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Impact of Technology on Taxi Industry: Determinants on Ridesharing in Kuala Lumpur

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ABSTRACT

The aim of this study is to identify the determinants of ridesharing services adoption in Kuala Lumpur. This study employed descriptive and correlational study of ridesharing services adoption in Kuala Lumpur. Statistical Package for Social Science (SPSS) version 20. Nonresponse Bias, Normality Test, Means and Standard Deviation, Common Method Variance, Missing Value Analysis, Frequency Analysis, Cronbach's Alpha, Hierarchical Multiple Regression Analysis, Spearman's Correlation and Hayes's Mediation PROCESS Analysis were the statistical tools used to produce representative results. The correlation results found attitude, operational characteristics and knowledge have a strong correlation with the intention to adopt ridesharing services.

Keywords: Ridesharing, attitudes, operational characteristic, knowledge, travel modes.

INTRODUCTION

As global trends move towards sharing economy, the competitive landscape for the taxi industry is fast changing. Since the emergence of ridesharing services early in 2014, the landscape of fleet services have rapidly changed whilst the world received its own facelift through the advancement of smartphone technologies, revolutionary internet connection together with dynamic algorithm platform that connects drivers and passengers. The sharing economy enables people to rent their possessions for someone else for a limited time, (Mittendorf 2016;Teubner & Flath, 2019).

The abrupt effects of ridesharing were stimulated by the advent thoughts of Internet-of-Things and autonomous vehicle trends. The innovation aspect of ridesharing has drawn the crowd to join the bandwagon and as a result, most people loved the idea of responsive fleet services and dynamic fares calculation based on demand and supply. Innovation creates hundreds of thousands of "gig economy" jobs and results in new income rivers to flow from the pockets of haves to have-nots. This in turn increases access to resources like education, child care, college education and fill the gaps left despite public transportation in cities like Chicago, New York, New Delhi, San Francisco, Mumbai, Calcutta, London where numerous layers of local public transportation services have been in existence for decades alongside taxicab drivers (Jared Maslin,2019).

Uber and Grab cases reflected the regulatory struggle faced by a new innovative technology business model when seeking to break into the regulated traditional business settings Uber and Grab entered ASEAN with digital technology that allowed their client to use the application on mobile phone or computer to book for transport or other services (Ramiah, Sirait & Smith,2019). It is very unfortunate if the issues arise around the rise of ridesharing services is not taken into great consideration as the services helps filing the gap between the supply of private transport fleet and the demand for efficient and reliable services from customers (Keong, 2015). Nevertheless, ridesharing services were criticized for restructuring the nature of employment and circumvent regulations to maximize company benefits. Uber, for example, hires drivers as "independent contractors" as opposed to "employees", so their basic rights as workers are not guaranteed (Li, Hong, & Zhang,2016).

The challenges faced by the governments include the need to regulate ridesharing operators and levelling the playing field with the taxi industry, while not inhibiting the innovations of this business given its recognized benefits. These benefits include introduce higher service standards and promote competition in the local taxi industry, ability to improve public transport connectivity and innovate expeditiously according to market's needs and encourage productivity amongst ridesharing drivers given additional employment opportunity. Many studies have investigated ridesharing from many perspectives. Past researches showed tendency to focus on the provisions of ridesharing services. This is proven through studies of a distributed Model-Free Algorithm for Multi-hop Ride-sharing Deep Reinforcement Learning, Sign,A,Alabbasi,A, Aggarwal,V. (2019), algorithm matching and path calculation (Agatz, Erera, Savelsbergh, and Wang (2010), Teubner and Flath (2015) and Stiglic, Agatz,Savelsbergh, and Gradisar (2015); safety aspects of ridesharing services (Brereton,Roe, Foth, Bunker, and Buys (2009), J. Davis (2015); and formulating a matching platform for ride request (Bicocchi & Mamei, 2014).

Meanwhile, Malaysian studies focus on the provision of taxi services as most researches focuses on Psychometric model for E- Hailing (Khalil Omar,Azimah, Hairianie & Zaimy, (2019), drivers' intention to adopt mobile apps (Keong (2015), review on Malaysian taxi scenario (Amirul and Hands (2016), taxi drivers attitude towards passengers (Kholid, Abdullah, Ramly, and Mohamad (2016), job characteristics of taxi drivers (Husain, Mohamad, and Idris (2014) and service quality of taxi services (Zakaria, Hj Husin, Abdul Batau, and Zakaria (2010). In other words, literature on ridesharing is still in its infancy. It is important to understand the determinants of users' adoption for ridesharing as this data will help the process of policy planning and decision making.

In Malaysia, ridesharing services were launched in 2012 for Grab and 2014 for Uber. Uber started operating in city center with high urban populations rates such as Kuala Lumpur and Penang while Grab gained their kick-off through their formerly known identity as MyTeksi. To date, the average number of trips recorded for Grab and Uber usage was between 300,000 and 350,000 monthly (PricewaterhouseCoopers, 2016). The uprising of ridesharing services in Malaysia has been dubbed as solution of the long-overdue problem which is the first and last mile connectivity for passengers of other

modes of public transport. PricewaterhouseCoopers (2016) found 59% of ridesharing users had never hailed a taxi before this and 52% of taxi users use ridesharing application to get taxi. In a positive way, ridesharing is viewed as a positive push for a change in the country's fleet services.

The presence of ridesharing services was accused of causing market disruption and promoting the deregulation of Malaysian's taxi industry (Lim, 2015). Ridesharing operators and drivers received threats for providing illegal passengers pick-up and drop-off in its territory and using private drivers and vehicle. In 2016, five hundred irritated taxi drivers in Kuala Lumpur took the streets to protest against Uber and Grab, effectively shutting down major parts of the city (Lee, 2016). The objections also include safety concerns where these services do not include insurance coverage and public vehicle permit, consequently strengthen the arguments on banning ridesharing services instead (Aaron, 2015).

