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Convenience, flexible service, and commute impedance as the predictors of drivers' intention to switch and behavioral readiness to use public transport

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ABSTRACT

This research was prompted by the underutilization of public transport (PT) and a gap in the relationship between intention and behavior. A research model was developed based on the theory of interpersonal behavior (TIB, Triandis, 1980) to identify the predictors of drivers' intention to switch from car driving to PT and their behavioral readiness to use PT. The sample of drivers (n = 317) was solicited from Malaysia using web based survey (SoGoSurvey). Results from the structural equation modeling of partial least square (PLS-SEM) show the significant associations between convenience, flexible service, commute impedance, and the intention to switch. Whereas, the intention to switch serves as the primary predictor of the behavioral readiness to use PT. Practical implications are discussed and pragmatic intervention programs proposed to target improvement in the drivers' behavioral readiness to use PT.

1. Introduction

In urban mobility, public transport (PT) is the key to active and more sustainable transport for daily commuting. On the other hand, the urban sprawl and ineffective PT network could cause commuters to turn to private vehicles for mobility. Malaysia is well equipped with mature infrastructure for PT development and land PT is one of its many modes of transportation in the country. However, the country has a relative low PT ridership when compared to its neighboring country. For instance, at least half of Singapore's population uses PT to commute every day (Singapore Land Transport Authority, 2017). In Singapore, the rail transport system is the primary means of commute to work and its rail transport serves 3.1 million passenger trips per day. Besides rail, the location and performance of the public bus fleet is predictable using data and technology to monitor in real time. The country's efficient public bus network enables the government to aim for a carless society.

Back in Malaysia, commuters usually mobilize either by motorcycles or cars. The most popular mode among them is to commute by car but car sharing is not highly practiced in the country. There are 14.7 million of labor forces who commute

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mostly in their single occupant cars (Quah, 2016) which eventually rode on major streets and causes carcinogenic vehicular emissions. The environment receives nearly 50 million metric tons (Mt) of CO^2 per year, which land transport attributes 85.2 percent of transportation emissions, whereas cars emission accounts for 59 percent of the overall emissions from land transport (Malaysia Ministry of Road Transport, 2017). Car dependent trips cause traffic congestion on the streets (Muhammad Hafizi Bin Mohd Teramizi, 2013, July 23). A traffic survey conducted to establish the timing of congestion in the major streets (Halcrow Consultants, 2012) reveals a substantial increase of cars during the morning (6.10 a.m. to 8.10 a.m.) and the evening peak hours (4.30 p.m. to 6.50 p.m.). Commuters have to make ways within the narrow and congested carriageways in order to get to workplace on time. The traffic congestion has affected the clean air and social milieu of a livable city.

PT's modal distribution in Malaysia is only 11 percent (Malaysia Performance Management and Delivery Unit, PEMANDU, 2010). Although the modal share increases slightly to 20 percent in 2016 (Malaysia Land and Transport Commission, SPAD, 2017), the population is largely dependent on private vehicles to get around which is extremely unsustainable daily transportation. Prices of national and foreign cars are competitive and they incite direct ownership of cars. The ownership indirectly minimizes the avenue of promoting PT among the drivers. The total population of the country is 32 million and its population density is 97 persons per kilometer with a steady increase of 2 percent annually Malaysia Department of Statistics, 2019. In contrast, there is a turbulent increase in 19 percent in private cars registration within the past five years Malaysia Road Transport Department, 2016. The faster growth in volume of cars compared to the population demonstrates an astonishing car reliance phenomenon in the country.

The policy makers and PT practitioners are tasked to improve overall urban transportation efficiency and sustainability in the country. Previous researches recognize that intention is a consistent predictor of behavior (Ajzen, 1991; Gollwitzer, 1999; Heath & Gifford, 2002; Bamberg, 2007; Gardner, 2009; Eriksson & Forward, 2011). The linear causal relationship between intention and behavior (intention-behavior) posits that intention alone is sufficient to predict behavior. Behavioral research reveals that providing incentive as a motivation to enhance intention to switch from the car driving to adopt PT has resulted in an increase in using PT (Redman, Friman, Garling, & Hartig, 2013). For instance, offering free bus pass as an incentive to encourage usage of public bus. However, the switching behavior is prone to relapse after such incentive is removed (Sukor, Basri & Tarigan, 2018). This probably explains why past intervention programs based on the intention-behavior causal relationship (Stark, Berger, & Hossinger, 2018; Mars, Ruiz, & Arroyo, 2018; Gao, Chen, Shan, & Fu, 2018) did not lead to a permanent modal shift from the car driving to adopt PT.

On the contrary, intention is proven as an antecedent of behavioral readiness (Gollwitzer, 1993, 1996, 1999) rather than actual behavior. Literature review has also shown that intention is essential for developing behavioral readiness which is the proximal determinant of action (Heckhausen, 1991). The behavioral readiness is characterized as the self-change behavior which has a volition property (Heckhausen & Gollwitzer, 1987). Volitional transport behavior is more promising compared to incentive motivated behavior to ensure modal shift in the commute phenomenon in Malaysia. The relationship of the drivers' intention to switch from the car driving to adopt PT (intention to switch) and their behavioral readiness to adopt PT (behavioral readiness) is still unknown. Hence, the research knowledge is essential to fill this gap. In addition, research has shown that psychological factors are important to predict modal shift of urban transportation (Thogersen & Moller, 2008). There is a widely held view that improvement of PT delivery could improve PT's utilization in the country (Malaysia Land Public Transport Commission, SPAD, 2017). Accordingly, it has been reported that low ridership of PT has a strong association with poor perception of its service quality. This paper extends the work of Galdames, Tudela, and Carrasco (2011) to investigate the psychological predictors of the drivers' transport behavior using theory of interpersonal behavior (Triandis, 1977, 1980). It explores the predictors (convenience, flexible service, commute impedance) of drivers' intention to switch and their behavioral readiness in order to understand what moves their ultimate shift from the car driving to adopt PT in Malaysia. Finally, the paper uses the findings from the empirical study to propose effective intervention programs and development targeting conversion of the drivers to become riders of PT.

2. The present study

This paper advances the prediction of the drivers' behavioral readiness in two stages. First, it segregates psychological predictors into functional constructs (convenience, flexible service) and affective construct (commute impedance) to test their influences on intention. Thus, it establishes the functional influence of psychological predictors compared to the affective impact towards the drivers' intention to switch respectively. Second, it clarifies the much assumed and causal linear relationship between intention-behavior presented in previously published studies. This paper aims at maximizing and differentiating the predictive power of psychological predictors on the drivers' intention. It contributes by integrating past findings regarding functional and affective influences on intention, and applies them to predict drivers' behavioral readiness. A deeper understanding of these predictors' influence on the drivers' behavioral readiness helps the PT practitioners to devise more effective and practical intervention development to enhance PT ridership.

2.1. Theory and hypotheses

Studies investigate the prediction of commute behavior are extensive with inconsistent findings (Kraus, 1995; Jackson, 2005). The transport literature is filled with applications of reasoned behavior (Fishbein, 1979) which subsumes that the

ultimate determinant of any behavior is based on weighted reason of an individual belief. It exhibits one's self-control in performing behavior that is socially expected by others. Prediction of behavior has been consistently proven difficult, more so when predicting the drivers' behavioral change (Proschaska & DiClemente, 1984). The assumption in the linear relationship of intention-behavior is that once intention is acquired, one will perform the relevant behavior. However, the complex relationship has been simplified (Burgess, Harrison, & Filius, 1998; Kollmuss & Agyeman, 2002) and induces misleading causality (Webb & Sheeran, 2006). For instance, intention may be affected by environmental influences after it is acquired Glanz, Rimer & Viswanath, 2015 and changes over time. Hence intention may not always materialize into an overt behavior. The linear relationship to perform behavior lacks an applied element in empirical transport research. In addition to its poor causality relationship, the distinction between behavior which needs the motivation to perform (Fishbein, 1963; Fishbein & Ajzen, 1975; De Groot & Steg, 2010) compared to self-directed behavior which possesses volition (Bamberg, 2007, 2013) has not been addressed in transport literature.

