[LOG 9] THE IMPORTANT OF INFORMATION & COMMUNICATIONS TECHNOLOGY IN UBER SERVICES

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ABSTRACT

There is a growing interest and concern towards the concept of sustainable transport due to the low functionality of public transport, unregulated taxi pricing, lack of parking space, insufficient availability of taxies and the growing number of traffic congestion during peak hour in urban and sub-urban area. Uber services appear to be cost effective and a sustainable way to travel for public user especially commuter. The study aimed to explore the relationship between information & communications technology (ICT) and the effectiveness of Uber services. The factor that had been found that influence public ridership is information & communications technology. The application of convenience sampling with the usable data from 408 respondents who at least has the intention to use for future ride has been conducted by using online survey. In this study, there is a significant relationship between monthly salary & occupation with information & communications technology. This study contributed to city planner and local planner in developing or planning in order to have a smart city.

Keywords: *uber services, peer-to-peer ridesharing, effectiveness, sustainable transportation*

INTRODUCTION

Transportation is important in our daily life. It is a non-separable part of any society in order to carry goods and services from one place to another place (Mathew, 2014). Peer-to-peer ridesharing is one of the public transports which the passengers could share the vehicle as well as saving the transportation cost (Fellows and Pitfield, 2000). Uber services is an alternative of public transport that becomes the trend in recent years especially in urban and sub-urban area. Uber began in 2010 by the founder and chief executive officer Travis Kalanick in San Francisco and he initially came out with ridesharing idea is just wanted to find a better way of getting around his home city in San Francisco (Goh, 2014). On January 9, 2014, it was officially launched in Kuala Lumpur with local team driving business.

This type of transportation rely on IT application, it can be based on Android and IOS platform which related to social media. It shows that Uber services is very depended on technology and social media, one of the successful of Uber services is due to the online payment, it is an alternative to solve inefficiency in public transport. Basically, all bookings and transactions are settled via online payment. However, a cash payment system has launch as of April 2016. Based on the research conducted by Ngo (2015),

Uber contend that their service offers several benefits to consumers, including shorter waiting times, lower fares and higher customer satisfaction. It is convenient and easy-to-use app with ability to rate both drivers and passengers. Besides that, Uber is having high demand in certain areas especially during peak hour, for example in Klang Valley. Moreover, Uber provides an opportunity for employment, especially for people who looking for flexible hours and also provide an opportunity to enhance the public transportation system. Finally, Uber is now available in those place that having high population such as Klang Valley, Selangor, Penang and Johor Bahru.

Uber was launched in Malaysia due to the low functionality of public transport, especially taxi, insufficient parking space and traffic congestion during peak hour. The low customer satisfaction of the current services such as negative feedback, regulated meter, refusing the journey when it is too short or too long, charging extra when raining, having smelly cars, and not knowing the route to specific destination. However, Uber services can help to solve these problems by provide a private driver hire services at the push of a button. For instance, there is always happening the insufficient availability of cars or public transport such as bus or train during peak hours. As a result, people would like to choose Uber services as their transportation because their accessible and available. Besides that, the catchment area of Uber services is more flexible. The price rate of Uber services always become an issue that used to compare with taxi services which is generally higher rate due to the taxi driver who did not use the regulated meter. With the integration of technology in the services provided, Uber users can estimate fares by accessing the fare calculator in Uber application before booking the services.

This study will be a significant initiative in contribution of a new logistics service provider especially for passenger ridesharing that focus on information and communications technology (ICT). This study can serve as a systematic framework for revising or creating a new transportation choice for transport users. The results of the user perception survey also can be used in pinpointing aspects of the service that have low ratings, as well as give solutions to the most common problems encountered by users.

PROBLEM STATEMENT

Uber services are global private driver hire services that offers a mobile application that connects passengers with drivers of vehicles for hire and ridesharing services (Goh, 2014). In fact, low functionality of public transport, unregulated taxi pricing, lack of parking space, insufficient availability of car and traffic congestion during peak hour in urban and sub-urban area are those problem that will be faced every day. However, Uber services can help to solve these problems by provide a private driver hire services at the push of a button. For instance, during peak hour, there is always happening the insufficient availability of cars or public transport such as bus or train. So, people would like to choose Uber services as their transportation because it is accessible. Besides that, the catchment area of Uber services is more flexible. Of course, the rate of Uber services always become an issue used compare with taxi services which is generally higher rate due to the taxi driver did not use the regulated meter. With the integration of technology in the services provided, Uber users can estimate fares by accessing the fare calculator in Uber application before booking the services. Therefore, the accessibility and availability of Uber services, affordability, the usage of information and

communications technology (ICT), and safety in using Uber services will the important factors to affect the Uber users.

