I use the mobile travel app.	(Ali et al., 2021)
	UE 2	I feel enthusiastic when I use mobile travel app.	
	UE 3	I find that the mobile travel app is immersive.	
Continuance Usage Intention	CUI 1	I will continue to use mobile travel app.	(Sun & Yuan, 2024)
	CUI 2	I will say positive things about mobile travel app.	
	CUI 3	I will recommend mobile travel app to others.	

3.3.3 Pre Test

The purpose of pre-testing in research is to ensure data quality by identifying potential issues and minimising errors. According to Lenzner et al. (2022), pre-testing is a crucial component of quantitative research and is conducted prior to actual data collection. It plays an essential role in ensuring that the main data collection process can be carried out effectively (Hashim et al., 2022). In addition, pre-testing the survey questionnaire helps confirm that respondents clearly understand the questions and that the wording and format are appropriate (Sekaran & Bougie, 2016; Stockemer, 2019 as cited in Hashim et al., 2022). As a result, the research instrument was forwarded to three academics and experts in the tourism industry, who provided feedback and recommendations for improving the survey.

3.3.4 Pilot Test

A pilot study was conducted to initiate data collection for the present research project (Murali & Charlesworth, 2024). In addition, Saunders et al. (2009) describe a pilot test as a small scale study used to evaluate an interview guide, observation schedule, or questionnaire, in order to reduce the likelihood of respondents experiencing difficulties in answering questions or recording data, as well as to evaluate the validity of the instruments and the reliability of the data to be collected. Besides, Hill (1998) and Isaac and Michael (1995) emphasized that, 10 to 30 participants are enough for a pilot study. Therefore, a pilot test was carried out with 30 target respondents who met the study's requirement.

3.3.5 Pilot Test Result

As discussed in the previous section, a reliability test was conducted using a pilot sample of 30 survey responses to assess the consistency of all measurement variables. Based on the reliability analysis using PLS-SEM, the results indicated that all 30 responses demonstrated acceptable reliability and were suitable for further analysis.

Table 2.1 Reliability Analysis for Pilot Test

Construct	Cronbach's alpha	Composite reliability (rho_c)
COM	0.864	0.917
CUI	0.793	0.879
PI	0.805	0.886
RA	0.849	0.909
UE	0.867	0.918
UI	0.919	0.944

Source: Author's own work

Note: CUI= Continuance Usage Intention, Com= Compatibility, PI= Perceived Incentives, RA= Relative Advantage, UE=User Engagement, UI= User Interface

As shown in Table 2.1, 30 pilot survey questionnaires were used for the reliability test. The results showed that Cronbach's Alpha and Composite Reliability scores for all variables above the threshold of 0.70.

3.4 Proposed Data Analysis Tools

The suggested tools were applied to analyse the data in this study, with Partial Least Squares Structural Equation Modelling (PLS-SEM) used to evaluate the measurement and structural models (Hair et al., 2019). In this study, SmartPLS 4.1.1.4 software was used to conduct the PLS-SEM analysis (SmartPLS, 2014), as it allows researchers to test relationships between variables effectively (Purwanto, 2021). PLS-SEM is a popular technique among researchers and students due to its easy-to-use visual interface, which facilitates the analysis of complex models involving relationships between observed and latent variables (Memon et al., 2021).

3.4.1 Descriptive Analysis

Data analysis typically begins with descriptive analysis, as it facilitates the organisation and summarisation of data without relying on rigorous hypothesis testing (Teng & Ang, 2024). This approach transforms large datasets into meaningful insights that can be effectively communicated through tables, graphs, and other visual representations (Salvatore, 2021). In this study, it is employed to present respondents' demographic profiles using percentage distributions, thereby enhancing clarity and interpretability.

3.4.2 Inferential Analysis

Inferential statistics are used to test hypotheses and generalize from a sample to the population (Ranganathan, 2021). In this study, the inferential analyses include reliability testing (Cronbach's Alpha), correlation, and regression, which help ensure the data's consistency, examine relationships, and predict outcomes.

3.4.2.1 Partial Least Square Structural Equation Model (PLS-SEM)

SmartPLS is a software application used to conduct PLS-SEM analysis for testing and evaluating the proposed hypotheses (Dash & Paul, 2021). PLS-SEM was chosen due to its ease of use in handling multiple relationships within complex structural models (Sabol et al., 2023). In addition, it is recognized for its capability and efficiency in estimating path coefficients and model parameters under non-normal data conditions compared to other analytical software (Richter & Tudoran, 2024). Furthermore, PLS-SEM is suitable for studies involving small- to medium-sized sample sizes (Memon et al., 2020). Therefore, SmartPLS is considered the most appropriate analytical method for this study.

3.4.3. Measurement Model Assessment

The assessment of the measurement model is the first phase in PLS-SEM analysis to confirm the validity and reliability of research constructs (Legate et al., 2021). The measurement model's purpose is to analyse underlying proportions of construct variables, confirm these proportions, and determine the number of proportions for each construct (Haji-Othman & Yusuf, 2022). It serves as a bridge that connects unobservable, latent constructs with measurable, observed variables, explicitly or implicitly outlines how these indicators are related to the underlying latent construct (Bhale & Bedi, 2024).

In general, measurement models can be classified as reflective and formative based on the way constructs and their indicators relate to one another. The latent construct is assumed to be the cause of its indicators in a reflective measurement approach. As a result, a strong correlation between the indicators is expected. A formative measurement assessment, on the other hand, assumes that the latent construct is formed by the indicators (Subhaktiyasa, 2024).

A reflective measurement model is used in this research. Reflective measurement model assessment includes four steps, which are evaluating indicator reliability, internal consistency reliability, convergent validity and discriminant validity (Hair et al., 2021).

3.4.3.1 Indicator Reliability

The initial action in assessing a reflective measurement model is to analyse how much every indicator's variance is accounted for by its construct, illustrating indicator reliability. Reflective indicator loading is carried out by assessing the outer loading value (Hair et al., 2021). Purwanto & Sudargini (2021) stated that it is best to load above 0.708 since this shows that the construction accounts for more than 50% of the indicator's variance, making it a reliable item. It is crucial to exercise carefully while determining whether to remove the signal. When an

indicator's reliability is poor, it makes reasonable to remove it to increase internal consistency reliability and convergent validity (Zulkiflee et al., 2025).

3.4.3.2 Internal Consistency Reliability

Construct reliability is the second criterion for consistency evaluations, and it is assessed using two methods, which are Cronbach's alpha and Composite Reliability (CR). Indicators measuring a latent construct are evaluated for internal consistency reliability by using Cronbach's alpha and Composite Reliability (Malapane & Ndlovu, 2024). However, composite reliability uses the standardised loadings of the observed variables, it is believed to be a better indicator of internal consistency than Cronbach alpha. Despite this difference, both Cronbach's Alpha and the composite reliability have similar interpretations (Ghanbar, 2024). The range of Cronbach's alpha is 0 to 1. Cronbach's alpha values greater than 0.7 are typically thought to as acceptable. A high alpha signifies a strong relationship among the items of the test (Shrestha, 2021). In addition, A reliability coefficient falling within the 0.60-0.70 range signifies good reliability, while the 0.70-0.90 range signifies great reliability (Dolinting & Pang, 2022).

3.4.3.3 Convergent Validity

Convergent validity assesses the quality of a measurement tool by analysing if indicators measuring the same construct show a strong correlation. It shows how closely related and conceptually similar the items intended to measure a specific latent variable are (Amora, 2021). In PLS-SEM, the average variance extracted (AVE) serves as a measurement for it. The

convergent validity primarily assesses the correlation among items within the same dimension and identifies the average variance extracted (AVE). Each dimension's AVE value is higher than 0.5, indicating strong convergent validity. AVE must be at least 0.50. The greater means that the construct accounts for at least 50% of the variance in the indicators that comprise the construct (Huang, 2021).

3.4.3.4 Discriminant Validity

Discriminant validity assesses the level to which each construct in the model is differences from the others. This indicates that the constructs should be only weakly connected and measure somewhat different things (Li & Lay, 2024). Discriminant validity can be evaluated using the heterotrait-monotrait (HTMT) ratio of correlations within the range +1 to -1 (Lim, 2024).

3.4.4 Structural Model

Additionally, an evaluation of the structural mode measurement findings comes after the outer model analysis is finished (Abdel-Tawab et al., 2023). The inner model refers to the structural model. The structural model centres on the relationships among latent variables within the overall model. In PLS-SEM, the structural model is used to evaluate theories on the connections between latent variables or constructs. The lines or arrows indicating the suggested links between the latent variables form the structural model in PLS-SEM. The directional influence of one construct on another is indicated by those paths (Subhaktiyasa, 2024). Collinearity Assessment, Path Coefficients, Coefficient of Determination, Effect Size and Predictive

Relevance are the five primary factors that researchers ought to examine at to evaluate the structural model (Astuti, 2021).

3.4.4.1 Collinearity Assessment

First, researchers must evaluate the collinearity using the Variance Inflation Factor (VIF). This step is to guarantee that predictor constructs are not highly associated and assesses any potential collinearity problems (Subhaktiyasa, 2024). Collinearity problem refers to high level of correlation between the independent variables (Vanhove, 2021). According to Li et al. (2025), a VIF score larger than 3.3 can indicate full collinearity concerns. If the VIF $\leq$ 3.3, then here is no bias from the data from a single source (Juliana et al., 2021).

3.4.4.2 Path Coefficients and Significant Level

The path coefficient evaluates how strongly one variable influence another based on direction of the arrow in the structural model. It shows the degree to which an independent variable affects a dependent variable, where higher path coefficient means more significant effect (Williams et al., 2024). A path coefficient's value indicates whether the influence is positive or negative, which is between +1 and -1. The analysis of p-value is also enabled. The relationship is significant if the p-value is less than 0.05, whereas it is not significant if the p-value is greater than 0.05(Astuti, 2021).

3.4.4.3 Coefficient of Determination

The determination coefficient (R^2) is frequently utilized to evaluate the regression model's quality or even determine whether the research was effective. It is a crucial metric that evaluates the explanatory power of the model. It indicates the extent to which the independent variable explains the variance in the dependent variable (Faraz et al., 2021). In general, the coefficient of regression effect is better when the value of R^2 is higher (Xu et al., 2022). The commonly accepted thresholds for R^2 values are 0.75, 0.50, and 0.25, which represent substantial, moderate, and weak levels of predictive accuracy, respectively (Zeng et al., 2021).

3.4.4.4 Effect Size

In PLS-SEM, effect size (F^2) is used to measure how much an independent variable affects dependent variable. When a particular independent variable is eliminated from the model, F^2 indicates how much the dependent variable's R^2 changes (Emerson, 2023). A significant decrease in R^2 suggests that the variable plays a crucial role. The F^2 estimates were 0.02 for small, 0.15 for medium, and 0.35 for high (Dam & Dam, 2021).

3.4.4.5 Predictive Relevance

The Q^2 value is used to evaluate the model's in-sample explanatory power and out of sample prediction capabilities. Data that was not used during model estimate can be properly predicted by a model with strong predictive power (Gotthardt & Mezhuyev, 2022). When the Q^2 value is greater than 0, it indicates that the structural model has predictive relevance and can

successfully predict the construct. Conversely, if the Q^2 value is less than 0, the model does not predict the construct well (Noh & Amron, 2021). The following step involves comparing the prediction errors (RMSE) of the PLS-SEM model against those of the linear model (LM) to evaluate predictive performance if the Q^2 value exceeds zero (Hair et al., 2019). Which model makes better predictions is indicated by the difference (PLS-SEM RMSE − LM RMSE). Strong predictive power is demonstrated when all values are negative. When the results are mixed, showing both positive and negative results, the predictive power is usually moderate. Weak predictive power is indicated when every value is positive (Seočanac, 2024).

3.5 Conclusion

In summary, this chapter provide a detailed explanation of the research instrument that was utilised for this study.

CHAPTER 4: DATA ANALYSIS

4.0 Introduction

We will be analysing and interpreting the collected data by using SmartPLS 4. In this chapter will be including 4.1 demographic profile, 4.2 measurement model assessment and followed by 4.3 structural model assessment.

4.1 Demographic Profile

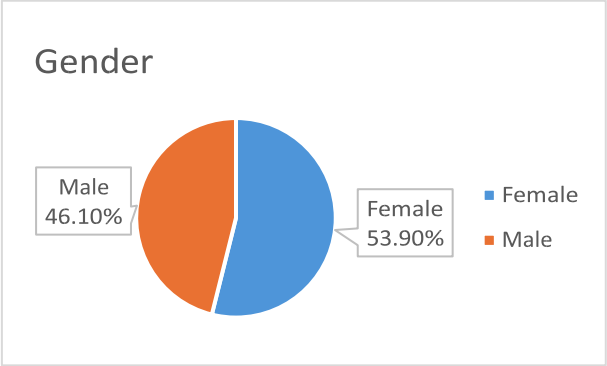


Figure 3.1; Gender

Source: Author's own work

The demographic distribution shows that 200 respondents (53.90%) were female, whereas 171 respondents (46.10%) were male.

