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**Factors Influencing Passengers' Attitude and Adoption Intention of Mobile Taxi Booking Application**

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**Abstract:** Mobile apps have been applied to financial services, airline booking services, shopping and the revolutionary service on taxis ordering. This result service level can be improved in terms of shorter time for passengers to have their orderings confirmed by the taxi driver. The Mobile Taxi Ordering (MIO) apps enable passenger to view taxi availability based on their current location. Fwi:her, passengers able to review their drivers and see driver review before confirming a ride. However, taxi passengers' complaints about Malaysian taxi drivers regarding refused jowneys and Wlllletered charges at popular taxi stands across Klang valley Malaysia are on the rise. There is a need to conduct a study on MIO adoption among passengers. Therefore, this research tries to fill the gaps on MIO adoption intention research by attempting to identify the factors which predict the rate of adoption intention of MIO in Malaysia. This study reviews the literature on MIO adoption and used a theoretical framework and had identified the critical five individual factors to capture a complete picture of MIO adoption intention. Using a survey method, data were collected from 368 sampled respondents from Klang valley area. Results showed that all five individual factors were fmmd to play important role in the adoption intention of MIO apps. The result contributes to a deeper understanding of the individual factors that promote the use of MIO in the Malaysian.

**Key words:** Mobile taxis booking apps, adoption intention, passengers attitude, Wlllletered charges, critical

## INTRODUCTION

It is widely acknowledged that the emergence of smartphone technology providing extraordinary changes to virtually every aspect of societies worldwide. It is spreading at work and at home, in education, health care and entertainment and in many other areas. The major characteristics in the smartphone technologies such as mobility and broad reach have created five value-added attributes that break the barriers of geography and time. The five value-added attributes are ubiquity, convenience, instant connectivity, personalization and localization of product and services (Rainer *et al.,* 2013). With these value-added attributes of the smartphone technology, mobile applications (apps) is rapidly growing ever since Apple Inc. first introduced the iPhone in 2007. The mobile apps are an end-user software created for mobile device operating systems which extend the capabilities of the mobile device. The mobile apps typically operated by the four mobile operating system, including the Apple App Store, Google Play, Windows Phone Store and BlackBeny App World. The mobile apps usually either made available at a minimal fee or free of charge. To date, mobile apps have been applied to financial services, airline booking services, shopping and the revolutionary service on taxis ordering.

In a developing country such as Malaysia, rapid economic and land use grm.vth increase the need for livable living and workplace. The increase of mobility demands has mcrease the pressure for public transportation service delivery. Primarily, taxis are positioned to provide a door-to-door service as a mode of choice for city center trips at Klang valley region. Further, the taxi industry supports others mobility requirements, including as a viable transport option outside rail and bus operational hours. There are 37,000 taxis, for a ratio of 4.8 taxis per 1000 people in Klang valley (MOTORME). The taxi service industry had generated over RJ\.1960 million at Klang valley in year 2013. However, the taxi service in capital region of Malaysia, Klang Valley has been ranked the third worst among major cities in the world according to TripAdvisor second annual cities survey. The Malaysian taxi industry's reputation, in particular, has long been plagued by inefficiencies. Passenger getting a taxi is not easy, passenger need to be concern on their safety, reach their destination on time and negotiation on fares. According to the official report from Land Public Transport Commission (SPAD) it has been found that a log of passengers complaints toward Malaysian taxi drivers including reckless drivers, rude drivers/lack of customer service, lack of knowledge on destinations/roads, overcharging, refusing to use meter,

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"chenypick" passengers, refuse to serve congested destinations and drivers pick up multiple passengers. The majority of the Malaysian taxis do not operate with radio circuits and llllable to be dispatched to telephone booking easily from passenger.