LITERATURE REVIEW

Effectiveness of uber services
Uber, is an on-demand taxi application via smart mobile and it has been a hot discussion in this few years (Pick & Dreher, 2015). Uber is become widely now and some of the people called it as Uberification services (Boland, 2015). Uber services is an innovation platform in economy system, so called sharing economy (Matus Sloboda, 2016). The innovation is depending on smart phone technology to deal with passengers and drivers which providing an unprecedented market especially in public transport industry (Hall & Krueger, 2015). Uber operates in around 38 countries in the world with only using the smart phone application to run their daily operation (Farrell, 2014). In the global alternative taxi operator, Uber has rising their attractive and interest in the market recently (Salnikov, Lambiotte, Anastasios & Mascolo, 2015). According to Jochen Wirtz and Christopher, it allowed user to use their smartphone through their application to book and share the rides in a private car (Jochen Wirtz & Christopher Tang, 2016). Uber application is a new smartphone application with the purpose of comparing the transportation fare in the city and promote the choices of public transportation to the users and lead to reduce the transportation cost as well (Salnikov, 2015). Uber services is a great deal especially to the economic, it is an economic sense for the society, environment and consumers themselves (Belk, 2014).

In business model, Uber is a very simple and convenient tool which connecting the drivers and passengers with an affordable fare to the user (Rogers, 2015). Uber normally save the cost and time, especially save the time for user waiting too long at the location, rather than conventional taxi which taking long time to calling the driver and waiting, or even standing on the street for hailing a taxi (Rogers, 2015). Uber is a good platform to the driver which provided a part-time job for drivers can work for only few hours to earn some pocket money (Rogers, 2015). There is an opportunity for those who interested and have extra time to do their part-time job, or even full time Uber driver due to their flexibility of working time (Hall & Krueger, 2015). There are five types of Uber services which are UberX, UberXL, UberPOOL, UberPlus, and UberBlack: UberX is the cheapest fare of Uber service with the normal sedan and four passenger seats; UberXL's seats can be up to six passengers due to the car will be a minivan or sport utility vehicle (SUV), but the fare will be higher than UberX; While, UberPOOL is sharing the car with another person and divide the costs according to the number of person who sharing the car; UberPlus is providing a luxury car which can up to four passengers such as Audi, Ferrari, Mercedes, and so on; While, UberBLACK provides a superior and luxury service such as black SUV or black luxury car (Wirtz & Tang, 2016). Uber driver unlike a taxicab, they are using their personal vehicle to pick up their passenger from point to point (Rempel, 2014).

According to Cramer and Krueger (2016), Uber has produce a high productivity in providing the services, and there is not obstacles to go anywhere and pick up their passengers and sending them to the pointed location. For Uber, there are three main conditions which are Uber has category itself as technology company among transportation company, there is no contract for drivers, and there is an open market for

those who interested to be a Uber drivers (Issac, 2014). In Uber network, there are around 30,000 of drivers around the world (Cushing, 2014). There is a clear concept to describe Uber services which defined that Uber is creating a platform to connect the passengers and drivers by using internet, the passenger can read the location of getting the vehicle while the driver pick up the passenger at the exact location by using Global Positioning System (GPS) (Nistal & Regidor, n.d.).

Among the ride sharing companies, Uber is the most successful one and it try to strengthen and conquer the market in transportation field (Taschler, E., n.d.). Uber can provide a service with safe, high quality, and predictable compare with other public transport alternative such as taxi (Mendoza, Ko, & Manipon, 2015). Uber application clearly stated the estimation fare, the available vehicle in the nearest area, information provided about the car and the driver, vehicle tracking which can share with friend for safety purpose, alternative payment with either cash or credit card, and provide an electronic receipt (Mastracci, 2015).