In an attempt to understand general perception towards taxi industry as well ridesharing services, the government through Land Public Transport Commission (S.P.A.D) conducted "Customer Satisfaction Survey" in 2015. Suruhanjaya Pengangkutan Awam Darat (2015b) found that more than eighty percent of forty-six thousand respondents have the experience of using ridesharing services like Uber and Grab. It was found that the motivation for users to switch for ridesharing services are mainly contributed by the factor of reliability and affordability. However, the findings only mention these factors without in-depth discussion to properly understand the trend.

Therefore, this study seeks to study about comprehending the nature of ridesharing, the factors influencing customers' decision to adopt ridesharing services and understanding ridesharing services in Kuala Lumpur.

LITERATURE REVIEW

Since the year of 1975, the empirical efforts on understanding the adoption rate of technology have been heavily discussed. The literatures on technology innovation of organizations suggest most research are based on the following models; Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Acceptance Model (F. D. Davis, 1989), Theory of Planned Behavior (Ajzen, 1991), Diffusion of Innovation Theory (Rogers, 1995), Task Technology Fit Theory (Goodhue & Thompson, 1995) and Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, & Davis, 2003). Hence, this study adopted elements taken from these models to help explaining the motives behind adoption of new technology; in this case the adoption of ridesharing services. The elements adopted represent the indicators that help framed the right constructs for adoption decision.

The theoretical foundation of this research is based on prior literature on behavioral theories and technology innovation studies, elements were taken out and adopted from six prominent theories as applicable frames of reference. These theories include Theory of Reasoned Action (Fishbein & Ajzen, 1975), Theory of Acceptance Model (F. D. Davis, 1989), Theory of Planned Behavior (Ajzen, 1985), Diffusion of Innovations Theory (Rogers, 1995), Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003) and Task Technology Fit Theory (Goodhue & Thompson, 1995).

The first theory that is going to be discussed is Theory of Reasoned Action (TRA). TRA by Fishbein and Ajzen (1975) was used as basis to forecast where and how to target consumers' behavioral change attempts. Somehow, it has obvious limitation of being able to predict intention to use specific product or services but not actual outcome. Apart from that, choices are made by ignoring alternative and competition and basically based on individual preferences. This gap has been identified and hence, the second theory will be examined in order to address this limitation.

The limitations addressed in TRA resulted Ajzen (1985) to came out with a theory examining relationship between intentions and actions; the ways in which goals and plans guide behavior, and factors that induce people to change their intention or prevent successful execution of the behavior. The theory, known as Theory of Planned Behavior (TPB) stands on belief which most human behavior is goal-directed. TPB has been widely discussed in researches across the globe and mutually used in many areas of study, widely known as an inspiration to the next theory that will be discussed.

The third model is the Theory of Acceptance Model (TAM). It was formulated with goal in mind to develop and test a theoretical model of the effect of system characteristics on user acceptance of computer-based information systems. TAM measures user motivation to use the alternative systems for information technology. F. D. Davis (1989) emphasized the important elements in TAM is total exposure time using the new system as it will influence user confidence.

The operational characteristics of ridesharing services include the following. Ridesharing services process starts with the development of algorithm to optimally matching request from driver and passenger in real-time (Agatz et al., 2010). Agatz et al. addresses the characteristics that drawn public interest towards ridesharing services is due to short-time responsive rate, flexibility over rigid schedule and accessible services. In summary, operational characteristics were found to be associated with elements such as reliability, safety, accessibilities and responsiveness (Mallat et al., 2008).

Reliability according to Agatz et al. (2010) is the ability of ridesharing platform to make a complete round trip, it is important for user to experience being in control and confident in planning their journey. In a dynamic ridesharing system with sufficient amount of capacity, rider should be able to arrange trips separately shortly before departure. In other words, reliability is a guarantee for riders that they will be able to find a ride back. The earliest effort in understanding the adoption decision of Ridesharing Services in South East Asia was conducted by Ackaradejruangsri (2015). The study listed reliability as one of the influential factors that influenced users in Philippines to adopt ridesharing services.

With regards to safety concerns, ridesharing services is found yet to have any clear explanation of insurance coverage for drivers and riders (J. Davis, 2015). Officials in California has taken a step forward to order ridesharing operators to remove the vaguely imposed insurance policies coverage and come out with new policy that protect drivers; whether before using the apps or while having passengers as well as for customers who ride the services. This is an attempt to prevent unfairly business practices

amongst ridesharing operators. Ridesharing safety standards has raised few questions amongst public after cases of the drivers were accused of abduction and sexual attacks of female passengers in India and the United States (The News Straits Times, 2015), (Kauzlarich, 2016). The case in New Delhi saw Uber failed to conduct background checks on driver which resulted a female passenger was raped when commuting with Uber.

In the same way, accessibilities have become one of the factors ridesharing hitting big in the public transportation sector. It is defined as an equal successful matching rate of riders' requests towards drivers' fleet supply, which resulted in high rate of satisfied users (Stiglic et al., 2015). A positive experience can be expected to continuous usage and promote the services to others. This can be seen through Ackaradejruangsri (2015), accessibilities was found to be significant towards the factors influencing ridesharing adoption in Philippines. Empirical investigation in the context on adoption of wireless internet services on mobile technology found significant relationship between perceived usefulness and adoption intention (Lu et al., 2005). The same study found the significance in relationship between ease of use and adoption intention. However, no significance was found in social influence towards adoption intention of the new innovation. Thus, usefulness and ease of use is believed to have significant influence in the context of this study.

