DETERMINANTS INFLUENCING BEHAVIOURAL INTENTION TO USE SMART MOBILE TRAVEL APPS (SMTA) AMONG GENERATIONS X, Y AND Z

SIA YUENG HEE

UNIVERSITI SAINS MALAYSIA

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TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

LIST OF APPENDICES

FAKTOR YANG MEMPENGARUHI KECENDERUNGAN TINGKAHLAKU GENERASI X, Y DAN Z DALAM MENGGUNAKAN APLIKASI PINTAR PELANCONGAN

ABSTRAK

Evolusi peranti pintar dan teknologi kecerdasan buatan telah memindahkan aplikasi perjalanan mudah alih ke arah teknologi pintar. Memandangkan kadar penembusan penggunaan telefon pintar yang tinggi tetapi penggunaan yang rendah dan kadar pembatalan Aplikasi Perjalanan Mudah Alih Pintar (SMTA) yang tinggi; pemahaman terhad tentang penentu yang mempengaruhi penggunaan SMTA ke arah pintar; kebimbangan privasi dan risiko pendedahan maklumat privasi telah mengancam penggunaan SMTA; dan generasi yang berbeza boleh mempengaruhi niat tingkahlaku untuk menggunakan SMTA. Kajian ini mencadangkan penggunaan Penerimaan Pengguna dan Penggunaan Teknologi Maklumat (UTAUT2) dengan memasukkan komponen kontekstual baru seperti Inovatif Peribadi dan Pendedahan Maklumat Privasi untuk mengkaji penentu yang mempengaruhi niat tingkahlaku untuk menggunakan SMTA. Model UTAUT2 juga disepadukan dengan model Teori Kalkulus Privasi (PCT) dengan menggabungkan dua antecedents seperti Kebimbangan Privasi dan Risiko Privasi untuk menentukan tahap Pendedahan Maklumat Privasi, yang mempengaruhi niat tingkahlaku untuk menggunakan SMTA. Tambahan pula, Teori Kohort Generasi (GCT) digunakan untuk mengkaji kesan penyederhanaan kohort generasi dan perbezaan generasi pada korelasi postulated di kalangan Generasi X, Y dan Z. Analisis statistik dijalankan pada 392 survei sampel mudah alih menggunakan model persamaan struktural dalam

SPSS 22.0 dan SmartPLS 3.0. Penemuan menunjukkan bahawa Jangkaan Prestasi, Tabiat dan Inovatif Peribadi mempengaruhi Niat TingkahLaku sementara Kebimbangan Privasi mempengaruhi Pendedahan Maklumat Privasi untuk menggunakan SMTA. Walau bagaimanapun, kesannya disederhanakan oleh Kohort Generasi yang berbeza di mana hubungan antara Keadaan Memudahkan dan Niat TingkahLaku untuk menggunakan SMTA berbeza antara Gen X dan Z, manakala hubungan antara Motivasi Hedonic/Nilai Harga/Tabiat dan Niat TingkahLaku untuk menggunakan SMTA berbeza antara Gen X dan Y, dan antara Gen Y dan Z. Perluasan teori UTAUT2 dan integrasinya dengan kedua-dua teori PCT dan GCT adalah penting dalam menentukan penentu mempengaruhi niat tingkah laku untuk menggunakan SMTA dari perspektif pengguna dan pintar. Penemuan kajian ini menaikan pemahaman penggunaan SMTA terkini, yang penting bagi industri pelancongan dalam menggabungkan ciri-ciri baru yang sesuai kepada SMTA untuk mempromosikan perkhidmatan dan produk mereka dengan cara yang lebih berkesan dan mampan. Analisis kohort generasi dan perbezaan generasi membantu penyedia pelancongan mengamalkan strategi pemasaran khas untuk setiap generasi dalam SMTA melalui perkhidmatan pemperibadian aplikasi untuk mempromosikan perkhidmatan dan produk berkesan untuk mendapat kelebihan daya saing dalam industri pelancongan.

DETERMINANTS INFLUENCING BEHAVIOURAL INTENTION TO USE SMART MOBILE TRAVEL APPS (SMTA) AMONG GENERATIONS X, Y AND Z

ABSTRACT

The evolution of smart devices and artificial intelligence technology has shifted mobile travel apps towards smart technologies. Given the high penetration rate of smartphone use but low usage and high uninstall rate of Smart Mobile Travel Apps (SMTA); limited understanding of determinants influencing the adoption of SMTA; privacy concerns and the risk of privacy information disclosure have threatened the SMTA adoption; different generations may influence behavioural intention to use SMTA. This study proposes the use of Consumer Acceptance and Use of Information Technology (UTAUT2) by including new contextual components such as Personal Innovativeness and Privacy Information Disclosure to examine the determinants influencing behavioural intention to use SMTA. The UTAUT2 model is also integrated with the Privacy Calculus Theory (PCT) model by incorporating two antecedents such as Privacy Concerns and Privacy Risks to determine the degree of Privacy Information Disclosure, which influencing the behavioural intention to use SMTA. However, the Perceived Benefits is eliminated as it was replicated with the perceived value constructs from the UTAUT2 model. Furthermore, Generational Cohort Theory (GCT) was adopted to examine the moderating effect of generational cohorts and generational differences on the postulated correlations among Generations X, Y and Z. Statistical analyses are performed on 392 convenience sampled surveys using structural equation modeling in SPSS 22.0 and SmartPLS 3.0. Findings revealed that Performance Expectancy, Habit and Personal