On the other hand, the theory of interpersonal behavior (TIB) (Triandis, 1977, 1980) was developed based on a three components view of schematic conception of behavior, namely cognition-affect-conation (Rosenberg & Hovland, 1960). Cognition is about the psychological value consequent on performing a particular behavior (perceived value), whereas affect is the state of emotion at the thought of performing the behavior (conation). Traindis argued that an individual's cognition and affect are the antecedents of one's intention to emit the behavior. Each construct is distinctively important towards performing the behavior and jointly represent the total strength in discharging the behavior. In the pursuit of switching behavior to adopt PT, this paper conceptualizes using TIB to understand broadly the drivers' behavioral readiness. The theory posits that the drivers do not change their behaviors decisively but change occurs when they possess volition and being in a phase of readiness called pre-actional phase (Heckhausen & Gollwitzer, 1987). In Fig. 1, the pre-actional phase characterizes as volitional self-change phase where the drivers begin to plan for switching in their transport behavior. Higher volitional strength leads to increase in behavioral readiness (Gollwitzer, 1996) which subsequently leads to behavior probability (Bamberg, 2007).

Adapted from Achtziger and Gollwitzer (2010), "Motivation and Volition in the Course of Action". In J. Heckhausen (Ed.), *Motivation and Action*, pp. 275–299. Copyright 2010 Cambridge University Press.

2.2. Functional and affective predictors

An early approach in psychology literature is to conceptualize attitude as having two dimensions, namely the functional (based on belief) and affective (based on feeling) components (Katz, 1960). The functional attitude is an expression of value expectation (Sarnoff & Katz, 1954; Fishbein, 1963) based on belief. Value orientation leads to intention to switch and self-determinant to decide a particular transport behavior (De Groot & Steg, 2010). A higher frequency of PT trips is made by the drivers when they perceived service value in PT (Sharaby & Shiftan, 2012). The perceived value significantly influences intention to switch (Lai & Chen, 2011) and it generates attribute-specific satisfaction in using the PT (Friman, Edvardsson, & Garling, 2001). Research suggests that a good PT service which incorporates the commuter's preference for service could deter car ownership (Cullinane, 2002; Shay & Khattak, 2012). On the other hand, affective attitude is the intensity or strength of feeling (emotion) in an individual for or against performing a particular behavior. For instance, whether having felt strongly in a certain way could lead to a change of one's commute behavior. Transport studies which measure affect reveal that affective attitude plays an important role in making decision on transport mode choice (Friman, Ettema, & Olsson, 2018), and emotion takes precedence of cognition in making transport decision (Jackson, 2005). It implies that human behavior bases on emotion more than cognition as a conscious deliberation. In studying the degree of attractiveness to switch from the car driving to adopt PT, both convenience and service flexibility account for 17 percent of variance in intention to switch (Steg, 2003). Studies on commuting options reveal that convenience and flexibility of transport mode are the factors influencing drivers' decision in using PT (Beckmann, 2013; Litman, 2008; Scott, Sarker, Peterson & Hough, 2011).

2.2.1. Convenience

Convenience of PT implies two aspects of demands, namely perceived physical and cognitive demand (Gardner & Abraham, 2007). For example, physical demand means to travel with adequate personal space such as availability of seats, while cognitive demand means having control over one's movement. Over the years, the drivers mobilize with ease and enjoy the convenience provided by car driving (Fujii & Van, 2009). They would expect the similar feature if they were to switch to PT. Convenience is tested to bring confidence and overall satisfaction to the drivers (Budiono, 2009) in their daily commuting (Litman, 2008). Both interior and exterior displays of electronic information, audio announcement, electronic text about the next stop, and availability of Wi-Fi are considered to provide convenience for PT use (Currie & Wallis,

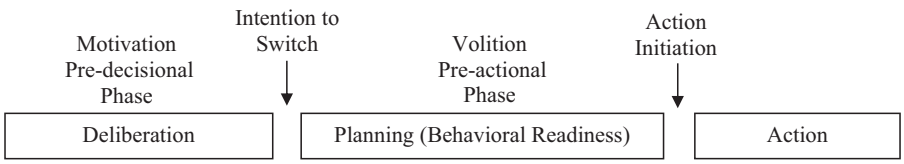

Fig. 1. The Rubicon Model of action phases.

2008). A recent study serves to introduce the smart card which serves as a smart ticket to be validated by a smart reader and an integrated ticketing system (Turner & Wilson, 2010). The smart card has an electronic chip embedded in a plastic card and it becomes a valid ticket to commute with buses. The smart ticketing system deploys integrated ticketing and automatic fare collection system in PT system (Malaysia Department of Prime Minister (2010), 2010) intends to provide faster passenger throughput (Turner & Wilson, 2010) and hopefully to stimulate demand. Use of smart ticket in PT has been ample in developed countries but approximately 30 cities in Asia adopt such smart ticketing system (Park & Kim, 2008). Empirical research to address the influence of smart ticketing on ridership is limited. Thus, the hypothesis is proposed as:

H1. *Convenience is positively related to intention to switch.*

2.2.2. Flexible service

Identification of rush hours to offer flexible service allows the number of standees kept below benchmark (Benh, 1995) but there is limited research attempt to use flexible service to increase PT ridership. The flexible service is the preference for flexible options and extended service span of PT service. The flexibility of PT operations is tailored for commuting from point to point (Sihvola, Hame, & Sulonen, 2010) which differs from a traditional fixed route. The flexible service of PT is the stated preferences of commuters (Alsnih & Hensher, 2003). It is based on the commuters' desires for trip requests to pick and deliver (Cortes & Jayakrishnan, 2002) and serves along the routes which are not well served by the PT which follows the traditional fixed route PT. Demand responsive transport (DRT) (Bakker, 1999) is an innovative and flexible public transport which addresses a wider coverage of PT route. The DRT aims to cater for commuters who live more than 400 m away from a PT station. It is reported that commuters choose to drive instead of consider using PT as it minimizes commuting time (Malaysia Department of Prime Minister, 2011). Smaller size buses are used to serve as feeder buses. The feeder buses serve the majority of the residential areas which are located more than 400 m away from the bus stops. The smaller feeder buses bring commuters from their homes to the nearby bus stops where they could follow the fixed route PT. Flexible feature of PT has the potential to more closely match the supply of PT service with the demand for that service and thereby increase the level of use of PT. Based on the original idea of DRT, this paper adopts the feature of flexible service as provided by Enoch, Potter, Parkhurst and Smith (2004) which involves (1) cut service, (2) selected stop service, and (3) feeder services. The cut service is similar to the normal fixed route but would skip selected regular stops because of congestion and when no passenger wishes to board and alight in these stops. By adapting cut service it ensures a shorter average commute time. The cut service routes could be introduced to complement or substitute the fixed routes for low population density areas. The selected stop service targets identified markets and delivers users directly to specific destinations. For example, high saturated employment hub. A timetable is prepared for the target market to meet the users' need. The operators plan the stops with the cooperation of specific users. The feeder service uses smaller size buses to serve as feeders. Feeder bus operates between peak hours in the morning between 6.10 a.m. to 8.10 a.m., and in the evening between 4.30p.m. to 6.50p.m. Thus, the hypothesis is proposed as:

H2. *Flexible service is positively related to intention to switch.*

2.2.3. Commute impedance

An extreme mood brought by a specific situation is referred as an affective or emotional response (Affect Theory, Russell & Snodgrass, 1987). Car driving has been related to symbolic-affective attitude (Steg, 2005). Past study reckoned that absence of positive affect impedes the generation of self-determined motivation which is much needed in an action (De Groot & Steg, 2010). On the contrary, a driver's intention to switch is influenced by negative emotion (Wall, 2006). Although car driving provides enjoyment (Steg, 2005), negative emotion disposition caused by congestion induces frustration and instills desire to reduce the stress level among drivers (Schneider, 2013). For example, when the drivers commute in a highly congested carriageway, they are exposed to an emotionally arousing situation referred as an "emotional disposition of situation" (Russell & Mehabrian, 1977). The constant congested trips cause frustration and negative emotion toward car driving (Anable, 2005). Previous study found that drivers reveal that they are more stressful driving than using PT (Gatersleben & Uzzell, 2007). A multi-modality index study discloses that drivers desire to reduce driving so that they could enjoy being a passenger (Diana & Mokhtarian, 2009).

