

FACTORS INFLUENCING MALAYSIAN TAXI DRIVERS BEHAVIORAL INTENTION TO ADOPT MOBILE TAXI APPLICATION

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Abstract

This paper aims to investigate empirically the decision of Malaysian taxi drivers to adopt the mobile taxi application. Using a survey of 305 sampled taxi drivers from Klang Valley area in Malaysia, and seven hypotheses about the factors that influence mobile taxi booking adoption intention has been tested. The finding show that relative advantage, complexity, knowledge, coercive pressures, mimetic pressures, normative pressures have significant relationships with taxi driver attitude towards mobile taxi booking apps. This study provides more understanding of mobile apps providers companies about the drivers behaviors toward adoption intention of mobile taxi booking apps. Others interested in promoting the mobile taxi booking apps adoption including drivers, trade association, related government agencies may find these results helpful in guiding their efforts.

Keywords: Mobile Taxi Application, Technology Adoption, Taxi Drivers, Institutional Theory, TOE framework

INTRODUCTION

The development in the telecommunication field has brought about extraordinary changes to virtually every aspect of societies worldwide. The power of telecommunication, turns our mobile smartphone into an amazingly effective tool for discovery, communication, and collaboration, vastly increasing business productivity and competitive advantage. A smartphone is a cellular phone that performs many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system such as Apple App Store, Google Play,

Windows Phone Store, and BlackBerry App World and capable of running downloaded applications (apps) usually either made available at a minimal fee or free of charge. The mobile apps are an end-user software created for smartphone operating systems which extend the capabilities of smartphone. 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, Turban and Potter, 2007). It is for these characteristics that smartphone has been widely regarded as a new frontier for business environment.

To date, mobile apps have been applied to financial services, airline booking services, shopping and the revolutionary service on taxis booking. Mobile taxi booking (MTB) apps is a ordering a taxi with an app on smartphone or tablet, when and where you like, has never been easier. In Malaysia, the taxi service industry generated RM 960 million revenue from approximately 91 million taxi trips at Klang Valley in year 2013 (Michael, 2014). The revenue clearly show the importance of the taxi industry to Malaysia. Taxi driver has a vital role to play in meeting the different mobility demands of all Malaysian and the tourists such as serving as a premium door-to-door service, or as a viable transport option outside rail and bus operational hours. Over and above that, good taxi services uplift the image of the country as they can be the first and last impression for tourists. Traditionally, passenger can order a taxi by making a phone call to the taxi company and inform the operator of the pick-up location and lastly the taxi registration number given by the operator. In Malaysia, however it is understood from passengers comments that telephone booking is perceived to be unreliable and so not the preferred method of booking. The majority of the taxi fleet do not operate with radio circuits and are therefore unable to be dispatched to a telephone booking easily. Further, drivers will not accept bookings unless they are in the immediate area or they would be out of pocket travelling to the fare – even allowing for the RM3 surcharge.

The recent petrol price hikes in Malaysia have affected the taxi drivers' income as it would drive up taxi maintenance cost. Taxi drivers are also facing continuous increase in both cost of spare parts and operations due to high inflation and recent Malaysian government start impose goods and services tax (GST) in Malaysia. The Malaysian taxi industry's reputation, in particular, has long been plagued by inefficiencies, from bookings to concerns over passenger safety – robbed, abducted or raped, and perceived dishonesty. The capital region of Kuala Lumpur even has been ranked the third worst among major cities in the world according to TripAdvisor (Michael, 2014).

There are numerous benefits of MTB apps to taxi drivers. MTB apps may increase taxi drivers' incomes if they are able to accept more bookings with less empty cruising, reducing operating costs and at the same time, it may increase the supply of taxis. There will be a more comfortable working environment with silent data. Compared with the conventional radio wave booking system, fewer misunderstandings will result between the dispatcher and the driver on booking messages. And more importantly, it will provide customers great experience and thus increase customers satisfaction and loyalty.