Not with standing, it is believed that Mobile Taxis Ordering (MIO) apps has the potential to solve the taxi issues on passenger. MIO apps is a smartphone based taxi ordering service in which connects between passengers, taxi dispatch center and taxi drivers using the application's proprietary global positioning system and enables users to order a taxi by using smartphone. This result service level can be improved in terms of shorter time for passengers to have their bookings confirmed by the taxi driver. The chances of getting a taxi can be enhanced due to the speed and accuracy of the systems. MIO apps enable passenger to view taxi availability based on their current location. Fwther, passengers able to review their drivers and see driver review before confinning a ride.

The usages of mobile smartphone are growing up at Malaysia. More feature phone users intend to change to smartphone in year 2014 or later. The dependency of smartphone MIO apps are very important to reach the conveniences by shorter waiting time, safety and others issues faced before. In spite of having these benefits towards its adoption, empirical research on MIO adoption intention by passengers has been very limited, fwthermore, because of more complaints such as drivers not using their meters and overcharging passengers. There is a need to conduct a study on MIO adoption among passengers. Therefore, this research tries to fill the gaps on MIO adoption intention research by attempting to identify the factors which predict the rate of adoption intention of MIO in Malaysia.

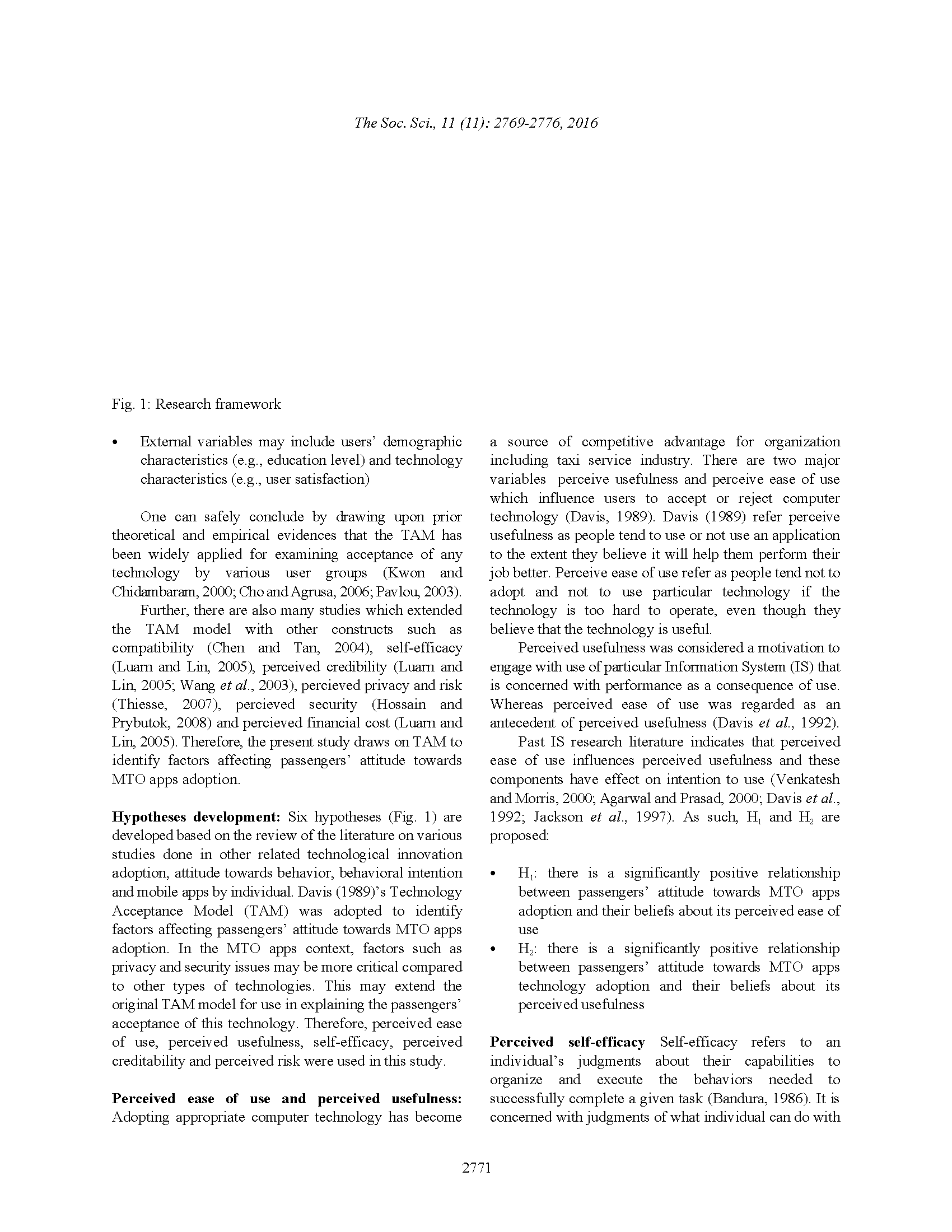
**Research objectives:** This study aimed to identify the factors affecting passengers' attitude towards MIO apps adoption. More specifically, by adopting Technology Acceptance Model (TAM), the pwpose of the study was to ascertain the effect of perceived usefulness, perceived ease of use, perceived self-efficacy, perceived creditability and perceived risk on passengers' attitude towards MIO apps adoption in Malaysia. Fwther, the relationship between passengers' attitude towards MIO apps adoption and their intention to adopt was also analyzed. This research provides information to taxi drivers in the industry about how passengers perceive MIO apps adoption and what are the factors affecting their intention to adopt MIO apps. By identifying factors affecting passengers' attitude towards MIO apps use, taxi drivers may improve passengers' service and relationship to attract more passengers and to best utilize MIO apps to enhance their competitive