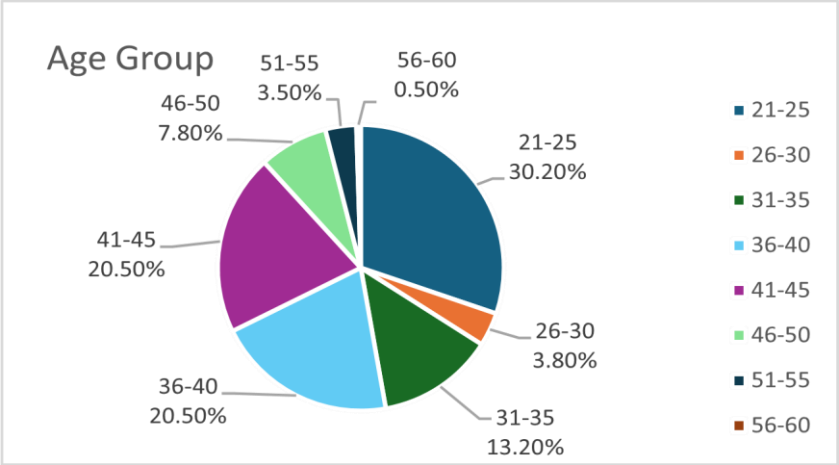


Figure 3.2 Age Group

Source: Author's own work

The largest age group is 21–25 years, with 112 respondents (30.2%). This is followed by respondents aged 36-40 years and 41-45 years, each accounting for 76 respondents (20.5%) respectively. Additionally, 49 respondents (13.2%) are aged 31-35 years, while 29 respondents (7.8%) fall within the 46-50 years category. A smaller proportion of respondents are aged 2630 years, representing 14 respondents (3.8%), and 51-55 years with 13 respondents (3.5%).
The least represented age group is 56-60 years, with only 2 respondents (0.5%).

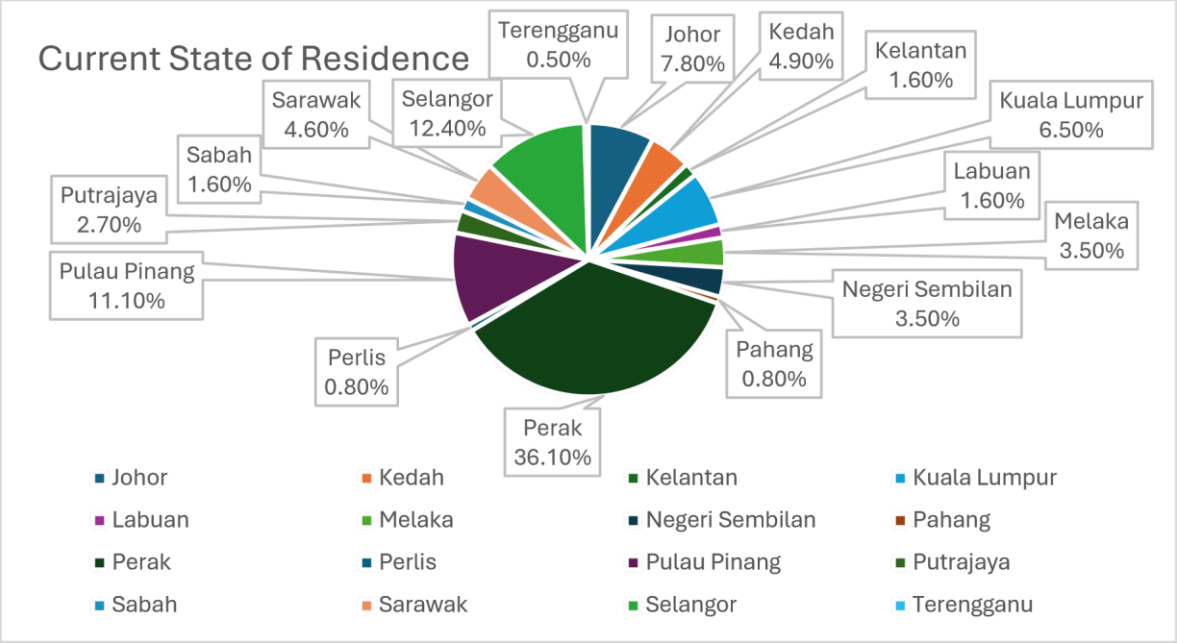


Figure 3.3; Current State of Residence

Source: Author's own work

Based on the respondents' current state of residence, most were from Perak (134 respondents, 36.1%). This was followed by Selangor (46 respondents, 12.4%) and Pulau Pinang (41 respondents, 11.1%). Johor recorded 29 respondents (7.8%), while Kuala Lumpur accounted for 24 respondents (6.5%). Moderate numbers were observed in Kedah (18 respondents, 4.9%), Sarawak (17 respondents, 4.6%), Melaka and Negeri Sembilan (13 respondents each, 3.5%), and Putrajaya (10 respondents, 2.7%). Lower proportions were reported in Sabah, Kelantan, and Labuan (6 respondents each, 1.6%), followed by Pahang and Perlis (3 respondents each, 0.8%), while Terengganu had the lowest number (2 respondents, 0.5%).

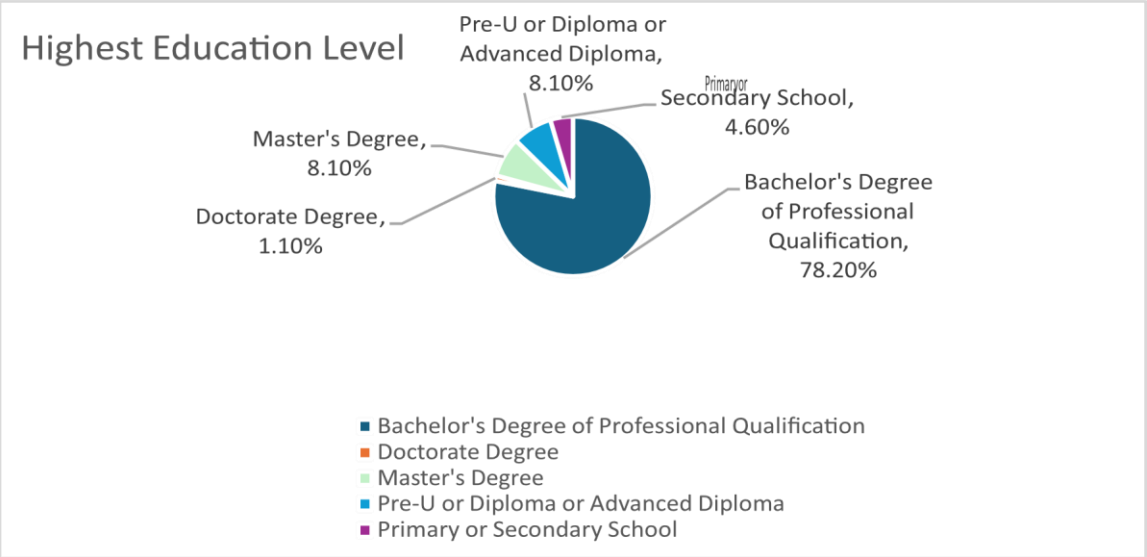


Figure 3.4; Highest Educational Level

Source: Author's own work

Most respondents held a bachelor's degree or professional qualification, comprising 290 individuals (78.2%), indicating that most of the sample is highly educated. This is followed by those with a master's degree and respondents with Pre-U, Diploma, or Advanced Diploma qualifications, each accounting for 30 respondents (8.1%). Meanwhile, 17 respondents (4.6%) had completed only primary or secondary education. The smallest proportion consisted of respondents with a Doctorate Degree, with 4 individuals (1.1%).

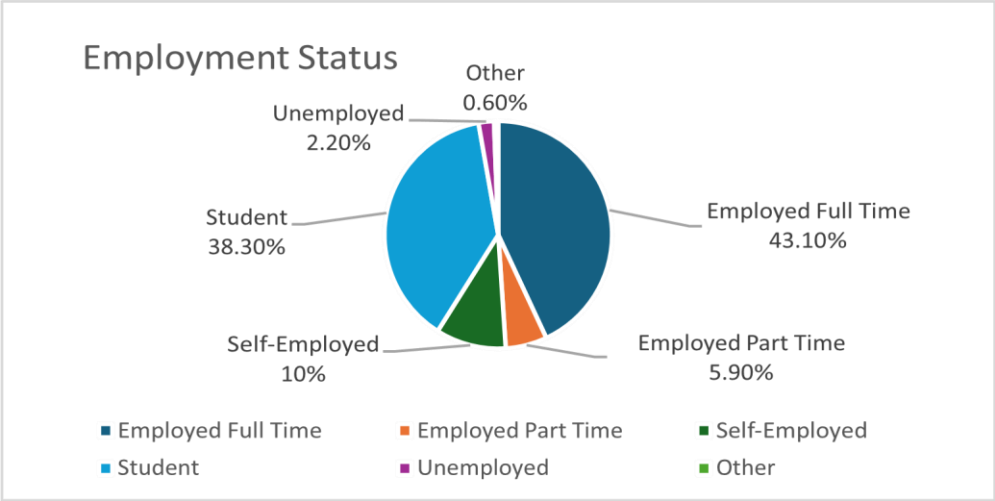


Figure 3.5; Employment Status

Source: Author's own work

Based on the employment status of the respondents, the largest group was employed full-time, with 160 respondents (43.1% of the total sample). This was followed by students, comprising 142 respondents (38.3%).

Additionally, 37 respondents (10.0%) were self-employed, while 22 respondents (5.9%) were employed part-time. A smaller proportion were unemployed, with 8 respondents (2.2%), and only 2 respondents (0.6%) fell under other employment categories.

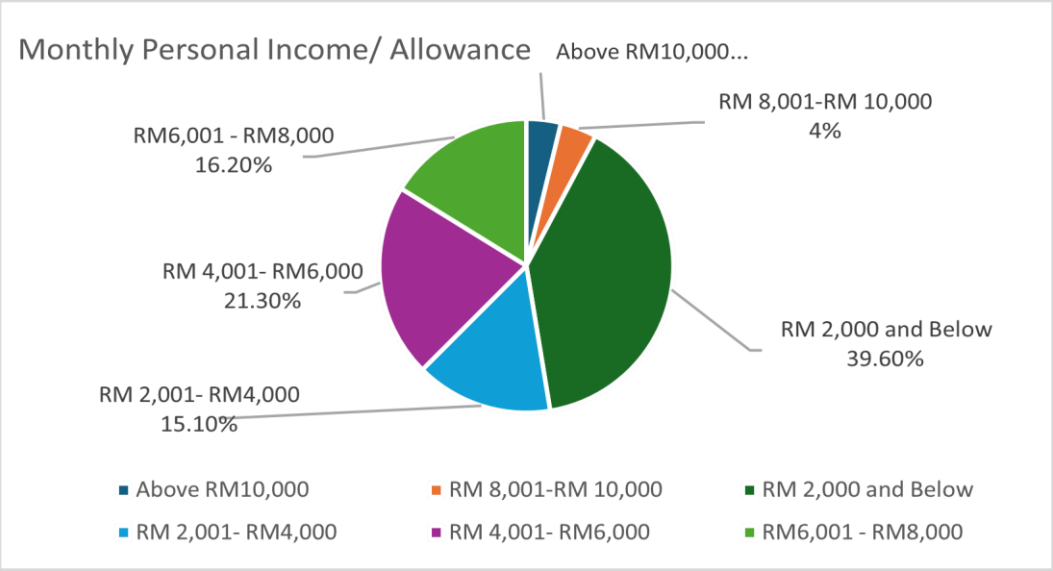


Figure 3.6; Monthly Personal Income

Source: Author's own work

Many respondents earned RM2,000 and below monthly, comprising 147 respondents (39.6%). This was followed by those earning RM4,001 to RM6,000, with 79 respondents (21.3%). Additionally, 60 respondents (16.2%) reported an income range of RM6,001 to RM8,000, while 56 respondents (15.1%) fell within the RM2,001 to RM4,000 category. A smaller proportion earned between RM8,001 and RM10,000, with 15 respondents (4.0%). Lastly, the lowest proportion reported earnings above RM10,000, with 14 respondents (3.8%).

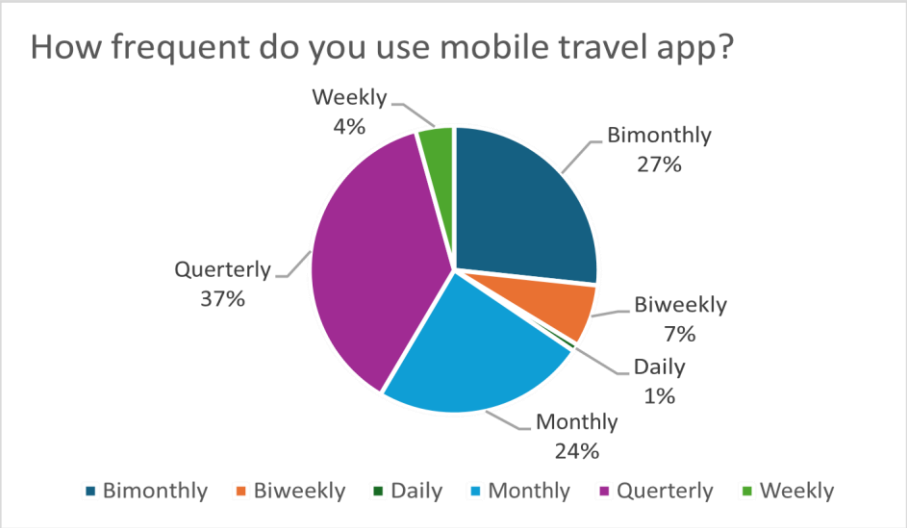


Figure 3.7; Frequency of Mobile Travel Application Usage

Source: Author's own work

Based on the results, the largest proportion of respondents reported using travel applications on a quarterly basis, with 138 respondents (37.2% of the total sample). This was followed by bimonthly users (99 respondents, 26.7%) and monthly users (89 respondents, 24.0%).