METHODOLOGY

This research employed quantitative research, often associated with numerical data and accuracy (Chua, 2012). This technique was chosen for the purpose of testing hypotheses and to understand the relationship between identified variables. Quantitative approach is also deemed appropriate for this study because it allows consideration on the relationship from either a causal or a correlation perspective.

Correlational approach was employed to fulfill interest in delineating the important variables associated with the problem and to identify the important factors associated with the problem (Sekaran & Bougie, 2009). In the contextual understanding of this study, correlational approach plays a role to help in describing the most influential factors of ridesharing services adoption and the motivation behind decision to comply for residents in Kuala Lumpur.

The target population for this study involves ridesharing users in Kuala Lumpur, who utilized the services around the city center for the period between January until March 2016. Decision on population of the study was based on the fact the adoption of new innovation significantly occurred mostly in areas contains high urbanization areas (Ramaiah, 2015), (Indati & Bekhet, 2014). Furthermore, ridesharing was found to flourish in countries with a large population living in urban areas (Lee, 2016).

The travel demand was found to have tremendous demands in urban areas compared to rural areas. There were 30,000 ridesharing users commute on monthly basis (Suruhanjaya Pengangkutan Awam Darat, 2015a). Hence, consumers in the city center were picked out as potential respondents that fit all the requirements for the right population for this study. The research focuses on getting feedbacks from customer to generate forecast on user acceptance for ridesharing services in urban transportation. Ridesharing users in Kuala Lumpur have been selected and

target respondents consist of people from age group of 18 years until 55 years old. The reason was because according to Land Public Transport Commission (2014), Kuala Lumpur is a city center where almost commuters for urban transportation occur. Respondents from outside Kuala Lumpur have been taken out to keep the original idea of capturing Kuala Lumpur respondents.

The significant of the age group chosen was based on replication from New York Taxi survey done in 2013 (New York Taxi & Limousine Commission, 2015) which saw 80% of ridesharing users came from below the age of 55 years and above. This has sparked an interest for this research to find out whether Malaysia will paint the same result as the survey done in New York.

Malaysia has the fourth-largest amount of build-up land in East Asia as of 2010 (The World Bank Group, 2015). Its urban land grew from 3,900 square kilometers to 4,600 between 2000 and 2010 with an average annual growth rate of 1.5 percent. The same report figured as of 2010, the Kuala Lumpur urban area was the eighth largest in the region, larger than some megacity urban areas like Jakarta, Manila, and Seoul despite its smaller population (Dewan Bandaraya Kuala Lumpur, 2016). Hence, this study focuses on the developing urban areas and Kuala Lumpur practically suitable for this purpose.

Sampling process includes selecting sufficient amount of the right elements from the population in order to understand the subjects' properties and characteristics. This study used the non-probability sampling where elements in the population do not have any probabilities attached to be chosen as sample subjects (Cooper & Schindler, 2011). Purposive sampling (Judgmental Sampling) was employed for this study as the sampling here was confined by specific types of people who can provide the desired information, either they are the only ones who have it, or conform to some criteria set by the researcher (Sekaran & Bougie, 2009).

The following are the statistical Analysis applied. Data obtained from these methods were collected and processed for statistical analysis using Statistical Package for Social Science (SPSS) version 20. Nonresponse Bias, Normality Test, Means and Standard Deviation, Common Method Variance, Missing Value Analysis, Frequency Analysis, Cronbach's Alpha, Hierarchical Multiple Regression Analysis, Spearman's Correlation and Hayes's Mediation PROCESS Analysis were the statistical tools used to produce representative results.

In order to investigate the objectives, employment of descriptive analysis was utilized to extract the right information. Frequency analysis means and one-way between group analysis of variance were statistical tools used to answer the main objectives. Descriptive analysis provides a good idea of how the participants in the study have reacted to the items in the questionnaire (Sekaran & Bougie, 2009). Frequencies refer to the number of times various subcategories of a certain phenomenon occur, from which the percentage and the cumulative percentage of their occurrence can be easily calculated. For instance, to investigate the main determinants of ridesharing adoption, frequency analysis and mean were utilized to assess to the information. Statistical analysis for second main objective involved one-way between group analysis of variance. The aim for this objective is to explain the variations that occurs in between respondents and to

obtain in-details information regarding variations across sample of this study.

The third main objective utilized the means and frequency analysis. To find out the current adoption of ridesharing services in Kuala Lumpur, two components from the questionnaire were set up. With this intention in mind, questions on frequency of usage and main purpose of traveling will be analyzed using frequency analysis and means.

CONCEPTUAL FRAMEWORK

Based on the theoretical explanation in section 2.0, a hybrid model was formed based on the six theoretical framework explored. The emphasis of this hybrid model is explaining the determinants on perceptions, adoption intention and actual adoption. This combined framework represents a novel approach to understand consumers' adoption of mobile technology. The early assumption is that all independent variables as well as mediating variable are both important determinants of ridesharing adoption.

