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Choice Experiment Attributes Selection: Problems and Approaches in a Modal Shift Study in Klang Valley, Malaysia

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Abstract

Choice experiment (CE) is a questionnaire based method that the accuracy of research questionnaire determines the validity of the research outcomes. Attribute selection has a prime importance in every CE studies. If respondents do not understand or do not have preference for a certain attribute, the attribute non-attendance problem might happen that biases overall results of the research. Qualitative approaches such as literature review, focus group discussion, and in depth discussion commonly applied in CE researches. However, especially in the developing countries context where ethnical and cultural diversity is a challenge in conducting survey based questionnaires, qualitative methods are not sufficient in selecting attributes. Present study investigates the application of relative importance index (RII) in respondents' preference for attributes in a modal shift study in Klang Valley, Malaysia. The 5 point Likert scale questions were employed to enhance respondents' preferences for initial 24 selected attributes. The results of this study showed that from 24 pre-selected attributes, only 18 of them had RII>0.5 and could be included in the final CE design. The results of this study could help researchers to control for unobserved problems in selecting the attributes which could not be discovered through qualitative approaches.

Keywords: attribute selection, choice experiment, developing countries, Likert scale, relative importance index

1. Introduction

Choice experiment (CE) is a stated preference method that could be employed to derive individual utilities based on attributes of goods and services in question (Boxall, 1996). The underlying basis of a choice modeling relies on random utility theory, and is based on Lancaster's characteristics theory of value. This allows that any specific goods to be valued based on their attributes; "any good can be described in terms of its attributes, or characteristics, and the levels that these take" (Bateman et al., 2002, p. 249). Therefore, in any CE studies potential policies or products are described by their assigned characteristics which is called attributes and a range of defined dimensions assigned to each attribute that is referred as attribute level (Abiiro et al., 2014). The experimental design in choice experiment forms finite number of alternatives from different combination of attributes and levels. The presented alternatives are policy scenarios or intervention programs. The respondents are then asked to choose their most preferred options or alternatives from set of presented ones. As it is obvious, designing the questionnaire, selecting attributes, levels, and experimental design is fundamental part in conducting every CE study (Hensher et al., 2005).

Experts of economic valuation of non-market goods have underscored the undesirable impact of bad instruments on valuation outcomes (Portney, 1994; Bateman et al., 2002). In the specific case of choice experiment, the proficiency of researchers to specify the appropriate sub-set of all potential choice-influencing attributes determines the validity of outcomes (Mangham et al., 2009; Adam et al., 2013). This is because, since any CE study is an attribute based research, the accuracy of study is greatly depend on appropriate selection of attributes and levels (Abiiro et al., 2014). Accordingly, if attributes are not specified accurately, there would be a chance of producing inaccurate results which can mislead policy implementation (Abiiro et al., 2014). Since the number of attributes which are affecting decision making could be extensive, reducing the number of attributes to be included in the study has various benefits (Louviere, Hensher, & Swait, 2000). First, as the number of attributes increase, the task of choice becomes more complicated to a respondent. It also can result in respondents'

confusion and fatigue and less accurate trade-off. Second, as the attributes and attribute level increases, the size and complexity of the choice task increases which needs more effort (in term of time and cost) to conduct. Hence, as choice metric team suggest, it is better to limit the number of attributes and levels to a more manageable size. To avoid complexity and confusing respondents, researchers need realistic attributes which make them policy implementable. Blamey et al. (2002) suggested that selected attributes have to be "demand relevant, policy relevant and measurable". In the process of selecting or reducing attributes if the specified attributes are not those about which respondents have the highest possible preference, attribute non-attendance problem, that biases estimated welfare measure could be induced (Alemu et al., 2013; Hess et al., 2012; Hensher et al., 2012). It means some of respondents might intentionally ignore those attributes that are least preferred by them in making choices (Lagarde, 2013). Thus, a great deal of caution is required in attribute selection which constitutes the first stage of analysis in CE (Coast & Horrocks, 2007; Kløjgaard et al., 2012). This is because, products, services or environmental goods possess long list of attributes beyond those usually modeled in CE studies (De Bekker-Grob et al., 2012). Choice-attribute selection is usually determined via the exploration of the views of target population in interviews as well as compilation of attributes from literature review (Hanley et al., 1998; Coast & Horrocks, 2007; Mangham et al., 2009; Kløjgaard et al., 2012). Some researchers such as Coast et al. (2012), Mangham et al. (2009) and Abiiro et al. (2014) applied qualitative approach as the most accurate way of deriving appropriate attributes. Some other researchers applied ranking and rating methods when restricting the number of attributes that are needed. For example, Hiligsmann et al. (2013) applied the nominal group technique which is based on ranking of attributes in their research. Adam et al. (2013) applied relative importance index to select the final set of attributes in their CE study on waste management in Nigeria. Kragt (2013) who reviewed more than 64 papers on natural resources and environmental valuation from 2002 and 2013 showed that majority of authors either used qualitative methods in attribute selection step or did not report it in their papers.