Information and communications technology
The term "Information and Communications Technology (ICT)" is often used in a broad sense to delineate a set of heterogeneous telecommunication and information technologies that allow for electronic communication, data collection and processing in distribution networks (Wang et al., 2015; Black and Geenhuizen, 2006; Giannopoulos, 2004). According to Cohen (2002), ICT currently has been characterised by the dynamic technological changes with rapid adoption and penetration rates; decreasing costs for new equipment and features and rapidly increasing range of applications and penetration in many realms of professional and personal life. The production and services package which depend on the rage of human resources skill qualities and also an intertwined institutional market place as the private sector acting in a decreasingly regulated environment also has been characterised in ICT (Cohen et al., 2002).

ICT has provide the chances for establish the new or more efficient markets especially for transport services. For example, effective shared rides and access to cars or bikes vehicles (Resnick, 2004). The new markets across the local geographies which establish by using ICT have become the secret to these new services for the successfulness (Chan & Shaheen, 2012).

Uber service investigate in this paper is part of the sharing economy nowadays and the ICT have play an important roles in this economy. The sharing economy is an emerging economic-technological phenomenon that is fuelled by developments in information and communications technology (ICT), growing consumer awareness, proliferation of collaborative web communities as well as social commerce or sharing (Hamari et al., 2015; Botsman & Rogers, 2010; Kaplan & Haenlein, 2010; Wang & Zhang, 2012). For instance, a European study proposed an integrated system of ICT to organize a ridesharing service which is part of the sharing economy (Calvo et al., 2004).

According to the United States Department of Transportation, the integration of the ICT includes vehicle-to-vehicle communications, vehicle-to-infrastructure communications, real-time data and information capture and more (US Department of Transportation, 2014). In transit research, the study of Brakewood (2014) has showed that real-time information has given positive impacts on transit ridership. Real-time ridesharing uses Internet-enabled "smartphones" and automated ride matching software

to organize rides in real time. Ridesharing has become far more efficient and widespread with services due to the ability of mobile applications and internet communications to provide real-time information for rides (Siddiqi & Buliung, 2013). This enables participants to organise the time before they take the trip, with passengers picked up and dropped off along the way (Chan et al., 2012). Especially for the busy users who need to manage a hectic schedule, a virtual transportation concierge that can check real-time conditions of the transportation system is important for them to determine the best schedule, travel, and mode choices that used to accomplish the activities in a timely and efficient manner (Miller, 2009).

In the sharing economy which full with ICT, technology and innovation has become the centre of this economy, which focuses on finding ways to accomplish things quickly and easily. Diffusion of innovations theory has been widely used to cite and apply under innovations diffuse throughout the relevant population (Skoglund, 2012). Rogers (1995) has defined this theory as the process by which an innovation is communicated through certain channels over time among the members of a social system. According to the diffusion of innovations theory, the adoption of a successful innovation resembles a bell-shaped curve as the innovation experiences exponential growth before reaching its asymptote (Rogers, 1983). By applying Rogers' (1983) diffusion of innovation theory to Uber services, it can be observed that Uber has experienced a rapid rate of adoption in a relatively short period of time by integrated with the advanced ICT. Through the study by Posen (2015), most of the Uber users use the services because the ICT functions as a social enterprise, in which customers have a personal and social experience that leads to trust. Uber's business model is premised on social interaction, with the focus being on consumers. In addition to the transportation services that Uber provides, it also offers social services. Users can experience the unique consumer "experience" that modernizes the services that traditional taxis offer as it is a technology-driven social experience that users can choose over owning a car (Posen, 2015).

The study of Mokhtarian and Salomon (2001) which determine the phenomena of undirected travel has shown the relationships between transport and telecommunications have drawn much attention over the last two decades. The study of Giannopoulos (2004) also had provided a comprehensive overview of various ICT systems that used in transport which focusing on passenger transport. It show that in term of passenger transport, ICT are the collection of technologies and applications that enable electronic processing, storing and transfer of information to a wide variety of users or clients.