Innovativeness significantly affect Behavioural Intention while Privacy Concern significantly affects Privacy Information Disclosure to use SMTA, and the rest is insignificant. Nevertheless, different Generational Cohorts moderates the effects, with the relationship between Facilitating Conditions and Behavioural Intention to use SMTA differs significantly between Gen X and Z, while the relationship between Hedonic Motivation/Price Value/Habit and Behavioural Intention to use SMTA differs significantly between Gen X and Y, and between Gen Y and Z. The extension of UTAUT2 theory and its integration with both PCT and GCT theories are significant in determining the determinants affects behavioural intention to use SMTA from both the user and smart perspectives. The study findings enable a better understanding of recent trends in the adoption of SMTA, which is significant for the tourism industry in incorporating suitable new features to SMTA for promoting their services and products in a more effective and sustainable manner. The analysis of generational cohort and generational differences help tourism providers to develop specific marketing strategies, tailored to each generation's expectations in SMTA through app personalization services to promote their services and products effectively for competitive advantage in the tourism industry.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Smart Mobile travel apps (SMTA) are essential tools in travel planning. It provides both tourists and providers with a solution that offers high-value-added services to solve problems at the destination. Additionally, the evolution of mobile technology and constant mobile app growth drive SMTA towards smart and change travellers' behaviour. SMTA powered by Artificial Intelligence (AI) and Machine Learning (ML) enables mobile smarts to execute activities as humans, and travellers expect SMTA to include planning or thinking features intelligently tailored to their preferences and requirements. The study research model is developed to identify the determinants influencing behavioural intention to use SMTA from both user and smart perspectives. Nevertheless, the degree adoption of SMTA may differ depending on the travelers' characteristics. Thus, this study also examine the moderating effect of the generational cohort on behavioural intention to use SMTA. Simultaneously, this study compares determinants influencing behavioural intention to use SMTA among Generations X, Y, and Z to analyse generational differences and provide empirical evidence of the most significant distinctions. This chapter is divided into six sections: introduction, research background, problem statements, research objectives, research questions, and significance of the study.

1.2 Research Background

Traveling had a significant impact on the evolution of our society and species. Tourism has become a worldwide phenomenon, and the travel industry is one of the biggest industries worldwide (Shoutern, 2016). Mobile travel apps such as Google Maps, Google Street View, and TripAdvisor are essential tools in travel planning and provide local insights and recommendations on destinations (The Global Economic Contribution of TripAdvisor, 2016). It ensures a smoother trip and avoids travelers' extensive long-term planning on itineraries, from booking flights to navigating a new destination. In addition, it provides a one-stop solution for users to perform travel-related activities such as booking tickets, booking hotels, car rentals, insurance, restaurant, and interesting places to visit, all in a single place without going through different portals.

The evolution of mobile technologies and the constant growth of mobile apps drive smart travel apps and change travelers' behaviour. Mobile technology innovation provides solutions for both tourists and providers to solve problems at the destination (Dorcic et al., 2018). Furthermore, it provides the tourism industry with a solution that offers high-value-added services, namely convenience, interactivity, and searching for information without geographical and time constraints (Bakar et al., 2019). Recent developments in the growth of mobile applications in Malaysia's tourism sector (Tourism Malaysia Launches Smart Tourism 4.0, 2018; Aman, 2019) improve tourist experiences at destinations, making travel easier and more pleasurable. However, other than an app that manages all travel-related tasks, travelers anticipated the app to have planning or thinking feature that is intelligently tailored to their requirements. Recently, Augmented Reality (AR) for visualisation and Big Data Analytics (BDA) for personalisation has been widely

embraced in tourism mobile app development. (Stfalcon.com, 2018; Vakhnenko, 2019; Barten, 2019; Singh, 2018).

This study is significant for tourism industries such as mobile app developers, smart-device manufacturers, travel organisations, and tourism stakeholders to incorporate new features into smart devices and introduce new services to the apps for promoting their services and products in more effective and sustainable ways. Besides, the differences in generational behaviour towards SMTA will help tourist providers to deliver specific marketing strategies, tailored to each generation's expectations on travel apps through app personalisation services.

1.2.1 Evolution of e-Tourism to Smart Tourism

Intelligent systems have fostered the evolution from e-Tourism to Smart Tourism. E-Tourism is referred to the utilisation of ICTs to improve business strategy and performance. Smart Tourism is an advancement of ICTs that includes efforts to collect data from physical infrastructure (Yalçınkaya et al., 2018), social media, government, organisational sources, and human resources minds. Apart from e-Tourism providing pre and post-travel information, Smart Tourism is expanding to deliver smart technology-mediated tourism experiences with greater mobility and better decision support.

Smart Tourism is referred to the application of innovative technologies such as the Artificial Intelligence (AI), Internet of Things (IoT), Information and Communication Technology (ICT), Mobile Communication and Cloud Computing to process the enormous volume of data in real-time for stakeholder effective decision-making (Gretzel et al., 2016; Dorcic et al., 2018). In addition, Smart Tourism can be defined as an

ecosystem that comprises smart technology infrastructure, smart business network and smart destination (Gretzel et al., 2016). Smart Tourism intelligently converts data into on-site experiences or develops a business value proposition (Femenia-Serra et al., 2019). Ma and his colleagues interpreted Smart Tourism as the changes in management, services, and marketing strategies by adopting the latest and most up-to-date technologies, such as ICTs (Ma & Liu, 2011). Li et al., 2017 revealed that Smart Tourism is the emergence of ICTs to meet individual demands with high-quality, preferred, and satisfying services (Li et al., 2017). Shi, 2013 presented that Smart Tourism is a new generation of ICTs that combines cloud computing, the internet of things, artificial intelligence, and mobile terminals equipped with 3G technology, PDA, and other devices (Li Y. , 2017)

1.2.2 Smart Mobile Travel Apps (SMTA)

1.2.2(a) Mobile Travel Apps

Mobile is becoming an indispensable part of the travel experience, with 98% of travelers bringing their smartphone along their journey, and 92% of travel firms stating that digital strategy is critical to their success (MacHale, 2019). Because the use of smartphones has increased rapidly in recent years, a mobile app has a significant impact on business. Almost 80% of internet users possess a smartphone for browsing the internet, and they spend 89% of mobile media time on apps (Sukhraj, 2017). According to Euromonitor International, mobile travel bookings will account for 25% of all global online travel reservations by 2019. (Shoutern, 2016). 68% of companies have made mobile marketing part of their marketing strategy, and 71% believe mobile marketing is essential to their business.