In contrast, lower frequencies of usage were observed. Specifically, 26 respondents (7.0%) used travel applications biweekly, while 16 respondents (4.3%) used them weekly. Only a very small proportion reported daily usage, with 3 respondents (0.8%).

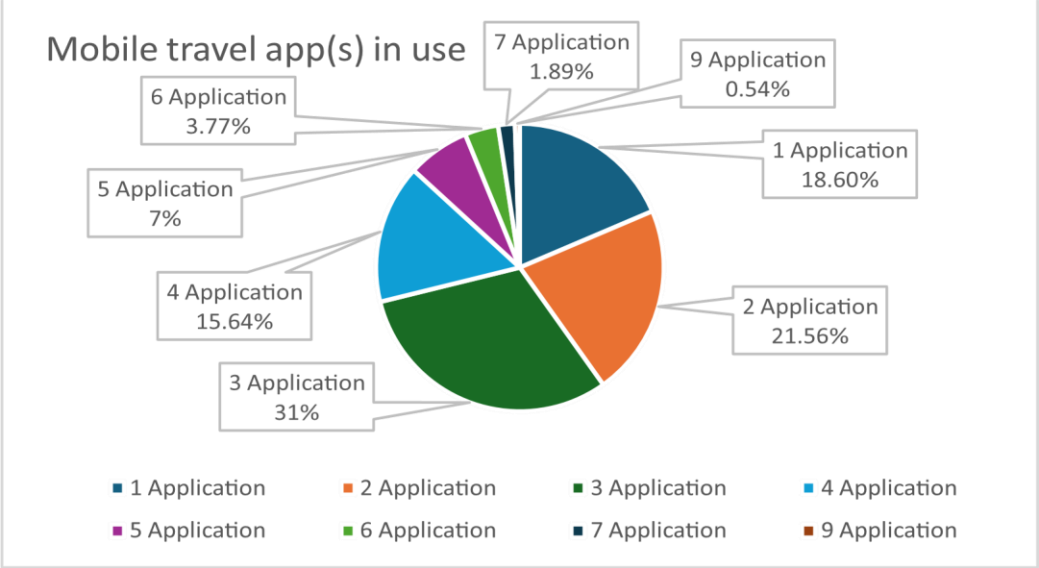


Figure 3.8; Mobile travel app(s) in use

Source: Author's own work

Based on the findings, the largest proportion of respondents reported using three travel applications, with 115 respondents (31.0% of the total sample). This was followed by those using two applications (80 respondents, 21.6%) and one application (69 respondents, 18.6%). Additionally, 58 respondents (15.6%) used four applications.

Smaller proportions of respondents reported using a higher number of applications. Specifically, 26 respondents (7.0%) used five applications, 14 respondents (3.8%) used six applications, and 7 respondents (1.9%) used seven applications. Only 2 respondents (0.5%) reported using nine applications, while none reported using eight applications.

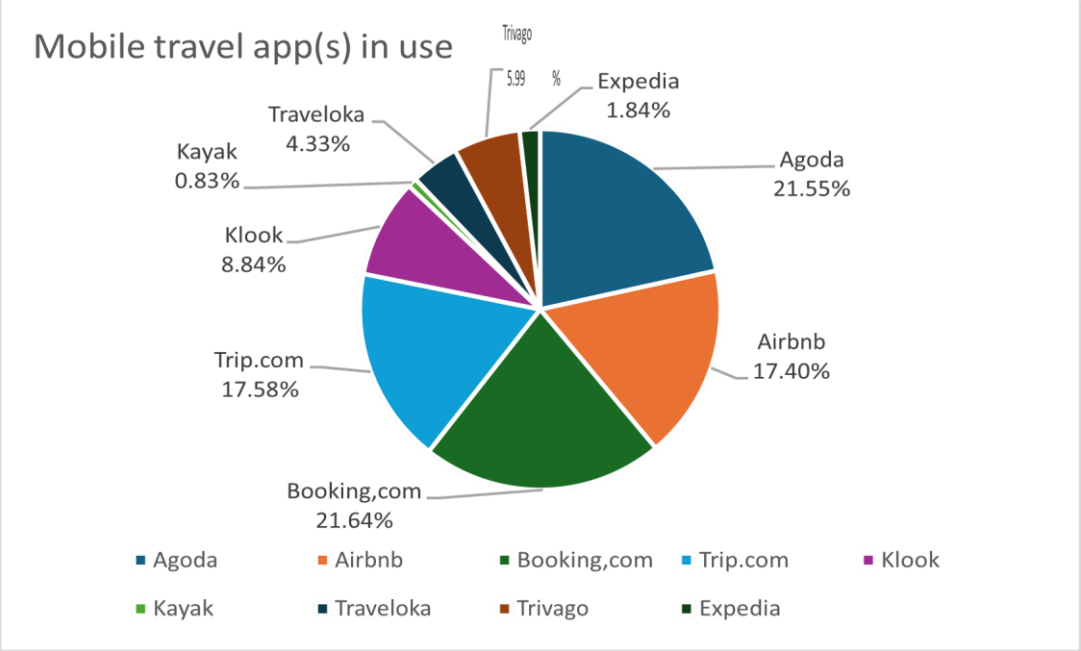


Figure 3.9; Mobile travel app(s) in use

Source: Author's own work

Based on the findings, the most used travel applications among respondents were Booking.com (235 respondents, 21.64%) and Agoda (234 respondents, 21.55%), indicating their strong popularity. This was followed by Trip.com (191 respondents, 17.58%) and Airbnb (189 respondents, 17.40%), showing that these platforms are also widely used.

Additionally, Klook accounted for 96 respondents (8.84%), while Trivago was used by 65 respondents (5.99%) and Traveloka by 47 respondents (4.33%). In contrast, lower usage was reported for Expedia (20 respondents, 1.84%), and Kayak recorded the lowest usage with only 9 respondents (0.83%).

4.2 Measurement Model Assessment

Table 3.1 Result of Indicator Reliability, Internal Consistency Reliability & Convergent Validity

Construct	Indicator	Loading	Cronbach's alpha	Composite reliability (rho_c)	Average Variance Extracted (AVE)
User Interface (UI)	UI 1 UI 2 UI 3 UI 4	0.806 0.826 0.840 0.841	0.848	0.897	0.686
Relative Advantage (RA)	RA 1 RA 2 RA 3 RA 4	0.849 0.830 0.880 0.803	0.862	0.906	0.707
Compatibility (COM)	COM 1 COM 2 COM 3	0.847 0.884 0.876	0.838	0.903	0.756
Perceived Incentives (PI)	PI 1 PI 2 PI 3	0.794 0.888 0.864	0.806	0.886	0.722
User Engagement (UE)	UE 1 UE 2 UE 3	0.884 0.886 0.828	0.833	0.900	0.750
Continuance Usage Intention (CUI)	LOY 1 LOY 2 LOY 3	0.827 0.854 0.847	0.796	0.880	0.710

Outer loadings are used to evaluate indicator reliability. The outer loading of every item must be a minimum of 0.708 and statistically significant (Haji-Othman & Yusuf, 2022). All the indicators in this study are within the acceptable range, as their outer loading values are more than 0.708.

Two techniques were used to evaluate internal consistency reliability: composite reliability (CR) and Cronbach's alpha. In general, Cronbach's alpha values higher than 0.7 are regarded as acceptable (Kotian et al., 2022). In this study, each value are exceeded 0.7, ranging from 0.796 to 0.862, demonstrating satisfactory reliability.

Moreover, high internal consistency is indicated by values between 0.7 and 0.9; internal consistency reliability cannot be reached by a value below 0.6, but a value of 0.6 is acceptable (Kamarudin et al., 2024). The composite reliability values indicate good internal consistency for all constructs, which are user interface (0.897), relative advantage (0.906), compatibility (0.903), perceived incentives (0.886), user engagement (0.900), and continuance usage intention (0.880).

The AVE value for each dimension is greater than 0.5, showing significant convergent validity. AVE requires it to be 0.50 or greater (Hair et al., 2021). The study's AVE values range from 0.686 to 0.756, all exceeding the recommended threshold of 0.5, indicating good convergent validity. Specifically, the AVE values are user interface (0.686), relative advantage (0.707), compatibility (0.756), perceived incentives (0.722), user engagement (0.750), and continuance usage intention (0.710).

Table 3.2 Result of Discriminant Validity

Construct	(COM)	(CUI)	(PI)	(RA)	(UE)	(UI)
Compatibility (COM)						
Continuance Usage Intention (CUI)	0.884					
Perceived Incentives (PI)	0.751	0.713				
Relative Advantage (RA)	0.953	0.863	0.735			
User Engagement (UE)	0.782	0.826	0.736	0.683		
User Interface (UI)	0.793	0.711	0.602	0.754	0.708	

Discriminant validity can be assessed using the heterotrait-monotrait (HTMT) ratio of correlations (Wnuk et al., 2025). The findings show that all constructs display acceptable discriminant validity within the range +1 to -1. As an example, Perceived Incentives (PI) shows correlations of 0.751 with Compatibility (COM) and 0.713 with Continuance Usage Intention (CUI). The relationship appears relatively high and accepted threshold of 1, from the value range between 0.602 to 0.953.

4.3 Structural Model Assessment

Table 4.1 Result of Collinearity Assessment

Indicator	VIF
COM 1	1.769
COM 2	2.180
COM 3	2.087
LOY 1	1.653
LOY 2	1.740
LOY 3	1.687
PI 1	1.490
PI 2	2.238
PI 3	2.012
RA 1	2.041
RA 2	1.861
RA 3	2.596
RA 4	1.912
UE 1	2.226
UE 2	2.244
UE 3	1.641
UI 1	2.055
UI 2	2.183
UI 3	1.973
UI 4	1.982

The Variance Inflation Factor (VIF) was utilized to evaluate collinearity. Based on the findings, every VIF value in this research is under the recommended threshold of 3.3 (Long et al., 2022). As a result, all the result of indicator are under the recommended threshold, from the range 1.490 to 2.596, collinearity does not seem to be an issue, suggesting that the model's predictor components do not significantly display multicollinearity (Rajabi et al.,2023).

Table 4.2 Result of Testing Hypothesis

Hypothesis	Relationship	β	Standard Deviation	T-value	Decision P value	
H1	User interface → User engagement	0.252	0.069	3.643	0.000	Supported
H2	Relative advantage → User engagement	-0.021	0.069	0.298	0.766	Unsupported
H3	Compatibility → User engagement	0.320	0.086	3.702	0.000	Supported
H4	Perceived incentives→ User engagement	0.292	0.100	2.920	0.004	Supported
H5	User engagement → Continuance usage intention	0.673	0.040	16.899	0.000	Supported

The path coefficients, standard deviations, and p-values were examined to evaluate the structural model and test the proposed hypotheses. Findings show that User Interface has a significantly effect on User Engagement since $\beta = 0.252$, t value = 3.643, $p < 0.001$. Therefore, H1 is supported. Moreover, Compatibility has a significant relationship with User Engagement, because $\beta = 0.320$, t value = 3.702, $p < 0.001$. Therefore, H3 is supported. Furthermore, Perceived Incentives significantly influence User Engagement, since $\beta = 0.292$, t-value = 2.920, $p < 0.005$. Therefore, H4 is supported. Similarly, User Engagement has a strong positive effect on Continuance Usage Intention since $\beta = 0.673$, t value =16.899, $p < 0.001$. Thus, H5 is supported. However, Relative Advantage does not significantly influence User Engagement as $\beta = -0.021$, t value = 0.298, $p = 0.766$. The p-value exceeds the recommended threshold of 0.05 and the t value is below 1.96. Thus, H2 is not supported.

Table 4.3 Result of Determination Coefficient

	R -square	R- square adjusted
User Engagement (UI)	0.524	0.519
Continuance Usage Intention (CUI)	0.453	0.451

The coefficient of determination (R^2) is commonly employed to evaluate how much independent variables account for the variation in the dependent variable (Malik et al., 2025). Based on the study's findings, all R^2 value belongs within the acceptable range. The adjusted R^2 value is 0.524, symbolizing 52.4 % of the variation in user engagement can be explained by user interface, relative advantage, perceived incentives and compatibility. Moreover, the adjusted R^2 value for continuance usage intention is 0.453, which indicates 45.3% of the variation in continuance usage intention can be explained by user engagement.