Physical impedance on carriageways represents increasing levels of commute constraint (Novaco, Kliewer, & Broquet, 1991). Restraint of movement due to traffic congestion during the commute is called commute impedance (Novaco & Gonzalez, 2009; Novaco, Stokols, Campbell, & Stokols, 1979). Generally, commute impedance is caused by three impedance factors namely (1) unavoidability of heavy traffic, (2) applying the brake while commuting, and (3) reduction of travel speed on street (Novaco & Gonzalez, 2009; Novaco et al., 1991). A study by Cohen, Kessler, and Gordon (1997) suggests that behavioral change occurs as a coping response to an environmental stressor. When commute impedance is a stressor and car driving becomes a stressful experience for the drivers, they require higher emotional energy to be expended on daily trips to deal with the uncertainty of arrival time at their trip destinations (Stradling, 2002). Uncertainty about reaching destinations causes tension and stress. Negative emotion is caused by uncertainty, and uncertainty of emotion proved to be taxing on drivers (Stradling, Anable, & Carreno, 2007; Stardling, 2002). Commute stress is explained in psychology model of stress (PMS) as a phenomena caused by pressure and tension from "environmental demands" (Cohen et al., 1997, pp. 6–7), and

it has been recognized to have impact on commute satisfaction which is measured by anxiety indicators (Abou-Zeid & Ben-Akiva, 2011). Commute impedance by itself does not lead the drivers to switch to adopt PT directly (Carrus, Passafaro, & Bonnes, 2008) but it causes them to consider an alternative transport (Diana & Mokhtarian, 2009). The psychologist believes that people welcome pleasure and avoid pain (Higgins, 1997, 2011). It is common for the drivers to commute with enjoyment and avoid impedance (Schneider, 2013), hence, it minifies habitual car driving and helps to promote behavioral readiness to adopt PT. However, research on commute impedance having impacts on car driving are inconclusive. Based on the above discussion, this paper hypothesizes that:

H3. *Commute impedance is positively related to intention to switch.*

2.3. Intention to switch from the car driving to public transport

Intention to switch is cognitive indication of performing a particular behavior (Eriksson & Forward, 2011) which needs motivation to act out the behavior (Gardner, 2009). Past studies have focused on the value expectancy to form intention to switch (Fishbein, 1963; Fishbein & Ajzen, 1975). It is believed that an objective consequence carries a value which generates intention formation (Triandis, 1980). The drivers' intention to switch is operationalized as "I intend to . . ." (Gollwitzer, 1999, p. 494) to represent intention to switch from the car driving to adopt PT. Desired service design may vary across different purpose of trips for the drivers but it could help bring significant improvement in the use of PT (Taylor, Miller, Iseki, & Fink, 2009). Thus, it is hypothesized that:

H4. *Intention to switch positively influences behavioral readiness.*

2.4. Behavioral readiness to adopt public transport

Deliberation, planning, and action mindset (Rubicon Model, Heckhausen & Gollwitzer, 1987) of the drivers has been adopted to explain the behavioral readiness. The Rubicon Model maintains that a driver's thought process involves two transitional phases, namely (1) pre-decisional phase (deliberation) where a driver requires motivation to consider an alternative mode of transport and preoccupied with incentive, and (2) pre-actional phase (planning) where the driver possesses volition and initiates planning such as "when", "where" and "how" to adopt PT in a planned trip. The driver's volition is the mental readiness (Bamberg, 2013) which characterizes planning through seeking information about where the bus stops are, and arrival and departure schedules of PT. Rather than remaining in the wish or desire phase of deliberation, planning will transform the wish into a goal intention resulting in determination to carry out action in fulfilling such wish (Model of Action Phases, Heckhausen, 1987). Drivers who are in the pre-actional phase have made decision to switch voluntarily (volition) and possess behavioral readiness.

Forming the behavioral readiness provides a psychological link between the planned trip and behavioral response of the drivers (Holland, Aarts, & Langendam, 2006) in the form of "if-then" plan (Gollwitzer, 1999). For instance, "if opportunity *Y* occurs, then I will perform behavior *Z*". *Y* is symbolized as a purposeful trip such as going to work, while *Z* is the action plan such as seeking information about PT. Activation of the behavioral response is very much facilitated by the formation of behavioral readiness as a prerequisite, and behavioral readiness precipitates behavior effortlessly (Gollwitzer, 1996; 1999). Empirical evidence attests that the drivers who form behavioral readiness have demonstrated positive attitudes toward initiating change (Gollwitzer & Sheeran, 2006) in an automatic manner (Orbeil, Hodgldns, & Sheeran, 1997). Studying the behavioral readiness to adopt PT could bring to light the reasons of low PT ridership. It is expected that the process of behavioral modification may take longer than anticipated. However, the initiation of search for an alternative transport marks a small step towards entire chain of behavioral modification in future. The findings of this study are important to lead to an eventual realization of moving people away from car driving. Hence, the behavioral readiness is the focus and interest of this study.

2.5. Research model

A research model was developed based on TIB and Rubicon Model (Heckhausen & Gollwitzer, 1987) to study the drivers' intention to switch and behavioral readiness to adopt PT. It was drawn based on the recent conceptualization of psychological predictors proposed by Galdames et al. (2011). The research model is shown in Fig. 2.

3. Method

3.1. Design

In 2016, an empirical study involving the state of Penang, Malaysia, was conducted to examine the behavioral readiness of drivers who are working adults to adopt PT. In consideration of heterogeneous sample, convenience sampling method was

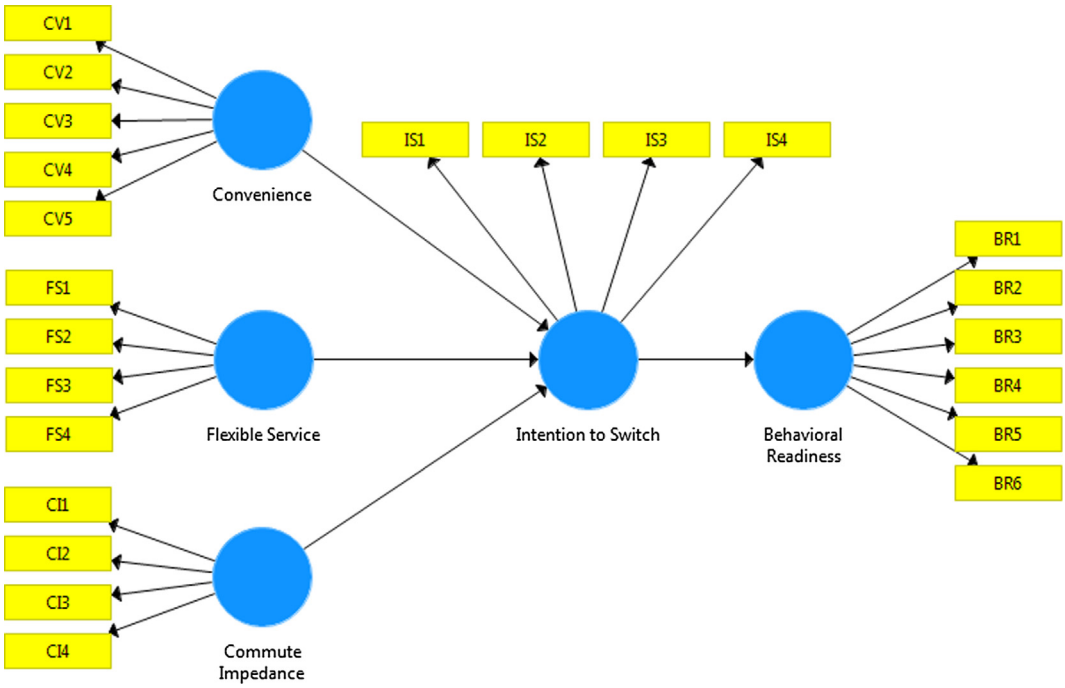

Fig. 2. Research model.