People around the world are comfortable planning their journey on a mobile device. Around 30 million people use mobile devices to search for travel information, while the growing popularity of apps has once again revolutionised travel (Shoutern, 2016). Travelers spend 90% of their time on mobile app browsing and only 10% of their time on mobile web browsing (Chaffey, 2019). Travelers are increasingly relying on mobile travel apps to organise their travel plans to ensure a smoother journey. Several different travel apps are adopted, ranging from booking flights, and accommodations, exploring a new place, itinerary generators, and storing itineraries. Numerous mobile apps can help with vacation planning, including where to go, where to stay, what to see, and what to do (Anderson, 2016). According to a global study by Travelport Digital based on the insights of 100+ professionals and 1,100+ travelers across the world, 58% of them use mobile apps for flight searches, and 53% use mobile apps for accommodation searches (MacHale, 2019). The continued growth of mobile app downloads and usage is due to the advantages of mobile apps over the mobile web, such as speed and UX, improved functionality, increased engagement via push notification, and offline accessibility (Kour, 2019). Travel industry professionals have aware of the value of mobile travel apps, with 90% planning to shift their investment to mobile and 60% looking for enhancement or better mobile apps in 2018 (MacHale, 2018). The investor has invested about US$10B into travel technology, and it was predicted will generate US$1,091B in revenue in the travel market by 2022 (Sharma, 2018).

The App Store and Google Play Store together had over 60,000 travel apps in 2015. Some famous iOS and Android mobile travel apps available are FlightAware for flight tracking, Triplt for trip planning, CityMapper for a city guide, DuoLingo for language

translator, AroundMe for destination discovery, and XE for currency convertor (Kido, 2019). Following compiled with the best mobile travel app available on App Store and Google Play Store:

i) Airbnb – Apps assist in the discovery of adventurous destinations as well as access to unique hotels, experiences, and places throughout the world.

ii) Google Flights – Flight searching apps for one-way, round-trip or multi-city destination flights.

iii) Google Maps – Best navigation apps provide directions for travel by car, on foot or public transportation.

iv) Hopper – Useful app to track flights with the best fare. It was embedded with AI technology that can automatically trace and propose travelers via push notification with the most affordable prices and schedules available.

v) Hotel Tonight – App thrives on last-minute deals with 24/7 customer service in case something goes awry.

vi) Kayak and kayak my trips – Apps that allow you to explore a variety of locations on an easy-to-navigate map. It searches for flights, hotels and car rentals available across various travel sites.

vii) Skyscanner – App similar to Google Flights, the app searches for the best offer and most affordable prices thru its travel partners.

viii) TravelZoo – Vacation packages derived from numerous sources are included in apps, which make the itinerary planning process easier for vacationers.

ix) Trivago –Use to identify low-cost hotels or accommodations that meet the needs and expectations of travelers.

x) TripAdvisor – Apps collect reviews and ratings on hotels, restaurants, interesting places, and transportation for travelers to access, as well as features that allow users to save their itinerary plan for future reference.

xi) TripCase – Another app allows users to save and maintain their itinerary plans, as well as share them with other people.

xii) Triple – As TripCase, is a travel planner that allows users to save itinerary plans and share trip information via social media.

xiii) Yelp – Asia, Australia, Europe, South and North America are among the 31 countries where the app is available. The app was created to allow residents to share and learn about local businesses, with the primary goal of allowing travelers to read citizen feedback.

1.2.2(b) Evolution of Mobile Travel Apps

Smart tourism refers to an infrastructure that combines hardware, software, and network technologies to deliver real-time intelligence data to stakeholders, allowing them to make smarter decisions (Gretzel et al., 2016). Furthermore, the utilisation of ICT technologies such as the internet of things, mobile communication, and augmented reality enables the collection of enormous data for providing real-time support to all stakeholders in the destination (Dorcic et al., 2018).

Five aspects that need to emphasise for the sustainability of the app in the future are Voice Search, Customer Relations, Artificial Intelligence (AI), Augmented Reality (AR) and Internet of Things (IoTs) (MacHale, 2019). AI-based applications are expected to become the backbone of various industries, including eldercare, education, and public

safety by 2030. Mobile AR is predicted to be the major driver, with a $108B VR/AR market by 2021 (Merel, 2017). By 2025, IoTs that connect the physical and digital worlds potential generate up to $11.1 trillion in annual economic value (Pascu, 2016). Mobile apps incorporate Artificial Intelligence (AI) and Machine Learning (ML) technologies to enable mobile smarts to execute activities as humans by including thinking or planning features, as well as speech or image recognition (MacHale, 2019). For example, it enables a user to search for a flight with a screenshot of a location. Then, auto-detect the location by performing geo-lookup to find a destination and suggest flights for booking subsequently.

The new developments in the growth of mobile travel apps aimed to enhance the tourist's destination experiences. Three critical factors that emerged the mobile travel apps toward Smart Tourism, such as privacy and security disclosure, perceive usage of smart technologies such as Augmented Reality (AR) and Virtual Reality (VR), and perception of interaction and co-creation with stakeholders (Femenia-Serra et al., 2019). As a result, mobile travel apps are evolving: Travelers are employing image recognition technology to book vacations based on Instagram Snapshot; voice recognition technology via Siri to check flight status; Messenger Platforms to acquire their boarding pass; and Augmented Reality and Virtual Reality technologies via KLM, Aeromexico, Kayak app to check luggage bag size is within the airline's baggage allowed sizes (MacHale, 2019).