position in the taxi service industry. Fwther, the findings of the study will help technology vendors to develop better marketing strategies and to gain competitive advantage.

**Literature review:** A review of literature on technology adoption and diffusion of innovation indicates that there is a rich stream of empirical and theoretical work has been conducted (Jeyaraj *et al.,* 2006). Past studies indicated that over the last 20 years, quite a rich but also diverse body of theoretical and empirical work has been conducted on the adoption and diffusion of innovations. Different theories have been formulated to examine the adoption and acceptance of new technologies in various industries. According to Fichman (1992), researchers usually consider two different aspects of adoption: the characteristics of a given technology and the consequences for adoption and diffusion process and the locus of adoption, i.e., adoption on an individual or an organizational level. Individual adoption studies typically deal with an individual's behavioral intention to adopt an innovation or actual adoption behavior. In the early 201Os, some of the popular areas studied were on adoption and/ or usage of different types of mobile apps such as mobile banking, mobile entertainment, mobile commerce and many others. In line with the objective of this research, the following sub-section discuss on one of the more popular models used on the study of individual innovation adoption, the Technology Acceptance Model (TAM) by Davis (1989).

**Technology acceptance model:** In this study of individual adoption on MIO apps, TAM is used because it is an important model to explain users' behavioral intentions in adopting computer technology after it was published in Management Science by Davis (1989). TAM was derived from the Theory of Reasoned Action (Ajzen, 1991) to explain and predict computer usage behavior. The TAJ\.1 identifies various variables (Fig. 1) which influence users to accept or reject computer technology (Davis, 1989):

* Perceived Usefulness (PU) was defined as "the degree to which a person believes that usmg a particular system would enhance his or her job performance"
* Perceived ease of use (PEOU), in contrast, refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989)
* Actual System Usage is influenced by users' behavioral intention to use which is in twn influenced by users' attitude toward using
* Attitude toward use is directly affected by PU and PEOU



Perceived ease of use

Perceived self-efficacy

# 

Perceived risk

# 

Perceived usefulness

|  |  |  |
| --- | --- | --- |
| Passengers’ attitude towards mobile taxi booking apps |  | Passengers’ intention to use mobile taxi booking apps |
|  |