Mobile smartphone usages are growing up very fast at Malaysia. More than 26% of mobile phone users using smartphone and half of feature phone users intend to change to smartphone in year 2014 or later (MCMC, 2012). The dependency of smartphone is very important to reach the competition by find the new markets and providing value-added services to customers. In spite of having better opportunities and encouragement in terms of technological and business resources towards its adoption, empirical research on MTB adoption intention by taxi drivers has been very limited, furthermore, because of the competitive, dynamic and images of taxi service industry, there is a need to conduct a study on MTB adoption among Malaysian taxi drivers. Therefore, this research tries to fill the gaps on MTB adoption intention research by attempting to identify the factors which predict the rate of adoption intention of MTB in Malaysian taxis service industry.

Research Objectives and Rationale

The purpose of this study was to determine the factors affecting taxi drivers' attitude towards MTB apps adoption. For this purpose, based on the effect of technological context, and institutional model, mimetic pressures, coercive pressures and normative pressures as well as the effect of technological contexts on taxi drivers' attitude towards MTB apps adoption were examined. In addition, the relationship between taxi drivers' attitude towards MTB apps adoption and their intention to adopt was also analysed. To accomplish the above research objectives, this research uses institutional model and technological context to fill the gaps of knowledge in the literature. The finding of this paper serve as a useful guide for taxi drivers to pay attention to institutional factors in their decisions to adopt mobile apps to avoid being left out of their taxi service industry or to attract more customers and to best utilize MTB apps to enhance their competitive position. The finding also provide useful information to related bodies such as the Malaysia Land Public Transport Commission (SPAD). Further, by identifying the factors affecting taxi drivers' decisions to adopt MTB apps, technology vendors could educate prospective drivers better on the potential benefits of MTB apps in order to increase the usage of these technologies.

LITERATURE REVIEW

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. Organizational adoption studies analyse the adoption by large aggregates, such as companies, business units, agencies, or departments (Fichman, 1992). According to Oliveira and Martins (2011), the literature on technology innovation on organization suggest most researches are based on the following models:

- The Diffusion of Innovation (DOI) (Rogers, 1995; Zhu and Kramer, 2005).
- The Technology-Organization-Environment Framework (TOE) (Tornatzky and Fleischer, 1990).
- Institutional Theory (Scott, 1995; Chatterjee et al., 2002).
- Resource-based Theory (Zhu and Kraemer, 2005).
- Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003)
- Theory of Planned Behavior (TPB) (Ajzen, 1991)

This study employs organizational behaviour theories including Technology-Organizational-Environmental (TOE) framework, and Institutional Theory. These theories are recognized in the IS research domain because its enable researchers to gain a useful insight into the reaction of organization toward computer technology and factors affecting their reactions.

Technology-Organization-Environment Framework

Technology-Organization-Environment framework (TOE) is developed by Tornatzky and Fleischer (1990), which defines a “context for change”. The process by which an organization adopts and implements technological innovation is influenced by the technological context, the organizational context, and the environmental context. TOE is a useful analytical tool for distinguishing between inherent qualities of an innovation itself and the motivations, capabilities, and broader environmental context of adopting organizations (Dedrick and West, 2003). Tornatzky and Fleischer (1990) define the three elements as follow:

- The technological context includes existing technologies inside the firm, as well as the pool of available technologies in the market;
- Organizational context includes firm size and scope; the centralization, formalization, and complexity of its managerial structure; the quality of its human resource; and the amount of slack resources available internally; and
- Environment context is the arena in which a firm conducts its business – its industry, competitors, access to resource supplied by others, and dealings with government.

One can safely conclude by drawing upon prior theoretical and empirical evidences that the TOE has been widely applied for examining innovation technology adoption by business organization groups (Thong, 1999; Kuan and Chau, 2001; Zhu *et al.*, 2003). Therefore, the present study draws on TOE to identify factors affecting passengers' attitude towards MTB apps adoption.