1.2.2(c) Smart Mobile Travel Apps (SMTA)

Smart technologies include IoT, Machine Learning, Cloud Computing, Big Data, Smartphones, Virtual and Augmented Reality, Mobile Apps and ubiquitous connectivity

through Wi-Fi and other networks (Gretzel et al., 2016). Such innovative technologies available in the application could help the providers distinguish their application from their competitors, encouraging them to increase investments in it. The two technologies that are highly adopted in the development of SMTA are visualisation through Augmented Reality (AR) and personalisation through Big Data Analytics (BDA) (Stfalcon.com, 2018; Vakhnenko, 2019; Barten, 2019; Singh, 2018).

Mobile Augmented Reality (MAR) was first introduced in mid of the 1990s. It enhances the overall tourism experience and augments by overlaying digital objects or information on top of the real world through a handheld, wearable or small device (Barten, 2019; Dorcic et al., 2018). Navigation and direction-finding are the most widely used features in MAR apps to help the traveler discovers unknown surrounding or unfamiliar environments enjoyably and educationally with the lesser mental effort required (Kourouthanassisa et al., 2015). Over 500 million AR-enabled mobile devices exist and over 2,000 apps with AR and VR technologies can be found in App Store. Besides that, major technology players, Google and Apple made massive investments in technology that enable the development of AR and VR capabilities easier, cheaper and quicker. In addition, both Google and Apple also invested and released their AR developer tools, ARCore and ARki respectively, and dedicated a large amount of time to AR (MacHale, 2019).

Big Data (BD) refers to the large and complex data sets available on the internet, which comprises unstructured and structured data generated by technological developments. Abundant BD relevant to tourism is generated from three primary sources: users, devices and operations (Li et al., 2018) for a better understanding of tourist

behaviour, tourist satisfaction, and tourism issues in improving tourism marketing. BD's huge volume is difficult to process using traditional statistical methods and technological techniques. Business Intelligence technology emerges by integrating Machine Learning (ML) with embedded learning algorithms to process massive data sets by filtering multiple variables, clustering large objects into a small number of classes, and so on (Mariani et al., 2018).

Big Data Analytics (BDA), a data-driven approach is adopted to analyse broad information specific to the tourism industry (Mariani et al., 2018). BD improved the marketing strategy through BDA to auto-provide appropriate suggestions for supporting travelers in making decisions and encouraging visitor participation by analysing and anticipating travelers' demand or experience, user information and activities performed for better price management and optimise revenue. Due to BDA being based on users' actual actions, the collected data is more accurate to support and deliver superior predictive analytics for improving traveler decisions and expectations. Furthermore, the collected customer reviews and the performance of travel accommodations aid the tourism industry in analysing tourism flows, discovering investment opportunities and promoting new business models. For example, airlines could use BDA to understand better passenger behaviour, choices and overall industry performance to maximise revenue and discover sales opportunities (Saha, 2018); hotels and resorts could use BDA to offer customers packages, deals and add-on services according to tourist demand (Saha, 2018).

A variety of SMTA has been launched to help travelers plan their travel itineraries and improve their tourist experiences. For example, a fantastic app named Sygic Travel allows one to personalise or automate travel itineraries in a fun and straightforward way

(Patkar, 2018). It also incorporated GPS features for mapping and locating the point of interest, assuring up-to-date information. In emergencies, TravelSmart Insurance App can locate nearby hospitals, pharmacies and police stations, and a quick way to find insurance-covered providers (Henning, 2018). Smart Assistant for Mobile or SAM for short, powered by AI assists with flight or hotel booking services and advises what to pack based on the destination's weather. It also intelligently advises on departure gate, flight rescheduling, luggage withdrawal, nearby restaurant recommendations, and traffic delays, while connecting to a live/phone conversation with a consultant.

1.2.2(d) Smart Mobile Travel Apps (SMTA) in Malaysia

The travel and tourism industry plays an essential role in Malaysia's economy, according to World Travel and Tourism Council. The recent preferences of Malaysians traveling abroad have grown tremendously, leading to a good sign in Malaysia's economy. Malaysians took a total of 235.2 million trips in 2015, an increase of 8% from the previous year to 253.9 million trips in 2016. In 2016, Malaysia had approximately 11.9 million international outbound travel trips, and the number is forecast to increase by 3.5% to 14.2 million in the year 2021 (Malaysian travel trends a sign of good economy, report says, 2020).

Numerous travel apps have been launched, all of which are useful to visitors to Malaysia. The travel apps comprise Tripviss founded by Chan Lee Siong and Jacky Chan in 2015, Tripovo founded by Hannah Pearson and Steven Wong in 2015, Tourplus founded by Rickson Goh and Kyle Foo in 2014, LocalUsher founded by Sabrina Cheng and Hui Ling in 2014 (Srivastava, 2016) and XTVT, a location-based app founded by

Abdul Muizz Mohammad Khuzaini together with his seven team members (Teoh, 2019). Several factors such as increases in the young population, rapid internet connectivity, and increases in mobile penetration have accelerated the growth of introducing SMTA in Malaysia. The most common and popular SMTA that are useful to travelers when visiting Malaysia are listed below.

i) TripAdvisor – Founded by Stephen Kaufer, it is the largest and most popular travel community channel globally. This app is free and can work offline by installing all live data upon connection to the internet. All nearby city places such as restaurants, interesting places, hotels, and transportation are listed in the app. Thousands of user reviews could be found, with a self-guided tour feature available, enabling the traveler to explore new stranger places easily. In addition, it also existed with "Point me there" and "GPS", which could easily guide and provide direction for the traveler to reach the place easily.

ii) PocketGuide – This app is a city guide application that provides a tour city guide to the travelers to explore the travel place through its audio guide, just like a real tour guide.