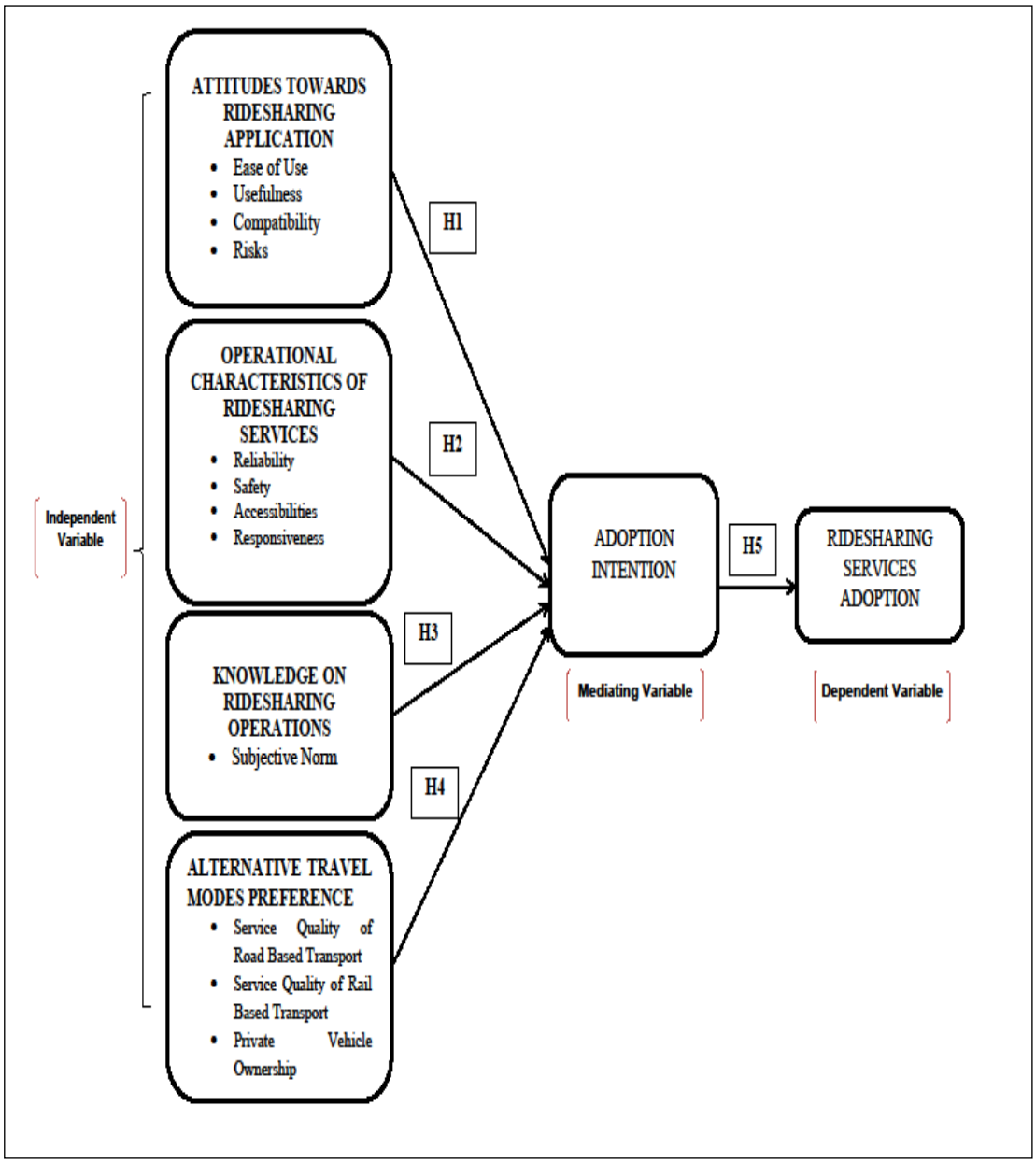

Figure 4.1: Conceptual Framework

DEVELOPMENT OF HYPOTHESES

Based on the literature review done, five assumptions were formed as the basis of this research. Thus, five hypotheses were formulated based on the conceptual framework to be achieved in this study. The hypotheses are as follows:

H1: Attitude towards ridesharing applications is likely to influence adoption intention.

H2: Positive perception on the operational characteristics of ridesharing services is likely to influence adoption intention.

H3: Good knowledge on ridesharing operations is likely to influence adoption intention.

H4: Negative preference towards alternative travel modes is likely to influence adoption intention.

H5: Strong intention to adopt is likely to influence services adoption.

RESULTS: DEMOGRAPHIC ANALYSIS

The demographic profile of respondents for this study was dominated by female respondents with 243 participants (58.6%) and respondents with age range 26 to 35 years scored highest with 228 respondents (54.9%). Similar study conducted by Land Public Transport Commission (Suruhanjaya Pengangkutan Awam Darat, 2015a) also found that 63% of respondents were dominate by female respondents and 39% were those aged 20-29 years old.

Private sector workers topped the employment type with 170 respondents (41%) with highest contribution of education level for this study was University Graduate with majority of 404 participants (97.3%).

Respondents with earnings range from RM2500 – RM3999 came on top of the list with 105 respondents (25.3%) and most respondent lives in Shah Alam with 149 respondents (35.9%). In the survey of customer satisfaction towards public transportation in Malaysia showed Shah Alam was the highest participation with 31% and they also found the highest monthly income was RM3000 – RM5000 (Suruhanjaya Pengangkutan Awam Darat, 2015a).

Based on the feedback, it can be described that the adoption pattern aspects showed most people adopted ridesharing services for work purposes with 193 respondents (46.5%). Apart from that, most of them owned a car with 319 respondents (76.9%). The pattern also can be seen through ridesharing services adoption with almost 212 respondents (51.1%) used the services at least one or twice for the last two weeks.

DESCRIPTIVE ANALYSIS

The summary of Normality Tests shows the significance level is not greater than .05. Based on the Kolmogorov-Smirnov and the Shapiro-Wilk test, data is normally distributed if the tests are insignificant (p> .05). Thus, based on the result suggesting data is not normally distributed (Chua, 2013). However, this result is acceptable since it is quite common outcome for larger sample (Pallant, 2007).

The means and standard deviations for each variable in this study include the Independent Variables that has the highest mean value is Alternative Travel Mode Preferences (M=75.33, SD=21.894). Mediating variable showed mean value of (M=12.07, SD=2.821) and Dependent variable value of mean is (M=2.05, SD=0.791).

