Paper Title: Uber-nization of Transport: An Investigation into the Sustainability of Ride-Sharing Applications in Malaysia

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ABSTRACT

Commuting trips is projected to hit 72 million alongside the urban population growth 75% by 2020. However, transportation mode availability has only grown by 8% over the last 5 years, thereby creating an unfulfilled demand gap in transportation. This has led to delays in public transportation, causing a ripple effect on work productivity. Suppressed demand affects riders' decision to use public transportation, spurred the use ride-sharing in the past 2 years in Malaysia. The research aims to investigate the factors that influence the adoption of ride-sharing services and to identify target segments of ride-sharing users in order to tailor offerings and solutions to them, thus assisting the government and industry to improve the sustainability of the transportation landscape of the country. The integration of the Technology Acceptance Model and Theory of Planned Behaviour adopted for this research aims to understand the adoption usage of the ride sharing app user's consumer behavior. From a purposive convenient snowball sampling of 107 out 144 samples multiple linear regression and Hayes Process for mediation show significant results between the constructs of Perceived Ease of Use, Perceived Usefulness, Attitude and Intention in using ride sharing apps. The analysis was followed by a two-step cluster deriving 4 distinct clusters of ride-sharing users with individual consumer behavior and corresponding demographic characteristics. Results of this research can see larger applications replicated across various contextual scenarios and geographies not limited to just the transportation industry.

KEY WORDS

Ride Sharing Application, Transportation Sustainability, Business Analytics, Uber-nization.

INTRODUCTION

The services industry in Malaysia contributes RM569 million (53.5%) to Gross Domestic Product (GDP) and expected to grow by 4.4% (Bank Negara Malaysia 2015). The main growth contributors are mainly from financial services, communications subsectors and wholesale and retail trade, backed with resilient household expenditure and steady labour market condition (Economic Planning Unit 2016). However, the current development of the transportation industry is unable to keep up with the exponential growth of socio-economic development within the country. With an estimated annual economic growth rate between 5 to 6%, the demand for good transportation will increase to 72 million trips per day by 2020. Most of these trips come from urban areas in line with the estimated increase in urban populations to 75% by 2020 from 67% in 2010 (Economic Planning Unit 2016).

Malaysia's public transportation services is predominantly managed by private companies with the support of numerous government agencies led by Land Public Transport Commission (SPAD). However, these agencies lack coordination in terms of planning and implementation of transportation initiatives and as a result resources are used inefficiently (Economic Planning Unit 2016). Particularly for the public transportation system in Kuala Lumpur, the development lacks attention and integration at levels (Schwarcz 2003).

Research Gap

Public transport ridership in Kuala Lumpur is 2 to 3 times lower compared to cities in neighbouring countries (Schwarcz 2003). One possible cause is the lack of integration and therefore low service level and accessibility (Malaysiakini 2016). Public transportation companies is solely reliant on fare as a primary source of revenue, though they can barely keep

up with the high operating cost because of low ridership because of poor service delivery (Economic Planning Unit 2016).

This problem has since seen its' fair share of reduction since 1999 when technology disruptors created ride-sharing applications to provide an alternative means to commute (Meece 2012). The general perception is that it provides better service, fixed pricing system, safety, convenience and also created job opportunity for those who are unemployed (Smith 2012). However, the legality of such services rendered have come into question with its economic effect on the transportation industry as they compete to gain market share. According to an article by Free Malaysia Today (2016), ride-sharing services is still considered illegal because it involves using private vehicles for commercial use as opposed to other regulated transport services. However people want the ride-sharing services to be legalised because of its benefits which includes cheaper fare, convenient booking, safety and quality (Julia 2016). Despite the healthy competition, many taxi drivers opposed to this idea as it is seen as a threat to their livelihood (The Malay Mail 2016).

Ride sharing service has been supported by the exponential increase in smartphone usage over the years spurning the 'sharing economy' (Kissonergis 2015). One of the largest players in the transportation sector of the 'sharing economy' is Uber. When the co-founders, Travis Kalanick and Garrett Camp, had difficulty hailing a cab in Paris during one snowy night, they saw an opportunity to create a service to cater to this untapped market (Uber 2016). Eight years later, Uber has grown multi-folds and expanded to over 450 cities worldwide and is valued at $68 billion today (Kosoff 2016). Since then, other ride sharing players like Lyft, Didi, BlaBlaCar, Relay Rides, Sidecar and Ridejoy entered the market offering similar services (Gilpin 2014).

