



Faculty of Technology Management and Technopreneurship

**STUDY ON SMARTPHONE GPS NAVIGATION APPLICATIONS
SATISFACTION AMONG TOURISTS IN MALAYSIA**

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**STUDY ON SMARTPHONE GPS NAVIGATION APPLICATIONS
SATISFACTION AMONG TOURISTS IN MALAYSIA**

MUHAMMAD SULTAN BINTANG FAJAR

**A thesis submitted
in fulfillment of the requirements for the degree of Master of Science
in Technology Management**


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2020

DECLARATION

I declare that this thesis entitled “Study on Smartphone GPS Navigation Applications Satisfaction Among Tourists in Malaysia” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.


Signature : 

Name : MUHAMMAD SULTAN BINTANG FAJAR

Date : 14/02/2020

APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and qualify for the award of Master of Science in Technology Management.

Signature : 

Supervisor Name : DR. YUSRI BIN ARSHAD

Date : 14/2/2020

DEDICATION

I dedicate this thesis to my beloved father and mother, Mr. Muhamad Farid Soufian, Mdm.

Emilia Martini and to my precious family in Banjarbaru, Indonesia

ABSTRACT

Smartphone users increased tremendously in Malaysia in the last ten years. As smartphone users depend more on sophisticated and intelligent mobile devices to assist them in their daily lives for better decision making, this has prompted developers to develop more mobile applications suitable for them. One of the popular mobile application development is using Global Positioning System (GPS) for navigation purposes. Most of the smartphone users, especially tourists utilize these GPS navigation applications for traveling purposes because of those applications, inexpensive, easy to access, and user-friendly. Google Maps is one of the freely available and popular GPS navigation application that is used by around nine million users in the world. Past researches on GPS navigation applications were mostly system and mobile application developments using Google Maps and its technology. However, there are lacks of studies done on the factors that make Google Maps as a GPS navigation application popular among its user. While previous researchers hinted at the need to study on the factors that affect user satisfaction of mobile applications. The item measurement for each factor in the other satisfaction model of mobile applications cannot be used directly and needed to be modified for GPS navigation applications measurement specifically. Hence, this study aims to fill in this gap by investigating the factors that affect the user satisfaction of GPS navigation applications among smartphone users in Malaysia and identify the relationship between the factors with the satisfaction of GPS navigation application's user. Additionally, this study examines the effects of experience towards the relationship between the factors and the user satisfaction of GPS navigation applications. A total of 402 tourists in Malaysia were selected to answer the questionnaires. The Statistical Package for Social Science (SPSS) version 23.0 analysis began with exploratory factor analysis to analyze the factors that affected the user satisfaction of GPS navigation applications and followed by multiple regression analysis to test their relationship and hypotheses. The results showed that system quality, information quality, perceived value, and perceived usefulness were significantly influencing user satisfaction of GPS navigation applications, furthermore perceived usefulness was the most influencing factor that affected user satisfaction of GPS navigation application. In addition, the experience had played significant moderating effects on the relationship between perceived value and user satisfaction. Therefore, this research helps future researches and software development company to understand in-depth details of the factors that affect user satisfaction of GPS navigation applications, as well the body of knowledge for satisfaction research for mobile applications. A qualitative inquiry is needed to get more in-depth responses on why and how GPS navigation applications can improve more traveling experience for better decision making.