Prioritizing attributes might face more challenges and hence need special care when research is conducted in developing countries (Mangham, 2009). These challenges could be related to the presence of different ethnic groups with different culture and language (such as Malaysia) and trust issue. It could also happen when the surveyed population is less accustomed to choice based questionnaires (Mangham, 2009). Being accustomed with the current condition of resource under question and difficulty in acceptance of hypothetical scenario is another challenge. So the requirement for additional research beside primary attribute selection is necessary to assure the appropriateness of final set of attributes (Mangham, 2009).

The reason behind conducting this research was the difficulties we confronted in our pretest of choice experiment research on modal shift in Klang valley, Malaysia. First the response rate was as low as 30% and second attributes non-attendance problem was observed. Researchers believed that the presence of some attributes of the private transport made respondents to not complete the task and gave up in the middle. Also presence of some attributes in the public transport modes caused them without thinking and trading off to select the car option. In order to investigate the reason of disprefrence, application of a systematic method in attributes selection seemed necessary.

The aim of this paper is to explore the application of a systematic method in attribute selection. This way, respondents' preferences for attributes will be taken into account from the first stage of the study and the chance of non-attended attribute will be minimized. The relative importance of attributes based on respondents' preferences could help in getting better insights on relevance of attributes. The study was conducted in Klang Valley, Malaysia, to investigate the attributes of transportation mode choice between citizens.

2. Methodology

2.1 Attributes Selection Procedure

The first step in selecting attributes and levels is the refinement of the problem in hand to assure the sufficient understanding of the researchers from the situation (Hensher et al., 2005). Once the problem is defined, possible solutions to solve that and achieving the goal of research should be described (Blamey et al., 2002). It is important to note that unnecessary widening the problem and irrelevant questions should be avoided to help the respondents to focus on the main problem (Hensher et al., 2005; Whittington, 2010). The second step is defining the possible alternative as described by Henhser et al. (2005). According to Hensher et al., (2005), researchers need to cull alternatives to be able to create a manageable design. The selected alternatives could be labeled (e.g. car, bus, and train) or unlabeled (alternative 1, alternative 2, and etc.) (Rose & Bliemer, 2009) This decision of choosing labeled or unlabeled alternatives is important part of design because of its impact on the number of parameters to be estimated later (Rose & Bliemer, 2009).

Once the analyst has identified the number of alternatives to be included in the study, attributes and attributes'

levels must be determined (Hensher et al., 2005; Rose & Bliemer, 2009). In selecting relevant attributes, first we benefited from literature review and similar studies, and second from focus group discussions with experts. The Relative Importance Index was applied to measure the importance of researcher selected attributes to the respondents. The attributes were presented to the respondents on a five point Likert scales from "strongly disagree to strongly agree". The relative importance index (RII) was calculated then to reflect the relative preferences of each attribute. In the literature, the RII used to rank and cross compare relative satisfaction or importance of items (Sambasivan & Soon, 2007; Zeng et al., 2007). The index was calculated as follows (Kometa et al., 1994; Afroz et al., 2011; Adam et al., 2013):

$$RII = \left(\sum \frac{W_i X_i}{I * 100} \right) \quad (1)$$

Where:

W_i= the weight given to each factor by respondents, ranging from 1 to 5;

X_i= Frequency of answers to each factors

I= the highest rate (here 5)

The RII value has a range within 0 to 1, where closer to unit means higher perceived satisfaction. The closer to the unit shows the relevant importance of that attribute to the respondents.