In Malaysia, the sustainability of the transportation industry is continued to be marred by infrequency, limited accessibility, and traffic congestion resulting in delays, timeliness, lack of road safety, loss of productivity and suppressed demand would further affect the well-being of riders (The World Bank 2015) with passengers beginning to lose confidence on the reliability of the LRT service due to frequent downtime (New Straits Times 2016).

Hance, it is important to study the viability of these ride sharing applications by gaining a deeper understanding of the current user's behavioural influencing factors of adoption as well to investigate the segmentation possibilities of the users. This in turn will help the industry continue to sustainably grow alongside other modes of transport and to ensure availability of choice for the citizens without compromising on the quality. Policy makers would be able to then ascertain the segments of riders to better serve the community.

Research Aim and Objectives

This research aims to identify factors that influence the adoption of ride-sharing applications among Malaysians. This research seeks to first establish the intention of ride sharing users and then proceed to profile them unveil insights into the demographic and psychographic aspects of a ride sharing user in order to contribute to the ride sharing businesses like Uber or GrabCar. Given that ride-sharing services is something new and launched only recently, there is fairly little research on the adoption ride-sharing services (Meece 2012; Millward 2013). Hence this research aims to:

1. Identify the factors that influence adoption of ride sharing services in Malaysia
2. Segment the adopters of ride-sharing services to develop more effective marketing tools to expand each segment

This research is believed to benefit the economy, transportation authorities, policy makers and end-consumers alike. Due to the changing global environment, the current market pose both new challenges and opportunity for market segmentation (Wedel & Kamakura 2012). With recent advancement of information technology, marketers are now able to gather more data on the actual behaviour of the consumer and reach out to specific individuals (Wedel & Kamakura 2012). Proper market segmentation will allow researchers and managers to define their artificial groupings of its consumers to provide better intelligence on how to design and target them (Johnson 1971).

LITERATURE REVIEW

In order to understand the complexity of the adoption influences of ride sharing applications, the Theory of Planned Behaviour and Theory of Acceptance Model are reviewed and integrated to explain the consumer behaviour of ride sharing application users.

Theory of Planned Behaviour

Theory of Planned Behaviour (TPB), which is an extension of the Theory of Reasoned Action (TRA) model, postulates that a person's behaviour is determined by their intention to perform the behaviour which is a function of their attitude towards a specific behaviour, the subjective norms dictating that particular behaviour, and the perceived behavioural controls which will determine their action (Ajzen 1991).

TPB has been widely used in studies across different industries showing merit and usefulness in predicting future behavioural intentions of consumers especially in the transportation industry. Madahi & Sukati (2016) suggests that positive Behavioural Attitude is influenced by the positive benefits one perceives from an action taken. Heath & Gifford (2002) to examine

dchanges in university students' bus ridership after the implementation of a universal bus pass (U-pass) program, and found subjective norms were highly reliable in predicting behavioural intention and behaviour among students. A similar study was replicated in Malaysia to ascertain willingness to commute with public trains, found that subjective norms also had the same effect (Madha 2016). Bamberg & Schmidt (1998) conducted a longitudinal study to understand the students' choice of mode of transportation and found that reduction in price significantly affected the behaviour mediated by attitudes towards preferences and perceived restrictions. Chowdhury & Ceder (2013) states that perceived behavioural control variable was constituted by self-efficacy and perceived controllability and can influence a traveller's willingness to use public transportation routes with transfers.

However TPB theory has been criticised for solely focusing on logical reasoning, not taking into consideration the unconscious influence like feelings or emotions on behaviour (Conner et al. 2013; Sheeran et al. 2013). Furthermore, the predefined description of the TPB theory did not assist in understanding the evidence arised from the behaviour on perceptions and future behaviour (McEachan et al. 2011).

Technology Acceptance Model

Technology Adoption plays a key role in determining the outcome of any new technological product in the market and has typically been assessed through the use of Technology Acceptance Model (TAM) which is made up of Perceived Usefulness and Perceived Ease of Use (Davis 1989). Wang et al. (2011) established that the level of online community participation in a new technology is largely explained by the perceived usefulness of the technology, further supported by three other exogenous factors such as Internet self-efficacy, community environment and intrinsic motivation.