iii) Free Travel & Tourist Guide – Published by Free Travel & Tourist Guides in September 2013. The app also helps users to locate nearby accommodations, attractions, restaurants, ATMs and other services.

iv) Malaysia Trip Planner – This app primarily assists travelers in trip planning, focuses on helping travelers discover unique attractions throughout Malaysia, and highlights upcoming events and cultural festival activities

throughout the year. Simultaneously, it allows travelers to save their itineraries and share their trips on social media easily and conveniently.

v) XTVT – This app, launched in Malaysia in October 2019, is a location-based app that allows travelers to discover the event and landmarks nearby, get to their destination with a real-time map and allow travelers to save favorite places to share with others. It has more than 700 locations and activities spread throughout 12 categories, including entertainment, nature, food, caving, diving, hiking, beach, shopping, museums, galleries, theme parks, parks and trails. It also works with different event providers and homestays to enable users to purchase tickets and book accommodation. It plans to expand the number of locations and activities to 1,000 by the end of 2020 and provide Virtual Reality (VR) features that allow users to preview a location in 360°.

vi) MySejahtera – Equipped with MySejahtera Traveler function (a contact tracing feature) especially for travelers to complete a health declaration before arrival in Malaysia, arrival check-in via QR code scanner, digitally issue Home Surveillance Order and swap test reminding before end of quarantine, 14 days self-assessment during quarantine and so on (BCD travel, 2021).

Although there are plenty of SMTA launched in Malaysia but still a lack of apps for smart tourism embedded with AI technology that includes features such as Augmented Reality (AR) and Big Data Analytics (BDA). Due to the globalisation of technology, it is believed that the apps embedded with AI technology in Malaysia shall be offered soon.

1.2.3 Generations X, Y & Z

Although there are many discrepancies and disagreements over each generation's age range, various researches have indicated that Generation X was born in the year 1965 to 1980 from age 40 to 55 years old as of 2020, Generation Y was born in the year 1981 to 1995 with age 25 to 39 years old as of 2020, and Generation Z was born in the year 1996 to 2015 with age 5 to 24 years old as of 2020 (Figure 1.1) (Kotler & Armstrong, 2010; Wiedmer, 2015; Blackburn, 2018; Kasasa, 2019).

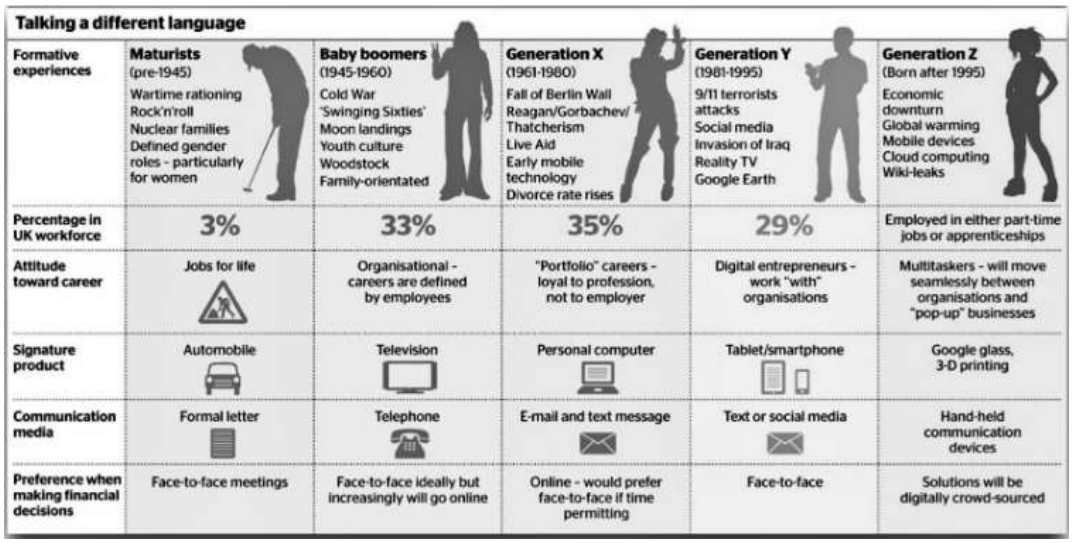

Figure 1.1 Comparison across Different Generations

Malaysia had a population of 32.7 million people in 2020, with a slightly annual population growth rate of 0.4% compared to 32.5 million people in 2019 (Current Population Estimates, Malaysia, 2020, 2020). Malaysia's population is categorised into three major age groups, 23.3% were young age (0 - 14 years), 69.7% were working age (15 - 64 years), and 7% were old age (65 years and over) (Figure 1.2). Almost all the Generations X, Y and Z with age range 5 – 55 years old are from the largest 69.7%

"working age" group while a portion of Generation Z is from the 2nd largest 23.3% "young age" group. Therefore, it indicated that Generations X, Y and Z makes up the largest segment of Malaysia's population, with over 78%.