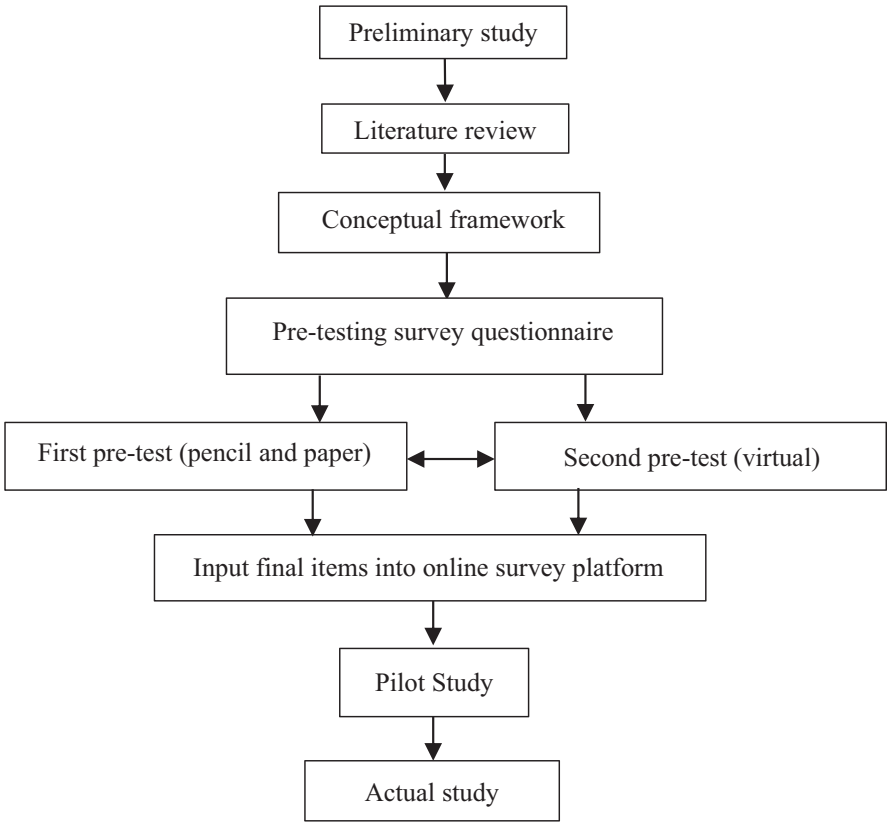

Fig. 3. Research design.

employed to prevent common method bias (Podsakoff, MacKenzie, & Podsakoff, 2012). Fig. 3 shows the procedure of the study which optimizes the research design through rigorous pre-test techniques.

3.2. Pre-tests

Pre-tests are administered to both genders, varying age groups, and races. Two consecutive pre-tests were conducted to ensure validity of the instruments used before data collection. First pre-test was conducted using paper and pencil (Hunt, Sparkman, & Wilcox, 1982), whereas the second pre-test was conducted using SoGoSurvey online platform to ensure the participants were able to understand instructional, sentential and lexical comprehension of the instruments (Hardy & Ford, 2014). Each participant was approached and asked to read, comment and evaluate the instruments on the basis of (1) meaning and clarity of questions, (2) appropriateness of words and vocabulary used in the questions, (3) ambiguous or faulty questions, and (4) expected time to complete the entire questionnaire. Forms of communication such as personal interviews, telephone calls, email correspondence, chatting tools were used to clarify doubts to increase effectiveness of the pre-tests (Boyd, Westfall, & Stasch, 1977; Churchill & Gilbert, 1979). A total of 10 respondents participated in each of the pre-tests.

3.3. Data and procedure

A web-based survey questionnaire was employed for data collection using public-access URL which was created using a platform designed by SoGoSurvey (SoGoSurvey Inc.) to host the online questionnaire. SoGoSurvey enables eligible respondents to access and participate in the survey as well as sending invitations to others as recipients. Two questions were included as qualifying criteria with an objective to screen in eligible respondents namely (1) car is the mode of transport daily, and (2) resident of Penang, Malaysia. The online data collection was conducted through few mediums via smart phone, e-mail, web portals, chatting Apps, posting thread on the active public transport groups and websites. For example, sustainable Penang mobility agenda and the state transport council.

Participation's IP address was tracked to avoid multiple submissions. Each item in the survey adopts the "mandatory response" option in order to prevent missing data entry. Participants who did not meet the two inclusion criteria were screened out during the data pooling process before data analysis. A total of 523 invitations were issued using web portals to ensure adequate responses to meet the minimum sample size. 317 respondents took the survey with equal representation from male and female respondents. They were drawn from a good combination of occupational background. The full-time workers formed the majority at 72 percent, the part-time workers were 21 percent, and freelance workers were 8 percent categorized as other as shown in Table 1.

3.4. Measures

The entire survey questionnaire contained 24 items of self-reporting instruments adapted from five established papers of transport behavior studies. Source of items adaptation is shown in Appendix A.

4. Results

Smart PLS version 3.2.7 (Smart PLS 3) (Ringle, Wende, & Becker, 2015) was used for data analysis. In the application of multivariate analysis, this paper adopted Hair et al.'s (2014, 2017) recommendation of the structural equation modeling

Table 1
The profile of respondents.

	Frequency	Percent
Gender		
Female	163	51.4
Male	154	48.6
Occupation		
Full-time worker	226	71.3
Part-time worker	65	20.5
Others	26	8.2
Duration of using cars		
5 years or more	279	88.0
<5 years	38	12.0
Experience the PT		
Have used but not daily basis	208	65.6
Never used	109	34.4

of partial least square (PLS-SEM) sequences to analyze the path model. The analysis was preceded with the analysis of the measurement models and followed by the structural model.

4.1. Measurement models

The overall assessment of the reflective measurement models involved assessments for indicator reliability (outer loadings), internal consistency reliability (composite reliability [CR]), convergent validity (average variance extracted [AVE]), and discriminant validity (variance inflation factor [VIF]). The rule of thumb (Hair, Hult, Ringle, & Sarstedt, 2014) requires the CR to be above 0.70 which demonstrated high levels of internal consistency reliability, and the AVE to be above the required minimum level of 0.50 in order to have high levels of convergent validity. The results of the reflective measurement models of the study are shown in Table 2. Overall, the results of the measures of all the reflective constructs recorded the outer loadings which were higher than 0.70 translated into indicator reliability values which were either equal or higher than 0.50, CR values which were well above 0.70 and AVE values which were all above 0.50.

The heterotrait-monotrait ratio of correlations (HTMT) assesses the discriminant validity in variance-based PLS-SEM (Henseler, Ringle, & Sarstedt, 2015). This study adopted the suggested threshold value of 0.90 (Gold, Malhotra, & Segars, 2001; Teo, Srivastava, & Jiang, 2008) as the predefined threshold value to assess the discriminant validity. As shown in Table 3, all computations yielded values below the threshold value of 0.90. In addition, bootstrapping procedure showed that the 95% confidence intervals (bias-corrected) of the construct's HTMT value did not include one. Hence, the results provided support for the constructs' discriminant validity (Hair, Hult, Ringle, & Sarstedt, 2017). Overall, all measurement models evaluation criteria were met and provided support for the measures' reliability and validity.

4.2. Structural model

4.2.1. Multicollinearity assessment

In assessing the multicollinearity of the indicators in the structural model, each set of the constructs were examined against the endogenous constructs (intention to switch and behavioral readiness) separately. A variance inflation factor (VIF) value of 5.0 and higher among the constructs indicated a potential multicollinearity problem (Hair, Ringle, & Sarstedt, 2011). The results from collinearity diagnostics using Smart PLS 3 are shown in Table 4. All constructs' VIF values were uniformly below the threshold value of 5.0. Henceforth, it was concluded that multicollinearity did not reach critical levels in any of the constructs and it was not an issue for the estimation of the PLS-SEM path model.

Table 2
Summary results of measurement models.

Construct	Indicator	Loading	CR[a]	AVE[b]
Convenience	CV1	0.866	0.949	0.789
	CV2	0.919		
	CV3	0.882		
	CV4	0.881		
	CV5	0.893		
Flexible service	FS1	0.882	0.935	0.782
	FS2	0.882		
	FS3	0.875		
	FS4	0.899		
Commute impedance	CI1	0.774	0.899	0.691
	CI2	0.887		
	CI3	0.816		
	CI4	0.844		
Intention to switch	IS1	0.859	0.939	0.794
	IS2	0.907		
	IS3	0.898		
	IS4	0.899		
Behavioral readiness	BR1	0.924	0.968	0.833
	BR2	0.939		
	BR3	0.915		
	BR4	0.900		
	BR5	0.908		
	BR6	0.890		

Note. CI5 was deleted due to low loading.
[a] CR = Composite Reliability.
[b] AVE = Average Variance Extracted.