Perceived credibility

whatever skills individual possesses (Bandura, 1986). Self-efficacy affects what behaviors people choose to perform, the ammmt of effort they are ready to use and the amormt of time they will persist to overcome obstacles (Bandura, 1986). In the context of!S, computer self-efficacy represents an individual's perception of his or her ability to use computers to accomplish a task such as data analysis, graphic design or even programming rather than reflecting simple component skills such as twn on computer (Compeau and Higgins, 1995). In the past study on mobile banking, perceived self-efficacy was defined as the judgment of one's ability to use mobile banking (Luam and Lin, 2005). Further, past IS studies had examined perceived self-efficacy plays an important role in llllderstanding individual response to information technology (Compeau and Higgins, 1995; Hassan, 2007). This study has focused on whether passengers had the required knowledge, skill or ability to use MIO apps as such perceived self-efficacy for MIO apps was defined as the judgment of one's ability to use MIO apps. Hence:

* H3: there is a significantly positive relationship between passengers' attitude towards technology adoption and their self-efficacy about using it

**Perceived credibility:** Meyer defined the concept of credibility as "reasonable grollllds for being believed" according to Webster's New Collegiate Dictionary . In the context of!S, Wang *et al.* (2003) andLuam and Lin (2005) defined perceived credibility as the extent to which a person believes that the use of a technology will have no privacy and security threats. Privacy commissioners arolllld the world are closely scrutinizing mobile apps for gathering too much personal information from llllaware consumers including the MIO app. There are four common issues of privacy on mobile apps including accessing the user contacts on a smartphone (including the contact information that may come from corporate email that syncs to the phone), accessing the user's calendar information, collecting or determining the user's location and tracking his movements and passing along any or all of this information to ad networks or analytics companies. In the context of MIO app, a third party can gather personal information, the use of MIO app presents potential privacy and security threats which will affect passengers' intention to use MIO app. For instance, with the MIO app, the app opens with a map showing passenger cwrent location with the corresponding address listed at the top. These issues will be affect the decision to download and use the MIO apps.

With MIO app, personal identification data are linked to mobile apps service provider, taxi mobile apps

provider can build customer profiles and gather information about the characteristics of their passengers and their taxi usage behaviors. Since the information collected is potentially available to third parties, the collection of personal information by MIO apps provider not only increase passengers' concerns about personal privacy and security but also affects their intention to use MIO apps. Hence:

* H4: there is a significantly positive relationship between passengers' attitude towards MIO apps adoption and their beliefs about its perceived credibility

**Perceived risk:** Perceived risk refers to consumer's level of llllcertainty regarding the outcome of a purchase decision. When consumers' perception of risk for buying a product is high, their likelihood of purchasing that product will be low (Lim, 2003). Past IS literature show that perceived risk is an important factor for consumers' acceptance of a technology including electronic commerce, online shopping and online banking (Pavlou, 2003; Lim, 2003; Kim and Prabhakar, 2000). These studies indicated that there is a negative relationship between perceived risk and the technology. As discussed MIO apps has raised many privacy and security fears since the personal information collected for the use of MIO apps can be gathered by third parties. In addition, MIO apps is perceived that it would be used to track, identify and acquire passengers' personal information in many ways. To this end, passengers may fear that apps service provider and taxi driver will use MIO apps to gather information about their characteristics and usage behaviors. This may affect passengers risk perception about MIO apps and their intention to use it. Hence:

* H5: there is a significantly negative relationship between passengers' attitude towards MIO apps adoption and their beliefs about its perceived risk

**Attitude towards adoption and behavioral intention to adopt:** In general, attitude has been conceived as a person's generalized evaluation of an object. Attitudes are pre-disposition to respond favorably or lllllavorably to an object, person, event, institution or another discriminable aspect of the individual's world (Ajzen, 1991). Behavioral intention on the other hand, predicts behavior on the basis of individual's attitude toward the act and individual social-normative belief (Ajzen, 1991). Azjen (1991) stated that intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to *try* of

how much of an effort they are planning to exert in order to perform the behavior. As a general rule, the stronger

Table 1: Profile ofrespondents

Demographic characteristics Frequency Percent Gender

the intention to engage in a behavior, the more likely

should be its performance.