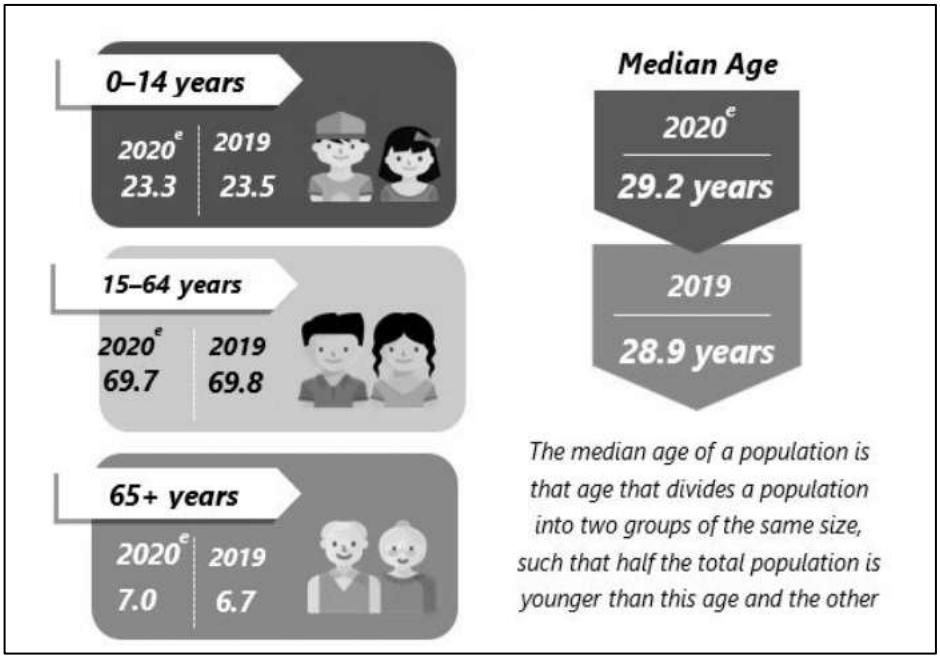

Figure 1.2 Population by Age Group and Median Age, Malaysia

Generations X, Y and Z grew up in different generations and were exposed to different influences throughout their lives. Therefore, their characteristics and behaviours differ slightly (Figure 1.3). Technology usage is varied by age, and the use of mobile apps is no exception. In assumption, younger generations use mobile apps more frequently than older generations. However, should not overlook target apps to the older generations, as people aged 45-54 spend 1 hour and 15 minutes every day using mobile apps. That's only 27 minutes less than those between the ages of 25 and 34. Apart from that, app users over 65 still spend about an hour every day on mobile apps (Blair, 2020).

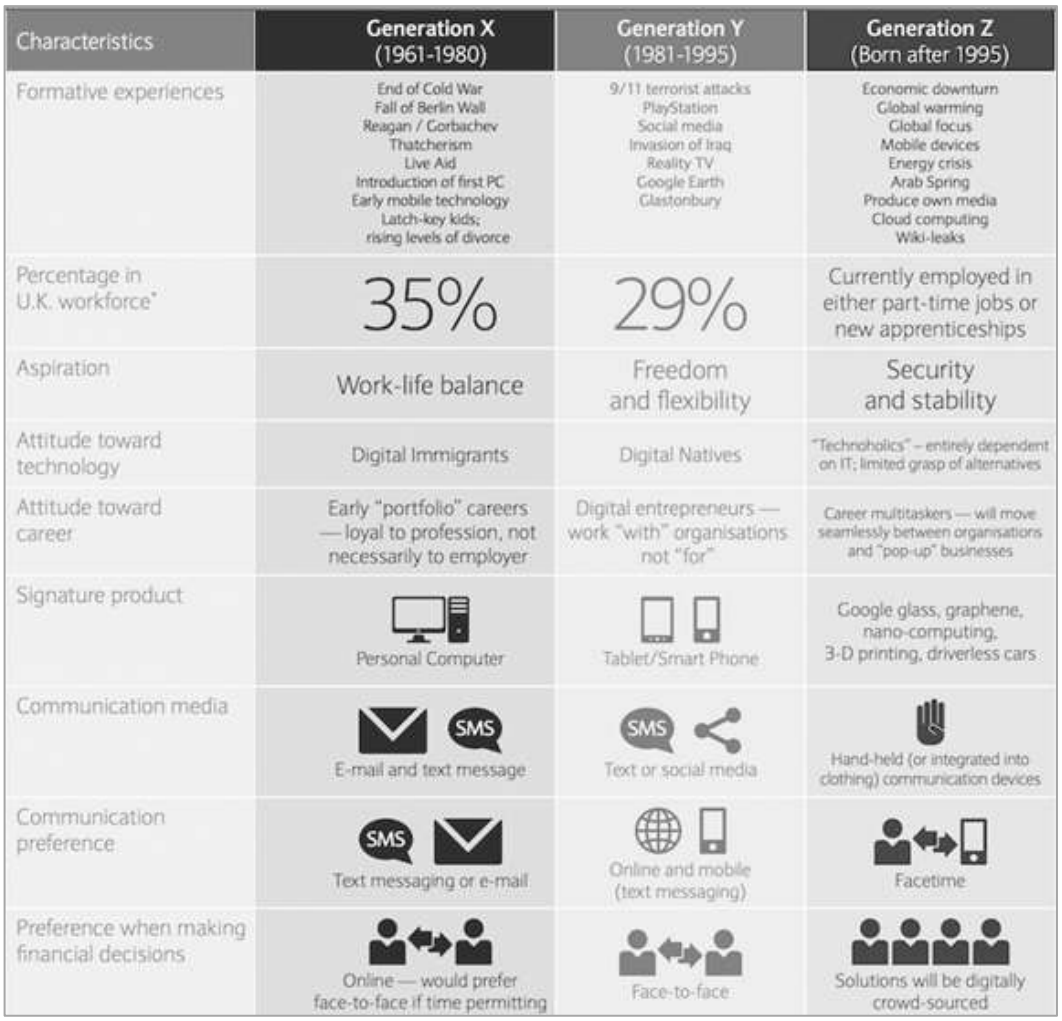

Figure 1.3 An Overview of Generations' Characteristics

1.2.3(a) Characteristics of Generation X

Generation X is a segment of Malaysians born between 1965 and 1980, with an average population of 7.29 million (Current Population Estimates, Malaysia, 2020, 2020). They were born during the emergence of the internet, so they have avid technology and online enthusiasts. However, some of them are still hesitant to use the internet; they will be more concerned about proper instruction to complete their online tasks (Charlotte, 2019). They are digital immigrants as most of them did not have a computer in school time and were only introduced to computers in middle or high school (Fourhooks, 2015).