Table 4.4 Result of Effect Size

Construct	(COM)	(CUI)	(PI)	(RA)	(UE)	(UI)
Compatibility (COM)					0.063	
Perceived Incentives (PI)					0.104	
Relative Advantage (RA)					0.000	
User Engagement (UE)		0.828				
User Interface (UI)					0.068	

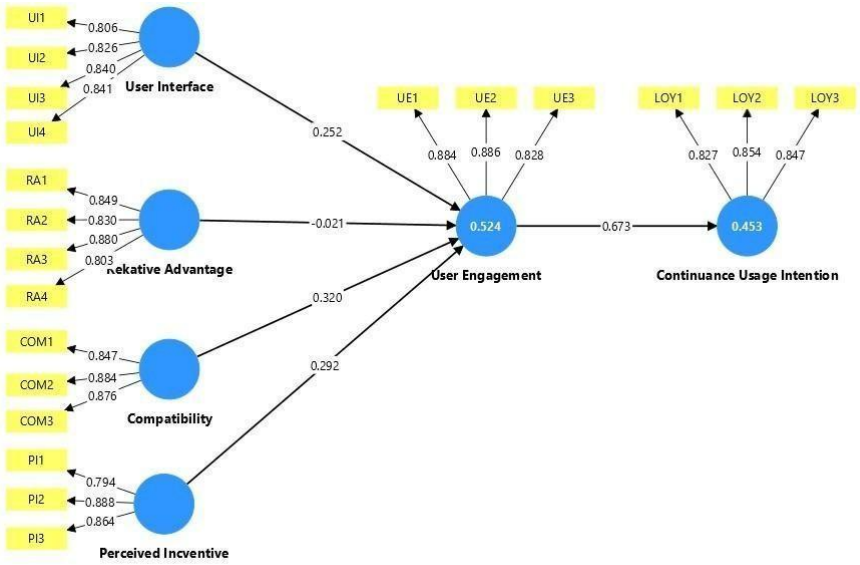
The effect size (f^2) in PLS-SEM assesses the relative contribution of each predictor and measures the influence of an independent variable on a dependent variable (Adriansyah et al., 2025). The findings demonstrate that user engagement has a substantial effect on the intention to continue using the application, which is 0.828 of effect size. However, relative advantage has an insignificant impact on user engagement, as evidenced by the effect size (0.000) being below the suggested threshold. The remaining f^2 values indicate that the other variables make a substantial contribution to the model because they are within the acceptable range, which are compatibility with user engagement (0.063), perceived incentives with user engagement (0.104) and user interface with user engagement (0.068).

Table 4.5 Result of Predictive Relevance

Construct	Q^2 Predict	PLS-SEM_RMSE	LM_RMSE	
UE 1	0.385	0.977	1.001	-0.024
UE 2	0.383	0.989	1.024	-0.035
UE 3	0.352	0.989	1.015	-0.026
LOY 1	0.304	0.893	0.815	0.078
LOY 2	0.361	0.948	0.916	0.032
LOY 3	0.340	0.969	0.959	0.010

The Q^2 value is used to evaluate the model's in-sample explanatory power and out-of-sample prediction capabilities (Pereira et al., 2024). Fron this study, all Q^2 value is greater than 0, it shows the predictive relevance for the structural model and can successfully predict the construct (Fauzi, 2022). This points that the model's acceptable prediction performance. Subsequently, the PLS-SEM and linear model (LM) prediction errors (RMSE) are then used to further evaluate the model's predictive capacity using a case wise comparison method. Given that the values include both positive and negative differences, the results point to a moderate degree of predictive potential.

Figure 4.1 Model in Smart PLS



4.4 Conclusion

This chapter presents the interpretation and SmartPLS results, which including descriptive analysis, the measurement model assessment, and the structural model assessment. The findings indicate that the data is reliable and valid, with four out of five hypotheses supported and one did not support.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

This chapter compiles and discusses the key findings of the study. It consists of Section 5.1 Discussion of the Findings, Section 5.2 Implications of the Study, Section 5.3 Limitations of the Study, Section 5.4 Direction for the Future Research, and Section 5.5 Conclusion**.**

5.1 Discussion of the findings

H1: User Interface Positively Influences on User Engagement in Travel Application.

The results obtained indicated that user interface has positive influence on user engagement in travel application. A well- designed and attractive user interface enhances user's willingness to interact with the application. The results are supported by earlier studies, which show that interface design significant effects on user engagement. Zhou et al. (2021) found that the technical features embedded within the user interface can satisfy users' psychological needs, which are competence, autonomy, and relatedness that can subsequently enhance user engagement and promote long-term usage of the fitness technology. In additional, traditional static interfaces tend to provide more passive and less engaging experience. In contrast, adaptable interfaces that react to unique behavioural patterns can boost interaction throughput, enjoyment, and engagement. This is supported by Khamaj and Ali (2024), which demonstrated that adaptive user interfaces can enhance user engagement by personalizing the interaction

based on real-time user behaviour. In our study, users are more likely to actively engage with the travel application when they view the interface is clear, attractive, and simple to use. A well-design interface lower cognitive load of user, allowing them to compare options, search for travel information, and make plans more quickly. Given this, users are more likely to spend time using the application, thereby increases their level of behavioural engagement.

H2: Relative Advantage Positively Influences User Engagement in Travel Application.

The finding indicated that H2 is not supported refer to insignificant relationship between Relative Advantage and User Engagement. The respondents' demographics might be useful clarify this. The mobile usage can affect by demographic, which is age (Tian et al., 2021). Young users between the ages of 21 and 25 represent most responders, and they are typically well knowledgeable about mobile technologies. Young adults use mobile applications at the highest rate, averaging 93.5 hours per month. The top 20% of this age group utilize mobile applications for up to four hours per day, making them among the most active users (Mehra et al., 2020). According to these findings, younger users interact and engage with mobile devices at far higher levels as users in other age groups. The advantages that travel applications offer, such efficiency and ease, are seen by this group as standard expectations rather than unique benefits. Thus, these advantages do not considerably increase their level of engagement.

Diffusion of Innovation (DOI) theory can be used to explain the weak correlation between relative advantage and user engagement. Relative advantage is a crucial factor in the early adoption phase of a technology, based on Rogers' DOI theory, as users assess the advantages of utilizing a new system (Amini & Javid, 2023; Yohana et al., 2025). However, the impact of relative advantage tends to decrease as consumers become more accustomed and experienced. Most of the respondents in this study are young, skilled mobile application users, showing that they are most likely in the post-adoption stage rather than the initial adoption phase. Given this, the advantages offered by travel applications are already widely recognized and seen as regular features. As a result, the connection becomes insignificant since relative advantage is no longer a strong reason for more user engagement.

H3: Compatibility Positively Influences User Engagement in Travel Application.

Findings indicated that a H3 is supported, showing that there is a significant relationship between Compatibility and User Engagement of travel application. Previous study has shown that when users perceive a mobile application as consistent with their lifestyle, needs, and routines, they are more likely to use and continue engaging with that technology (Bhardwaj et al., 2021). Similarly, this study stated that compatibility of chatbot boosted the level of user engagement. In online services, the application that matches the user's requirements and preferences with location-based services, push notifications, and personal assistants, resulting in brand engagement (Hari et al., 2021).

Compatibility, according to Diffusion of Innovation (DOI) theory, is the extent to which an innovation fits to consumers' current routines, values, and habits (Rogers, 1983). An innovation is more likely to be implemented when it demonstrates greater compatibility. An invention is likely to be adopted once it is compatible, making it a significant feature (Roger, 2003). This theory supports the relationship between compatibility and user engagement, when the travel application is compatible with trip schedules and meet their needs. When an application is viewed as compatible, users can integrate it seamlessly into their regular routines, lowers cognitive effort and behavioural friction (Abubakari et al., 2024). As consumers are more likely to engage regularly with innovations that quickly fit into their established habits, this alignment promotes deeper interaction and frequent use (Yahaya et al., 2023). In our research, compatibility is a crucial component in long-term engagement since it allows the travel application to fulfil users' current requirements and habits. A travel application must largely satisfy the demands and targets for the users (Alghizzawi et al., 2023). When travel application that cater to their needs and preferences by recommended the suitable travel plan or personalized hotel, the users are more likely to be used often.

H4: Perceived Incentives Positively Influence User Engagement in Travel Application.

Our research implies that a H4 is supported, showing that user engagement with travel applications is likely to be positively influenced by perceived incentives. Perceived incentives were found to be more closely associated with motivational and behavioural engagement, as reported in prior studies. These incentives enhance users' psychological drive to participate (motivational engagement) as well as their actual participation behaviours (behavioural engagement) (Xiao et al., 2021). In online contribution, user engagement outcomes environments are strongly correlated with financial incentives. When combined with supportive intervention strategies, such as goal setting or challenge-seeking, small monetary incentives can significantly increase both the quantity and quality of voluntary contributions, even though they may undermine intrinsic motivation if used alone (Qiao et al., 2021). In the context of this study, incentives can motivate users to engage more actively with the travel application. User will keep engaging through making activities feel rewarding, pleasurable, or meaningful. Additionally, incentives aid in setting clear objectives and providing feedback, which direct users' behaviour and boost interest and actual engagement. Well-designed incentives combine opportunity for repeating positive behaviour with motivation to increase engagement.

H5: User Engagement Positively Influences Continuance Usage Intention in Travel Application.

The finding revealed that user engagement influence continuance usage intention of travel application. Previous research has shown that customer interaction significantly and favourably affects continuing intention. A customer's possibility of continuing with a mobile payment platform over time increases with how actively and meaningfully they interact with it. These results show that maintaining continuing intention depends critically on consumer interaction (Seridaran et al., 2024). This is consistent with the findings of the Gao et al. (2023) study, which looked at how Chinese Gen Y users used travel applications. Higher levels of user engagement were linked to stronger intentions to keep using the application in this study, emphasizing the crucial role that engagement plays in maintaining user behaviour on digital platforms. As to the

suggested approach, engaged consumers feel more satisfied and valued, making them more likely to remain with the service. In our study, user engagement has a positive impact on continued use because it strengthens the user's connection to the travel application in multiple ways. High levels of engagement enhance satisfaction and emotional attachment. Users are more likely to stay with an application when they find it enjoyable and fulfilling. Habits and behavioural commitment are fostered by ongoing participation. Regular engagement improves users' psychological attachment to the application by encouraging them to develop routines and devote time and effort. Users who are highly engaged get more information of the service. Positive experiences, such receiving prizes and helpful features, encourage continuing use and create a feedback loop that increases users' motivation to stay involved.

5.2 Implications of the Study

5.2.1 Practical Implications

This study offers several practical implications for travel application developers, managers, marketers, and policymakers in enhancing user engagement and continuance usage intention.

Firstly, developers should focus on creating a clean, simple, and visually attractive user interface to enhance users' impression of the application. A well-designed interface enhances usability and reduces user frustration, which ultimately increases users' motivation to use the application. Developers should focus on developing a unique application that provides easy booking for flights, hotels, and travel deals to increase the likelihood of using the application.

Secondly, developers should not assume that providing additional functional benefits alone is sufficient to enhance user engagement. Although travel applications may offer advantages such as time-saving features, efficient booking systems, and enhanced travel experiences, these

benefits may not be strongly perceived or valued by users. This suggests that users may already consider such features as standard expectations rather than unique advantages.

Thirdly, developers should ensure that the travel application is compatible with users' preferences, needs, and lifestyle. This can be achieved by incorporating customization features, such as personalized travel suggestions, flexible itinerary planning, and user-friendly settings that adapt to different types of travellers. When the application aligns well with users' expectations and habits, it becomes more relevant and meaningful to them. Thus, this finding indicates that compatibility has a significant positive influence on user engagement, suggesting that users are more likely to engage with applications that fit well with their travel needs and personal preferences.

Fourthly, developers should incorporate attractive perceived incentives, such as discounts, rewards, cashback, and exclusive travel deals, to encourage users to engage with the application. These incentives can serve as external motivation that attracts users and encourages repeated interaction with the applications. Developers can also implement loyalty programs or point based systems to sustain user interest over time. Thus, this finding indicates that perceived incentives have a significant positive influence on user engagement, suggesting that users are more likely to interact with the application when they receive tangible benefits.

Finally, developers should recognize that user engagement plays a crucial role in influencing continuance usage intention. When users feel motivated, enthusiastic, and immersed while using the application, they are more likely to continue using it and recommend it to others. Therefore, developers should focus on maintaining high engagement levels through interactive features, personalized content, and continuous updates.

5.2.2 Theoretical Implications

This study investigates the factors influencing user engagement and continuance usage intention in travel applications by applying the Stimulus-Organism-Response (S-O-R) model.

First, the application of the S-O-R model provides a comprehensive framework for understanding how users interact with travel applications and develop continuance usage intention. Unlike earlier studies that primarily focused on technology adoption models, this study demonstrates how external technological factors (stimuli) and internal psychological states (organism) are interconnected, ultimately influencing behavioural outcomes (response). This strengthens the explanatory power of the S-O-R model, particularly in explaining postadoption behaviour rather than initial adoption. This contributes to the academic. They can serve as one of the foundations or guidelines for the researchers.