In the context of IS adoption literature, attitude and behavioral intention relationship were two of the main concepts in many theories including TAM. There is a growing nwnber of research to suggest that attitude towards technology use have a strong link to behavioral intention and thereafter to actual behavior (Davis, 1989; Surnak el al., 2011). In this study, passengers' attitudes toward MIO apps were analyzed. In this study, attitude towards MIO apps refers to the degree to which the apps decision makers/passengers has a favorable or lllllavorable evaluation or appraisal of MIO apps

Male Female **Age**

20-29

30-39

40-49

50 and above Ethic

Malay Chinese Indian Others

Own a smartphone Yes

No

Years using smartphone

<lyear 1-2years

|  |  |  |  |
| --- | --- | --- | --- |
| adoption. Similarly, intention to adopt MIO apps refers to | 3-4 years | 102 | 27.7 |
| the technology decision makers'/passengers' willingness | >5 years | 117 | 31.8 |

240

128

152

24

100

92

154

89

65

60

368

0

32

117

65.2

34.8

41.3

6.5

27.2

25

41.9

24.2

17.6

16.3

100

0

8.7

31.8

to adopt MIO apps in general. Hence:

* H6: there is a significantly relationship between passengers' attitude towards MIO apps technology

|  |  |  |  |
| --- | --- | --- | --- |
|  | 5-10 | 84 | 22.8 |
| adoption and their intention to adopt it | 11- 20 | 38 | 10.3 |

Experience using mobile apps Yes

No

How often you ride a taxi (a week)

>5

368

0

132

100

0

35.9

## MATERIALS AND METHODS

A questionnaire survey was conducted in Klang valley areas especially major shopping malls and major shopping districts regardless of their demographic and geographic factors. These locations are chosen to conduct survey due to the well-populated area and convenient to gathering data. The questionnaire was distributed to respondents who O\Vll a smartphone and have an experience and ability of using a mobile apps.

A convenience sampling was chosen as it can generate a large nwnber of questionnaires more swiftly and economically. The larger nwnber of respondents, the more accurate data generated. A quantitative questionnaires for this research were developed based on the related prior studies (Table 1). Multiple items for each construct organized in a survey questionnaire were used for gathering data. Most theoretical constructs were assessed on the basis of a 5 point Likert type scale (I Strongly disagree to 5 Strongly agree). The population rmder study consists of 480 questionnaires distributed, 368 were collected to the researcher. Table 1 shows the respondents' demographics, their smartphone usage and taxi riding time.

The purpose of this study were used to identify factors affecting passengers' attitude towards MIO apps adoption intention. Dependent variable for this study were measured and modified the scale developed based on the studied by Ajzen and Fishbein (1980), Azjen (1991)

>20 114 3

and Davis el al. (1992). The study depended on overall weight rating that was based on the responses received from the following statements:

* Using MIO apps is (would be) a good idea
* I like the idea of using MIO apps
* Given the chance I intend to use MIO apps
* Given the chance I predict that I should use MIO apps
* Given the chance I plan to use mobile tax apps

As for the independent variables, there are five sections presented respondents with a list of 19 statements on perceived ease of use, perceived usefulness; perceived risk, perceived credibility and perceived self-efficacy. The constructs and nwnber of questions (Table 2) are based upon the research objectives.

The data collected were coded and keyed into the computer before analysis was carried out using a statistical package software and spreadsheet software. Data analysis methods including descriptive statistics, factor analysis, reliability and multiple regression analysis were used for this study. The factor analysis with VARIJ\.1AX rotation was used to identify the llllderlying dimensions of technology organizational and institutional pressures. Items were retained based on the following criteria: Items with loading of 0.50 or more were retained and items with loading of <0.50 were removed.