Schultz and Slevin (1973) found, in their study, that perceived usefulness showed a consistent outcome on how individuals predict using a decision model. There is also a strong connection between perceived usefulness and systems (Robey 1979). Davis (1989) defined perceived usefulness as the extent improved use proficiency by using a particular technology. Perceived ease of use on the other hand refers to the perception level of an individual in terms of how much effort is needed to use the system (Davis 1989) and has stronger influence on technology adoption.

However Chuttur (2009) critised TAM for its insufficient explanation and power to predict user behaviour. In addition, due to the ever-changing environment of information technology, efforts to expand the study of TAM has led to confusion of the theoretical study (Benbasat & Barki 2007). The theory was also challenged by Lunceford (2009) for its oversight on other factors that could have influence the adoption level such as cost and obligations that forces the individual to use the technology.

Integration Model of TPB and TAM

Both stand-alone theories; TAM and TPB have been found to be inconsistent with its justification and assumptions of how individuals will behave since there are various elements such as technology, type of users and context that influences the user's adoption level (Taylor & Todd 1995; Venkatesh et al. 2003). However, Chau & Hu (2002) suggest that by studying theories that have replicative reasoning could garner support for a theory and also avoid possible limitation. An integration model helps provide better explanation compared to a single theory (Dishaw & Strong 1999). Hence, the theory integration method proposed by Sparrowe & Mayer (2013) was adopted by integrating 2 theoretical perspectives that share a single

phenomenon (see figure 1). As both TPB and TAM are intended to understand the attitudes and behavioural intentions of consumers, the integration of these 2 theories yields deeper insights both from a technological usage perspective and also a consumer behavioural perspective.