The assessment of missing value and measurement model was done in order to inspect data file for missing data patterns as well as avoiding error in running data analysis (Pallant, 2007). Common Method Variance, Missing Value Analysis and Assessment of Measurement Model were carried out to fulfill this objective.

This study had a single data collection method, relying solely on the online survey data. It led to few potential method biases such as *Common rater effects* where any artifactual covariance between the predictor and criterion variable produced by the fact that the respondent providing the measure of these variables is the same (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

In order to recognize the missing value, Missing Value Analysis procedure was used for this purpose (Tabachnick et al., 2001). This method was employed to check the

missing data pattern and the pattern showed that the values were scattered and randomly missing.

Assessment of Measurement Model was conducted to ensure that the measures used for this study is reasonably good (Sekaran & Bougie, 2009). In order to determine suitability of items to be factor analyzed, few statistical values are observed. This is achieved by looking into the values of Measure of Sampling Adequacy (MSA), Kaiser-Meyer-Olkin (KMO) and the Bartlett's test of Sphericity (Pallant, 2007). The MSA value for the individual items was set to be above .50 and the KMO (overall items) value to be above .60.

The Bartlett's test of Sphericity is observed to detect the presence of significant correlations among variables. It is appropriate to proceed with factor analysis if the value of the test is large and significant ($p < .05$) (Hair et al., 2006). Anti-image is to see the correlation and must be > .05 while communalities extraction must be > .05, otherwise; item is deleted.

Table 6.1.1:
KMO and Bartlett's Test

KMO	0.918
Bartlett's test	.000

$p < 0.05$

The overall KMO for perceptions of ridesharing services was 0.918 and significance for Bartlett's test was $p < 0.05$, as shown in the table both indicating that the data for the items on perception towards ridesharing services were suited for factor analysis.

FREQUENCY ANALYSIS FOR MAIN DETERMINANTS

Frequency analysis was carried out to get the insight input on every item based on questions from the online survey. Each question listed contains every response for every scale from 1 (Strongly disagree) to 5 (Strongly agree). Each variable was put under code name to simplify the process. The result based on frequency analysis was carried out for the first independent variable, Attitude towards Ridesharing Services. Overall respondents showed tendency towards positive attitude towards ridesharing services to each of the questions answered are mostly agree and strongly agree. The frequency analysis for second independent variable, Operational Characteristics of Ridesharing Services. A total of twelve questions were asked based on contextual dimension of the variable such as Reliability, Safety, Accessibilities and Responsiveness. On the other hand is the frequency analysis for the third independent variable, Knowledge on Ridesharing Services. Four questions were included that represent the dimension of social norms.

The result from the analysis for third independent variable showed the same tendency as the first two independent variables, majority of responses favored positive attitude towards ridesharing services. Most of the respondents chose agree and strongly agree. The analysis of frequency for the last independent variable, Alternative Travel Mode Preference. The dimensions included in this variable were service quality for road based and rail-based transport as well as private vehicle ownership.

The overall result for the last independent variable showed mixed feedback with road-based transport and rail-based transport recorded lower favorability compared to private car ownership. It

represents the frequency analysis result for mediating variable, Ridesharing Adoption Intention. Four questions were asked in regards of the time of adoption, future intention and the intention to use the services.

In summary, the analysis found respondents were mixed between the degree of neutral and agreement. Even the result shows mixed feedback, preference towards agree and strongly agree still dominated.

Lastly, the result for the dependent variable, Ridesharing Services Adoption. This variable only contained one question, provides inquiry about the adoption for using ridesharing services. This question only has four options to answer. Based on the results, most of respondents showed tendency of using ridesharing services for at least one or two times in the last two weeks.

The descriptive analysis of main variables according the research objectives and research questions. Examination on the frequency analysis found patterns in perception of ridesharing services. Based on the frequency table on current attitudes towards ridesharing applications, each item was found to be lenient towards statement of agreement. Ease of using, usefulness and perceived risk using mobile applications were found to be favorable towards the degree of agree and strongly agree. The highest mean among these items were Usefulness. Respondents agreed that it is easier to book a ride with ridesharing apps, mainly because the apps offered job-related productivity, performance enhancement and effectiveness.

The result showed that 44.3% of respondents agreed it is easier to book a ride with ridesharing apps. This outcome is relevant with Alharbi and Hashim (2009) which discusses the best way to provide passenger with ridesharing is via mobile phone service. Similarly, Mallat et al. (2008) supported that usefulness is major determinant of consumer adoption decision. With the convenience ridesharing application provides, customers may now perform their fleet request transaction at the place and time of their choice.

However, it was found that the lowest mean recorded by Perceived Risk. Respondents' attitude towards perceived risk showed fewer leniencies towards statements of agreement. Respondents were found to be neutral in discussing the risk of technical problem while doing ridesharing request.

Overall perception towards operational characteristics of ridesharing services were found to have tendency towards agree and strongly agree. The highest mean was found in Accessibilities, respondents agreed with the fact that ridesharing services helped reducing queuing time to get a ride. This is a clear example of how accessibility affects perception towards ridesharing, by seamlessly integrated technology into use environments and into people's everyday lives.

Accessibilities scored the highest mean (M = 4.31) for operational characteristics for ridesharing services. 48.9% respondents strongly agreed that using ridesharing services reduces queuing time to get a ride. Similar study by Rayle et al. (2014) also found accessibility helped ridesharing to be more appealing compared to traditional taxis. On the other hand, safety aspects were found to have less association with the agreement of good perception on ridesharing services. Almost majority of respondents felt neutral in discussing their

feelings of assurance while using ridesharing services

Analysis of knowledge on ridesharing services found the most favorable item was the aspect of trendy. Respondents mostly agreed with the statement using ridesharing services are something trendy nowadays.