Institutional Theory

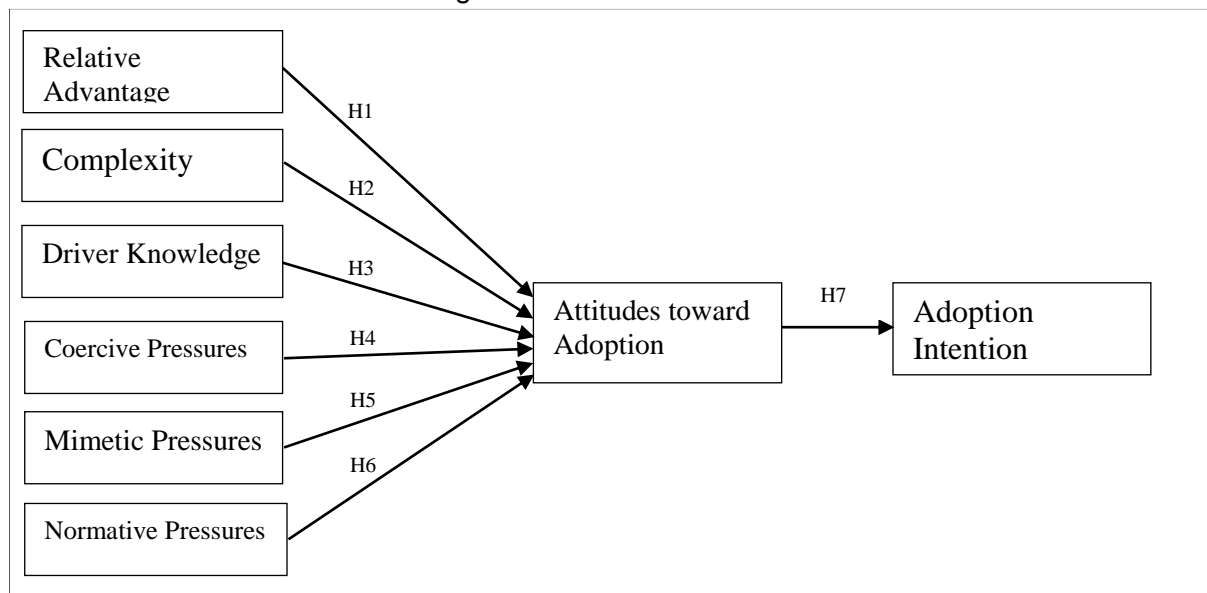
Institutional theory is one of the theories used to study organization's innovation adoption level developed by Scott and Christensen (1995). Institutional theory emphasizes that institutional environments are crucial in shaping organizational structure and actions (Scott and Christensen, 1995). Based on the prior studies, researchers such as Gibbs and Kraemer (2004), Khalifa and Davison (2006) and Son and Benbasat (2007) have identified that organizations adopt IS innovations are due to environmental forces. They found that IS is not used by organization to improve operation efficiency and effectiveness, but also to gain legitimacy in their environments, in order to be accepted.

Institutional theory is concerned with external environmental pressures that lead organizations that reside in an organization environment that increasingly resemble each other, resulting in institutional isomorphism. According to DiMaggio and Powell (1983), the net effect of institutional pressures is to increase the homogeneity of organizational structures in an institutional environment. Organizations will adopt similar process, structures and strategies as a result of three types of external pressures: mimetic, coercive, and normative (DiMaggio and Powell, 1983).

In this study, a new framework (Figure 1) applicable to the taxi drivers' innovation adoption, this study included relative advantage and complexity in the technology context while the organizational context, drivers' knowledge are used based on the TOE framework. With the Institutional theory added to the environmental context of the TOE framework external pressures, which include pressure from competitors and pressure exerted by trading partners and customers. By combining more than one theoretical model enabled to achieve a better understanding and has provided critical implication in influencing adoption and diffusion of innovation (Oliveira and Martins, 2009).

Hypotheses development

Figure 1. Research Framework



Relative Advantage

Based on past IS literature, relative advantage has been found to be an important determinant in determining adoption of particular technology (Lertwongstien and WongPininwatana, 2003; Thong, 1999; Iacovou, et al., 1995). Relative advantage refers as “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers, 2003). MTB apps has both direct benefits and indirect benefits to taxi drivers. These benefits include increase income by getting more customers, save waiting time at the taxi stand, save cost of fuel, create better relationship with passengers, improved service quality and higher passenger satisfaction. Past IS studies had examined relative advantage have a positive effect on the likelihood of a particular technology adoption (Lertwongstien and WongPininwatana, 2003; Thong, 1999; Iacovou, et al., 1995), it is expected that relative advantage of MTB apps positively influence the perception and consequently its adoption. Hence:

H1: Relative advantage of MTB apps will have a significantly positive relationship with taxi drivers’ attitude towards MTB apps adoption.