Second, this study extends the S-O-R framework by integrating underexplored variables, particularly compatibility and perceived incentives. While prior literature has largely emphasized perceived usefulness and ease of use, this study highlights the importance of how well applications align with users' lifestyles and needs (compatibility) and the role of reward mechanisms (perceived incentives) in shaping user engagement. By empirically validating these factors, the study provides deeper insights into how user technology fit and motivational elements enhance user engagement in travel applications.

Lastly, the findings provide empirical support for the applicability of the S-O-R model in the Malaysian context. This contributes to the generalizability of the model in emerging digital economies, demonstrating its relevance across different cultural and technological environments.

5.3 Limitations of the Study

In this study, several limitations were identified that can be addressed in future research. First, the study adopted a cross-sectional research design, whereby data were collected at a single point in time. This limits the ability to observe changes in user behaviour, engagement, and continuance usage intention over time, as it does not capture the dynamic and evolving nature of users' interactions with travel applications.

Secondly, the study relies solely on purely quantitative approach, relying on structured questionnaires to collect data. While this method allows for statistical analysis and generalization, it may not fully capture the deeper insights into users' perceptions, experiences, and motivations when using travel applications. Respondents' answers may be limited by predefined questions, which restrict their ability to express detailed opinions or unique experiences.

5.4 Directions for the Future Research

Based on the identified limitations, several recommendations are proposed for future research. Firstly, Second, future research is encouraged to adopt a longitudinal research design to better capture changes in user behaviour over time. By collecting data at multiple points, researchers can observe how user engagement and continuance usage intention evolve, especially as users gain more experience with travel applications or as new features are introduced.

Secondly, future research is encouraged to adopt a mixed-methods approach by integrating quantitative surveys with qualitative techniques such as interviews or focus group discussions.

This would allow researchers to gain more comprehensive insights and richer explanations of user behaviour, thereby enhancing the depth and validity of the findings.

5.5 Conclusion

In conclusion, this study confirms the key findings across all tested hypotheses. In addition, this chapter discusses the research limitations and provides several recommendations to improve future studies.

References

Abbasi, A. Z., Rehman, U., Hussain, A., Ting, D. H., & Islam, J. U. (2021). The impact of advertising value of in-game pop-up ads in online gaming on gamers' inspiration: An empirical investigation. Telematics and Informatics, 62, 101630. https://doi.org/10.1016/j.tele.2021.101630

Abdel-Tawab, M., Kineber, A. F., Chileshe, N., Abanda, H., Ali, A. H., & Almukhtar, A. (2023). Building Information Modelling Implementation Model for Sustainable Building Projects in Developing Countries: A PLS-SEM Approach. *Sustainability*, *15*(12), 9242. https://doi.org/10.3390/su15129242

Adriansyah, Zuriadah Ismail, & Anis Suriati Ahmad. (2025). The Effect of Public Trust on Individual Taxpayer Compliance with Minangkabau Culture as a Contextual Factor. *Jurnal Ilmiah Akuntansi Kesatuan*, *13*(6), 1663–1674. https://doi.org/10.37641/jiakes.v13i6.4366

Ahmad, A. K. A., Baharom, S. N., Abdul Rahman, A., Abdullah, M., & Abdul Aziz, M. N. (2020). Developing User Interface Mobile Application for Tourist. *Idealogy Journal*, *5*(2), 17–24. https://doi.org/10.24191/idealogy.v5i2.220

Ahmed, S. K. (2024). Research methodology simplified: How to choose the right sampling technique and determine the appropriate sample size for research. *Oral Oncology Reports*, *12*(100662), 1–7. https://doi.org/10.1016/j.oor.2024.100662

Albayrak, T., Rosario González-Rodríguez, M., Caber, M., & Karasakal, S. (2021). The Use of Mobile Applications for Travel Booking: Impacts of Application Quality and Brand Trust. *Journal of Vacation Marketing*, *29*(1), 135676672110665. https://doi.org/10.1177/13567667211066544

Ali, F., Terrah, A., Wu, C., Ali, L., & Wu, H. (2021). Antecedents and consequences of user

engagement in smartphone travel apps. *Journal of Hospitality and Tourism Technology*, *12*(2), 355–371. https://doi.org/10.1108/jhtt-09-2020-0221

Althubaiti, A. (2022). Sample Size determination: a Practical Guide for Health Researchers. *Journal of General and Family Medicine*, *24*(2), 72–78. https://doi.org/10.1002/jgf2.600

Amini, M., & Jahanbakhsh Javid, N. (2023). A multi-perspective framework established on diffusion of innovation (DOI) theory and technology, organization and environment (TOE) framework toward supply chain management system based on cloud computing technology for small and medium enterprises. *International Journal of Information Technology and Innovation Adoption, 11*(8), 1217–1234. https://doi.org/10.1108/IJITIA-11-2022-0147

Amora, J. T. (2021). Convergent validity assessment in PLS-SEM: A loadings-driven approach. *Data Analysis Perspectives Journal*, *2*(3), 1-6.

Anass Bayaga, & André du Plessis. (2023). Ramifications of the Unified Theory of Acceptance and Use of Technology (UTAUT) among developing countries' higher education staffs. *Education and Information Technologies*. https://doi.org/10.1007/s10639-023-12194-6

Andriopoulos, S. (2021, July 16). Most popular mobile apps for travelers. TravelDailyNews International. https://www.traveldailynews.com/column/featured-articles/most-popular-mobile-apps-for-travelers/

Asiamah, N. (2022). Non-Probabilistic Sampling in Quantitative Clinical Research. *International Journal of Applied Research on Public Health Management*, *7*(1). https://doi.org/10.4018/ijarphm.290379

Astuti, C. C. (2021). PLS-SEM Analysis to Know Factors Affecting The Interest of Buying Halal Food in Muslim Students. *Jurnal Varian*, *4*(2), 141–152.

https://doi.org/10.30812/varian.v4i2.1141

Atulkar, S., & Singh, A. K. (2021). Role of psychological and technological attributes on customer conversion to use food ordering apps. *International Journal of Retail & Distribution Management*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/ijrdm-09-2020-0349

Atulkar, S., & Verma, B. K. (2021). Attributes Affecting to Use Food Ordering App by Young Consumers. *Innovations in Information and Communication Technologies (IICT-2020)*, 165–170. https://doi.org/10.1007/978-3-030-66218-9_19

Benaya Firzatullah. (2025, March 9). *UI/UX Case study: Enhancing Trip.com mobile app user experience*. Medium. https://medium.com/@benayafirzatullah/ui-ux-case-study-enhancing-trip-com-mobile-app-user-experience-d8d4e98d70e7

Beneito-Montagut, R., Rosales, A., & Fernández-Ardèvol, M. (2022). Emerging Digital Inequalities: A Comparative Study of Older Adults' Smartphone Use. *Social Media + Society*, *8*(4), 205630512211387. https://doi.org/10.1177/20563051221138756

Bennett, P. D., Lamm, R. P., & Fry, R. A. (1988). Marketing (pp. 630–640). McGraw-Hill.

Bhale, U. A., & Bedi, H. S. (2024). MEASUREMENT MODEL VS STRUCTURAL MODEL IN STRUCTURAL EQUATION MODEL (SEM).

Bhardwaj, A. K., Garg, A., & Gajpal, Y. (2021). Determinants of blockchain technology adoption in supply chains by small and medium enterprises (SMEs) in India. Mathematical Problems in Engineering, 2021, 1–14. https://doi.org/10.1155/2021/5537395

Bhattacherjee, A. (2001), "Understanding information continuance: an expectation-confirmation model", MIS Quarterly, Vol. 25 No. 3, pp. 351-370

Camilleri, M. A., Troise, C., & Kozak, M. (2023). Functionality and usability features of

ubiquitous mobile technologies: the acceptance of interactive travel apps. *Journal of Hospitality and Tourism Technology*, *14*(2), 188–207. https://doi.org/10.1108/jhtt-12-2021-0345

Casquero, D., Monzon, A., García, M., & Martínez, O. (2022). Key Elements of Mobility Apps for Improving Urban Travel Patterns: A Literature Review. *Future Transportation*, *2*(1), 1–23. https://doi.org/10.3390/futuretransp2010001

Chang, K.-Y., & Ku, E. C. S. (2023). Discount or Prestige: E-reputation, Compatibility, and Continued Mobile Apps Usage Intention of Low-Cost Carriers. *Journal of Tourism and Services*, *14*(26), 73–91. https://doi.org/10.29036/jots.v14i26.463

Che Mustaffa, N. U., & Sailin, S. N. (2022). A Systematic Review of Mobile-Assisted Language Learning Research Trends and Practices in Malaysia. *International Journal of Interactive Mobile Technologies (IJIM)*, *16*(05), 169–198. https://doi.org/10.3991/ijim.v16i05.28129

Chen, Y., Mohd Zawawi, J. W., & Binti Yaakup, H. S. (2022). Innovative Characteristics of Users' Intention to Continue Using Personalized Recommendation News Apps. *International Journal of Academic Research in Business and Social Sciences*, *12*(7). https://doi.org/10.6007/ijarbss/v12-i7/14244

Choi, K. J. (2018). Understanding post-adoption behavioural intentions of mobile travel app users. In Griffith Research Online (Griffith University, Queensland, Australia). https://doi.org/10.25904/1912/3165

Choi, K., Wang, Y., & Sparks, B. (2018). Travel app users' continued use intentions: it's a matter of value and trust. *Journal of Travel & Tourism Marketing*, *36*(1), 131–143. https://doi.org/10.1080/10548408.2018.1505580

Clark, R. G., & Steel, D. G. (2022). Sample Design for Analysis Using High-influence

Probability Sampling. *Journal of the Royal Statistical Society: Series a (Statistics in Society)*, *185*(4). https://doi.org/10.1111/rssa.12916

Cudjoe, D., Zhu, B., & Wang, H. (2024). The role of incentive policies and personal innovativeness in consumers' carbon footprint tracking apps adoption in China. *Journal of Retailing and Consumer Services*, *79*, 103861–103861. https://doi.org/10.1016/j.jretconser.2024.103861

Creswell, J. W., & Creswell, J. D. (2023). Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.). SAGE Publications

Dahri, N. A., Yahaya, N., Vighio, M. S., & Jumaat, N. F. (2025). Exploring the impact of ChatGPT on teaching performance: findings from SOR theory, SEM and IPMA analysis approach. *Education and Information Technologies*. https://doi.org/10.1007/s10639-025-13539-z

Dam, S. M., & Dam, T. C. (2021). Relationships between Service Quality, Brand Image, Customer Satisfaction, and Customer Loyalty. *The Journal of Asian Finance, Economics and Business*, *8*(3), 585–593. https://doi.org/10.13106/jafeb.2021.vol8.no3.0585

Dash, G., & Paul, J. (2021). CB-SEM vs PLS-SEM methods for research in social sciences and technology forecasting. *Technological Forecasting and Social Change*, *173*, 121092. https://doi.org/10.1016/j.techfore.2021.121092

Davood Ghorbanzadeh, Sayed, B. T., Hitmi Khalifa Alhitmi, Hasan, R. A., Aldulaimi, M. H., & Prasad, K. (2025). Applying UTAUT and experiential consumption theory to understand the adoption of ChatGPT's digitalized itinerary. *Journal of Hospitality and Tourism Insights*. https://doi.org/10.1108/jhti-02-2025-0300

Department of Statistics Malaysia [DOSM]. (2023). *LAPORAN SURVEI PENGGUNAAN DAN*

CAPAIAN ICT OLEH INDIVIDU DAN ISI RUMAH ICT USE AND ACCESS BY INDIVIDUALS AND HOUSEHOLDS SURVEY REPORT. https://www.dosm.gov.my/uploads/release-content/file_20240626114512.pdf

Dolinting, P. P., & Pang, V. (2022). ASSESSING THE VALIDITY AND RELIABILITY OF ADAPTED CLASSROOM CLIMATES INSTRUMENT FOR MALAYSIAN RURAL SCHOOLS USING PLS-SEM. *International Journal of Education, Psychology and Counseling*, *7*(47), 393–411. https://doi.org/10.35631/ijepc.747033

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*. https://doi.org/10.1002/isd2.12339

Durgekar, S. R., Rahman, S. A., Naik, S. R., Kanchan, S. S., & Srinivasan, G. (2024). A Review Paper on Design and Experience of Mobile Applications. *EAI Endorsed Transactions on Scalable Information Systems*, *11*(3). https://doi.org/10.4108/eetsis.4959

Emerson, R. W. (2023). Regression and Effect Size. *Journal of Visual Impairment & Blindness*, *117*(2), 191–192. https://doi.org/10.1177/0145482x231166596

ETTravelWorld. (2024). *40% of travel enthusiasts find unresponsive customer support as most frustrating: Kapture CX report*. Travel; ETTravelWorld. https://travel.economictimes.indiatimes.com/news/research-and-statistics/research/40-of-travel-enthusiasts-find-unresponsive-customer-support-as-most-frustrating-kapture-cx-report/109795557