Table 2: Research variables and measurement Items Descri tion Sources

Perceived ease of use

EU! EU2 EU3 EU4

Perceived usefulness

Mobile taxi app will not make confused It is cumbersome to use :MTO apps

My interaction with :MTO apps will be easy to understand Mobile taxi apps is easy to use

Davis (1989)

CXl Mobile taxi apps save my time

CX2 Mobile taxi apps enable me to reach the destination more quickly

CX3 Mobile taxi apps are more convenient than phone call to taxi centre Perceived self-efficacy

SEl Being able to use the mobile app if only there is a manual for reference

SE2 Being able to use the mobile app if there is someone else using it before trying it myself SE3 Being able to use the mobile app if someone for help could be called ifl got sh.ick

SE4 Being able to use the mobile app if someone else had helped to get started

SES Being able to use the technology if someone showed how to do it first Perceived credibility

PCl Using :MTO app would not divulge my personal information

PC2 Mobile taxi app is secure in using other mobile apps Perceived risk

PRl I am afraid if mobile smartphone is lost or stolen, my personal data will be exposed to llllauthorized users

PR2 I am concerned about the privacy ofmy personal information during a transaction

PR3 I am concerned that mobile booking apps are collecting too much on my personal information PR4 I am concerned that the mobile booking apps service providers will use my personal

information without my authorization.

PR5 I am concerned that llllauthorized persons will have access to my personal information Attitude towards mobile taxi apps

ATl Using :MTO apps is (would be) a good idea

AT2 I like the idea ofusing :MTO apps tedmology Intention to adopt mobile taxi apps

IAl Given the chance I intend to use :MTO apps

IA2 Given the chance I predict that I should use:MTO apps

IA3 Given the chance I plan to use :MTO apps

Researcher

Researcher; Compeanu and Higgins (1995)

Malhotra and Peterson (2006) Son and Benbasat (2007)

Ajzen and Fishbein (1980)

Son and Benbasat (2007)

#### RESULTS AND DISCUSSION

In order to explore whether the independent variables of five factors had statistically significant impacts on the dependent variable, attitude toward MIO apps, correlation and multiple regression analysis was utilized. Five factors derived from the factor analysis were used as the input variables in the analysis. The results of the regression analysis are presented in Table 3.

As hypnotized, perceived risk (H1) was folllld to have significant negative influence on passengers' attitude towards MIO apps adoption( 0.249; p<0.001). This finding confirmed a similar result by Pavlou (2003) who indicated that passengers' high level of perceived risk of a technology is a barrier to their acceptance of that technology. The results of the study suggested that when the passengers believe that MIO apps are not effective as they think and when they believe that MIO apps have llllcertainties, then their attitude towards MIO apps adoption will be affected negatively (Table 4).

The result of testing H2 and H3 indicate that, there are significant relationship between perceived usefulness, perceived ease of use and the attitude towards MIO ordering apps adoption intention. Correlation analysis shows perceived usefulness having 0.299; p<0.001

Table 3: Pearson correlation coefficient between :MTO apps adoption

intention and other factors Variables Attih.ide towards :MTO apps @) Perceived risk 0.218

Perceived usefulness 0.444

Perceived ease ofuse 0.294

Perceived self-efficacy 0.160

Perceived credibility 0.179

Table 4: Re ession results Variables Beta t-values p-values Perceived risk 0.249 3.824 0.000

Perceived usefulness 0.299 4.493 0.000

Perceived ease ofuse 0.150 2.967 0.003

Perceived self-efficacy 0.269 4.276 0.000

Perceived credibility 0.126 2.659 0.008

and perceived ease of use having 0.150; p<0.005. This suggests that the usefulness and ease of use of a technology would be promising for the passengers' attitude toward MIO apps adoption and their adoption intention decision. This is consistent with the past studies on IS confinning that perceived usefulness and perceived ease of use were the predominant factors in assessing attitude and behavioral intention toward technology adoption (Vijayasarathy, 2003; Venkatesh and Morris, 2000). Another studies conducted by using TAJ\.1 have identified perceived ease of use and perceived

usefulness were the most important factors affecting attitude toward technology (Chen and Tan, 2004; Hossain and Prybutok, 2008).