Similarly, knowledge on ridesharing services showed strong tendency towards others perception towards users with highest mean (M = 4.04) scored by those who think using ridesharing services is something trendy nowadays. This result confirm the association between knowledge and adoption as reported in Keong (2015) where knowledge was found to have significant relationship towards attitude to adopt mobile taxi booking apps. This trend supports the assumption of knowledge is affected by perceived pressures from social network to make behavioral decision or otherwise. In terms of gaining respect by using ridesharing services, respondents were found to be neutral as it did not contribute to the favorability of ridesharing services

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Based on the result, respondents' preference towards other transport mode found to have tendency towards private car ownership. The highest mean among feedback was the statement of driving is always a flexible alternative to ridesharing.

On the contrary, Rayle et al. (2014) found ridesharing have allowed some people to drive less frequently. It was also worth mentioning that ridesharing was found to serve many residents who do not own a car. These characteristics proved that ridesharing users in Kuala Lumpur perceived the services as compatible with their lifestyle, easy access for a ride at any time and any place, fresh and trendy.

On the other hand, respondents were found to be highly associated with their own car compared to public transportation and instead of comfortably driving on their own, they were found to be favor towards using private chauffeur services like Uber and Grab. To make a decision for alternative available, comparison of the advantages in the case of success with the disadvantage in the event of failure were made. The current preference towards alternative modes found fewer tendencies towards Road Based Transport as most respondents gave strong disagreement perception.

This section discusses mainly on the second main research question; "What is the current state of attitude towards Ridesharing Adoption?". It was determined through the test of differences in perception among variables towards socio-demographic profiles. Each variable, independent, mediating and dependent variables analyzed using one-way between groups analysis of variance. It showed the differences in state of attitude towards ridesharing adoption based on socio-demographic profile. It was found that there were significance differences occurred in age, income level and main purpose of traveling.

The largest significance differences in attitude towards ridesharing applications are shown highest tendency by respondents who earn RM4000-RM6999 per month and using ridesharing services for leisure purposes. Apart from that, positive attitude towards ridesharing applications contributed from those who are in age range of 36-45 years old. In this situation, the decision to have tendency for positive attitude towards the services is due to the fact that respondents who are middle aged and work for a living with

comfortable pay love the aspect of being able to have a ride for leisure purposes.

The only significance difference in between respondents for operational characteristics of ridesharing services occurred in education level which respondents who obtain SPM showed positive tendency towards ridesharing services. This situation might be contributed by the fact that these groups of respondents believe ridesharing services helps in reducing waiting time, provide safety rides, offers convenience and secure a ride at any time. The test of differences for knowledge on ridesharing services by all socio-demographics of the respondents. The result revealed there are significance differences occurred in employment type, income level and main purpose of traveling.

Notably, the largest significance differences for knowledge on ridesharing services happens in main purpose of traveling where the main contributor was those who use ridesharing services for shopping purposes. Besides that, the positive attitude towards knowledge of ridesharing services came mostly from those who work in government sector and earn about RM4000-RM6999. In this situation, conclusion can be made that respondents who showed positive tendency to believe in others perception mainly because these people came from stable background and live comfortably and travel using ridesharing services for shopping trips. summarized the test of differences for alternative travel modes preferences by all socio-demographics of the respondents. The result revealed there is significance differences occurred in age, employment type and income level.

The result supported the fact that variations across sample happened for alternative travel modes preferences. Respondents who are in the age group of 19-25 years old preferred other transport modes other than private vehicle. Apart from that, respondents who have tendency towards other transport modes work in private business sector and earn RM4000-RM6999 per monthly. Conclusion can be made that younger generation loves having various options for traveling, people who work has or work in private business sector enjoy having options for transportation and higher income groups appreciate various options of transport modes.

The test of differences for adoption intention by all socio demographics of the respondents. The results revealed there are significance differences for Education Level, Income Level and Residency Area.

Variations across samples were found in education level and income level with both significantly different in ridesharing adoption intention. Respondents who earn remarkable amount of monthly income are more likely to have strong intention to adopt ridesharing services compared to other group of income level. Apart from that, respondents who have education qualification of SPM are most likely to have intention to adopt ridesharing services. In conclusion, ridesharing adopters contributed by people who are regular and earned comfortably amount of monthly income.

The test of differences for Ridesharing Services Adoption by all socio demographics of the respondents. The results revealed that there is only one significance difference for education level. The result supported the fact that variations across sample occurred in Ridesharing Services Adoption for respondents who are SPM holders.

Conclusion can be made that adopters of this new innovation in transportation are people with regular education background.

To sum this second main objective discussion, the descriptive statistics and tests of differences on the perception towards ridesharing services revealed variations across sample occurred in every variable in the study. Income level and education level are the dominant socio-demographic characteristics across variables.

INFERENTIAL STATISTICS AND SIGNIFICANCE TEST

This section provides discussion on research objectives to discover relationship between independent, mediating and dependent variables using correlation analysis, hierarchical multiple regression and mediation analysis.

The Impact of Attitude, Operational Characteristics, Knowledge and Preference on Ridesharing Intention.

Table 6.3.1:
Pearson's Correlation Analysis

No		1	2	3	4	5	6
1	Attitudes towards Ridesharing Application		.788**	.744**	.060	.654**	.314**
2	Operational Characteristics of Ridesharing Services			.735**	.060	.715**	.306**
3	Knowledge on Ridesharing Services				.070	.674**	.251**
4	Alternative Travel Mode Preferences					.141**	-.130**
5	Ridesharing Adoption Intention						279**
6	Ridesharing Services Adoption						

**. Correlation is significant at the 0.05 level (2-tailed).

The inter-correlation analysis results show a strong and positive correlation between attitude and adoption intention (r = .65), characteristics and adoption intention (r = .71 and knowledge and adoption intention (r=.67). The correlation is weak between preference and knowledge (r = .07) and preference and adoption intention (r = .14). Correlation for attitude, operational characteristics, knowledge and preference are significant at p < .05. The test results Table 6.3.2:

proved ridesharing users in Kuala Lumpur who adapt the services have positive attitude towards the apps, positive perception on operational characteristics, obtain good knowledge on the services and have negative experience with alternative travel modes.