Complexity

In the past studies of IS innovation adoption, the relationship between complexity of particular technology and innovation adoption has a negative effect on its adoption (Thong, 1999; Corrocher, 2011; Tornatzky and Klein, 1982). Complexity of an innovation refer as the degree to

which an innovation is perceived as relatively difficult to understand and use (Rogers, 1983). A MTB apps is a taxi driver software created for mobile device operating systems. The apps allow taxi drivers identify their passenger contacts, pick-up and drop-off location in advance, map view, message board, etc. Taxi drivers may perceived difficulty to operate the apps, which will affect their app adoption decision. Hence:

H2: Complexity of MTB apps will have a significantly negative relationship with taxi drivers' attitude towards MTB apps adoption.

Driver Knowledge toward Mobile Taxi Booking Apps

Knowledge of innovation is an important variable for innovation adoption based on the past literature studies (Attewll, 1992; Hall and Andriani, 2002; Sharma, 2007). The knowledge about an innovation in organization will motivate toward innovation adoption (Thong, 1999; Attewell, 1992). Knowledge can be divided into product knowledge and business knowledge (Hall and Andriani, 2002). These knowledge which capture the amount of or extent of new knowledge that needs to acquire in order to adopt and apply the innovation in a business activity setting (Sharma, 2007). Product knowledge includes the technology and features and how it could be potentially used, business knowledge refers to new knowledge about the settings and contexts in which the product could be applied to potentially benefit the adopter (Sharma, 2007). A mobile taxi booking apps is much more complex than a radio booking system, therefore knowledge about the mobile taxi booking apps such as features, past experiences using others mobile apps will have a positive impact on the taxi drivers' adoption decision. Hence:

H3: Knowledge about MTB apps will have a significantly a positive relationship with taxi drivers' attitude towards MTB apps adoption.

Coercive Pressures - Customers

In the context of technology innovation adoption decision, powerful and dominant customers can exert direct and indirect pressures toward business organizations (Teo et al.; Son and Benbasat, 2007; Khalifa and Davison, 2007). Organizations intend to adopt the technology innovation because these organizations might otherwise appear illegitimate to their customers. Past studies of technology innovation adoption that employ institutional theory identified direct pressures from customers such expectation, demand and encouragement exert on them to adopt technology innovation. On the other hand, Teo et al.(2003) and Son and Benbasat (2007) find that, although no attempt at direct pressures are undertaken, adoption of an technology innovation by powerful and dominant customers indirectly pressures the organizations to adopt the same technology innovation. Taxi drivers intend to adopt the MTB apps because they fear

that they lose legitimacy from their passengers. Realizing the importance of passengers pressures toward intention of mobile taxis apps adoption, H3 is developed to test the relationship of coercive pressures from passengers and MTB apps adoption:

H4. Greater coercive pressures from the passengers will have a significantly positive relationship with taxi drivers' attitude towards MTB apps adoption.

Mimetic Pressures - Competitors

Institutional theory suggests that mimetic pressures force business organizations responses to uncertainty and adopt the actions or innovation imitating of competitors that are perceived to be similar; closely connected by ties, including resources, information, and board interlock; have high status or prestige; and are more successful. According to Haveman (1993), an organization can face mimetic pressures if the number of organizations in its environment that have taken the same action increases. Such mimetic pressures lead to a bandwagon (Abrahamson and Rosenkopf, 1993). In addition, a business organization can face mimetic pressures when the organization perceives that the actions of other organizations in its environment are successful and beneficial. Business organization conforms to these mimetic pressures by imitating the actions of other competitors in its industry in order not to be seen as a laggard to its stakeholders or competitors, reduces uncertainty of the action, and to reduce fears of losing competitive advantages. Prior studies on IS adoption found that mimetic pressure from competitors have a positive influence on an organization (Mackenzie, 2011; Khalifa and Davison, 2006). In these studies, mimetic pressures are measured with extent of adoption among competitors and business organization perceives that its competitors who have adopted technology innovation have benefited or succeeded greatly, the organization is willing to adopt the technology in order to compete. As such, H4 and H5 are proposed to identify the nature relationship between mimetic pressures and MTB apps adoption intention:

H5: Greater mimetic pressures from the competitors will have a significantly positive relationship with taxi drivers' attitude towards MTB apps adoption.