2.2 Questionnaire and Data Collection

The first part of the questionnaire was the introductory script. The transportation related issues were presented to the respondents via pictures and graphs. They also were given brief information on health and environmental impacts of using private vehicles versus cleaner modes of transport. The objective of the study then was presented to them. The questions presented on a 5 point Liker scale to measure the respondents' preferences. This section followed by questions on respondents' background profile including their age, gender, education, income, commute time, and duration and the number of cars in each household.

Following the recommendation by NOAA panel (Arrow et al., 1993; Portney, 1994), face-to-face survey mode was used for data collection. This technique is the commonest adopted as evident in the literature review. Besides, this method has the potential to attract the highest response rate when compared to others (Bateman et al., 2002). To synthesize these two, the CAPI method that combines both interview complexity and face-to-face feature is the computer assisted personal interview (CAPI). The sample unit describes the researcher's unit of study and analysis. In micro-econometric analysis like that of the current study, it generally comprises either units of individuals or units of households. Quiggin (1998) found that estimates from individual units yield amounts greater than those based on the use of household units. In this study, the target population comprises the individuals who currently own a car and at the same time prefer using the "drive-alone" transport-mode to travel to their places of work. As such, individuals are taken to be the unit of analysis in this study. In each household, any individual up to the age of 18 and above, who has a car and uses it to travel between home and office is interviewed. Ninety (90) respondents were recruited for the study. The analysis of responses from the collected data yield estimates which were finally specified for optimization in the efficient design configuration of attributes. Data gathered from respondents in Kuala Lumpur, Shah Alam, Damansar, and Gombak in Klang valley area. To avoid trust and language issue each ethnicity group were assigned an interviewer from same race.

3. Results

3.1 Results of Alternatives and Attributes Selection

Based on literature review and focus group study the main transportation related problems were categorized as air pollution and congestion. The Malaysian transportation statistics in 2013 indicated that the total number of cars in Selangor and Wilayah Persekutuan were 1,037,243 and 3,442,319, respectively. For motorcycles, the number in Selangor was 1,202,473, and 1,626,718 in Wilayah Persekutuan. The share of public transport in Klang Valley is only 19%, which is low compared to neighboring countries such as Thailand and Singapore. A sustainable transport policy is needed to promote a more eco-friendly mode of transport and at the same time discourages commuting in private owned vehicles.

Initially, motor-cycle transport-mode was included as one of the future alternatives, increasing the specified transport-modes to four, including transportation by car, bus and train. The inclusion was deemed fit since it constitutes the transport-mode with the highest private ownership in Malaysia. However, motor-cyclists were found insensitive to the changing scenarios. As a result, this option was removed as a feasible future transport-mode. This is considered logical as it adds to the total number of road accidents in Malaysia despite the

fact that motor-cycles emit more harmful pollutants than cars or even large SUVs (Department of Environment Malaysia, 2012).

In the next step, from literature review and focus group studies, 24 attributes were selected. Due to the significant impact of transports on air quality and health, it was decided to allocate some attributes to the health. Travel characteristics such as travel time, travel cost, convenience, accessibility, number of transfers, egress mode, and reliability of service were also included. Twenty four attributes were then decided to be included in the pilot study. However, from the 24 attributes, six were common between public transport, and another 9 were peculiar to private transport. The car alternative attributes were designed as if a respondent desires to drive to work in the future (the target year was set as 2030 based on Malaysian Transportation Plan), and the driver has to pay for the externality that impose to the society. This payment for externality is accounted as increase in toll, parking fee, petrol price, and congestion fee. At the meantime, the attributes of public transport are considered in the Malaysian Master Plan 2030 when a significant improvement is expected in the efficiency of public transport sector.

3.2 Respondents Socioeconomic Characteristics

The results of the socioeconomic profile of respondents are presented in Table 1. The achieved response rate was 80%, meaning that from each 10 respondents who were approached only 8 of them agreed to be interviewed. Overall ninety questionnaires were filled out. From the total number of questionnaire, 2 of them were eliminated due to incomplete responses. The final analysis, hence, was carried out using 88 valid questionnaires.

The results showed that the average sample age was 35 years old. The gender distribution was 30.7% women and 69.3% men. Considering the gender ratio in Malaysia, which is 1.03male/female, our sample had a higher number of males compared with the Malaysian average. From marital point of view 21% were single while 79% were married. About 63.6% of sample had 1 to 4 children, 28% had no child, while 8% had more than 5 children in the household. Forty five percent of the respondents were Malay, 35% Chinese and 20% Indians.