The support of IL (perceived efficacy) is in line with

the results found by Hasan (2007), perceived self-efficacy have a positive significant impact on passengers' attitude towards MIO apps adoption( 0.269; p>0.001). This is consistent with the study done by Lauran and Lin (2005) which concluded that perceived self-efficacy play an important role in passengers' attitude towards adoption and intention to adoption information technology. Passengers believe that the required knowledge, skill or ability to use MIO apps is an important factor affecting their attitude towards mobile apps adoption.

The results of the study indicated that perceived credibility (H5) had significant positive impact on passengers attitude towards MIO apps adoption. Regression analysis showed perceived credibility having 0.126; p>0.05. This research therefore further proves

the earlier finding that showed by Wang on mobile banking studies.

Finally, past researchers in the field of information technology have investigated the relationship between attitude and behavioral intention and have fmmd significant results (Chen and Tan, 2004; Vijayasarathy, 2003). Consistent with these studies, the findings of the study indicated that passengers' attitude will influence MIO apps adoption intention having( 0.982; p>0.001). Therefore, H6 is accepted.

#### CONCLUSION

The finding of this research may have implication for smartphone users that had not yet adopted and had an intention to adopt MIO app and were looking for more benefits from MIO apps adoption. Passengers' perception of risk about the MIO apps will be high when they face uncertainty and undesirable consequences because of the usage of their technologies. As discussed MIO apps can be used to track, identify and acquire personal I nformation in many ways. Since, the third party can gather personal information intentionally or unintentionally, the use of MIO apps raises many potential privacy and security issues which affect passengers' attitude towards MIO apps adoption and consequently their intention to adopt them. It is important for mobile apps service providers to develop and design the apps with valuable functions and a perceived trustworthiness to overcome security and privacy challenges that MIO apps users may face. It is recommended that mobile service providers should upgrade their security procedures and policy and

emphasizes the security and privacy of MIO apps to their passengers through email, sms and social media platform. By using MIO apps, taxi drivers can create better commmrication with the passengers which will help to increase their service quality and improve customer relationship. To be able to do this, drivers should be capable of identifying the factors that affect their passengers' attitude towards MIO apps adoption and their intention to adopt the mobile apps.

Government ministries and agencies that responsible for building a better image for the taxi service industry should focus their effort on resting the literacy, especially in terms of MIO apps adoption. This is because findings of the study showed that factors such as perceived ease of use, perceived usefulness, perceived risk and perceived credibility contribute to the passengers' adoption ofMTO apps. Government should take steps to create awareness to passengers so as to educate them about the benefits and importance of MIO apps. The MIO apps helping to regulate drivers by registering them to the service and allowing them to be tracked as they travel. In addition, reduce the drivers' who insisted on charging a significant higher flat fee and refusing to use the official meter for the ride. Hence, improve the Malaysian taxi service industry image and reputation.

Compared to original TAJ\.1 model, the model developed in this study suggested that in addition to perceived ease of use and perceived usefulness, other factors such as perceived risk and perceived credibility contribute to the passengers' intention to adopt MIO apps. This finding contributes to the theoretical elucidation of passengers' adoption of other IT innovations.

Although, this study has investigated factors such as perceived ease of use and perceived usefulness, there may be other potential determinations of MIO apps adoption intention. Hence, future research should examine this possibility. Finally, this study was a perception based study and actual MIO apps use was not analyzed in this study. Future research which will measure the actual use of MIO apps, may provide more accurate and valid results for passengers' perception about MIO apps.

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