Fan & Yang. (2025). Research on User Interface Design of Mass Customized Travel APP. *Frontiers in Art Research*, *7*(5). https://doi.org/10.25236/far.2025.070515

Fang, J., Zhao, Z., Wen, C., & Wang, R. (2017). Design and performance attributes driving mobile travel application engagement. *International Journal of Information*

Management, *37*(4), 269–283. https://doi.org/10.1016/j.ijinfomgt.2017.03.003

Faraz, N. A., Ahmed, F., Ying, M., & Mehmood, S. A. (2021). The interplay of green servant leadership, self-efficacy, and intrinsic motivation in predicting employees' pro-environmental behavior. *Corporate Social Responsibility and Environmental Management*, *28*(4). https://doi.org/10.1002/csr.2115

Fauzi, M. A. (2022). Partial least square structural equation modelling (PLS-SEM) in knowledge management studies: Knowledge sharing in virtual communities. *Knowledge Management & E-Learning: An International Journal*, 103–124. https://doi.org/10.34105/j.kmel.2022.14.007

Ferreira, A., Silva, G. M., & Dias, Á. L. (2021). Determinants of continuance intention to use mobile self-scanning applications in retail. *International Journal of Quality & Reliability Management*. https://doi.org/10.1108/ijqrm-02-2021-0032

Foroughi, B., Sitthisirinan, S., Iranmanesh, M., Nikbin, D., & Ghobakhloo, M. (2023). Determinants of travel apps continuance usage intention: extension of technology continuance theory. *Current Issues in Tourism*, 1–17. https://doi.org/10.1080/13683500.2023.2169109

Frankort, H. T. W., & Avgoustaki, A. (2021). Beyond Reward Expectancy: How Do Periodic Incentive Payments Influence the Temporal Dynamics of Performance? *Journal of Management*, *48*(7), 014920632110160. https://doi.org/10.1177/01492063211016032

Gao, Z., Cheah, J.-H., Lim, X.-J., Ng, S. I., Cham, T.-H., & Yee, C. L. (2023). Can travel apps improve tourists' intentions? Investigating the drivers of Chinese gen Y users' experience. *Journal of Vacation Marketing*, 135676672311529. https://doi.org/10.1177/13567667231152938

Ghanbar, H. (2024). Using SmartPLS for Structural Equation Modeling in Applied Linguistics:

A Method Note. *Educational Methods and Psychometrics*, *2*(1), 40–52. https://doi.org/10.61186/emp.2024.6

Gotthardt, M., & Mezhuyev, V. (2022). Measuring the Success of Recommender Systems: A PLS-SEM Approach. *IEEE Access*, *10*, 30610–30623. https://doi.org/10.1109/access.2022.3159652

Green, M. (1985). The University of Alberta user interface management system. *ACM SIGGRAPH Computer Graphics*, *19*(3), 205–213. https://doi.org/10.1145/325165.325286

Gumasing, Ma. J. J. (2025). Exploring Factors Influencing E-Bike Adoption Among Filipino Commuters: An Integrated Diffusion of Innovation and Technology Acceptance Model. *World Electric Vehicle Journal*, *16*(2), 113. https://doi.org/10.3390/wevj16020113

Hair, J. F., Howard, M. C., & Nitzl, C. (2019). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*(1), 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R. In *Classroom Companion: Business*. Springer International Publishing. https://doi.org/10.1007/978-3-030-80519-7

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. European business review, 31(1), 2-24.

Hamouda, M. (2022). Mobile applications in tourism. *International Journal of Technology and Human Interaction*, *18*(1). https://doi.org/10.4018/ijthi.293198

Hashim, S., Mohamad, S. F., Abdul, S., & Nur. (2022). Pretesting Survey Questionnaire: A Guide on Dissemination. *International Journal of Academic Research in Economics*

and Management Sciences, *11*(3), 408–416. https://doi.org/10.6007/ijarems/v11-i3/15228

Haute, E. van. (2021). Sampling Techniques. *Research Methods in the Social Sciences: An A-Z of Key Concepts*, 247–251. https://doi.org/10.1093/hepl/9780198850298.003.0057

Hendijani, R., & Steel, P. (2022). Reward Salience and Choice in a Controlling Context: A Lab Experiment. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.862152

Hidayanti, P. E., Handayani, R. I., & Rifai, B. (2023). UI/UX design of online tickets for Situ Pasir Maung Tourism in Dago Village using the Figma application. SinkrOn, 8(4). https://doi.org/10.33395/sinkron.v8i2.12098

Hill, R. (1998). What sample size is "enough" in internet survey research? Interpersonal Computing and Technology: An Electronic Journal for the 21st Century, 6(3–4).

Hossain, M. A., & Magar, S. T. (2025). Using Rewards to Increase Consumer Engagement and Build Brand Loyalty On-Demand Service Platforms. *Theseus.fi*. http://www.theseus.fi/handle/10024/895492

Hsieh, S. H., Tseng, T. H., & Lee, C. T. (2022). Feeling psychologically close: examining the determinants of branded app engagement. *Journal of Product & Brand Management*. https://doi.org/10.1108/jpbm-07-2021-3565

Hsu, C.-L. (2023). Enhancing brand love, customer engagement, brand experience, and repurchase intention: Focusing on the role of gamification in mobile apps. *Decision Support Systems*, *174*, 114020–114020. https://doi.org/10.1016/j.dss.2023.114020

Huang, C.-H. (2021). Using PLS-SEM Model to Explore the Influencing Factors of Learning Satisfaction in Blended Learning. *Education Sciences*, *11*(5), 249. https://doi.org/10.3390/educsci11050249

Huang, Y., & Suo, L. (2024). Influence of the Technology Acceptance Model on Customer

Engagement. *HUMAN BEHAVIOR, DEVELOPMENT and SOCIETY*, *25*(2), 39–49. https://doi.org/10.62370/hbds.v25i2.273288

Hunziker, S., & Blankenagel, M. (2021). Research Design in Business and Management: A Practical Guide for Students and Researchers.

Isaac, S., & Michael, W. B. (1995). Handbook in Research and Evaluation. San Diego, CA: Educational and Industrial Testing Services.

Jaidev, U. P., & Shekhar, R. (2023). Mobile wallet app engagement and word of mouth recommendation: An exploration of antecedents. *International Journal of Enterprise Network Management*, *14*(2), 1. https://doi.org/10.1504/ijenm.2023.10041700

Jamieson, M. K., Govaart, G. H., & Pownall, M. (2023). Reflexivity in Quantitative research: a Rationale and beginner's Guide. *Social and Personality Psychology Compass*, *17*(4), 1–15. https://doi.org/10.1111/spc3.12735

Japutra, A., Molinillo, S., Fitri Utami, A., & Adi Ekaputra, I. (2022). Exploring the effect of relative advantage and challenge on customer engagement behavior with mobile commerce applications. *Telematics and Informatics*, *72*, 101841. https://doi.org/10.1016/j.tele.2022.101841

Jia Yee Yeh, Choon Sen Seah, Yin Xia Loh, Mei Peng Low, Najmi, A., & Farah Waheeda Jalaludin. (2024). Exploring the actual implementation of e-wallet application in Malaysia. *Mağallaẗ Baġdād Li-l-ʿulūm*, *21*(2(SI)). https://doi.org/10.21123/bsj.2024.9864

Juliana, A., Saffardin, F. S., & Teoh, K. B. (2021). Job Demands-Resources Model and burnout among Penang preschool teachers: The mediating role of work engagement.

Kabir, S. M. S. (2016). Sample and sampling designs. *Fundamentals of Research Methodology and Statistics, July 2016*, *323*.

Kamarudin, N. Y., Kosnin, A. M., Handayani, L., & Mamat, C. R. (2023). Structural equation modelling: validation of career readiness model using psychological constructs. International Journal of Evaluation and Research in Education (IJERE), 13(1), 159. https://doi.org/10.11591/ijere.v13i1.27143

Katiniou, P. (2023). UI/UX Design and User Engagement in Smartphone Applications. Hellenic Open University (Postgraduate Dissertation).

Kaur, N., Mohit Jamwal, Pritpal Singh, & Avinash Rana. (2024). Game on: Exploring the impact of gamified features on travel app continuance intention. *Multidisciplinary Science Journal*, *7*(1), 2025056. https://doi.org/10.31893/multiscience.2025056

Kemp, S. (2023, February 13). *Digital 2023: Malaysia*. DataReportal. https://datareportal.com/reports/digital-2023-malaysia

Khamaj, A., & Ali, A. M. (2024). Adapting user experience with reinforcement learning: Personalizing interfaces based on user behavior analysis in real-time. *Alexandria Engineering Journal*, *95*, 164–173. https://doi.org/10.1016/j.aej.2024.03.045

Kim, E., Lin, J.-S., & Sung, Y. (2013). To App or Not to App: Engaging Consumers via Branded Mobile Apps. *Journal of Interactive Advertising*, *13*(1), 53–65. https://doi.org/10.1080/15252019.2013.782780

Kim, H., Huh, C., Song, C., & Lee, M. J. (2021). How can hotel smartphone apps enhance hotel guest experiences? An integrated model of experiential value. *Journal of Hospitality and Tourism Technology*, *12*(4), 791–815. https://doi.org/10.1108/jhtt-07-2020-0176

Kim, S., & Baek, T. H. (2018). Examining the antecedents and consequences of mobile app engagement. *Telematics and Informatics*, *35*(1), 148–158. https://doi.org/10.1016/j.tele.2017.10.008

Kotian, H., Varghese, A. L., & Motappa, R. (2022). An R Function for Cronbach's Alpha

Analysis: A Case-Based Approach. *National Journal of Community Medicine*, *13*(08), 571–575. https://doi.org/10.55489/njcm.130820221149

Kruger, L., & Steyn, T. (2024). Technology adoption frameworks in Industry 4.0: A comparative analysis of TAM, UTAUT, DOI and TOE. University of Pretoria Institutional Repository. https://repository.up.ac.za/server/api/core/bitstreams/6f006629-10aa-4a76-a5a9-59f62b82afc3/content

Legate, A. E., Hair, J. F., Chretien, J. L., & Risher, J. J. (2021). PLS-SEM: Prediction-oriented solutions for HRD researchers. Human Resource Development Quarterly, 34(1). https://doi.org/10.1002/hrdq.21466

Lenzner, T., Hadler, P., & Neuert, C. (2022). An experimental test of the effectiveness of cognitive interviewing in pretesting questionnaires. *Quality & Quantity*. https://doi.org/10.1007/s11135-022-01489-4

Li, W., & Lay, Y. F. (2024). Examining the Reliability and Validity of Measuring Scales related to Informatization Instructional Leadership Using PLS-SEM Approach. *Dinamika Jurnal Ilmiah Pendidikan Dasar*, *16*(1), 12. https://doi.org/10.30595/dinamika.v16i1.19768

Liang, H., Wang, M.-M., Wang, J.-J., & Xue, Y. (2018). How intrinsic motivation and extrinsic incentives affect task effort in crowdsourcing contests: A mediated moderation model. *Computers in Human Behavior*, *81*, 168–176. https://doi.org/10.1016/j.chb.2017.11.040

Lim, W. M. (2024a). A typology of validity: content, face, convergent, discriminant, nomological and predictive validity. *Journal of Trade Science*, *12*(3), 155–179. https://doi.org/10.1108/jts-03-2024-0016

Lim, W. M. (2024b). What is quantitative research? An overview and guidelines. *Australasian Marketing Journal (AMJ)*, *1*(1). Sagepub. https://doi.org/10.1177/14413582241264622

Lim, X.-J., Cheah, J.-H., Morrison, A. M., Ng, S. I., & Wang, S. (2022). Travel app shopping on smartphones: understanding the success factors influencing in-app travel purchase intentions. *Tourism Review*. https://doi.org/10.1108/tr-11-2021-0497

Liu, Y., Li, Q., Edu, T., & Negricea, I. C. (2023). Exploring the Continuance Usage Intention of Travel Applications In the Case of Chinese Tourists. *Journal of Hospitality & Tourism Research*, 109634802096255. https://doi.org/10.1177/1096348020962553

Liu, Y., Tan, H., Cao, G., & Xu, Y. (2024). Enhancing User Engagement through Adaptive UI/UX Design: A Study on Personalized Mobile App Interfaces. *World Journal of Innovation and Modern Technology*, *7*(5), 1–21. https://doi.org/10.53469/wjimt.2024.07(05).01

Locke, E. A. (1968). Toward a Theory of Task Motivation and Incentives. *Organizational Behavior and Human Performance*, *3*(2), 157–189. https://doi.org/10.1016/0030-5073(68)90004-4

Long, F., Bhuiyan, M. A., Aziz, N. A., & Rahman, M. K. (2022). Predicting young Chinese consumers' intentions to purchase Western brands: Structural model analysis. *PLOS ONE*, *17*(5), e0267563. https://doi.org/10.1371/journal.pone.0267563

Mahmoud Alghizzawi, Mohamad Habes, Abdalla Alassuli, & Abd Alrahman Ratib Ezmigna. (2023). Digital Marketing and Sustainable Businesses: As Mobile Apps in Tourism. *Studies in Systems, Decision and Control*, 3–13. https://doi.org/10.1007/978-3-031-35828-9_1

Malapane, T. A., & Ndlovu, N. K. (2024). Assessing the Reliability of Likert Scale Statements in an E-Commerce Quantitative Study: A Cronbach Alpha Analysis Using SPSS

Statistics. *Assessing the Reliability of Likert Scale Statements in an E-Commerce Quantitative Study: A Cronbach Alpha Analysis Using SPSS Statistics*. https://doi.org/10.1109/sieds61124.2024.10534753

Malaysian Communications and Multimedia Commission. (2022). *Hand phone users survey 2021: Full report*. https://www.mcmc.gov.my/skmmgovmy/media/General/pdf2/FULL-REPORT-HPUS-2021.pdf

Malik, S., Aras Solong, Subhan Djaya, & Khaerunnisa Sucipto. (2025). The Influence of Discipline and Work Motivation on Employee Productivity Improvement. *Journal of Indonesian Scholars for Social Research*, *5*(1), 121–128. https://doi.org/10.59065/jissr.v5i1.180

Manos, A., Filipidou, D. E., Deliyannis, I., Pavlidis, N., Argyros, V., & Mazi, I. (2024). INDIANA: Personalized Travel Recommendations Using Wearables and AI. *ArXiv (Cornell University)*. https://doi.org/10.48550/arxiv.2411.12227

Marijana Seočanac. (2024). PLS-SEM: A hidden gem in tourism research methodology. *Menadžment U Hotelijerstvu I Turizmu/Menadžment U Hotelijerstvu I Turizmu*, *00*, 6–6. https://doi.org/10.5937/menhottur2400005s

Mehrabian, A., & Russell, J. A. (1974). An approach to environmental psychology. MIT Press.