Normative Pressure – Trade Association

Normative pressures come from dyadic relationships where business organizations and external professional groups (i.e., trade, business and professional associations, trade partners and the media) share some information, rules, and norms. Sharing these norms through relational channels amongst members of a network facilitates consensus, which, in turn, increases the strength of these norms and their potential influence on organizational behaviour (DiMaggio and Powell, 1983). In other word, organizations conform to these normative pressures by adopting

the particular business practices because they perceive that adoption is an appropriate thing to do (Scott, 2003; Chiravuri and Ambrose, 2002). In the past studies, normative pressures arise from trade and business associations have significantly positive influence on an organization's technology innovation adoption intention (Teo et al., 2003; Son and Benbasat, 2007). In the taxi service industry, taxi association encourage the usage of mobile taxis apps in order to provide better passengers services. As such, normative pressures from trade and business associations that promote and share information on the MTB apps adoption will be used to study taxi drivers' MTB apps adoption. Therefore, the following hypothesis is formulated:

H6. Greater normative pressures from the taxi's service trade and associations will have a significantly positive relationship with taxi drivers' attitude towards MTB apps adoption.

Attitude towards Adoption and Behavioural Intention to Adopt

Attitudes are pre-disposition to respond favourably or unfavourably 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. In the context of IS adoption literature, attitude and behavioural intention relationship were two of the main concepts in many theories. There is a growing number of research to suggest that attitude towards technology use have a strong link to behavioural intention and thereafter to actual behaviour (Davis, 1989; Wong and Teo, 2009; Šumak et al., 2011). In this study, taxi drivers' attitudes toward MTB apps were analyzed. Attitude towards MTB apps refers to the degree to which taxi drivers has an evaluation of MTB apps adoption. Hence:

H7: There is a significantly relationship between taxis' drivers attitude towards mobile taxi booking apps adoption and their intention to adopt it.

METHODOLOGY

In this study, a survey toward Malaysian taxi drivers was conducted in year 2014. The reason of this quantitative survey is pertaining to factors that influence the taxi drivers' attitude toward mobile taxi booking apps adoption and their intention to adopt it in Malaysia. Therefore, the target population for this research is the Malaysian taxi drivers with their experience for using mobile taxi booking apps. The research study was conducted in Klang Valley areas due to the well-populated area and convenient to gather data. The questionnaire was distributed to all

respondents who have an ability of using smartphone. A convenience sampling was chosen as it can generate a large number of questionnaires more swiftly and economically. There were 416 questionnaires distributed to the respondents, and only 305 of questionnaires had been collected due to incomplete questionnaires. Table 1 shows the respondents' demographics, the number of years in the taxi service industry and their smartphone usage. There are more than 98% of taxi drivers use a smartphone, and also 98% had an experience on mobile apps.

Table 1. Profile of Respondents

Demographic Characteristics	Frequency	Percent (%)
Gender		
Male	261	85.6
Female	44	14.4
Age		
20 – 29	31	10.2
30 – 39	128	42
40 – 49	127	41.6
50 and Above	19	6.2
Ethnic		
Malay	36	11.8
Chinese	126	41.3
Indian	128	42
Others	15	4.9
Year in the taxi service industry		
< 1 year	5	1.6
1 – 5 years	35	11.5
6 – 10 years	119	39
11 – 15 years	112	36.7
16 – 20 years	24	7.9
>20 years	10	3.3
Education Attained		
Primary	5	1.6
Secondary	31	10.2
Certificate	125	41
Diploma	108	35.4
Others qualification	36	11.8
Own a smartphone		
Yes	299	98
No	6	2
Years using smartphone		
<1 year	15	4.9
1 – 2 years	150	49.1
3 – 4 years	86	28.2
>5 years	54	17.7
Experience using mobile apps		
Yes	299	98
No	6	2