Table 3
The result of heterotrait-monotrait ratio (HTMT).

	Behavioral readiness	Commute impedance	Convenience	Flexible service	Intention to switch
Behavioral readiness					
Commute impedance	***0.232***				
Convenience	0.545	***0.186***			
Flexible service	0.512	0.179	***0.671***		
Intention to switch	0.752	0.287	0.671	***0.668***	

Note. HTMT values are shown in diagonal boldface.

Table 4
Variance inflation factor.

Construct	Intention to switch	Behavioral readiness
Convenience	1.637	–
Flexible service	1.630	–
Commute impedance	1.041	–
Intention to switch	–	1.000

4.3. Hypotheses testing

The path analysis was performed using PLS-SEM to test the generated four hypotheses. In order to examine the size of the path coefficient, first, the application of Smart PLS 3 run the bootstrapping option (Ringle et al., 2015) to determine the significance of the paths. The image of the structural model is as shown in Fig. 4.

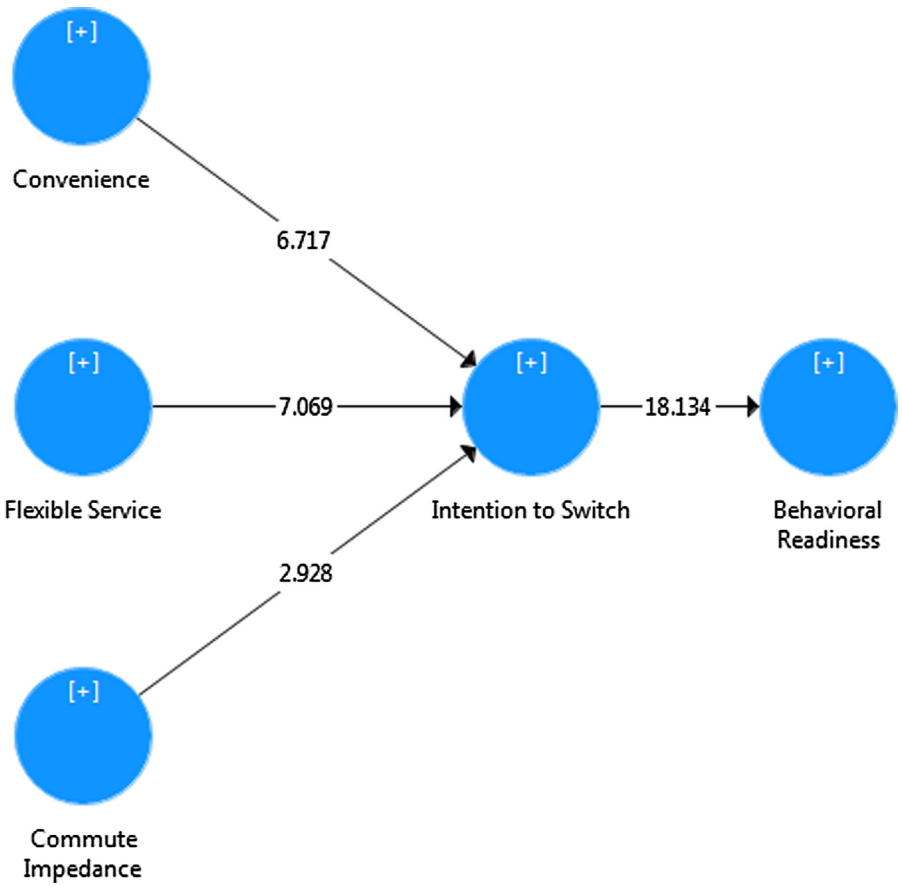

Fig. 4. The results of the structural model.

An overview of results from PLS-SEM of the three predictive constructs and intention to switch on behavioral readiness are shown in Table 5.

The results show that convenience, flexible service, and commute impedance explained 48.7 percent of the total variance in intention to switch. All predictors, namely convenience ($\beta = 0.375$, $p < 0.056$), flexible service ($\beta = 0.354$, $p < 0.050$), and commute impedance ($\beta = 0.141$, $p < 0.048$) are positively related to intention to switch. Likewise, intention to switch explained 49.7 percent of the total variance in behavioral readiness. Intention to switch ($\beta = 0.705$, $p < 0.039$) is positively related to behavioral readiness. All *t*-values of the four hypothesized relationships are significant at the one-tail test. Thus, H1, H2, H3, and H4 of this study are supported. In addition, both R^2 values are close to 0.50, which indicates moderate models (Hair et al., 2011). The effect size (f^2) (Cohen, 1992) f^2)is a measure of the impact of a specific predictor on an endogenous construct (Hair et al., 2014). In this paper, intention to switch ($f^2 = 0.988$) indicates a large effect size (Cohen, 1988) on behavioral readiness. Correspondingly, convenience ($f^2 = 0.167$) and flexible service ($f^2 = 0.150$) both indicate medium effect sizes (Cohen, 1988) on intention, whereas commute impedance ($f^2 = 0.037$) shows small effect size on intention to switch to PT.

5. Discussion

The findings of this paper show that intention to switch is the primary predictor for the drivers' behavioral readiness to adopt PT. It justifies to prioritize the promotion strategies to enhance intention to switch among the drivers. All three predictors namely convenience, flexible service, and commute impedance are positively related to intention to switch. As hypothesized, the drivers acknowledge that car driving is a convenient transport mode in their daily trips. Similarly, they expect the same convenience attribute if they were to adopt PT. Convenience as the perceived value positively predicted intention to switch and well supported by literature (Beale & Bonsall, 2007). In addition, the drivers also accustomed to the flexibility of car driving in their daily trips. The offering of PT's flexible service meets their different and spatial demand levels of commuting. Contrary to the service provided by PT which serves the traditional fixed routes, the flexible service is innovative and could be tailored to meet the accessibility and connectivity issues in the landscape of Malaysia. Service design which provides convenience and offers flexible service could overcome issues arising from poor connectivity of the traditional PT which serves in the fix schedules and rigid routes.

On the other hand, the findings show that commute impedance positively predicted the drivers' intention to switch to adopt PT. Their frequent encountering of commute impedance (Novaco & Gonzalez, 2009) in daily trips generates negative emotion. The negative emotion has prompted thought of breaking the routine of car driving (Heckhausen, 1987; Sheeran, Webb, & Gollwitzer, 2005) to consider alternative transport mode such as PT. Henceforth, commute impedance predicted intention to switch positively. However, the degree of impedance-derived emotion may vary in accordance with different drivers. The current commute impedance encountered by the different drivers may have instilled thought provoking effect on intention to switch as a way to reduce tension encountered from impedance. Hypothetically, such mind provoking thought may or may not materialize into behavioral readiness as evidenced in its rather small effect on intention to switch despite its statistical significance. The empirical findings establish the importance of the predictors in conversion of drivers to become riders of PT. Knowledge of the current commute impedance encountered by the drivers could be taken as an opportunistic approach to campaign favorably for conversion from the car driving to adopt PT.

5.1. Managerial implication

The drivers rated convenience as their strong preference in intention to switch to PT. In this perspective, PT practitioners need to improve service design which tailored for convenience to become attractive to move modal shift based on this demand, such as provide ease of access to bus stops. There are areas raised by the drivers concerning their impulsive need to go places, which give rise to spontaneous behavior. The phenomena could be tackled by providing more PT routes to cater for such impulsive intent to run errands. Transport practitioner may work to provide credible and real-time information

Table 5
Hypothesis testing.