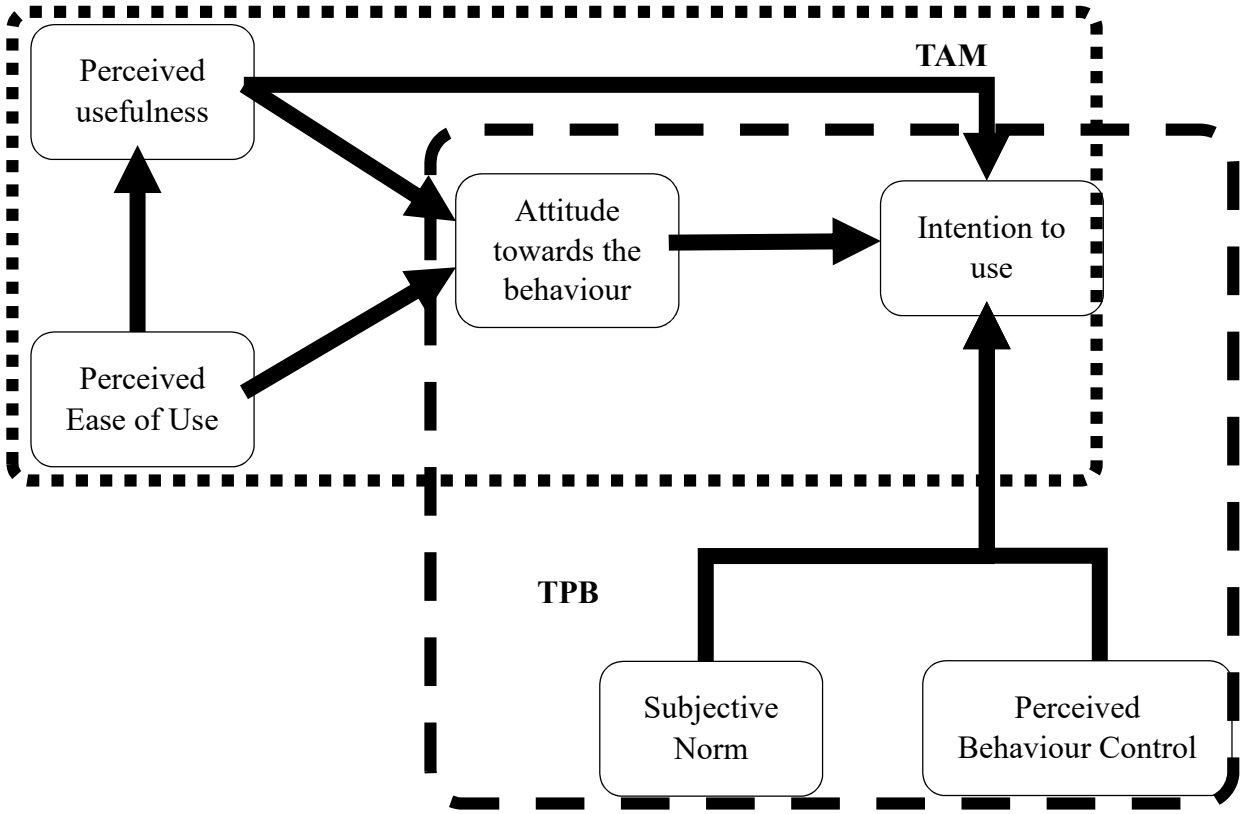

Figure1: Theoretical framework – Integration of TPB (Azjen 1991) and TAM (Davis 1989)

Theoretical Framework and Hypotheses

Based on the integrated TPB and TAM model and constructs highlighted, the following hypotheses is postulated to address the research aim and objectives:

H1a: Perceived ease of use positively influences attitude towards ride sharing app/service

H1b: Perceived usefulness positively influences attitude towards ride sharing app/service

H1c: Perceived ease of use positively influences perceived usefulness

H2a: Positive attitude towards ride sharing app/service influences positive intention to use ride sharing app/service

H2b: Subjective norms of others positively influences intention to use ride sharing app/service

H2c: Positive perceived behavioral control influences positive intention to use ride sharing app/service

H3: Perceived usefulness positively influences intention to use ride sharing app/service