The study of Mondschein (2014) also shown that ICT not only make travel easier, increase the effectiveness of the transport, but also provide users new activity choices, possibly resulting in new travel choices. This technology also provides users with more certainty about arrival times, how to use the system, and provide new opportunities distractions, such as distance working. It also has given rise to networks and cloud services that allow people to access resources only when they need them, connecting people to resources through the simple click of a button (Posen, 2015). As result, users or clients has become more reliant on these technologies for travel and their own ability to independently choice locations and navigate through the built environment atrophies (Middleton, 2011). However, there was an argued from a study by Wang and Law (2007), saying that the direct effect of 'use of ICT' on travel time is insignificant. There

only show positive and highly significant relation in the total and indirect effect of 'use of ICT' on travel time; because it is obvious that if more trips are made, more time will be spent for traveling and this is revealed by the existing literature has shown a positive relation between the duration of activities and travel time (Levinson 1999; Schwanen & Dijst 2002).
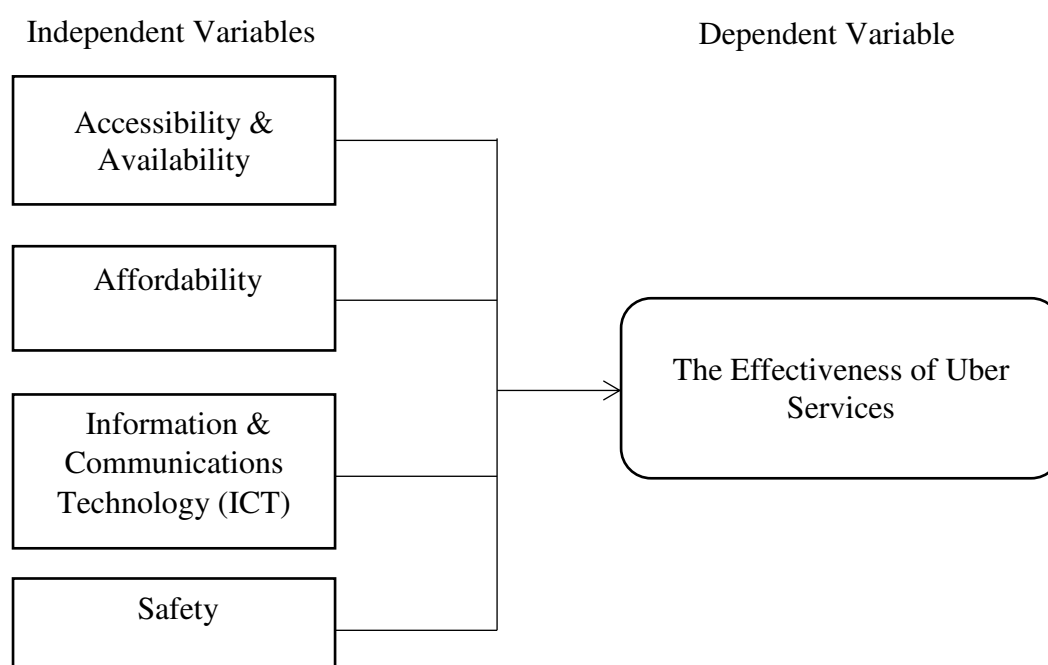
RESEARCH METHODOLOGY

Independent Variables   Dependent Variable

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┌─────────────────────┐
│   Accessibility &   │
│     Availability    │
└─────────────────────┘

┌─────────────────────┐
│     Affordability   │            ╭──────────────────────╮
└─────────────────────┘            │  The Effectiveness of Uber │
                                   │        Services      │
┌─────────────────────┐            ╰──────────────────────╯
│    Information &     │
│   Communications    │
│  Technology (ICT)   │
└─────────────────────┘

┌─────────────────────┐
│       Safety        │
└─────────────────────┘
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Figure 1
Research framework of uber services

Research hypotheses
The hypothesis was developed as below:
H1: There is a significant relationship between ICT and the effectiveness of Uber services.

Research design
Quantitative approach is used to conduct the research. The research is designed as non-experimental which do not involve manipulation of situation, circumstances or experience of respondents. A correlation study is chosen to examine the relationships between the independent variables (information and communications technology (ICT) and dependent variable (effectiveness of Uber services). A non-contrived setting is used in the research where events will normally occur in natural environment. The unit of analysis in the study is individual as the data is collected from individual Uber users. In the research, a cross-sectional study is carried out over a short period or at single point in time.

Sampling and data collection
The sample size chosen for the research is 408 respondents based on Krejcie and Morgan's formula. In the study, non-probability convenient sampling method is

applied. In the study, primary data is collected through survey instrument method which is full structured questionnaire. A set of structured online (web-based) questionnaires were distribute to respondent.