The respondents' education classification showed that 8% of them had secondary school, 19% graduated from college, and 37.5% bachelor degree, 9% professional certificate, and 26.1% post graduate degrees. This figure is a little higher than Malaysia's reported average 13 years of schooling for the country. However, since our respondents were employees of private and public sectors that commuted to work by their own car, higher level of education compared to average population was expected. From the income perspective, majority of the respondents (63.5%) had monthly income of RM 5000-6000, which is consistent with the monthly average income of RM 5000 in 2014. Majority of the respondents (70%) were government sector employees, while only 30% were working in private sector. The respondents also asked about the number of vehicles in their household. The results showed that 6.8% of respondents have one car, 48% have 2 cars per household, while 20% have3 cars and 23.8% have 4 cars and more per household. Average car number per household was 3. The majority of respondents (52%) commuted in the morning peak hours between 7 am and 8am and evening peak hours between 5pm and 8pm.

3.3 Results of RII for Travel Mode Choice

The respondents' preferences for all the attributes are shown in Table 2. The health attribute was presented to the respondents as if they continue using their car and so do everyone else, the number of unhealthy days will increase from current number. Therefore this attribute was presented as "increase in the number of unhealthy days". The results indicated that 64.4% strongly agreed and 35.6% agreed to include this attribute in the study. The results also indicated that 69.4% strongly agreed and 30.6% agreed with inclusion of travel time attribute as well. In terms of toll increment, 30% and 34% agreed and strongly agreed, respectively, with this attribute. However, 15.3% strongly disagreed and 20.4% disagreed with the attribute of toll increment. The respondents' reaction to the parking fee increment to the maximum RM 10 per day indicated that 20% and 25.5% were strongly disagree and disagree, respectively, with the inclusion of this attribute. However, 24.5% strongly agreed and 24.5% agree with this attribute. The interesting results obtained from the respondents preference was the petrol price increment in the choice set. Majority of respondents were strongly disagree (38.4%) and disagree (29.2%) with this attribute to be entered in the final research, while 18.4% were agreed and 14.6% strongly agreed with this attribute. In investigating the reason for high objection rate for oil price increment attribute, we realized that Malaysians response to petrol price increments have been always negative and sensitive. See for example the studies by Almeslati et al. (2011) and Shaari (2013). Congestion fee was the last attribute of car option that was presented to the respondents. The results showed that 10.2% and 25.5% were strongly disagreed and disagree with this attribute, respectively. On the other hand, 20.4% were neither agree nor disagree, 28.7% agreed, and 15.3% strongly agreed with this attribute.

Table 1. Respondents' socioeconomic profile

Variable	Frequency	Percentage	Mean	St. Deviation
Age			35	10.21
Gender			0.69	0.46
Male	61	69.3		
Female	27	30.7		
Marital Status			0.79	0.40
Single	18	20.5		
Married	70	79.5		
Household size			2.00	1.65
0 child	18	28.4		
1 child	8	9.1		
2 children	23	26.1		
3 children	15	17		
4 children	10	11.4		
5 and more children	7	7.9		
Ethnicity				
Malay				
Chinese				
Indian				
Education			5	1.06
Secondary School	7	8		
Diploma	17	19.3		
Professional certificate	8	9.1		
Bachelor degree	33	37.5		
Master and higher	23	26.1		
Income group (RM)			3.98	1.90
<3000	20	22.8		
3001-6000	56	63.5		
>6000	12	13.7		
Employment type			1.75	0.43
Government	62	71		
Private sector	26	29		
Number of vehicles per household			2.65	1.01
1	6	6.8		
2	43	48.8		
3	18	20.5		
4	17	19.3		
4<	4	4.5		
Total number of observation	**88**			

Train is a sustainable mode of transport that has lesser pollution compared to car and bus. The health attribute in the case of train was presented as "decrease in the number of unhealthy days". This implies that switching to public transport such as train will guarantee better air quality. The results of the respondents' preference for this attribute were 74.5% strongly agree and 28.7% agree. Almost 80% of respondents were strongly agreed and 20.4% were agreed with the importance of travel time in vehicle when using train. The results indicated that 69.4% and 30.6% of the respondents were strongly agree and agree, respectively, with the inclusion of the train access attribute. The frequency of the train was another attribute in which 64.4% had strong agreement with the incorporation of this attribute in the study. The train comfort which was presented as the number of available

seats received neutral vote from 20.4% of respondents, while 79.6% had preference for its inclusion. The number of transfers when presented to the respondents arose 68.2% opposite vote and only 31.8% were in favor with this attribute. The respondents' further mentioned that if two public transport modes were needed to reach the destination, they would prefer to continue using their own car.