Hypothesis	Relationship	Standard beta	Standard error	t-Value	Decision	(R^2)[a]	(f^2)[b]	VIF[c]
H1	CV->IS	0.375	0.056	6.717**	Supported	0.487	0.167	1.637
H2	FS->IS	0.354	0.050	7.069**	Supported		0.150	1.630
H3	CI->IS	0.141	0.048	2.928**	Supported		0.037	1.041
H4	IS->BR	0.705	0.039	18.134**	Supported	0.497	0.988	1.000

Note. CV = Convenience; FS = Flexible Service; CI = Commute Impedance; IS = Intention to switch; BR = Behavioral readiness.
[a] Coefficient of determination (R^2).
[b] Effect size (f^2).
[c] Variance inflation factor (VIF).
** $p < 0.01$, one-tailed ($t > 2.33$).

about the availability of PT and its service routes daily. Generally, a good flexible service will produce shorter commute times than the traditional fixed route PT. The real-time information enables focus on the availability of flexible service nearby based on the need basis of the drivers. It will also benefit them and ease their commute experience on congestion occurring in the weekdays, typically during the morning and evening peak hours. The prime preference in the drivers was also accessibility and convenience of the locations of bus stops.

Ironically, the current commute impedance may have given the drivers other problems such as the difficulty of parking, cost of parking, and stress of driving cars or motorcycles. This fits the promotional campaigns which are directed toward the behavioral readiness and should meet with success if the drivers are targeted to realize the importance underlying relationship between commute impedance and intention to switch PT. With the current state of commute impedance experienced by the drivers, right messages built in the intervention program could be tailored to change their behavioral readiness. Most research examines only intent as an alternate form of transport but failed to identify how the drivers could possess behavioral readiness. Campaigns aimed at changing behavior need to focus on encouraging PT use, while different campaigns aimed at discouraging personal car use. Clearly, the analyses indicated that creating strong intention to switch as a determinant of behavioral readiness is, in fact, a result of volitional intent and more behavioral readiness could be pursued.

5.2. Intervention

Study indicates that effective intervention needs to consider support mechanism for the drivers to extend their switching intention to switch into behavioral readiness to adopt PT (Friman et al., 2018). This paper identifies the drivers who had used PT before but not on daily basis, and also the drivers who use car driving occasionally for their trips.

First, the drivers who have "never used" PT before are liken to the drivers who are in the pre-decisional phase. These drivers need encouragement to motivate them to consider trips using PT. Hence, intervention strategy to convert this group of drivers to become riders of PT should be persuasive messages. Generally, intervention program which strategizes to create awareness on the pros and cons of car driving compared to the beneficial switch to ride with PT is influential and effective in this phase. They either do not recognize the need to switch or have no interest to switch from the car driving to adopt PT. Therefore, intervention programs which activate awareness on environmental pollution, effects of commute impedance, perceived personal responsibility on using active transport and so forth shall be receptive to them. The objective of these intervention programs is to create awareness on congestion, air pollution, and effort in reducing car driving which prompts reduction of volume of cars on roads. Activation of such awareness allows the drivers to consider the goodness of using PT to replace their car driving trips.

Second, the drivers who have used PT but not on regular basis. They are likened to the occasion riders. As reiterated, the drivers in the pre-actional phase possess volition strength to implement intention to switch to adopt PT. Intervention programs which target to move this group of drivers to realize their intention to switch, and behavioral readiness to adopt PT could be successful. Intervention programs which are tailored to support them to select specific action plans for their planned trips as options should be welcome. For instance, intervention involves providing traffic information about congestion at real time and alternative transport which gives benefits if they are prepared (behavioral readiness) to adopt adjacent PT service.

6. Conclusions

This paper contributes to the ongoing debate on how to persuade the drivers to adopt more sustainable mobility in their transport behavior. The findings of this paper imply the need to develop the phase-tailored intervention in order to meet the specific lifestyle and demand of the drivers. Irrespective of whether it is a long term mode choice such as making a normal work trip, or a medium term mode choice such as shopping and escorting children to school, the drivers will search for the most appropriate set of activities and transport mode required to satisfy their trips. Instead of applying "one-size-fits-all" approach of the traditional fixed route PT system to persuade the drivers to adopt PT, it promotes service design of PT based on convenience and flexible service to encourage sustainable urban mobility and behavior in light of their intention to switch to adopt PT. The findings assist to affirm that current commute impedance serves as affective influence on their intention to switch hence it could ease the adoption of PT. The findings show that both drivers' psychological and affective predictors are crucial for influencing their intention to switch and behavioral readiness to adopt PT with volition. The findings indicate the importance of the three predictors to receive managerial attention in targeting conversion of drivers to become riders of PT.

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Appendix A. Survey items

Construct (definition)	Dimension	Item	Code	Likert scale	Reference
Functional Attitude (Perceived Value)	Convenience	• Use of smart ticket to substitute cash in paying fares. • Use of large route number in front of the public bus. • Use of audio announcement about the next stop. • Use of electronic text about the next stop. • Availability of internet inside the bus.	• CV1 • CV2 • CV3 • CV4 • CV5	1 = Not at all important 5 = Very important	Currie and Wallis (2008)
	Flexible service	• Express shuttle public bus which delivers passengers from point A to point B without stops. • Feeder bus which brings passengers to the nearby bus stops to follow the regular bus. • More frequent buses which serve the morning rush hours from 6.10 a.m. to 8.10 a.m. • More frequent buses which serve the evening rush hours from 4.30p.m. to 6.50p.m.	• FS1 • FS2 • FS3 • FS4		Sihvola et al. (2010)
Affective Attitude (Emotional Response)	Commute impedance	• Are you able to avoid traffic jams when you go places daily? • Are you able to avoid traffic jams on your way home daily? • Is your average driving speed reduced by the traffic jam? • Do you find it necessary to apply brakes in the morning rush from 6.10 am to 8.10 a.m.? • Do you find it necessary to apply brakes in the evening rush from 4.30 pm to 6.50p.m.?	• CI1 • CI2 • CI3 • CI4 • CI5	1 = Never 5 = Always	Novaco et al. (1991)
Intention (Cognitive Indication)	Intention to switch to adopt PT	"In the next few weeks, instead of using the car for my daily trips, . . ." • I intend to use public bus. • I will try to use public bus. • I plan to use public bus. • I aim to use public bus.	• IS1 • IS2 • IS3 • IS4	1 = Strongly disagree 5 = Strongly agree	Gardner (2009)
Behavior (Planning)	Behavioral readiness to adopt PT	"If you intend to use the public bus instead of the car for daily trips during the next few weeks, . . ." • Have you yet decided which route you will use public bus? • Have you yet chosen a specific day on which you will carry out your plan? • Have you already informed yourself when and where the public bus route you want to use departs? • You could save the time searching for parking space. • You would not be annoyed by the frequent traffic jams. • You would reach the destination in a more calm and relaxed way than by car.	• BR1 • BR2 • BR3 • BR4 • BR5 • BR6	1 = Very unlikely 5 = Very likely	Bamberg (2007)

Appendix B. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.trf.2019.02.005.

References

Abou-Zeid, M., & Ben-Akiva, M. (2011). The effect of social comparisons on commute well-being. *Transportation Research Part A: Policy and Practice, 45*(4), 345–361.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211.

Alsnih, R., & Hensher, D. (2003). The mobility and accessibility expectations of seniors in an aging population. *Transportation Research Part A: Policy and Practice, 37*(10), 903–916.

Anable, J. (2005). Complacent car addicts or aspiring environmentalists? Identifying travel behaviour segments using attitude theory. *Transport Policy, 12*(1), 65–78.

Achtziger, A., & Gollwitzer, P. M. (2010). Motivation and Volition in the Course of Action. In J. Heckhausen (Ed.), *Motivation and Action* (pp. 275–299). New York: Cambridge University Press.

Bakker, P. (1999). Large scale demand responsive transit systems - A local suburban transport solution for the next millennium. In *Proceedings of the National Academy of Sciences, ETC Conference Paper* (pp. 109–126).

Bamberg, S. (2007). Is a stage model a useful approach to explain car drivers' willingness to use public transportation? *Journal of Applied Social Psychology, 37*(8), 1757–1783.

Bamberg, S. (2013). Applying the stage model of self-regulated behavioral change in a car use reduction intervention. *Journal of Environmental Psychology, 33*(3), 68–75.