Measurement scale
A set of structured online (web-based) questionnaire with Likert seven-point rating scale was used where anchored at each end only with descriptive labels. This scale is used to indicate the degree of agreement for each criterion, with 1(extremely disagree) as minimum and 7 (extremely agree) as maximum. The construction of questionnaire is adopted and adapted from Department of Statistics, Malaysia and the previous study from Ngo (2015) and Jack (n.d.) which determines the relationship between dependent variable and independent variable in this study.

Data analysis
The reliability test was assessed in the study is to measure the internal consistency. The higher the Cronbach's alpha score, the higher the internal consistency reliability. Pearson correlation is used to measure the strength and direction of linear relationship between independent variable and dependent variable involved in the study. The coefficient of correlation shows the extent to which changes in the value of one variable are correlated to changes in the value of the other (Udovičić, et al., 2007). In the study, simple regression analysis will be used to determine the relationship of between dependent variable and independent variables in the study. Simple regression analysis is used to describe, estimate or predict relationships among a dependent variable with one independent variable.

RESULTS

The result of this study was analyzed by using IBM Package for Social Sciences (SPSS) Version 23 software.

Table 1
Cronbach's alpha score for variables

Variables	Item	Cronbach's Alpha Value
Effectiveness of Uber Services	2	0.902
Information and Communications Technology	4	0.862

According to Sekaran and Bougie (2013), reliability less than 0.6 are considered to be poor, those in 0.7 is acceptable and those over 0.8 are good. In the research, Cronbach's alpha for the two variables score ranges from 0.862 to 0.902 as shown in Table 1. Thus, the reliability between ICTs and the effectiveness of Uber services is met.

Table 2
Correlation between independent and dependent variables

		Effectiveness of Uber Services	ICT
Effectiveness of Uber Services	Pearson Correlation	1	0.914**
	Sig. (2-tailed)	408	0.000
	N		408
Information and Communications Technology (ICT)	Pearson Correlation	0.914**	1
	Sig. (2-tailed)	0.000	
	N	408	408

** Correlation is significant at the 0.01 level (2-tailed).

Based on Table 2, the p-value for information & communications technology is 0.000 at which it is less than α value of 0.01; therefore the researcher conclude that there is a relationship between information & communications technology and effectiveness of Uber services. A positive relationship exist between information & communications technology and effectiveness of Uber services, in which the correlation co-efficient value, r = 0.914. This means that when information & communication technology increases, the effectiveness of Uber services also increases and that the strength of relationship is considered to be strong.

Multiple regression analysis was conducted to test the extent to which the information and communications technology (ICT) influence the effectiveness of Uber services among users. Overall, there is a significant relationship between the independents variables and dependent variable, where F = 2061.330 (Table 4) and p-value = 0.00 ($\alpha < 0.05$). In other word, it can say that the model in general has good predictive capabilities. R-square (R^2) value indicates how much of the dependent variable can be explained by the independent variables. Based on Table 3, it has revealed R^2 is 0.835, which means 83.5% variability of the effectiveness of Uber services among users can be explained by information and communications technology (ICT).

Table 3
Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.914[a]	0.835	0.835	0.18246

a. Predictors: (Constant), Information & Communications Technology Score
b. Dependent Variable: Effectiveness of Uber Services Score

Table 4
ANOVA table

Model		Sum of Squares	df	Mean Square	Sig.
1	Regression	68.628	1	68.628	.000[b]
	Residual	13.517	406	.033	
	Total	82.145	407		

a. Dependent Variable: Effectiveness of Uber Services Score
b. Predictors: (Constant), Information and Communications Technology Score

Table 5

Coefficients table

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std Error	Beta	t	Sig.
1 (Constant)	0.573	0.135		4.252	0.000
Information and Communications Technology Score	0.958	0.021	0.914	45.402	0.000

a. Dependent Variable: Effectiveness of Uber Services Score

Table 5 shows the relationship exists between the independent variables and dependent variable.

H1: There is a significant relationship between ICT and effectiveness of Uber services. In addition, the p-value for information and communications technology (ICT) is 0.000 at which it is less than α value of 0.05. Hence, it can conclude that there is a significant relationship between ICT and effectiveness of Uber services. Therefore, H3 is accepted. The standardized coefficient value of 0.914 means that for 1 unit of changes in the information and communications technology (ICT), the effectiveness of Uber services will changed by 0.914 unit.