Based on the results, the discussion on research hypotheses is summarized as follows:

Hypothesis Testing Result

Items	Hypotheses	Beta coefficient	p-value	Result
$H1^{o}$	Attitude towards ridesharing applications is not likely to influence ridesharing adoption intention.	.654	.000	Rejected ($p < 0.05$)
$H2^{0}$	Positive perception on the operational characteristics of ridesharing services is not likely to influence ridesharing adoption intention.	.715	.000	Rejected ($p < 0.05$)
$H3^{0}$	Good knowledge on ridesharing operations is not likely to influence ridesharing adoption intention.	.674	.000	Rejected ($p < 0.05$)
$H4^{0}$	Negative preference towards alternative travel modes is not likely to influence ridesharing adoption intention.	.141	.004	Rejected ($p < 0.05$)

The Impact of Adoption Intention on Ridesharing Services Adoption.

The inter-correlation analysis results show a positive but weak correlation between adoption intention and ridesharing adoption ($r = .28$). The correlation is significant at $p < .05$. Based on the results, the discussion on research hypotheses is summarized as follows:

Table 6.3.3
Hypothesis Testing Result

Items	Hypotheses	Beta coefficient	p-value	Result
$H5^{0}$	Strong intention to adopt is not likely to influence ridesharing services adoption.	.279	.000	Rejected ($p < 0.05$)

Based on the correlation analysis, the most prominent relationship for adoption intention was contributed by operational characteristics of ridesharing services. Reliability, safety, accessibility and responsiveness were the factors effecting the change in adoption intention. Operational characteristics have a strong and positive correlation towards adoption intention. The beta coefficient value is .715 and the value can be classified as strong (Chua, 2013) . Second hypothesis was accepted as the p-value was significant.
Accordingly, attitude towards ridesharing applications was also found to have strong and positive correlation with adoption intention. It was found the Beta coefficient value was .654 and according to Chua (2013), the value can be classified as strong correlation. The feeling of easy to navigate, useful and perceived risk were found to be significant and provide consumer with the user friendly application interface. Therefore, first hypothesis was accepted as the p-value was significant.

Knowledge, on the other hand was found similarly to have strong and positive correlation towards adoption intention. The value for beta coefficient is .674 and it

can be classified as strong (Chua, 2013). Third hypothesis was accepted as the p-value was significant. Similarly, Mallat et al. (2008) found that social influence was significant towards adoption decision. Social influence is derived from other people's recommendation and perception of approve behavioral patterns.

Meanwhile, Preference have a positive correlation, but the value of beta coefficient is .104 and considered as weak correlation (Chua, 2013). This finding was similar to Rayle et al. (2014) where 92% of their respondents stated they would still would have made the trip without ridesharing. In contrast, availability of other alternative was found to be significant towards adoption decision (Mallat et al., 2008). Fourth hypothesis was accepted, p-value was significant ($p < 0.05$). Therefore, adoption intention was found to possess positive, but weak correlation with ridesharing services adoption. Fifth hypothesis was accepted as the p-value was significant.

DISCUSSION

In the effort to investigate the first research objectives, examination on the main determinants of ridesharing adoption discovered accessibilities to be very indicative in terms of being factors influencing respondents' decision to adopt ridesharing services. 87.2% of total respondents believed using ridesharing services reduce queuing time to get a ride. This has significantly proven the fact that with the advancement of technology and availability of smartphones have enhanced the way people hail a taxi ride. Traditionally, a person needs to hail a taxi either from a taxi stand or on the side of the street. This act needs a lot of effort and time, meanwhile people nowadays have evolved to be very aware of total time spend and effort needs to be given. Ridesharing services indirectly changed the traditional ways of hailing a ride by enhancing the experience with seamless connectivity and timely services. The aspect of accessibility in the context of the study can be translated as seamless connectivity, efficient vehicle management.

Ridesharing users were also found to have tendency towards the aspect of usefulness. Usefulness was the most favorable aspect of operational characteristics of ridesharing services across respondents and 85.3% of them believed in the statement of it is easier to book a ride with ridesharing apps. The result indicated that respondents believed by using ridesharing services, it could guarantee the aspect of job-related productivity, performance and effectiveness. In the era of fast-paced generation, people generally want to have easy access to transport services where they can minimize waiting time, being able to get reliable ride with affordable rates. These requirements fortunately being used as an advantage by ridesharing operators and they came out with services that can guarantee these aspects.

Subsequently, the result shows that most respondents believe the knowledge about ridesharing services have an impact towards their decision to adopt. They believe ridesharing services promotes the image as trendy and hip represent their perception of current trends. Accumulating with 78.4% of positive feedback, respondents who are mostly came from Generation Y significantly verify that social norm or word of mouth have an impact towards the decision to adopt new technology. In the age of technological driven and the rise of social media leads the way of a community that influence by the word of mouth and perception of

others. Thus, this has contributed to the successful appeal of ridesharing services among younger generations.

In contrast, the result shows in case of preference towards other modes of transportation found respondents preferred private cars compared to public transportation such as bus or trains. This comparison was made based on the advantages in the case of success with the disadvantage in the event of failure in public transportation modes. Besides ridesharing services, 82.4% of respondents preferred to use their own car to travel to achieve their demands compared to using bus or train. These results contributed by the fact that respondents did not agree with the statements of frequency, travel time, punctuality, comfortableness, security and safety of buses and trains offered in Kuala Lumpur.