ABSTRAK

Pengguna telefon pintar meningkat dengan pesat di Malaysia dalam sepuluh tahun yang lalu. Semakin pengguna telefon pintar lebih bergantung pada peranti mudah alih yang canggih dan bijak untuk membantu mereka dalam kehidupan seharian untuk membuat keputusan yang lebih baik, ini telah mendorong pembangun aplikasi untuk membangunkan lebih banyak aplikasi mudah alih yang sesuai untuk mereka. Salah satu pembangunan aplikasi mudah alih yang popular menggunakan teknologi Global Positioning System (GPS) untuk tujuan navigasi. Kebanyakan pengguna telefon pintar, terutamanya pelancong menggunakan aplikasi navigasi GPS ini untuk tujuan perjalanan kerana aplikasi tersebut, murah, mudah diakses, dan mesra pengguna. Peta Google adalah salah satu aplikasi navigasi GPS yang tersedia dan popular yang digunakan oleh sekitar sembilan juta pengguna di dunia. Penyelidikan yang lalu mengenai aplikasi navigasi GPS kebanyakannya perkembangan aplikasi sistem dan mudah alih menggunakan Peta Google dan teknologinya. Walau bagaimanapun, terdapat kajian yang tidak dilakukan terhadap faktor-faktor yang menjadikan Peta Google sebagai aplikasi navigasi popular di kalangan penggunaannya. Walaupun penyelidik sebelum ini membayangkan keperluan untuk mengkaji faktor kejayaan aplikasi mudah alih. Pengukuran item bagi setiap faktor dalam model kepuasan lain aplikasi mudah alih tidak boleh digunakan secara langsung dan perlu diubah untuk pengukuran aplikasi navigasi GPS khusus. Oleh itu, kajian ini bertujuan untuk mengisi jurang ini dengan menyiasat faktor kejayaan aplikasi navigasi GPS di kalangan pengguna telefon pintar di Malaysia dan mengenal pasti hubungan antara faktor kejayaan dengan kepuasan pengguna aplikasi navigasi GPS. Selain itu, kajian ini mengkaji kesan pengalaman terhadap hubungan antara faktor kejayaan dan kepuasan pengguna aplikasi navigasi GPS. Sejumlah 402 pelancong di Malaysia telah dipilih untuk menjawab soal selidik. Analisis Pakej Statistik untuk Sains Sosial (SPSS) versi 23.0 bermula dengan analisis faktor penerokaan untuk menganalisis faktor kejayaan dan diikuti dengan analisis regresi berganda untuk menguji hubungan dan hipotesis yang telah dibina. Keputusan kajian menunjukkan bahawa kualiti sistem, kualiti maklumat, nilai yang dirasakan, dan kegunaan yang dirasakan sangat mempengaruhi kepuasan pengguna aplikasi navigasi GPS, dan juga kegunaan yang dirasakan adalah faktor yang paling mempengaruhi ke arah kepuasan pengguna aplikasi navigasi GPS. Di samping itu, pengalaman telah memainkan faktor moderating yang signifikan terhadap hubungan antara nilai yang dirasakan dan kepuasan pengguna. Oleh itu, penyelidikan ini membantu penyelidikan dan syarikat pembangunan perisian masa depan untuk memahami butiran terperinci tentang faktor kejayaan aplikasi navigasi GPS, serta badan pengetahuan untuk penyelidikan kepuasan untuk aplikasi mudah alih. Siasatan kualitatif diperlukan untuk mendapatkan maklum balas yang lebih mendalam mengenai mengapa dan bagaimana aplikasi navigasi GPS dapat meningkatkan pengalaman perjalanan untuk membuat keputusan yang lebih baik.

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LIST OF ABBREVIATIONS

EFA	-	Exploratory Factor Analysis
GPS	-	Global Positioning System
IQ	-	Information Quality
MRA	-	Multiple Regression Analysis
PLS	-	Partial Least Square
PU	-	Perceived Usefulness
PV	-	Perceived Value
SEM	-	Structural Equation Modeling
SPSS	-	Social Package for Social Science
SQ	-	System Quality
US	-	User Satisfaction

LIST OF PUBLICATIONS

Journal Paper

Fajar, M.S.B., Arshad, Y., Tahir, M.H.N., and Syed Ibrahim, S.N., 2019. The Success Factors of Mobile GPS Navigation Applications Among Tourists in Malaysia. *International Journal of Recent Technology and Engineering (IJRTE)*, 8(3s2), pp. 462-471.

Poster Exhibition (Presentations)

Arshad, Y., Ibrahim, S.N.S., Salam, S., Safiee, N.E.N, and Fajar, M.S.B., 2017. Flipped classroom innovative method to enhance students' experiential learning and innovative thinking. *E-learning Carnival 2017 Universiti Teknikal Malaysia Melaka*.

Arshad, Y., Ibrahim, S.N.S., Salam, S., Safiee, N.E.N, and Fajar, M.S.B., 2017. Students learning styles as predictive behaviour for innovative minds. *E-learning Carnival 2017 Universiti Teknikal Malaysia Melaka*.

Fajar, M.S.B., and Arshad, Y., 2016. Assistant of Dentition System. *Mini UTeMEX 2016*.

CHAPTER 1

INTRODUCTION

1.1 Introduction

In chapter one, the research describes the background of the study, problem statement, research questions, research objectives, research scopes, research limitations, significance of the study, and the structure of the thesis.

1.2 Background of the study

Nowadays, the application usage in a smartphone is popular among the people, because there is an increasing number of smartphone users that resulting in huge demand for mobile applications (Kim et al., 2013). From several applications in the smartphone, one of the popular application is regarding the usage of GPS (Global Positioning System) for navigation purposes. The growth of GPS usage in mobile applications, especially for navigational has drastically increased (Yang and Hsu, 2015; Zhou et al., 2015). Most of the people utilize these GPS navigation applications for travel purposes (Lee et al., 2014). Because most of the GPS navigation applications are inexpensive, easy to access, and user-friendly (Chauhan and Upamannyu, 2017), GPS navigation applications became popular among its user especially tourists which give them benefit for their travel experience.

Based on that, software development company uses the GPS navigation functionality as their core to develop new application, and many researchers conduct research that discussed regarding the GPS usage (Lin et al., 2013; Cui et al., 2016; Ismail et al., 2016). The popular GPS navigation applications in a smartphone such as Google Maps, and Waze

are used by more than one million users around the world (Rouse, 2013; Klosowski 2016; Mobile, 2017). Therefore, this research conducted a study that related to the GPS navigation topic, because there is a huge demand of knowledge of these types of research, which may able to help future researchers and software development company to give them additional information that may be needed.