McLean, G. (2018). Examining the determinants and outcomes of mobile app engagement - A longitudinal perspective. *Computers in Human Behavior*, *84*, 392–403. https://doi.org/10.1016/j.chb.2018.03.015

Md Noh, N. H., & Amron, M. T. (2021). Exploring Cloud Computing Readiness and Acceptance in Higher Education Institution: A PLS-SEM Approach. *Asian Journal of University Education*, *17*(4), 367. https://doi.org/10.24191/ajue.v17i4.16193

Mehra, A., Paul, J., & Kaurav, R. P. S. (2020). Determinants of mobile apps adoption among young adults: theoretical extension and analysis. *Journal of Marketing Communications*, *27*(5), 481–509.

Memon, M. A., T., R., Cheah, J.-H., Ting, H., Chuah, F., & Cham, T. H. (2021). PLS-SEM STATISTICAL PROGRAMS: A REVIEW. *Journal of Applied Structural Equation Modeling*, *5*(1), i–xiv. https://doi.org/10.47263/jasem.5(1)06

Memon, M. A., Ting, H., Cheah, J.-H., Thurasamy, R., Chuah, F., & Cham, T. H. (2020). Sample Size for Survey Research: Review and Recommendations. *Journal of Applied Structural Equation Modeling*, *4*(2), 1–20.

Milad Sherzad. (2025, January 17). *British Airways passengers can't check in for flights with app & site BOTH down as customers slam '...* The Sun. https://www.thesun.co.uk/travel/32864858/british-airways-website-down-flights-booking-login/

Muhammad Zafar Yaqub, Saeed Badghish, Muhammad, R., Ali, I., & Noor Sahar Ali. (2024). Integrating and extending the SOR model, TAM and the UTAUT to assess M-commerce adoption during COVID times. *Journal of Economic and Administrative Sciences*. https://doi.org/10.1108/jeas-09-2023-0259

Murali, M., & Charlesworth, M. (2024). How to write pilot and feasibility studies. *Anaesthesia*. https://doi.org/10.1111/anae.16283

Murrar, A., Paz, V., Batra, M., & Yerger, D. (2025). Strategies for driving customer adoption of AI-powered mobile apps: insights from structural equation modeling in the water sector. *Journal of Systems and Information Technology*. https://doi.org/10.1108/jsit-12-2023-0335

Mussa Saidi Abubakari, Nasir, A., & Musa, J. (2024). Perceived compatibility and students'

intention to adopt digital technologies in Islamic education institutions. *Cogent Education*, *11*(1). https://doi.org/10.1080/2331186x.2024.2430869

Nicole Franziska Richter, & Ana Alina Tudoran. (2024). Elevating theoretical insight and predictive accuracy in business research: Combining PLS-SEM and selected machine learning algorithms. *Journal of Business Research*, *173*, 114453–114453. https://doi.org/10.1016/j.jbusres.2023.114453

O'Brien, H. L., & Toms, E. G. (2008). What is user engagement? A conceptual framework for defining user engagement with technology. *Journal of the American Society for Information Science and Technology*, *59*(6), 938–955.

O'Halloran, J. (2022). *Travel apps leave users unsatisfied when facing delays, changes*. ComputerWeekly.com. https://www.computerweekly.com/news/252526119/Travel-apps-leave-users-unsatisfied-when-facing-delays-changes

Ohiare, O., & Amah, E. (2023). *Incentive Program and Employee Engagement of Port Harcourt Electricity Distribution Company*. https://arcnjournals.org/images/27751456791014.pdf

Pereira, L. M., Sanchez Rodrigues, V., & Freires, F. G. M. (2024). Use of Partial Least Squares Structural Equation Modeling (PLS-SEM) to Improve Plastic Waste Management. *Applied Sciences*, *14*(2), 628. https://doi.org/10.3390/app14020628

Pınar Çelik Çaylak, Mehmet Kayakuş, Nisa Eksili, Fatma Yiğit Açikgöz, Artuğ Eren Coşkun, Maria, A., & Moiceanu, G. (2024). Analysing Online Reviews Consumers' Experiences of Mobile Travel Applications with Sentiment Analysis and Topic Modelling: The Example of Booking and Expedia. *Applied Sciences*, *14*(24), 11800–11800. https://doi.org/10.3390/app142411800

Population Pyramids. (2025). *Malaysia Population Pyramid 2025 - Demographics & Age*

Distribution. Populationpyramids.org. https://www.populationpyramids.org/malaysia

Price, O., & Lovell, K. (2018). Quantitative research design. *A Research Handbook for Patient and Public Involvement Researchers*. https://doi.org/10.7765/9781526136527.00008

Purwanto, A. (2021). *Education Research Quantitative Analysis for Little Respondents: Comparing Lisrel, Tetrad, GSCA, Amos, SmartPLS, WarpPLS, and SPSS*. Social Science Research Network. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3982756

Purwanto, A., & Sudargini, Y. (2021). Partial Least Squares Structural Squation Modeling (PLS-SEM) Analysis for Social and Management Research : A Literature Review. *Journal of Industrial Engineering & Management Research*, *2*(4), 114–123. https://doi.org/10.7777/jiemar.v2i4.168

Qing, T., & Haiying, D. (2021). How to achieve consumer continuance intention toward branded apps—from the consumer–brand engagement perspective. *Journal of Retailing and Consumer Services*, *60*, 102486. https://doi.org/10.1016/j.jretconser.2021.102486

Qiao, D., Lee, S. Y., Whinston, A. B., & Wei, Q. (2021). Mitigating the adverse effect of monetary incentives on voluntary contributions online. *Journal of Management Information Systems, 38*(1), 82–107. https://doi.org/10.1080/07421222.2021.1870394

Rahi, S., Alghizzawi, M., Ishtiaq, M., Ngah, A. H., & Mehta, A. M. (2025). Examining consumer behaviour towards continuance use of mobile shopping apps with the integration of expectation confirmation theory and flow theory. *International Journal of Business Information Systems*, *49*(1), 1–24. https://doi.org/10.1504/ijbis.2025.145961

Rahman, M. M. (2023). Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations. Journal of

Entrepreneurship, Business and Economics, 11(1), 42–62. https://www.scirp.org/journal/paperinformation.aspx?paperid=123876

Rahman, Md. M., Tabash, M. I., Salamzadeh, A., Abduli, S., & Rahaman, Md. S. (2022). Sampling Techniques (Probability) for Quantitative Social Science Researchers: a Conceptual Guidelines with Examples. *SEEU Review*, *17*(1), 42–51.

Rajabi, M., Rasoolimanesh, S. M., Andam, R., & Abdollahnezhad, F. (2023). A systematic review of PLS in sports management. Human Resource Management in Sports, 10(1), 167–192. https://journals.kmanpub.com/index.php/HRMS/article/view/4307

Ranganathan, P. (2021). An introduction to statistics: Choosing the correct statistical test. *Indian Journal of Critical Care Medicine*, *25*(S2), 184–186. https://doi.org/10.5005/jp-journals-10071-23815

Rashid & Sipahi. (2021). *Quantitative Statistical Method - an overview | ScienceDirect Topics*. Www.sciencedirect.com.https://www.sciencedirect.com/topics/social-sciences/quantitative-statistical-method

Rogers, E. M. 1962. Diffusion of innovations (1st ed.). New York: Free Press.

Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). Free Press.

Rogers, E. M. (2003). Diffusion of Innovations (5th ed.). Free Press.

Sabol, M., Hair, J. F., Cepeda-Carrión, G., Roldán, J. L., & Alain Yee-Loong Chong. (2023). PLS-SEM in information systems: seizing the opportunity and marching ahead full speed to adopt methodological updates. *Industrial Management and Data Systems*, *123*(12), 2997–3017. https://doi.org/10.1108/imds-07-2023-0429

Sakeah, E., Bawah, A. A., Kuwolamo, I., Anyorikeya, M., Asuming, P. O., & Aborigo, R. A. (2023). How different incentives influence reported motivation and perceptions of performance in Ghanaian community-based health planning and services zones. *BMC*

Research Notes, *16*(1). https://doi.org/10.1186/s13104-023-06286-2

Salvatore, D. (2021). Theory and problems of statistics and econometrics. http://elibrary.gci.edu.np:8080/bitstream/123456789/3303/1/BT-50%5BDominick_Salvatore%3B_Derrick_P_Reagle%5D_Schaum%27s_ou.pdf

Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed.). Pearson.

Seridaran, S., Sithamparam, A. G., Falahat, M., & Ekmekcioğlu, Ö. (2024). Determinants of continuance usage intentions: the mediating role of satisfaction and trust in branded mobile applications among Malaysians. *Cogent Business & Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2402082

Shi, Y., & Zhang, Y. (2025). Group-based trajectory modeling to identify effect of badges in online Q&A communities. *Information Technology & People*. https://doi.org/10.1108/itp-03-2024-0368

Shrestha, N. (2021). Factor Analysis as a Tool for Survey Analysis. *American Journal of Applied Mathematics and Statistics*, *9*(1), 4–11. https://doi.org/10.12691/ajams-9-1-2

Shukla, S. (2023). Non-probability sampling method 1. National Faculty Development Programme, Department of Testing and Evaluation, Children's University. https://www.researchgate.net/publication/372724527_NON-PROBABILITY_SAMPLING_METHOD_1

Siedlecki, S. L. (2020). Understanding descriptive research designs and methods. *Clinical Nurse* Specialist, 34(1), 8–12. ResearchGate. https://doi.org/10.1097/NUR.0000000000000493

Singh, S. S. (2024). Fundamentals of Research Methodology: A Comprehensive Guide. International Journal of Research in Academic World, 3(6), 123–127

Siti Hajar Komariah, Asep Mulyana, Rita Komala Dewi, & Yunizar Yunizar. (2023). USER INTERFACE MEASUREMENT ANALYSIS OF TRAVEL E-COMMERCE BASED ON USABILITY AND USER EXPERIENCE. *Demandia (Bandung)*, *8*(2), 267–267. https://doi.org/10.25124/demandia.v8i2.6347

Sivasothey, J. A., Yeo, S. F., & Tan, C. L. (2024). Assessing the Applicability and Reliability of the SOR Theory in the Healthcare Sector: A Comprehensive Review of Recent Research. *PaperASIA*, *40*(1(b)), 1–12. https://doi.org/10.59953/paperasia.v40i1(b).55

Smartpls. (2014). *Product | SmartPLS*. Smartpls.com. https://www.smartpls.com/

Statista. (2023, October 27). *Malaysia: smartphone ownership by age 2019*. Statista. https://www.statista.com/statistics/973694/malaysia-smartphone-ownership-by-age/

STRYZHAK, O. (2022). TOURISM AND DIGITAL TECHNOLOGIES: ANALYSIS OF THE RELATIONSHIP. *Economics of Development*, *21*(2). https://doi.org/10.57111/econ.21(2).2022.42-50

Subhaktiyasa, P. G. (2024). PLS-SEM for Multivariate Analysis: A Practical Guide to Educational Research using SmartPLS. *EduLine: Journal of Education and Learning Innovation*, *4*(3), 353–365. https://doi.org/10.35877/454ri.eduline2861

Sun, Y., & Yuan, Z. (2024). A virtual gym in your pocket: the influence of augmented reality exercise app characteristics on user's continuance intention. *Virtual Reality (Waltham Cross)*, *28*(1). https://doi.org/10.1007/s10055-024-00959-4