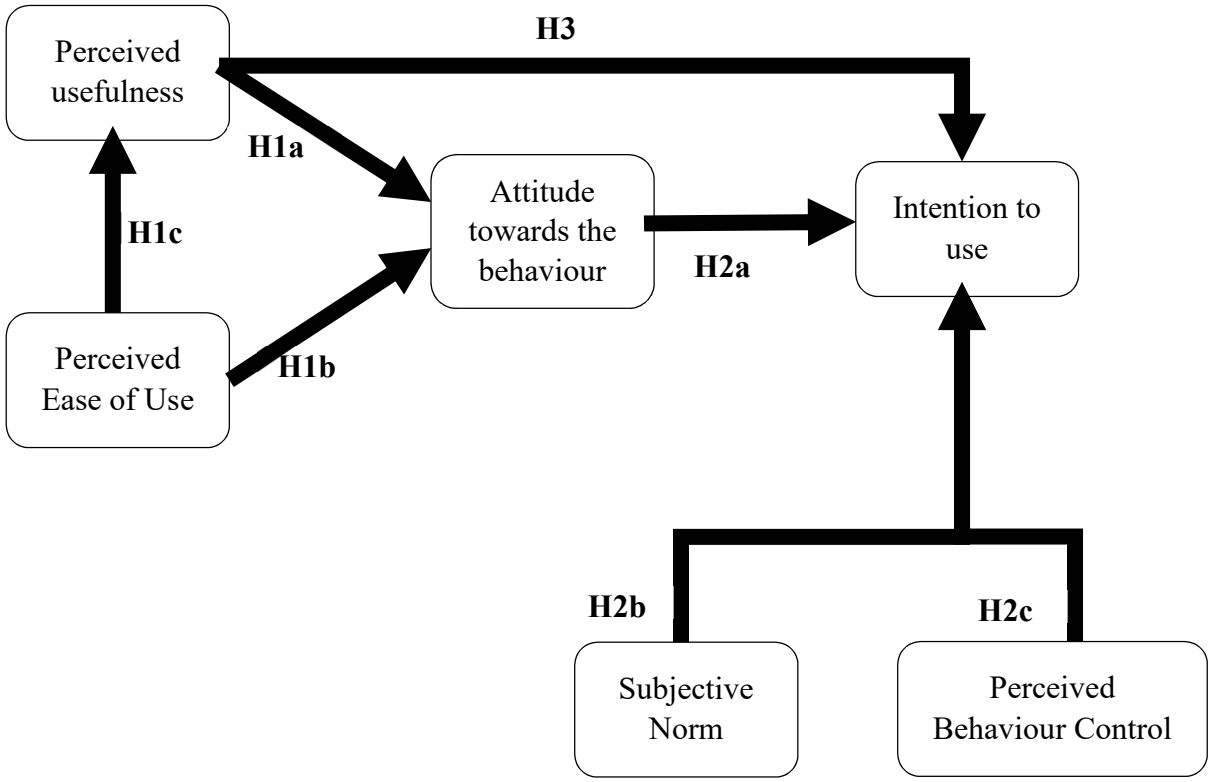

Figure 2: Research framework and hypotheses

METHODOLOGY

Research Design

This study aims to understand the cause and effect relationship between variables affecting attitudes and intention of people in adopting ride-sharing (Blumberg, Cooper, & Schindler 2011) and to segment the types of consumer profile that use ride-sharing (Shields & Rangarajan 2013). Hence, an exploratory research enables the discovery of ideas and insights into the ride-sharing industry, which is still growing in Malaysia since its introduction in January 2014 (Uber 2014; Hair et al. 2016). The quantitative research design approach allows the results to be generalized and replicable in other contexts (Bryman & Bell 2015).

Questionnaire Design

A survey questionnaire was developed to gather data about constructs derived from the integrated model of TPB and TAM. The constructs used in this study consists of the dependent variable of Intention to use ride-sharing app/services, and the independent variables of Perceived Ease of Use, Perceived Usefulness, Perceived Behavioral Control, Subjective Norm and Attitudes towards ride sharing app/services were all adopted from existing studies as shown in Table 1.

Table 1: Constructs adopted from existing studies

Construct	Item	Source	Internal Reliability*
Perceived Usefulness	Using ride sharing services allows me to order a ride at anytime	Chen et al. 2007, Fleischer & Wahlin 2016; Davis 1989;	α = .896
	Using ride sharing services saves me money		
	Using ride sharing services reduces my travel time		
	Using ride sharing services minimizes the hassle of looking for parking		
	Using ride sharing services allows me to stop at multiple destinations without switching mode of transportation		
	Overall, I find ride sharing services useful in my life		
Perceived Ease of Use	I find it easy to set up an account for ride sharing services	Bhattacherjee 2000; Chen	α = .950

	There are different options to pay for my ride	et al. 2007, Fleischer & Wahlin 2016; Davis 1989;	
	The application has a user-friendly interface		
	It is easy for me to order a ride		
	It is easy for me to select my pick-up and drop-off location		
	Overall I find the ride sharing application easy to use		
Attitude	I'm positive towards the usage of ride sharing services	Taylor & Todd 1995; Chen et al. 2007, Fleischer & Wahlin 2016	α = .962
	I think using ride sharing services is a good idea		
	I'm comfortable using ride sharing services		
	I think ride sharing services can help me save time		
	I think ride sharing services can help me save money		
	I think ride sharing services serves a good purpose		
Social Norms	Most of my family / friends use ride sharing services	Taylor & Todd 1995; Chen et al. 2007, Fleischer & Wahlin 2016	α = .888
	Most of my family / friends think I should use ride sharing services		
	It is important what my family / friends think about ride sharing services		
	I think my family / friends should use ride sharing services		
	The public perception of ride sharing services in general is positive		
	The positive media attention of ride sharing services affects my intention to use the service		
Perceived Behavioral Control	I have the resources (smartphone, financial resources) to use ride sharing services	Taylor & Todd 1995; Chen et al. 2007, Fleischer & Wahlin 2016	α = .874
	I have the knowledge to use ride sharing services		
	I have the ability to use ride sharing services		
	I trust the drivers of ride sharing services		
	I trust the rating system of ride sharing services		
	I feel safer when using ride sharing services compared to other modes of transportation		
	I feel secure sharing my credit card details with the ride sharing services company		
Intention	I would consider using ride sharing services for short distance trips	Davis 1989; Taylor & Todd 1995; Chen et al. 2007, Fleischer & Wahlin 2016	α = .950
	I intend to continue to use ride sharing services in the future		
	I would consider using ride sharing services outside of Malaysia		
	I would consider using ride sharing services if I can book a ride within 5 minutes		
	I would use more of ride sharing services if discounts are offered		

** Original Cronbach's alpha scores*

A 6-point scale Likert (1 being Strongly Disagree to 6 being Strongly Agree) was used to ascertain the perception of each construct was used for the survey questionnaire to generate higher discrimination and reliability values as compared to a 5-point Likert scale (Chomeya 2010).