DISCUSSION

Our research objective is to explore the relationship between information & communications technology (ICT) and the effectiveness of Uber services. The findings result showed that there is a strong and positive relationship exists between information & communications technology and effectiveness of UBER services. Consistent with existing research from Mondschein (2014) which shown that ICT not only make travel easier, increase the effectiveness of the transport, but also provide users new activity choices, possibly resulting in new travel choices. Interestingly, significant relationship also existed between ICT and effectiveness of UBER services. This is supported by the previous study (Posen, 2015) and (Middleton, 2011). Users have become more reliant on the technologies to access peer-to peer ridesharing resources through the simple click of a button for travel. This meant that changes in the ICT variables would highly influence the effectiveness of Uber services. Thus, the result also indicated that respondents more preferred and willing access to ICT with their mobile devices in order to gain technology-driven social experience in the process of getting transportation services.

Contribution

The study generates useful knowledge on better understanding the key factor that affecting the effectiveness of Uber services among users. The findings of the study provide a clear picture on how the key factor affecting effectiveness of Uber services among users in Malaysia. The study has identified affordability and information & communications technology are the important factors when addressing effectiveness of Uber services. Information & communications technology was clearly contributed the

most to the effectiveness of Uber services. In addition, affordability also will influencing effectiveness of Uber services among users in Malaysia.

Furthermore, the study can significant initiative in contribution of a new logistics service provider especially for passenger ridesharing focus on information and communications technology. This study will be beneficial to Uber user especially future Uber user by offering a valuable information regarding effectiveness of Uber services. Besides that, this study can serve as a systematic framework for revising or creating a new transportation choice for transport users. The results of the user perception survey also can be used in pinpointing aspects of the service that have low ratings, as well as give solutions to the most common problems encountered by users.

Recommendation
Based on the findings of this study, it showed that the key factor that affecting effectiveness of Uber services is information & communications technology (ICT). However, there are small shortcomings of Uber services in term of application which do not allow users to book a cab in advance before their real itinerary. In fact, every demand coming into the system is "pick me up as soon as possible" because the initial idea of Uber services through mobile application platform is to enable users to book a cab in minutes. Therefore, users are not allow to booking a cab in advanced. For consumer that would like to book in advance in order to heading for a meeting or airport, they may have a hard arrival time that need to meet at any time. Thus, it is sometimes inconvenience for them. Furthermore, if Uber allow scheduled pick-ups for their users, it is not only enable Uber services to be operate efficiently, but also create an interesting of consumer facing things. For example, by offer an opt-in to sync with iOS calendar and let people choose at the beginning of the day or week which meetings they would like to book in advance for the trips. On the other hand, for those users who need an airport rides can sync with Triplt. They can even propose pick up times based on expected travel time with a user-adjustable cushion through the traffic data. But need to take note that this feature may have to come with a slight price bump. You may need to pay additional fees for a scheduled ride and basically paying for the additional driver downtime if book in advance.

 Besides that, the finding also showed that affordability is the other variable which can affects the effectiveness of Uber services. Based on the previous study by Victor (2015), stated that Uber services will "surge pricing" during times of high demand in order to provide an incentive for additional drivers available in order to meet customer demand and also increase their profits. However, the frequent surge seem rather extreme. Uber should provide transparency on the algorithm used to set surge pricing by providing a data on number and location of drivers and riders in real time. In other way, Uber can provides an estimate of how much of wait that will give to the riders based on how many higher-paying riders are ahead of them. Then, let the rider bid how much they are willing to pay. This could give the rider a choice to wait for an available car with a predicted waiting time or bide a surge price in order to get the car in shortest time.

Scope and limitation
This study is conducted in Universiti Utara Malaysia during first semester of 2016/2017. Samples will be taken from those who are experience using Uber services. The duration of the study redistricted couple of months, most of the sample of population are students, might or maybe not representing the whole population.

CONCLUSION

The study determined effectiveness of Uber services among users in Malaysia based on several theories. Affordability and information & communications technology (ICT) are significantly affect effectiveness of Uber services. This research project has achieved its purpose to investigate the relationship between independent variables and dependent variable. However, researchers have faced several limitations while conducting the research. Therefore, researchers have suggested some recommendations regarding these limitations. In conclusion, the research can provides insights for future research that related to this topic.

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