They experience the emergence of music videos, hip hop and new wave music. However, they still read a newspaper and periodicals, listen to the radio and watch television. They watch about 165 hours of television every month and spend about 7 hours per week on Facebook, indicating that they are digitally sophisticated (Kasasa, 2019). Their communication preferences are through E-mail or text messaging. They are loyal to a brand and prefer making payments online or with credit cards (Fourhooks, 2015). They prefer using smartphones to access the internet where they seek personal interaction rather than visual stimulation. They also use social media more to interact with their friends, peers and family. Besides, problem-solving tasks may engage them to take participate in a task (Charlotte, 2019). Thus, the key to engaging Generation X is through social media apps.

1.2.3(b) Characteristics of Generation Y

Generation Y is a segment of Malaysians born between 1981 and 1995, with an average population of 6.84 million (Current Population Estimates, Malaysia, 2020, 2020). Generation Y, known as the millennial generation, are digital natives who have grown up with rapid technological advancements (Prensky, 2001). They are the first generation to grow up in a digital world where information technology has influenced their working and living environments (Bennett & Lachowetz, 2004; Wesner & Miller, 2008). The most significant characteristic of Generation Y is that they are technology-savvy and extremely reliant on technological complexity. They are frequent internet users who rely significantly on technology and use the internet to form and maintain long-term personal relationships with others (Martin & Turley, 2004; Kumar & Lim, 2008; Ang et al., 2009;

Toh et al., 2011). In addition, they have a strong emergence of social media and use their phones for multitasking, such as job searching, social networking, and acquiring travel information (Parment, 2013). Simultaneously, they are digital natives, and the earliest generation to adopt new technology and less response to a brand (Quintal et al., 2016). In addition, Generation Y has a high level of emotional involvement, which reflects their perception of how others perceive them to buy a product (Parment, 2013). Furthermore, Generation Y is known for their buy-now-pay-later behaviour, which has created a market opportunity for this market segment.

Generation Y spends more time and effort than the earlier generations on high-involvement product decisions. Generation Y has a low level of brand loyalty, is price conscious and buys based on price or convenience. They also pose variety-seeking buying habits, were makes numerous shopping to buy a product (Parment, 2013). Generation Y prefers to use apps such as Amazon (35%), Gmail (30%) and Facebook (29%) for social networking. The key to engaging Generation Y is through rewarded and interstitial video formats.

1.2.3(c) Characteristics of Generation Z

Generation Z is a segment of Malaysians born between 1996 and 2015, with an average population of 9.91 million (Current Population Estimates, Malaysia, 2020, 2020). Generation Z is a generation that has grown up with the internet and is well-versed in technology. They have a short attention span and are keen on multitasking across multiple devices simultaneously (Charlotte, 2019). A generation has never known a world without a computer or a cellphone, and they have been heavily using technology since their

youngest age. They are digital integration and are known as “Technoholics” since they are entirely reliant on technology (Fourhooks, 2015). They experience google glass, 3-D printing, nano-computing and driverless cars. A smartphone is their preferable communication device, which they use for at least 3 hours per day. They are sensitive to personal finances and always avoid debt (Kasasa, 2019).

Generation Z prefers visual apps like Snapchat, with 75% of them considering Snapchat as the best platform to stay connected with each other, while 71% of them use YouTube for long-term content. The key to engaging Generation Z is to keep tasks simple, interesting and fun, and use visual ad formats in full-screen interstitials (Charlotte, 2019) rather than text to get their attention. Furthermore, this group is more concerned about privacy (Charlotte, 2019), with the intent of the information provided to be more transparent, as well as how it will be shared and the benefits derived from it.

1.3 Problem Statements

Malaysians spent USD 2.759 billion on e-travel in 2018, the most of any e-commerce activity (Kemp, 2019). However, only a third of travel agents in Malaysia have registered for e-commerce adoption, and over 82% of Malaysians still book trips using desktops, while only 39% use a mobile phone (Amadeus, 2017). Furthermore, according to a survey, out of 80 apps installed on a smartphone, 25% are used only once, and more than 62% are never used (Mobile App Download Statistics & Usage Statistics (2021), 2021). Recently, the Malaysian government launched the MySejahtera contact tracing app to address the Covid-19 pandemic in Malaysia. As of July 15, 2020, the app had 6,366,678 users, which is only about 20% of Malaysia’s entire population of 32.7 million

people (CodeBlue, 2020). Moreover, travel apps had the highest uninstall rate of all industries, with 35% of users churning an app within two weeks (Karnes, 2019). Various causes for app uninstallation include complicated registration, privacy concerns where excessive personal information and permissions are requested, annoying push notifications or in-app messaging, and intrusive ads (Mobile App Performance Metrics For Crash-Free Apps, 2020).The smartphone users in Malaysia are predicted to reach 30.41 million in 2020 and over 33 million by 2024 (Müller, 2020). Although, a total of 71% of Malaysian access the internet through smartphones (Malaysia Digital Marketing Statistics 2020, 2020). However, older generations continue to own fewer smartphones than younger generations, with 30% of those aged 65 and above (Müller, 2020). According to a survey of 6,870 tourists in 14 markets across the Asia Pacific, including Malaysia, laptops and desktops remain the most used device for trip research and booking. Among the 14 markets, Malaysia is even low in the usage of mobile devices for trip planning and booking, with 56% and 39% respectively (Amadeus, 2017). Generation Y in Malaysia is the most likely to use a mobile device to book journeys, with only 49%. In comparison, older generations such as Generation X with 38% and baby boomers with 18% are even less likely (Amadeus, 2017). As these generations aged 16 to 55, accounted for 78% of Malaysia travelers, compared to a usage rate of below 50%, this indicates that mobile travel app in Malaysia still has room to grow.