The measurement items for this survey were adapted from previous research where their psychometric properties have been established. 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 five-point Likert type scale (1=Strongly Disagree to 5=Strongly Agree). A summary of the measurement items is provided in Table 1. The choice of theoretical constructs to be examined was determined through a review of the technological adoption literature. The survey questionnaires were pre-tested with sub-sample of 15 taxi drivers which minor amendments were made to some questionnaires were long and ambiguous in wording. Specifically, researchers captured the following information in the survey: 1. demographic profile of respondent, years of experience in taxi service industry and their smartphone usage; 2. Mobile taxi booking apps adoption intention; 3. Relative advantage associated with taxi drivers' attitude toward mobile taxi booking apps; 4. Complexity associated with taxi drivers' attitude toward mobile taxi booking apps; 5. Drivers' knowledge associated with taxi drivers' attitude toward mobile taxi booking apps; 6. Coercive pressures from passengers associated with taxi drivers' attitude toward mobile taxi booking apps; 7. Mimetic pressures from competitors associated with taxi drivers' attitude toward mobile taxi booking apps; and 8. Normative pressures from trade association associated with taxi drivers' attitude toward mobile taxi booking apps. The constructs and number of questions (Table 2) are based upon the research objectives.

Table 2. Research Variables and Measurement

Item	Description	Source
<i>Relative Advantage</i>		Researcher
RA1	Adopting mobile taxi booking apps allows me to get more passengers.	
RA2	Adopting mobile taxi booking apps allows me to save cost of fuel.	
RA3	Adopting mobile taxi booking apps allows me to save waiting time at the taxi stand.	
RA4	Adopting mobile taxi booking apps creates easy communication with customers.	
<i>Complexity</i>		Researcher
CX1	The use of mobile taxi booking apps requires a lot of mental effort.	
CX2	The use of mobile taxi booking apps is frustrating.	
CX3	Mobile taxi booking apps are complex for my business operations.	
<i>Drivers' Knowledge</i>		Researcher
DR1	I know how mobile taxi booking apps can be used to support my services.	

DR2	I have necessary technical and other skills to operate mobile taxi booking apps.	
DR3	I have a good understanding of mobile taxi booking apps can be used in my services.	
DR4	The overall level of knowledge for adopting and using mobile taxi booking apps is high.	
<i>Coercive Pressures</i>		Khalifa and Davison (2006)
CP1	Many of my passengers expect I use mobile taxi booking apps.	
CP2	Many of my passengers encourage us to use mobile taxi booking apps.	
CP3	I may not retain our important passengers without mobile taxi booking apps.	
<i>Mimetic Pressures</i>		Son and Benbasat (2007)
MP1	Many of our competitors are currently adopting mobile taxi booking apps.	
MP2	Many of our competitors will be adopting mobile taxi booking apps in the near future.	
MP3	Many of our competitors that adopt mobile taxi booking apps are benefiting greatly.	
MP4	Many of our competitors that adopt mobile taxi booking apps are perceived favourably by their customers.	
<i>Normative Pressures</i>		Son and Benbasat (2007)
NP1	Large pressure is placed on our firm to adopt mobile apps by industry sources (e.g., industry or trade associations).	
NP2	I am actively participate in industry, trade, or professional associations that promote mobile taxi booking apps adoption.	
NP3	I often receive information regarding mobile apps from external sources (such as industry associations, professional associations, or trade newsletters).	
DA1	Adopting mobile taxi booking app is (would be) a good idea (Ajzen and Fishbein, 1980)	
DA2	In my experience, taxi drivers that use mobile taxi booking app benefit financially	
<i>Taxi Drivers' Intention to Adopt Mobile Taxi Booking Apps</i>		Son and Benbasat (2007)
DI1	I intend to adopt mobile taxi booking apps in the future.	
DI2	It is likely that I will take some steps to adopt mobile taxi booking apps.	

The data obtained was coded and analyzed 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 Table-2 shows items included in the questionnaire for each factor. The factor analysis with VARIMAX rotation was used to identify the underlying dimensions of technology, organizational, and institutional pressures. Items were retained based on the following criteria: (i) items with loading of 0.50 or more were retained and (ii) items with loading of less than 0.50 were removed.