1.3 Problem statement

Global Positioning System (GPS) is a well-known system, especially for navigation purposes. GPS for navigation researches are mostly on the technical aspects of system development and infrastructure. Research on adoption and satisfaction of the system is scarce in the literature, particularly in developing or third world countries. Malaysia is rapidly moving towards a developed nation status by 2020. Hence, GPS such as navigation applications is one of the important elements to indicate Information and Communication Technology (ICT) support services are available for citizens as well as tourists to locate buildings and destinations easily.

Binjammaz et al. (2013) conduct a study on the usage of GPS. They found that GPS usage in transportation businesses grew rapidly in recent years. They highlight that there is a significant improvement in safety and monitoring because it can avoid transportation problems such as road accidents and traffic jam. GPS can also be used to provide a real-time vehicle positioning by providing necessary information on longitude, latitude, direction, and the speed of the vehicle that the people use. This is supported by Jalayer et al. (2016) who has mentioned drivers, particularly tourists, often need some additional technology assistance such as voice-guided navigation applications to locate their destinations easily. They stated that drivers, especially tourists, depended a lot on GPS navigation applications to help them reach their desired destinations because they are not familiar with the

surroundings and the road environment to reach their destinations. Bicen and Sadikoglu (2016) have affirmed this in their study of 352 Turkish university students. They found that students prefer using the Trip Advisor application to find tourism places. Students prefer to download map application and used the GPS navigation applications in their smartphone when they travel the cities. Moscaritolo (2013) states the number of users for navigation applications in the smartphone has increased from 37% in 2011 to 47% in November 2012, from the survey with 20,704 car owners who switch from using the in-car navigation system to the GPS navigation application on the smartphone.

In addition, Liu et al. (2014) who conduct research in China on real-time personalized route recommendation system for self-drive tourist based on a vehicle to vehicle communication, pointed out that long queue and traffic jam are common in famous tourist destinations, caused by an increasing number of self-driving tourists. Yang and Hsu (2015) affirm that tourists and drivers in China used GPS navigation functions in the smartphone, such as Google Maps data a lot. Hence, they create a mobile application which is called Dr. What-Info that provides location-based services and Google Maps based information application for tour guiding. This includes tourism information and the application also acts as a navigation device to go to registered tourism places in the application. Followed by Zacarias et al. (2015) who develop a mobile application for tourism named Smart City World Heritage, that provide information regarding hotel, restaurants, and tourist attraction in Mexico city, then act as a navigation application by providing the shortest route to follow by using GPS and Google Maps technology.

Many researchers have been using GPS technology, especially Google Maps as their topic of the study (Dhar, 2014; Lee et al., 2014; Yang and Hsu, 2015; Zacarias et al. 2015). However, there is a lack of research that discuss regarding Google Maps as the GPS navigation applications in the smartphone such as factors that make Google Maps popular

among the user, although there is an increasing number of user for GPS navigation application in a smartphone (Moscaritolo, 2013; Bicen and Sadikoglu, 2016; Jalayer et al., 2016).

Hence, based on the research gap above, the objective of the research is to determine the factors that affect user satisfaction of GPS navigation applications in a smartphone among tourists. Despite several literature in user satisfaction for mobile applications in general already exists (Muslim et al., 2014; Özata and Er, 2015), the item measurement for each factor in the satisfaction model cannot be used directly and needed to be modified for GPS navigation applications measurement specifically. GPS navigation applications on the smartphone have several unique characteristics that make the applications different from the other mobile application. Therefore, it is necessary to conduct research regarding the user satisfaction of GPS navigation applications, because the findings of the research can be contributed as a knowledge to be used by future researchers and software development company in the GPS industry.

1.4 Research questions

Based on the problem statement above, this study aims to answer the research questions below:

1. What are the factors that affect user satisfaction of GPS navigation applications in the smartphone?
2. What is the most influencing factor that affects user satisfaction in GPS navigation applications in the smartphone?
3. What is the relationship between system quality, information quality, perceived value, perceived usefulness, toward user satisfaction of GPS navigation applications individually and as a whole?

4. What is the effect of experience on the relationship between system quality, information quality, perceived value, perceived usefulness and user satisfaction of GPS navigation applications?

1.5 Research objectives

This part describes the research objectives that explain the purpose of the research. Research objectives make the research focus on what needs to be studied and explained in the research. This allows the research to focus on the right track for the research while avoiding unnecessary information. The objectives of the research are:

1. To investigate the factors that affect user satisfaction of GPS navigation applications in the smartphone.
2. To identify the most influencing factor that affects user satisfaction of GPS navigation applications in the smartphone.
3. To identify the relationship between system quality, information quality, perceived value, perceived usefulness, toward user satisfaction of GPS navigation applications individually and as a whole.
4. To examine the effect experience of the relationship between system quality, information quality, perceived value, perceived usefulness and user satisfaction of GPS navigation applications.

1.6 Research scope

This research investigates factors that affect user satisfaction of GPS navigation applications in the smartphone, the relationship between the system quality, information quality, perceived value, perceived usefulness as the independent variable, and user satisfaction of GPS navigation applications as the dependent variable. The research also examines the effect of moderating variable on the relationship between system quality,