Table 2. Result of attribute relative important index for transportation mode choice in Klang Valley, Malaysia

Attribute	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	RII	Rank
Car alternative							
Increase in number of unhealthy days				35.6	64.4	0.92*	5
Travel time in vehicle				30.6	69.4	0.93*	4
Toll increment	15.3	20.4		30.1	34.3	0.69	11
Parking fee increment up to MYR 10	20.4	25.5	5.1	24.5	24.5	0.61	14
Petrol price increment	38.4	29.2		18.4	14.6	0.48	15
Congestion fee	10.2	25.5	20.4	28.7	15.3	0.62	13
Train alternative							
Decrease in the number of unhealthy days				25.5	74.5	0.94*	3
Travel time in vehicle				20.4	79.6	0.95*	2
Access to the train station				30.6	69.4	0.93*	4
Frequency or waiting time in the station				35.6	64.4	0.92*	5
Comfort as number of seats			20.4	38.9	40.7	0.84	7
Number of transfers (up to 2)	29.8	38.4		22.6	9.2	0.48	16
Access to main destination by walking				32.6	67.4	0.93*	4
Access to main destination by PT	35.6	42.3	10.1	12		0.40	17
Fare			35.3	40.2	24.5	0.77	9
Bus alternative							
Decrease in the number of unhealthy days		35.6		25.5	38.9	0.66	12
Travel time in vehicle				20.4	79.6	0.96*	1
Access to the train station			21.8	49.1	29.2	0.81	8
Frequency or waiting time in the station				35.6	64.4	0.92*	5
Comfort as number of seats			14.8	30.6	54.6	0.87	6
Number of transfers (up to 2)	44.5	31.1		18.3	6.1	0.42	17
Access to main destination by walking				28.7	71.3	0.94*	3
Access to main destination by PT	46.8	40.3		12.9		0.35	18
Fare			46	28.7	25.3	0.75	10

As expected, including the egress mode by public transport attribute was objected by 78% of the respondents, while incorporation of egress by walking favored by most of them. Twenty of the respondents were selected randomly to investigate the reason for disfavoring the egress mode by public transport attribute. Most of them (82%) stated the wasting time issue, while waiting and changing the transports as their main reason. Others (28%) stated that they simply do not like to have several transfers in their daily commute.

Travelling by bus, as an alternative to train, anticipates having lower emission rate compared to cars. The health attribute therefore was presented as "decrease in the number of unhealthy days". From overall responses, 35.6% were disagreed with this attribute inclusion, while 64.4% were agreed with that. In terms of travel time in the vehicle, 80% strongly agreed and 20.4% agreed with the inclusion of this attribute in the final choice sets. From the responses, 22% were neutral, 49% agreed and 29% strongly agreed with access to the bus station attribute. Frequency of the bus service was also favored by more than 80% of the respondents. As with the train, the comfort level was presented as the number of available seats. About 14% of respondents were neutral to the presence of this attribute, while more than 80% agreed. Similarly as with the train, inclusion of the number of transfers and getting to the main destination by another public transport was highly rejected by the respondents. To explore the reason behind this, twenty respondents were randomly selected and asked about the possible reasons. Their experience with buses which usually takes longer travel time was the main reason for the rejection. Hence they stated that if they have to use more than one public transport, they would prefer to continue using their car until to the point that they cannot afford it. However, this affordability has different measure for different persons based on several factors such as distance and income.

The computed RII index, as shown in Table 2, reveals that, except for petrol price, the other attributes of car alternative have RII more than 0.5. This confirms that almost all of pre-selected attributes were important to be included in the survey. However, if one needs to screen the attributes due to the time or cost constrains, the results of such a research give enough information on more preferred attributes. For example for car alternative, the number of unhealthy days and travel time had highest RII. While for the case of the train, the number of unhealthy days, travel time in vehicle, access, frequency of train and getting to the destination by walking received the highest scores. In term of bus alternative, travel time in the vehicle, frequency of service, and getting to the destination by walking obtained higher RII score.