Besides these independent variables, demographic data was also included in the questionnaire development for segmentation purposes using clustering analysis. The demographic variables used for clustering, have been found to have significant differences of attitudes and intention in terms of decision making: gender (Goldberg, Sweeny, Merenda & Hughes 1998); age groups (Gupta & Chintagunta 1994); marital status (Laroche, Bergeron & Barbaro-Forleo 2001); race (Lee, Lee & Wicks 2004); occupation (Woodside, Cook & Mindak 1987); household size (Zeithaml 1985); monthly income (Porter & Donthu 2006); and highest education level obtained (Diamantopoulo, Schlegelmilch, Sinkovics, & Bohlen 2003).

Sampling and questionnaire validity

The population of this research consists of users who have taken at least 2 or more ride-sharing rides in the past 6 months within the Klang Valley. Ride-sharing is defined as either services provided by Uber or GrabCar.

A pilot test for questionnaire face validity was conducted 10 initial expert respondent to ensure adequacy of the research instruments and assessing the proposed data analysis techniques to uncover potential problems (Van Teijlingen et al. 2001). No changes were deemed necessary to be made to the questionnaire after the pilot test

Purposive random snowball sampling method was employed as there were no publicly available data of ride-sharing users from Uber or GrabCar owing to the fact that both companies are at pre-IPO (Initial Public Offering) stages, hence information about their rider base is highly classified (Uber 2014).

Thus, close friends and colleagues who have taken a ride-sharing service in the past 6 months were asked to complete the online survey questionnaire disseminated through Google Forms (Fricker & Schonlau 2002). Social media platforms such as Facebook, Whatsapp, Linkedin and email were mainly used to reach an initial 31 respondents directly and further disseminated the questionnaires to their friends or family who fit the sampling criteria.
A further 2-step verification process was performed by asking a screener question at the beginning of the survey to eliminate respondents who did not take Uber or Grab in the last 6 months in order to ensure the legitimacy of the responses obtained, and were also required to submit their most recent trip taken in the form of a receipt to support their responses. This screening process was necessary enhance the quality of data and add rigor to the research (DeSimone, Harms & DeSimone 2015).

In order to achieve an adequate number of sample sizes to test our hypotheses, Cohen's statistical power analysis (1988) using G*power 3, (Faul et al. 2007) with an effect size of 0.15, significance level of 0.05 and power of 0.80, was used to derive a minimum sample size of 90. During data collection, a total of 107 realised samples were gathered out of an initial 140 planned samples. The breakdown of the 107 respondents are as follows:

Table 2: Sample summary breakdown

Demographic		n	%	Demographic		n	%
Gender	Male	50	46.73	Monthly	<=3,000	7	6.54
	Female	57	53.27	income	3,001 to 5,000	27	25.23
Race	Malay	16	19.28	in RM	5,001 to 7,000	24	22.43
	Chinese	53	63.86		7,001 to 10,000	19	17.76
	Indian	10	12.05		>10,000	30	28.04
	Others	4	4.82	Highest	SPM/O-levels	6	5.61
Age in	<20	9	8.57	Qualification	STPM/A-Levels	7	6.54
years	21-25	42	40.00	Earned	Bachelor's Degree	62	57.94
	26-30	19	18.10		Masters	21	19.63
	31-35	19	18.10		Professional Certification	11	10.28
	36-40	9	8.57	Occupation	Student	0	0.00
	>40	7	6.67		Employed	89	83.18
Marital	Single	47	57.32		Self-Employed	12	11.21
status	Married	30	36.59		Unemployed	4	3.74
	Divorced	5	6.10		Retired	2	1.87
Household	1 to 2	23	21.50				
Size	3 to 4	53	50.48				
	5 to 7	31	29.52				

FINDINGS

Reliability and Factor Analyses

Reliability analysis was conducted to ensure the measurements are appropriate for the present study and free from error (Drost 2011; Malhotra, Birks, & Wills 2012). All constructs in the initial assessment showed Cronbach alpha of above 0.85 (shown in table 3). From there, confirmatory factor analysis was conducted using varimax rotation to ensure the construct items are represented correctly and understood by the respondents before conducting mean summation on the items to produce the final constructs. The final item constructs (shown in table 4) show adequacy of samples (KMO) (Hutcheson & Sofroniou 1999) and approximate a multivariate normality (Field 2014).