Taherdoost, H. (2022). What Are Different Research Approaches? Comprehensive Review of Qualitative, Quantitative, and Mixed Method Research, Their Applications, Types, and Limitations. *Journal of Management Science & Engineering Research*, *5*(1), 53–63. https://hal.science/hal-03741840/document

Tak, P., & Gupta, M. (2021). Examining Travel Mobile App Attributes and Its Impact on

Consumer Engagement: An Application of S-O-R Framework. *Journal of Internet Commerce*, *20*(3), 293–318. https://doi.org/10.1080/15332861.2021.1891517

Takona, J. P. (2023). Research design: qualitative, quantitative, and Mixed Methods Approaches / Sixth Edition. *Quality & Quantity*, *58*(1), 1011–1013. https://doi.org/10.1007/s11135-023-01798-2

Teng, W. H., & Ang, J. H. (2024). The impact of risk perception on the purchase intention among Generation X on autonomous vehicle in Malaysia (Doctoral dissertation, UTAR). UTAR ePrints. http://eprints.utar.edu.my/6936/1/1903643_Teng_Wen_Hao.pdf

Tian, Y., Zhou, K., & Pelleg, D. (2022). What and How long: Prediction of Mobile App Engagement. *ACM Transactions on Information Systems*, *40*(1), 1–38. https://doi.org/10.1145/3464301

Tian, Z., Shi, Z., & Cheng, Q. (2021). Examining the antecedents and consequences of mobile travel app engagement. *PLOS ONE*, *16*(3), e0248460. https://doi.org/10.1371/journal.pone.0248460

Tiwari, P., Pratap, R., & Kian Yeik Koay. (2023). Understanding travel apps usage intention: findings from PLS and NCA. *Journal of Marketing Analytics*. https://doi.org/10.1057/s41270-023-00258-y

Tuch, A. N., Presslaber, E. E., Stöcklin, M., Opwis, K., & Bargas-Avila, J. A. (2012). The Role of Visual Complexity and Prototypicality regarding First Impression of websites: Working Towards Understanding Aesthetic Judgments. *International Journal of Human-Computer Studies*, *70*(11), 794–811. https://doi.org/10.1016/j.ijhcs.2012.06.003

Vanhove, J. (2021). Collinearity isn't a disease that needs curing. *Meta-Psychology*, *5*.

Williams, J., Anggy Giri Prawiyogi, Rodriguez, M., & Kovac, I. (2024). Enhancing Circular Economy with Digital Technologies: A PLS-SEM Approach. *International Transactions on Education Technology (ITEE)*, *2*(2), 140–151. https://doi.org/10.33050/itee.v2i2.590

Willie, M. M. (2023). Distinguishing Between Population and Target Population: A Mini Review. *Surgery Research Journal*, *3*(2), 1–2. https://doi.org/10.33425/2768-0428.1027

Wiyata, W., Md Zain, N. A., Asyraff, M. A., Anuar, F. I., & Hanafiah, M. H. (2024). From user engagement to app love: Investigating the antecedents and consequences of third-party travel app usage. *Journal of Hospitality and Tourism Technology*. https://doi.org/10.1108/jhtt-06-2024-0396

Wnuk, M., Czerw, A., Żywiołek-Szeja, M., & Chudzicka-Czupała, A. (2025). The Polish version of the Ethical Climate Questionnaire. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-025-93990-7

Wohllebe, A., Stoyke, T., & Podruzsik, S. (2020). Incentives on E-Commerce App Downloads in Medium Apps: A Case Study on the Effects of Coupons and Bonus Points. *International Journal of Interactive Mobile Technologies (IJIM)*, *14*(19), 180. https://doi.org/10.3991/ijim.v14i19.16427

Wu, S.-H. (2022). Minds Think Alike: How Do Food Delivery Mobile Applications Innovate Consumer Service. *Journal of Tourism and Services*, *13*(25), 137–155. https://doi.org/10.29036/jots.v13i25.384

Xiao, R., Wu, Z., & Hamari, J. (2021). Internet-of-Gamification: A Review of Literature on IoT-enabled Gamification for User Engagement. *International Journal of Human–Computer Interaction*, 1–25. https://doi.org/10.1080/10447318.2021.1990517

Xu, X., Du, H., & Lian, Z. (2022). Discussion on regression analysis with small determination coefficient in human-environment researches. *Indoor Air*, *32*(10). https://doi.org/10.1111/ina.13117

Yahaya, S., Hamid, S. N. A., & Nafi, S. N. M. (2023). Influence of UTAUT, perceived compatibility, and perceived credibility on m-commerce adoption. International Journal of ADVANCED AND APPLIED SCIENCES, 10(11), 49–58. https://doi.org/10.21833/ijaas.2023.11.007

YIN, L. (2024). DECODING THE ANTECEDENTS OF USER ENGAGEMENT AND ADVOCACY IN MOBILE TRAVEL APPS (Doctoral dissertation, UNIVERSITI TUNKU ABDUL RAHMAN).

Yohana, A., Shayo, F., & Mburaa, S. (2025). The impact of adoption relative advantage of technology on firm performance: Applying innovation diffusion theory in the gas energy sector of Dar es Salaam, Tanzania. *Business Education Journal, 11*

Yoon, C., & Rolland, E. (2015). Understanding Continuance Use in Social Networking Services. *Journal of Computer Information Systems*, *55*(2), 1–8. https://doi.org/10.1080/08874417.2015.11645751

Yusuf Haji-Othman, & Mohd. (2022). Assessing Reliability and Validity of Attitude Construct Using Partial Least Squares Structural Equation Modeling (PLS-SEM). *International Journal of Academic Research in Business and Social Sciences*, *12*(5), 378–385. https://doi.org/10.6007/ijarbss/v12-i5/13289

Zeng, N., Liu, Y., Gong, P., Hertogh, M., & König, M. (2021). Do right PLS and do PLS right: A critical review of the application of PLS-SEM in construction management research. *Frontiers of Engineering Management*, *8*(3), 356–369. https://doi.org/10.1007/s42524-021-0153-5

Zhai, J. (2026). Platform Competition and Compatibility: Strategic Choices and Market Outcomes in Two-Sided Digital Markets. *Advances in Economics, Management and Political Sciences*, *256*(1), 36–45. https://doi.org/10.54254/2754-1169/2025.bl31111

Zhang, Y. (2023). Analysis of the Digital Transformation Development Path for Travel Enterprises. *Open Journal of Applied Sciences*, *13*(8), 1370–1386. https://doi.org/10.4236/ojapps.2023.138109

Zhou, X., Krishnan, A., & Dincelli, E. (2021). Examining user engagement and use of fitness tracking technology through the lens of technology affordances. *Behaviour & Information Technology*, *41*(9), 1–16. https://doi.org/10.1080/0144929x.2021.1915383

Zhu, Z., Liao, L., & Hu, B. (2022). Factors correlated with online travel service adoption: a meta-analysis. *Journal of Hospitality and Tourism Technology*. https://doi.org/10.1108/jhtt-10-2020-0284

Zulkiflee, H., Razak, N. A., & Dzulkalnine, N. (2025). Assessing Hierarchical Component Model for Work-Life Balance Strategies and Entrepreneurial Competencies: Reflective-Reflective Model

Zyoud, M. M., Bsharat, T. R. K., & Dweikat, K. A. (2024). Quantitative Research Methods: Maximizing Benefits, Addressing Limitations, and Advancing Methodological Frontiers. *ISRG Journal of Multidisciplinary Studies (ISRGJMS)*, *II*(IV), 11–14. https://doi.org/10.5281/zenodo.10939470

Appendices

Appendix 1.1: Sources of Measurement Item

Variables	Items		Sources
User Interface	UI 1	The design of mobile travel app looks clean.	(Fang et al., 2017)
	UI 2	The design of mobile travel app is simple.	
	UI 3	The user interface design of mobile travel app is fascinating.	
	UI 4	The design of mobile travel app is attractive.	
Relative Advantage	RA 1	This mobile travel app enhances my traveling experience.	(Fang et al., 2017)
	RA 2	This mobile travel app helps me understand the destination easily.	
	RA 3	The mobile travel app saves my times.	
	RA 4	The mobile travel app makes traveling more effective.	
Compatibility	COM 1	I find the mobile travel app is compatible with my travel preferences.	(Gao et al., 2023)
	COM 2	I find that the mobile travel app suits my travel needs.	
	COM 3	I find the mobile travel app fits well with my travel needs.	
Perceived Incentives	PI 1	I receive offers from the mobile travel app.	(Choi, 2018)
	PI 2	I receive rewards from the mobile travel app.	
	PI 3	I receive special deals from the mobile travel app.	
User Engagement	UE 1	I feel motivated when I use the mobile travel app.	(Ali et al., 2021)
	UE 2	I feel enthusiastic when I use mobile travel app.	
	UE 3	I find that the mobile travel app is immersive.	
Continuance Usage Intention	CUI 1	I will continue to use mobile travel app.	(Sun & Yuan, 2024)
	CUI 2	I will say positive things about mobile travel app.	
	CUI 3	I will recommend mobile travel app to others.	

Appendix 1.2: Questionnaire for Main Study

Greetings to all,

We are final year undergraduate students of Bachelor of Marketing (Honours), from Teh Hong Piow Faculty of Business and Finance in University Tunku Abdul Rahman (UTAR) Kampar campus. As part of our research, we are conducting a research project entitled **"Determinants of User Engagement and Continuance Usage Intention in Travel Applications".** This research aims to **examine the factors influencing user engagement and continuance usage intention in travel applications.**

This survey will only take you approximately **5 minutes**, and all participation towards this survey are voluntary. Rest assured that all the responses collected will be used solely for academic purposes, and will be kept private and confidential. Thank you in advance for your time and cooperation in answering our questionnaire. If you have any questions regarding this questionnaire, please feel free to contact us at deandra03yong@1utar.my or huishi0321@1utar.my

Your participation is highly appreciated.

Yours sincerely,

Deandra Yong Qian Yi (2202653)

Wong Hui Shi (2202598)

Section A: Screening Questions

1. **Do you have travel application(s) in your mobile phone:**
   - Yes
   - No
2. **Are you currently residing in the Klang Valley area? (E.g. W.P Kuala Lumpur)**
   - **Yes**
   - **No**

Section B: Demographics Questions

3. **Gender**
   - Male
   - Female

4. **Age Group**
   - 18-21
   - 21-30
   - 31-40
   - 41-50
   - 51-60

5. **Highest Education Level**
   - Primary or Secondary School
   - Pre-U or Diploma or Advanced Diploma
   - Bachelor of Professional Qualifications
   - Master or PhD

6. **Employment Status**
   - Student
   - Employed full-time
   - Employed part-time
   - Self-employed
   - Unemployed
   - Other: _____

7. **Monthly Personal Income / Allowance**
   - RM2,000 and below
   - RM2,001 - RM4,000
   - RM4,001 - RM6,000
   - RM6,001- RM8,000
   - RM 8,001 - RM10,000
   - Above RM10,000

8. **Mobile travel application(s) in use**
    - Agoda
    - Airbnb
    - Booking.com
    - Expedia
    - Kayak
    - Klook
    - Traveloka
    - Trip.com
    - Trivago
    - Others:

9. **How frequently do you use mobile travel applications?**
    - Daily
    - Weekly
    - Biweekly
    - Monthly
    - Bimonthly
    - Quarterly

Section C: Variables

Instruction: Please indicate the extent to which you agree or disagree with each of the following statements about your use of travel applications. Please select the number that best represents your opinion. There are no right or wrong answers. Choose the response that best reflects your view using the following scale: (1) Strongly Disagree, (2) Disagree, (3) Somewhat Disagree, (4) Neutral, (5), (6) Agree, and (7) Strongly Agree.

10. User Interface (UI)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
UI 1. The design of travel app looks clean							
UI 2. The design of travel app is simple							
UI 3. The user interface design of travel app is fascinating.							
UI 4. The travel app has an attractive design							
UI 5. The design of travel app is attractive							

11. Relative Advantage (RA)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
RA 1. The travel app enhances my traveling experience.							
RA 2. The travel app helps me understand the destination easily							
RA 3. The travel app saves my time							
RA 4. The travel app makes traveling more effective							

12. Compatibility(COM)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
COM 1. I find the travel app is compatible with my travel preferences							
COM 2. I find that the travel app suits my travel needs							
COM 3. I find the travel app fits well with my travel needs							

13. Perceived incentives (PI)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
PI 1. I receive offers from the travel app (e.g. promotions)							
PI 2. I receive rewards from the travel app (e.g. member's points)							
PI 3. I receive special deals from the travel app (e.g. exclusive, limited deals)							

14. User Engagement (UE)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
UE 1. I feel motivated when I use the travel app							
UE 2. I feel enthusiastic when I use travel app							
UE 3. I find that the travel app is absorbing and immersive							

15. Continuance Usage Intention (CUI)

	(1) Strongly Disagree	(2) Disagree	(3) Somewhat Disagree	(4) Neutral	(5) Somewhat Agree	(6) Agree	(7) Strongly Agree
CUI 1. I will continue to use travel app							
CUI 2. I will recommend mobile travel app to others							
CUI 3. I will say things about travel app							