ANALYSIS AND RESULTS

In order to explore whether the independent variables of six factors had statistically significant impacts on the dependent variable, drivers' attitude towards MTB apps, a multiple linear regression analysis was conducted. Six factors derived from the factor analysis were used as the input variables in the analysis (Table 3). According to the adjusted R^2 of this regression model, 76.3% of the variation of the overall drivers' attitude towards MTB apps was explained by the relative advantage, complexity, drivers' knowledge and three institutional independent variables together. The significant F-ratio ($F=159.6$, $p<0.001$) indicated a satisfactory level of the "Goodness-of-Fit". Of the six independent variables from TOE framework and institutional model context, all factors were found to be significantly related to drivers' attitude towards MTB apps.

Six hypotheses were constructed to determine the relationship between relative advantages, complexity, drivers' knowledge, coercive pressures, mimetic pressures and normative pressures and drivers' attitude towards MTB apps. As shown in Table 5, all six factors have significant influence on drivers' attitude towards MTB apps.

Table 3. Test of collinearity

Variable	Tolerance	VIF
Relative advantage	0.584	1.711
Complexity	0.429	2.330
Drivers' knowledge	0.771	1.297
Coercive pressures	0.543	1.843
Mimetic pressures	0.676	1.479
Coercive pressures	0.547	1.827

Table 4. Pearson correlation between MTB apps adotion intention and other factors

Variable	Attitude towards MTB apps (<i>R</i>)
Relative advantage	.218
Complexity	.444
Drivers knowledge	.294
Coercive pressures	.160
Mimetic pressures	.179
Coercive pressures	.172

Table 5. Regression results

Variables	Beta	t-value	p-value
Relative advantage	.172	4.667	.000
Complexity	.388	9.000	.000
Drivers' knowledge	.200	6.215	.000
Coercive pressures	.129	3.357	.001
Mimetic pressures	.152	4.420	.000
Coercive pressures	.118	3.105	.002

The results of testing H1 indicate that, there is significant relationship between the relative advantage and drivers' attitude towards MTB apps. Correlation analysis shows relative advantage having ($r=0.218$; $p<0.05$) and multiple regression having ($\beta = .172$; $p<.001$). This shown that Malaysian taxi drivers believed that adopting mobile taxi booking apps will help them to get more customers, save cost of fuel and easier to communicate with passengers. Therefore, H1 is accepted. This is further confirmed the consolation made by past literature on innovation adoption (Kuan and Chau, 2001; Premkumar and Roberts, 1999; Thong, 1999).

Complexity was found to have significant negative impact on taxi drivers' attitude towards MTB apps adoption. This hypothesis (H2) was supported. The results shown in Table 5 suggested that complexity of mobile taxi booking apps had a positive significant relationship with taxi drivers' attitude towards the apps adoption (standardized $\beta = .388$; $p<.001$). This result was in accordance with the results of many other IT adoption studies (Thong, 1999; Soh *et al.*, 1997; Cooper and Zmud, 1990) confirming that when learning to operate mobile taxi booking apps and integrating them in the current work practices were difficult, the taxi drivers would be less likely to adopt them.

Drivers' knowledge (H3) was supported with the results of standardized $\beta = .200$; $p<.001$. The relationship between knowledge about mobile taxi booking apps and their attitude toward the apps adoption was positively significant. This study findings along with previous studies in technology adoption (Thong, 1999; Ettlie, 1990) indicated that more knowledge about an innovation are more likely to the technology adoption. The result of this finding indicated that drivers' awareness of the strength and limitation of the apps affect drives attitude towards mobile taxi booking apps adoption and consequently their intention to adopt them.

Coercive pressures (H4) from customers were found to have a positive impacts on their attitude toward the mobile taxi booking apps adoption with the result of standardized $\beta = .129$; $p<.01$. The support of H4 is in line with the results found by past studies (e.g. Teo *et al.*, 2003; Gardner, 2008; Khalifia and Davison, 2007; Young, 2009; McGinity, 2004) in the context of IT innovation. Customer pressures reflect the intensity level of pressures in the taxi service industry is high, this will perceived to positively affect the drivers' attitude toward mobile taxi booking apps adoption intention.