Beale, J., & Bonsall, P. (2007). Marketing in the bus industry: A psychological interpretation of some attitudinal and behavioral outcomes. *Transportation Research Part F: Traffic Psychology and Behavior, 10*(4), 271–287.

Beckmann, M. (2013). Traffic congestion and what to do about it. *Transportmetrica B: Transport Dynamics, 1*(1), 103–109.

Benh, H. (1995). *Bus route evaluation standards – A synthesis of transit practice*. Transportation Research Board, National Research Council.

Boyd, H., Westfall, R., & Stasch, S. (1977). *Marketing Research – Text and Cases*. Homewood IL; Richard D: Irwin, Inc..

Budiono, O. (2009). Customer satisfaction in public bus transport – A study of travelers' perception in Indonesia. Thesis, Karlstad University, Sweden. Retrieved from http://www.diva-portal.org/smash/get/diva2:232419/fulltext01.pdf

Burgess, J., Harrison, C. M., & Filius, P. (1998). Environmental communication and the cultural politics of environmental citizenship. *Environment and Planning A, 30*(8), 1445–1460.

Carrus, G., Passafaro, P., & Bonnes, M. (2008). Emotions, habits and rational choices in ecological behaviors: The case of recycling and use of public transportation. *Journal of Environmental Psychology, 28*(1), 51–62.

Churchill, J., & Gilbert, A. (1979). *Marketing research – Methodological foundations* (2nd ed.). Hinsdale, IL: The Dryden Press.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.

Cohen, S., Kessler, R., & Gordon, L. (1997). *Measuring stress: A guide for health and social scientists*. New York: Oxford University Press.

Cortes, C., & Jayakrishnan, R. (2002). Design and operational concepts of high-coverage point-to-point transit system. *Transportation Research Record: Journal of the Transportation Research Board, 1783*(02–4006), 178–187.

Cullinane, S. (2002). The relationship between car ownership and public transport provision: A case study of Hong Kong. *Transport Policy, 9*(1), 29–39.

Currie, G., & Wallis, I. (2008). Effective ways to grow urban bus markets – A synthesis of evidence. *Journal of Transport Geography, 16*(6), 419–429.

De Groot, J., & Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioral intentions. *Journal of Environmental Psychology, 30*(4), 368–378.

Diana, M., & Mokhtarian, P. (2009). Desire to change one's multimodality and its relationship to the use of different transport means. *Transportation Research Part F: Traffic Psychology and Behavior, 12*(2), 107–119.

Enoch, M., Potter, S., Parkhurst, G., Smith, M. 2004. [Online]. INTERMODE: innovations in Demand Responsive Transport. Department for Transport and Greater Manchester Passenger Transport Executive. Final report. London: Department for Transport. Available at: http://www.dft.gov.uk [Accessed 5 June 2014].

Eriksson, L., & Forward, S. (2011). Is the intention to travel in a pro-environmental manner and the intention to use the car determined by different factors? *Transportation Research Part D: Transport and Environment, 16*(5), 372–376.

Fishbein, M. (1963). An investigation of the relationship between beliefs about an object and the attitude toward that object. *Human relations, 16*(3), 233–239.

Fishbein, M. (1979). A theory of reasoned action: Some applications and implications. In H. E. Howe & M. M. Page (Eds.), *Nebraska Symposium on Motivation*. Lincoln: University of Nebraska Press.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley Pub. Co..

Friman, M., Edvardsson, B., & Garling, T. (2001). Frequency of negative critical incidents and satisfaction with public transport services I. *Journal of Retailing and Consumer services, 8*(2), 95–104.

Friman, M., Ettema, D., & Olsson, L. E. (2018). Travel and wellbeing: Future prospects. In M. Friman (Ed.), *Quality of Life and Daily Travel, Applying Quality of Life Research* (pp. 255–263). Basel, Switzerland: Springer International Publishing AG.

Fujii, S., & Van, H. (2009). Psychological determinants of the intention to use the bus in Ho Chi Minh City. *Journal of Public Transportation, 12*(1), 97–110.

Galdames, C., Tudela, A., & Carrasco, J. (2011). Exploring the role of psychological factors in mode choice models by a latent variables approach. *Transportation Research Record: Journal of the Transportation Research Board*, 2230–2245.

Gao, Y., Chen, X., Shan, X., & Fu, Z. (2018). Active commuting among junior high school students in a Chinese medium-sized city: Application of the theory of planned behavior. *Transportation Research Part F, 56*, 46–53.

Gardner, B. (2009). Modelling motivation and habit in stable travel mode contexts. *Transportation Research Part F: Traffic Psychology and Behavior, 12*(1), 68–76.

Gardner, B., & Abraham, C. (2007). What drives car use? A grounded theory analysis of commuters' reasons for driving. *Transportation Research Part F: Traffic Psychology and Behavior, 10*(3), 187–200.

Gatersleben, B., & Uzzell, D. (2007). Affective appraisals of the daily commute comparing perceptions of drivers, cyclists, walkers, and users of public transport. *Environment and Behavior, 39*(3), 416–431.

Glanz, K., Rimer, B., & Viswanath, K. (2015). How individuals, environments, and health behaviors interact: Social cognitive theory. In Health behavior: Theory, research, and practice (pp. 159–181). Wiley.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems, 18*(1), 185–214.

Gollwitzer, P. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology, 4*, 141–185. https://doi.org/10.1080/14792779343000059.

Gollwitzer, P. (1996). The volitional benefits of planning. In P. Gollwitzer & J. Bargh (Eds.), *The Psychology of Action: Linking Cognition and Motivation to Behavior* (pp. 287–312). New York, NY: Guilford Press.

Gollwitzer, P. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist, 54*(7), 493–503.