Table 3: Reliability Analysis

Construct	No of item retained	Cronbach's Alpha
Perceived Usefulness (PU)	6 out of 6	0.896
Perceived Ease of Use (PEU)	6 out of 6	0.950
Attitude (ATT)	6 out of 6	0.962
Social Norms (SN)	6 out of 6	0.888
Perceived Behavioral Control (PBC)	4 out 7 (removed PBC 1, 2, 3)	0.874
Intention (Dependent Variable)	5 out of 5	0.950

*Loadings < 0.4 is removed

Table 4: Factor Analysis

Rotated Components	Items
Component 1 (PU)	PU1, PEU1, PEU2, PEU3, PEU4, PEU5, PEU6
Component 2 (PEU)	PU6, ATT1, ATT2, ATT3, ATT4, ATT5, ATT6
Component 3 (ATT)	SN1, SN2, SN3, SN4, SN5, SN6
Component 4 (SN)	PU1, PU2, PU3, PU4, PU5, PU6
Component 5 (PBC)	PU2, PBC4, PBC5, PBC6, PBC7

*KMO = 0.919; Bartlett = 3740.637** (p<0.01); Cumulative Variance Explained = 76.73%

Hypothesis Testing (Direct Relationship)

Regression results indicate significant direct relationship for all hypothesis as show in the table below:

Table 5: Direct Relationship Regression Results

Hypothesis	Std Beta	Std Error	t-value	Decision	f^2	95%CI LL	95%CI UL
H1a: PEU -> ATT	0.638	0.094	8.501**	Supported	0.123	0.614	0.987
H1b: PU -> ATT	0.602	0.087	7.726**	Supported	0.211	0.501	0.847
H1c: PEU -> PU	0.632	0.085	8.355**	Supported	0.125	0.539	0.875
H2a: ATT -> INT	0.834	0.054	15.508**	Supported	0.489	0.726	0.939
H2b: SN -> INT	0.652	0.077	8.815**	Supported	0.014	0.527	0.833
H2c: PBC -> INT	0.705	0.074	10.182**	Supported	0.035	0.610	0.904
H3: PU -> INT	0.590	0.088	7.495**	Supported	0.014	0.485	0.835

**p<0.01

Indirect Relationship Hypotheses

In order to validate the model in its entirety, several indirect relationships were also tested using the Process Macro by Hayes version 2.15 (Hayes, & Scharkow 2013) and were found to be significant as shown in table 6 below:

Table 6: Indirect Relationship Regression Results

Hypothesis	Mediation coefficient	Std Error	Decision	95%CI LL	95%CI UL
H1d: PEU -> PU -> ATT	0.262**	0.094	Supported	0.055	0.590
H4: PU -> ATT -> INT	0.506**	0.084	Supported	0.242	0.740
H5: PEU -> ATT -> INT	0.580**	0.095	Supported	0.417	0.768

**p<0.01

Segmentation and profiling

The segmentation and profiling analysis is a two-step analysis approach which multiple analysis of variance (MANOVA) was employed to ascertain the appropriate demographic variables to profile the various segments of the ride sharing app users. The results from the Tests of Between-Subject Effects reveals that gender, age group, marital status, household size and highest education obtained met the significance difference test between categories on at least on the variables used in the model. These variables were then used as inputs for the two-step clustering process alongside the constructs in the previous analysis (total of 10 inputs). A best-fitting number of 4 clusters (Rohm, Milne & MacDonald 2006) was derived from the two-step clustering analysis, which fulfils three main criteria of clustering; appropriate ratio of the largest to the smallest cluster, interpretability and sensibility of the clusters themselves (Dahlgren 2011). From the analysis, each cluster has been given an identifier suitable for the description of their cluster makeup; namely Junior Jason (n=41; 38.2%), Career Kate (n=14; 13.2%), Mr & Mrs Smith (n = 24; 22.4 %) and Aspiring Ivanka (n = 28; 26.3%).