Mimetic pressures (H5) by competitors ($\beta = .152$; $p<.001$) were found to have the stronger influence on drivers' attitude with mobile taxi booking apps adoption intention. Stated differently, Malaysian taxi drivers intend to adopt mobile taxi booking apps because they perceive that the number of their competitors that have already adopted mobile apps increase. Taxi drivers' intent to adopt mobile apps simply because of pressures being exerted by their competitors benefiting greatly and perceived favourably by their customers. Overall, because

their competitors have already adopted the apps, taxi drivers' intend to do the same in order to achieve legitimacy. This reflects the concept of organizational isomorphism from institutional theory. Based on literature review, this is consistent with the findings of prior studies on IT innovation, which observed effect of mimetic pressures (e.g. Mackenzie, 2011; Young, 2009). It is important for taxi drivers to align mobile apps with their services in order to gain and maintain their competitive edge in the taxi service industry.

In addition to mimetic pressures, normative pressures were found to have positive and significant impacts on the drivers' attitude with mobile taxi booking apps adoption intention (H6). Regression analysis showed normative pressures from the trade, industry and professional associations having ($\beta = .118$; $p < .05$), indicating that pressures from the associations influence the attitude with mobile taxi booking apps adoption intention. This is consistent with the previous research (Wu and Lee, 2005) in technology adoption. Taxi drivers learn more about the norms and values of technology innovation from the members of association that have already adopted the technology innovation when they frequently participate in the trade, industry and professional associations that promote technology innovation.

The results ($\beta = .828$; $p < .001$) of the study revealed that the relationship between attitude towards mobile taxi booking apps adoption and intention to adopt mobile taxi booking apps was positively significant (H7). Past researchers in technology adoption studies have investigated the relationship between attitude and behavioral intention and have found significant results (Chen and Tan, 2004; Vijayasathy, 2003). Consistent with these studies, the findings of the study indicated that, taxi drivers' attitude towards mobile taxi booking apps adoption is an important factor for determining their intention to adopt it. Furthermore, the results suggested that when drivers' attitude towards mobile taxi booking apps adoption is positive, their likelihood of using it would be high.

CONCLUSION AND RECOMMENDATION

The result of the research may have implication for taxi drivers, taxi service industry related association, government agencies, and mobile apps service provider for promoting innovation adoption. Therefore, the findings of this study suggested that mobile apps providers companies should emphasize and promote the potential advantages and benefits of mobile taxi booking apps to create a positive perception about them. In addition, the researcher suggested that to develop and improve the mobile taxi booking apps knowledge of drivers, mobile apps service providers need to educate drivers to ensure that they know the advantages and benefits of mobile taxi booking apps. Activities such as live presentations and hosting technology fairs specifically designed for drivers will help mobile apps service providers to identify potential

mobile taxi booking apps adopters, and will give chance to them to make drivers understand positive features of mobile taxi booking apps and limitations as well.

This study has several implications for taxi drivers. First, the empirical findings suggest that drivers must pay significant attention to their ability to adopt the apps before they commit to such action. If the drivers intend to adopt mobile taxi booking apps, they must ensure that they have sufficient capability to do successfully. This study also provide taxi drivers with a better understanding of macro-environment factors specifically on competitors, and their customers and others stakeholders associated with adoption of mobile apps, which will be useful reference for them to adopt mobile taxi booking apps to avoid being left out of their taxi service industry.

Government ministries and related industries association that are responsible for the taxis service industry of the country should focus their effort to encourage the adoption of mobile apps technology. For example, government and association could provide details information related to the technology through subsidised seminars to educate the taxi drivers as well as to improve the Malaysian taxi service industry image and reputation.

In addition to the above practical implications, this study has several theoretical implications. First, this study offers strong empirical evidence for the applicability of institutional theory as a guide to understand taxi drivers' adoption of mobile taxi booking apps and other new technology innovations. Normative, coercive and mimetic pressures from institutional model help to measure the influence on the taxi drivers' adoption intention of mobile taxi booking apps. Second, this study has contributed to IT research by integrating TOE framework and institutional model. This research incorporating technology's relative advantage, complexity, drivers' knowledge, as well as normative, coercive and mimetic pressures into environment context to determine the relationship of these variables with the adoption intention of mobile taxi booking apps.

Finally, further studies need to be carried out knowing that different geographic areas such as Johor and Penang have different perception those in Klang Valley. There may be other factors, which may influence decision to adopt mobile taxi booking apps. Specifically, the announcement of the good and service tax in the Malaysia may have impact on the drivers' decision to adopt the mobile apps.

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