Gollwitzer, P., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology, 38*, 69–119.
Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice, 19*(2), 139–152.
Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2014). *A primer of partial least square structural equation model (PLS-SEM)(1st ed.)*. CA: SAGE.
Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2017). *A primer of partial least square structural equation model (PLS-SEM)(2nd ed.)*. CA: SAGE.
Hardy, B., & Ford, L. (2014). It's not me, it's you: Miscomprehension in surveys. *Organizational Research Methods, 17*(2), 138–162.
Heath, Y., & Gifford, R. (2002). Extending the theory of planned behavior: Predicting the use of public transportation. *Journal of Applied Social Psychology, 32*(10), 2154–2189.
Heckhausen, H. (1987). Wishing-weighing-willing. In H. Heckhausen, P. Gollwitzer, & F. Weinert (Eds.), *Beyond the Rubicon: The Will in the Human Sciences* (pp. 3–9). Heidelberg, Germany: Springer-Verlag.
Heckhausen, H. (1991). Volition: Implementation of intention. In P. K. Leppmann (Ed.), *Motivation and Action* (pp. 163–188). Berlin: Springer-Verlag.
Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion, 11*(2), 101–120.
Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115–135.
Higgins, E. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12), 1280–1300.
Higgins, E. (2011). Value-Truth relations: Creating commitment. In E. Higgins (Ed.), *Beyond Pleasure and Pain: How Motivation Works* (pp. 197–227). New York: Oxford University Press.
Holland, R. W., Aarts, H., & Langendam, D. (2006). Breaking and creating habits on the working floor: A weld-experiment on the power of implementation intentions. *Journal of Experimental Social Psychology, 42*, 776–783.
Hunt, S., Sparkman, R., & Wilcox, J. (1982). The pre-test in survey research: Issues and preliminary findings. *Journal of Marketing Research, 19*(2), 269–273.
Jackson, T. (2005). Motivating sustainable consumption. A Review of Evidence on Consumer Behavior and Behavioral Change, Sustainable Development Research Network, Surrey, UK.
Katz, D. (1960). The functional approach to the study of attitudes. *Public Opinion Quarterly, 24*(2), 163–204.
Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research, 8*(3), 239–260.
Kraus, S. (1995). Attitudes and the prediction of behavior: A meta-analysis of the empirical literature. *Personality and Social Psychology Bulletin, 21*(1), 58–75.
Lai, W., & Chen, C. (2011). Behavioral intentions of public transit passengers – The roles of service quality, perceived value, satisfaction and involvement. *Transport Policy, 18*(2), 318–325.
Litman, T. (2008). Valuing transit service quality improvements: Considering comfort and convenience in transport project evaluation. *Journal of Public Transportation, 11*(2), 43–64.
Malaysia Department of Prime Minister (2010). Government Transformation Program, Chapter 11: Improving urban public transport. Retrieved From http://www.pmo.gov.my/GTP/documents/GTP%20Roadmap/GTP%20Roadmap_Chapter11.pdf.
Malaysia Department of Prime Minister (2011). PEMANDU Lab Highlights: Urban Public Transport. Retrieved from http://www.pemandu.gov.my/gtp/upload/32342fef-71ab-4030-9e4e-f0c1bd2a18bf.pdf.
Malaysia Road Transport Department. (2016). Table 1.2: motor vehicles by type and state. Retrieved from http://www.mot.gov.my/my/Statistics/Pages/Land.aspx.
Malaysia Department of Statistic, 2019. [Online]. Demographic statistics. First quarter (Q1). Available at: https://www.dosm.gov.my [Accessed 19 February 2019].
Malaysia Land Public Transport Commission (SPAD) (2017). National Land Public Transport Master Plan. Retrieved from https://www.spad.gov.my/sites/default/files/national_land_public_transport_master_plan_eng.pdf.
Muhammad Hafizi Bin Mohd Teramizi. (2013, 02 January). Bridge Express Shuttle Transit (BEST) (Web log post). Retrieved from http://ptc.penang.gov.my/images/stories/Brochure.pdf.
Malaysia Ministry of Road Transport (2017). Malaysia Stocktaking Report on Sustainable Transport and Climate Change Data, Policy, and Monitoring Retrieved from http://www.mot.gov.my/SiteCollectionDocuments/Darat/MY_StockTakingReport_Final.pdf.
Mars, L., Ruiz, T., & Arroyo, R. (2018). Identification of determinants for rescheduling travel mode choice and transportation policies to reduce car use in urban areas. *International Journal of Sustainable Transportation*. https://doi.org/10.1080/15568318.2017.1416432.
Novaco, R., & Gonzalez, O. (2009). Commuting and well-being. In Yair Amichai-Hamburger (Ed.), *Technology and Well-Being, University of California*. Irvine, USA: Cambridge University Press.
Novaco, R., Kliewer, W., & Broquet, A. (1991). Home environmental consequences of commute travel impedance. *American Journal of Community Psychology, 19*(6), 881–909.
Novaco, R., Stokols, D., Campbell, J., & Stokols, J. (1979). Transportation, stress, and community psychology. *American Journal of Community Psychology, 7*(4), 361–380.
Orbeil, S., Hodgldns, S., & Sheeran, P. (1997). Implementation intentions and the theory of planned behavior. *Personality and Social Psychology Bulletin, 23*(9), 945–954.
Park, J. & Kim, D. (2008). The potential use of smart card data to define the use of public transit in Seoul. Washington, DC: Transportation Research Board: United States Federal Transit Administration.
Performance Management Delivery Unit (PEMANDU) (2010). Economic transformation program handbook. (August 21, 2014). Retrieved from http://etp.pemandu.gov.my/download_centre.aspx.
Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539–569.
Proschaska, J., & DiClemente, C. (1984). *The Transtheoretical Approach: Crossing Traditional Boundaries of Change*. Homewood IL: J. Irwin.
Quah, J. (February, 2016). BEST Step forward for public transport. Penang Economic Monthly, 4, 40-41. Retrieved from: http://penangmonthly.com/best-step-forward-for-public-transport.
Redman, L., Friman, M., Garling, T., & Hartig, T. (2013). Quality attributes of public transport that attract car users: A research review. *Transport Policy, 25*, 119–127.
Ringle, C.M., Wende, S., Becker, J.M. (2015), Boenningstedt: SmartPLS GmbH. http://www.smartpls.com.
Rosenberg, M., & Hovland, C. (1960). Cognitive, affective, and behavioral components of attitudes. In C. Hovland & M. Rosenberg (Eds.). *Attitude, organization and change: an analysis of consistency among attitude components* (Vol. 3, pp. 1–14). New Haven, CT: Yale University Press.
Russell, I., & Snodgrass, J. (1987). Emotion and the environment. In D. Stokols & I. Altman (Eds.). *Handbook of environmental psychology* (Vol. 1, pp. 245–280). New York: Wiley.
Russell, J., & Mehabrian, A. (1977). Evidence of a three-factor theory of emotions. *Journal of Research in Personality, 11*(3), 273–294.
Sarnoff, I., & Katz, D. (1954). The motivational bases of attitude change. *Journal of Abnormal and Social Psychology, 49*, 115–124.
Schneider, R. J. (2013). Theory of routine mode choice decisions: An operational framework to increase sustainable transportation. *Transport Policy, 25*(1), 128–137.
Scott, M., Sarker, M., Peterson, D. & Hough, J. (2011). University of North Dakota campus shuttle study. Small Urban and Rural Transit Center Report, North Dakota State University.
Sharaby, N., & Shiftan, Y. (2012). The impact of fare integration on travel behavior and transit ridership. *Transport Policy, 21*, 63–70.

Shay, E., & Khattak, A. (2012). Household travel decision chains: Residential environment, automobile ownership, trips and mode choice. *International Journal of Sustainable Transportation, 6*(2), 88–110.
Sheeran, P., Webb, T., & Gollwitzer, P. (2005). The interplay between goal intentions and implementation intentions. *Personality and Social Psychology Bulletin, 31*(1), 87–98.
Sihvola, T., Hame, L. & Sulonen, R. (2010). Passenger-pooling and trip-combining potential of high-density demand responsive transport. Paper presented at the Annual Meeting of the Transportation Research Board, Washington DC.
Singapore Land Transport Authority Annual Report (2017). New journeys. Retrieved from https://www.lta.gov.sg.SoGoSurvey Inc. Herndon, VA, USA. www.sogosurvey.com.
Stark, J., Beyer, W. J., & Hossinger, R. (2018). The effectiveness of an intervention to promote active travel modes in early adolescence. *Transportation Research Part F, 55*, 389–402.
Steg, L. (2003). Can public transport compete with the private car? *IATSS Research, 27*(2), 27–35.
Steg, L. (2005). Car use: Lust and must. Instrumental, symbolic and affective motives for car use. *Transportation Research Part A, 39*(2–3), 147–162.
Stradling, S. (2002). Transport user needs and marketing public transport. *Proceedings of the Institution of Civil Engineers – Municipal Engineer, 151*(1), 23–28.
Stradling, S., Anable, J., & Carreno, M. (2007). Performance, importance and user disgruntlement: A six-step method for measuring satisfaction with travel modes. *Transportation Research Part A: Policy and Practice, 41*(1), 98–106.
Abdul Sukor, N. S., Basri, N. K., & Tarigan, A. K. M. (2018). The role of incentives towards adolescents' commitment to use public transport in Malaysia. *Transportation Planning and Technology*. https://doi.org/10.1080/03081060.2018.1435451.
Taylor, B. D., Miller, D., Iseki, H., & Fink, C. (2009). Nature and/or nurture? Analyzing the determinants of transit ridership across US urbanized areas. *Transportation Research Part A: Policy and Practice, 43*(1), 60–77.
Teo, T. S. H., Srivastava, S. C., & Jiang, L. (2008). Trust and electronic government success: An empirical study. *Journal of Management Information Systems, 25*(3), 99–132.
Thogersen, J., & Moller, B. (2008). Breaking car use habits: The effectiveness of a free one-month travel card. *Transportation, 35*(3), 329–345.
Triandis, H. (1977). *Interpersonal behavior*. Monterey, CA: Brooks/Cole Publishing Company.
Triandis, H. (1980). Values, attitudes, and interpersonal behavior. In University of Nebraska Press (Ed.), Nebraska Symposium on Motivation (Vol. 27, pp. 195–259). US: Lincoln.
Turner, M., & Wilson, R. (2010). Smart and integrated ticketing in the UK: Piecing together the jigsaw. *Computer Law & Security Review, 26*(2), 170–177.
Wall, R. (2006). Psychological and contextual influences on travel mode choice for commuting. Dissertation. De Montfort University, UK. Retrieved from http://www.iesd.dmu.ac.uk/staff/rob_wall.htm.
Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin, 132*(2), 249–268.