The tourism industry is venturing even more actively in connecting markets, developing digital platforms, integrating social media, and using big data analytics to personalise tourism experiences for diverse tourists worldwide (Sharon, 2019). With the aggregation of customer data and feedback, Travel Portal Expedia provides app

personalised travel-related services to meet tourists' expectations through innovative technologies such as big data analytics with machine learning algorithms and data mining systems (Ismail, 2018). Moving the industry forward 4.0 is a key development to transforming Malaysia's tourism industry into Smart Tourism (Amarthalingam, 2017). Malaysia Airports has also launched the MYairport mobile app to assist travelers navigate their way from home to board in the shortest time (Malaysia Airports launches mobile app for passengers, 2018). Nevertheless, Malaysia is still in the juvenile stage of industrial automation with the integration of the internet of things, virtual and augmented reality, big data analytics and cloud computing, owing to fear of investment, reluctance to change business models and low expertise (Amarthalingam, 2017).

Recently, Malaysia's tourist industry struggled hard with a coronavirus crisis in 2020, and three tourism sectors, including airlines, hotels, and restaurants, are struggling to survive or face bankruptcy (Bethke, 2020). The World Travel and Tourism Council (WTTC) reported that over 50 million tourism jobs are at risk. At the same time, numerous approaches are introduced to help the industry, including non-contact drop-off delivery, gift voucher purchases, virtual tours, webcams and live streams (Altschuler, 2020). Dave Thomson, Skyscanner predicted that new technologies such as touchless technology, "sanitagged" luggage, health kiosks, disinfection robots, AI security systems, Hotel TV apps and self-unlocking cars would revolutionise the travel industry post-COVID (Davitt, 2020). Several smart mobile tracing apps, including Gerak Malaysia, MySejahtera, Qmunity, CovidTrace Sarawak, SeLangkah, and KLSTEP have been rolled out by federal governments and states to curb COVID-19 outbreaks (Lee, 2020). The Malaysian government has launched MySejahtera, an app that helps visitors to Malaysia

register and manages their admission and monitors COVID-19 infection and hotspot tracing in Malaysia through health self-assessment (Tariq, 2020). However, the app's adoption raises users' concerns that the disclosure of location-tracking data would be exposed or hacked by outsiders for inappropriate purposes. Besides, the Gerak Malaysia app was introduced to facilitate the application of interstate traveling permits. However, it has raised concerns among travelers that providing personal information such as mobile number, identification card number, home address, and current location to the app could lead to citizen surveillance (Malek, 2020).

App personalisation has evolved into a marketing strategy to tailor the demands of each individual for meeting higher expectations along the journey (Hande, 2020). Therefore, personalisation rules based on user demographics such as age, gender, income, location, web browsing history and previous product purchases are essential and endless for clustering or segmenting similar customers together. However, personalisation rules based on current demographic data are insufficient to target app personalisation explicitly. Besides, it is hard to maintain a unified view of the customer since customer data and feedback collected online are obtained from multiple devices and a non-linear customer journey (Hande, 2020). Therefore, travel brands need to supplement their personalisation strategies based on customers' behavioural intentions rather than just their demographics (Savage, 2020). Demographic-based personalisation has been proven unreliable, resulting in ads that do not reach a large number of people. For instance, males accounted for 40% of YouTube viewers on parenting topics and 50% over 35 years old. (Sivanandan, 2018). It was discovered that over 40% of viewers would miss out on the attention of demographics based just on gender and age alone. Each generational cohort is a grouping

of age cohorts by birth year and sharing the same social, economic, political and cultural events throughout their lives (Fernández-Durán, 2016). Each generation with similar characteristics will perform similarly in terms of behavioural intention and decision-making (Çera et al., 2020). Therefore, a deeper personalisation based on generational cohort is proposed to conquer the shortage of existing demographic-based personalisation.

The COVID-19 pandemic has caused a drop in travel demand, as numerous governments throughout the world have implemented travel restrictions to prevent the spread of the coronavirus. Many tourist attractions in Malaysia, including Tourist Information Center, Museums, Memorial Centers, and National Art Gallery, were closed down in March 2020 (Impact of the COVID-19 pandemic on tourism, 2020). New travel marketing strategies for the year ahead are essential to planning effective travel marketing for the tourism industry. Understanding generational differences across Generation Z, Millennials, Generation X, and Baby Boomer travelers can help travel marketers engage these groups authentically (Travel Marketing Across Generations in 2020: Reaching Gen Z, Gen X, Millennials, and Baby Boomers, 2019).

As a result, the following problem statements must be carefully considered for ensuring that SMTA is enhanced or developed by travelers' expectations for achieving the highest app adoption.

i) Privacy concerns and risks on privacy information disclosure have threatened the adoption of SMTA.

ii) SMTA has a low usage rate and a high uninstall rate among tourism service providers and travelers.

iii) Lack of knowledge and expertise in innovative technologies slow to uptake the SMTA.

iv) Although the smartphone is high in penetration rate, SMTA usage is still low among Generation Y and Z and significantly lower among Generation X.

v) The existing marketing segmentation by age, gender, income, location, web-browsing history and previous product purchases applied in in-app personalisation services is insufficient to target personalisation specifically.

1.4 Research Objectives

The novelty of this study is to determine determinants influencing the adoption of SMTA as there is a lack of research on the adoption of SMTA. And the most essential is how these determinants could affect and increase travelers' behavioural intention to use SMTA. Both moderating effects of the generational cohort and comparisons of determinants influencing Generations X, Y & Z on users' behavioural intention to use SMTA are carried out to analyse the generational differences and provide empirical evidence of the primary differences. As a result, the following are the research objectives for this study:

i) To examine the degree of determinants Privacy Concern/ Privacy Risk on Privacy Information Disclosure which affects behavioural intention to use SMTA.