DISCUSSION AND CONCLUSION

The Importance of Present Study

This study validates the hypotheses outlined in the integrated Technology Acceptance Model and Theory of Planned Behaviour. Findings reveal that the technology itself (Perceived Ease of Use and Perceived Usefulness), perception of friends and family (Subjective Norm) and the effort required to adopt the technology and use the service (Perceived Behavioural Control) are all positively related to Attitude and Intention of using ride sharing. These driving influences are indeed important as it solidifies the application of TPB and TAM in the transportation industry whilst the integration of the two theories increases the understanding of behavioural and cognition of individuals within the context of technology adoption particularly for the ride sharing industry.

The second part of the research reveals unique traits of promoters and detractors towards ride sharing and how companies like Uber and Grab are able to better tailor their services to meet the needs of its users derived from results of cluster analysis. When the right product or service is offered to the right segment of customers, this will improve the Optimization of marketing spend can be improved through the right matching of services with the intended segments hence the savings from these marketing spend can be channelled towards R&D to improve value creation as a whole. Table 7 below highlights some of the characteristics and the marketing recommendations that would cater to each segment individually.

Table 7: Cluster descriptions and marketing recommendations

Cluster	Description	Marketing Initiatives
Junior Jason (n=41; 38.2%	Fresh graduates, first job; Degree holder	Introduce member-get-member program to expand social circle
	Friends and family recommend ride sharing	Brand ambassadorship program to generate Word-of-Mouth
	Very engaged with ride sharing; has positive attitude towards ride sharing	Surprise and delight for loyalty
Career Kate (n= 14; 13.2%)	Possesses own car or gets chauffeured around	Position ride sharing as on-demand, reliable service that caters for busy execs
	Successful career woman; C-suite execs; single; hectic lifestyle	Ride sharing companies to sponsor corporate events / conferences
	Less engaged with ride sharing, although may have tried it before	"One Family" plan to cater for her parents / grandparents' commute needs
Mr & Mrs Smith (n = 24; 22.4 %)	Married; either Male or Female; mid-20s to early-30s	Unique value proposition of convenient, reliable and affordable rides
	Friends and family recommend ride sharing	Brand ambassadorship program to generate Word-of-Mouth
	Very engaged with ride sharing; has positive attitude towards ride sharing	Surprise and delight for loyalty
Aspiring Ivanka (n = 28; 26.3%)	Single females; mid-20s to early 30s; working professionals	Introduce loyalty program to encourage consistent usage of ride sharing
	Friends and family recommend ride sharing	Surprise and delight marketing campaigns during moments in life (i.e birthday)
	Very engaged with ride sharing; has positive attitude towards ride sharing	Positioning ride sharing from safety and security angle

This research also benefits policy makers, particularly the Land Public Transportation Commission (SPAD), as it studies its decision to regulate the ride-sharing industry by understanding factors influencing choice of transportation and assess the current taxi monopoly.

Limitations of This Study

The present study has several limitations. Firstly, from a contextual perspective, the adoption of a purposive convenience snowball sampling method meant that there was no method of controlling the nationality of the respondents despite having put in place specific requirements

to filter out non-Malaysians Secondly, the research is also limited by geography as the questionnaire was only distributed to friends and family members residing in Klang Valley (Kuala Lumpur and Selangor). The absent data on geographical location would not be able to determine if there was a connection between location of residence and intention to use ride sharing. Finally, the research may be limited by the sampling approach adopted as there could be a possibility that the method would yield homogenous groups of respondents due to similar social circles (i.e. friends around the same age and race, working in similar industries). This might skew the results of the responses and overlook other key traits that could prove meaningful to the research.

Recommendations

Based on the limitations, there are several possible recommendations. Future researchers could extend the research to other states in Malaysia or even other ASEAN countries and compare derived clusters by state or by countries. An interesting option would be to compare respondents from areas with low and high smartphone penetration to further study the relationship between the integrated models and the intention to use ride sharing. Other forms of analytical methods could also be explored such as on SAS, R, and Decision Trees to improve the robustness of the clusters derived. The research can also potentially benefit from a longitudinal study that evaluates how key constructs evolve over time as ride sharing regulation becomes more imminent and also when the future of driverless cars becomes more plausible. Follow-up interviews or focus groups are also possible for future research to capture deeper meaning and unique differences especially if the scope of the research is widened to include other forms of public transportation.

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