Given these points, the main determinants of ridesharing services in Kuala Lumpur includes the factor of accessibility among users, the aspect of usefulness of the application, the social appearance of trendy as well as the preference of having a personalized ride with affordable rates. As a conclusion, ridesharing services in Kuala Lumpur was found to be adopted by community at large driven by these factors.

Here the focus is on detailing on the breakdown of the relationship between variable through correlation analysis, hierarchical regression and mediation analysis. The investigation on the influential factors of ridesharing services adoption in Kuala Lumpur was built based on the hypotheses formed to test relationship between these variables.

The correlation test found attitude, operational characteristics and knowledge have a strong correlation with the intention to actually adopt ridesharing services. This is mainly because of the appealing factors such as usefulness and accessibilities. These two factors appear to be very helpful in simplifying the process of getting a ride compared to conventional taxis. Imagine having a full control to get a ride at any time, any place with a simple touch of a button on your smartphone. This aspect of practicality really helps in the process of decision making as any kind of simplification of the process will be a deciding factor. On the other hand, both preference and adoption intention have weak correlation towards ridesharing adoption decision. This is driven by the fact that the availability of other transport modes does not have significant impact towards the decision to adopt ridesharing services. On the other hand, the decision to actually adopt ridesharing services does not based solely on adoption intention and might be affected by external factors such as impactful promotions, social influences and good feedback.

In order to predict the proposed hybrid behavioral model, hierarchical multiple regression was employed, and the result showed adoption intention only contributed a small amount of percentage of variance explained. Without the presence of adoption intention, independent variables were able to explain 13.1% of variance explained. This significantly proved that in order to make decision to adopt ridesharing services, the presence of intention is not necessary and decision can be made based on external factors such as good aspect of the services, heavy promotional period, widespread of word of mouth as well as the practicality of the application.

In view of mediation analysis, the role of adoption intention as a mediator for

independent variable towards dependent variable was examined and the result showed adoption intention was fully mediating the relationship of attitude towards ridesharing applications, knowledge and alternative travel modes preference towards ridesharing services adoption. On the other hand, intention was found to partially mediate operational characteristics of ridesharing services towards actual adoption. This situation can be supported by the fact that dimensions in operational characteristics such as accessibilities does not need further support in actual adoption because in terms of any kind of movement or transporting from one point to another, accessibility is crucial because seamless public transportation will definitely attract passenger to use it. On the other hand, the full mediation relationship of adoption intention between attitude, knowledge and preference towards actual adoption should be comprehend as these attributes needs extra push for actual adoption to take place. Push factors will elevate the intention to use the technology and subsequently produce actual adoption. For example, a person has intention to try ridesharing services for the first time but clearly have zero desire to actually using it. However, after that person found out that his/her family or friends have already tried Uber or Grab rides and happy with the outcome, his desire to try has been driven by the feedback from his surroundings. Adoption was found to be associated with having good or bad experience with in return help to make decision to adopt new innovation or otherwise. This shows that in certain circumstances, the actual adoption of ridesharing services needs to be driven by other push factors.

CONCLUSION

In conclusion **t**he results of this study provide both theoretical and practical implications. Theoretically, this study intends to come out with a framework that captured the essence of ridesharing acceptance rate, as well as providing an in-depth possibilities and opportunities review. Practically, this study aims to convey feedback and thoughts gained from consumer in taxi industry who shifted to ridesharing. In particular, it provides useful contribution and implication to information technology acceptance in the public transportation industry. On the whole, the key finding for this study is decision to adopt ridesharing services does not solely rely on the adoption intention. In either case, the decision to use ridesharing is driven by attitudinal factors such as accessibility, usefulness, social norm and private car preferences. Correlation analysis, hierarchical regression analysis and mediation analysis similarly found adoption intention fully effecting ridesharing adoption decision.

On the other hand, attitudinal factors on their own were found to be inter-correlated with ridesharing adoption decision. This explained the fact that consumers depend on surroundings and feedbacks from others to adopt new technology. The combination of attributes from previous behavioral and innovation theories implied for this study was only partially applicable in predicting adoption decision of ridesharing services. The overall model consisting of attitude towards ridesharing applications, operational characteristics of ridesharing services, knowledge on ridesharing services, alternative travel modes preference, adoption intention and ridesharing adoption decision proposed only 13.9% of *R* square value, indicating that it possesses very low explanation power.

To enhance the predictive power, it is recommended to integrate the model into a broader perspective.

The novelty of this study highlights the wants and needs of consumers of city taxi in Kuala Lumpur, as well as the characteristics of ridesharing services that help draw people to adopt the services. Ridesharing has the potential to greatly increase ride availability and city connectedness (Teubner & Flath, 2015). Thus, it is hoped that the result will help government agencies and taxi association to pay close attention towards what consumers wants and what they need in getting their moving needs. It is hoped that these services appealing factors such as responsiveness, ease of use and reliability can be implemented onto taxi industry for services transformation.

Since the government has approved the plan to legalize ridesharing services through the implementation of Taxi Industry Transformation Program (TITP) in 2016, consumers, providers and industrial players are looking forward to more opportunities and possibilities in the same level playing field. These initiatives suggested by Land Public Transport Commission created healthy competition surroundings between taxi providers and ridesharing operators. Consumers on the other hand will have more options and healthy competition always brings productivity of the industry. Therefore, ridesharing services bring opportunities and improvements in the existing taxi systems and eventually it will help elevate the industry to its full potential to serve and satisfy the growing demand of efficient mile-to-mile fleet services. Hopefully with the presence of ridesharing services will help leveling the playing field in taxi industry, at the same time helping the government to achieve forty percent of public transport modal share by 2030.

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