4. Discussion and Conclusion

Choice experiment method is a quantitative method to estimate respondents' preferences for set of policy scenarios or interventions which are different in combination of attributes and levels. Therefore, attribute selection is an important part of choice experiment studies. In many studies, this step is not clearly reported (Hiligsmann et al., 2013). However, if the attributes are disliked or misunderstood, the overall results of a research is biased. The most applied methods to select attributes are qualitative approaches such as literature review, focus group studies, and in-depth interviews (Kragt, 2013). These qualitative methods should be applied cautiously in developing countries where the literacy rate is high, or CE type questionnaires are not accustomed, or those countries whit diversity of ethnical groups, beliefs and languages. Therefore, a comprehensive understanding of respondents' experience, preferences, and point of view is necessary in attribute selection (Hall et al., 2004). As suggested by Mangham (2009) application of secondary research could assure the validity of final set of attributes. In combating the general issue of unfamiliarity with choice based surveys in developing countries, enhancing respondents' preferences before conducting the main survey could assist researchers to get their respondents perspectives in solving questions in hand clearly. Overall, research on attribute selection validity and preference could minimize attribute non-attendance bias and assure higher quality results.

This study was conducted in the Malaysian most congested and polluted region; Klang Valley. The primary research focus was on current car commuters' modal choice decision. The study followed the Malaysian Transport Policy and based on that designed a choice experiment survey. During the pretest, several obstacles including low response rate and continue selection of car option (public transport modes attributes non-attendance problem) was faced. The respondents' non-preferences for some attributes in the choice set caused attributes non-attendance issue. To solve the problem, a Likert scale survey, which included all the 24 primary attributes, was presented to 90 respondents. To solve the language and cultural issue problems, each ethnic group was interviewed with interviewee from the same ethnic group. The results showed that the respondents had high dispreferences for attributes such as increase in oil price for car alternative, number of transfers, and access to destination by public transport. With the estimated relative importance index, only 18 out of primary 24 attributes had RII more than 0.5. This means to get the better results from choice experiment and reduce the attribute nonattendance issue, one better consider those attributes with higher RII. The procedure described in this study could facilitate the CE application in developing countries, especially to minimize the attributes non-attendance problem. This is also to provide more accurate method in minimizing the number of attributes. However, if time and cost allow, it would be better to gain the preference of different groups or stratas to have better perspective of all groups (Adam et al., 2013).

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References

Abiiro, G. A., Leppert, G., Mbera, G. B., Robyn, P. J., & De Allegri, M. (2014). Developing attributes and attribute-levels for a discrete choice experiment on micro health insurance in rural Malawi. *BMC health services research*, *14*(1), 235. http://dx.doi.org/10.1186/1472-6963-14-235

Adam, S. U., Shamsudin, M. N., Sidique, S. F., Rahim, K. A., & Radam, A. (2013). Attribute prioritization in choice experiment pre-design: suggested method and application to solid waste management service improvement. *Journal of Energy Technologies and Policy*, *3*(11), 291-298.

Afroz, R., Hanaki, K., & Tudin, R. (2011). Factors affecting waste generation: a study in a waste management program in Dhaka City, Bangladesh. *Environmental monitoring and assessment*, *179*(1-4), 509-519. http://dx.doi.org/10.1007/s10661-010-1753-4

Alemu, M. H., Mørkbak, M. R., Olsen, S. B., & Jensen, C. L. (2013). Attending to the reasons for attribute non-attendance in choice experiments. *Environmental and resource economics*, *54*(3), 333-359. http://dx.doi.org/10.1007/s10640-012-9597-8

Almeslati, I. A., Rahmat, R. O., Jaafar, O., & Ahmed, M. (2011). The rise of the private car usage in Kajang, Malaysia: role of parking policy on reducing car usage. *Journal of Applied Sciences Research*, *7*(8), 1263-1268.

Bateman, I. J., Carson, R. T., Day, B., Hanemann, M., Hanley, N., Hett, T., ... & Swanson, J. (2002). *Economic valuation with stated preference techniques: A manual*. http://dx.doi.org/10.4337/9781781009727

Blamey, R. K., Bennett, J. W., Louviere, J. J., Morrison, M. D., & Rolfe, J. C. (2002). Attribute causality in environmental choice modelling. *Environmental and Resource Economics*, *23*(2), 167-186. http://dx.doi.org/10.1023/A:1021202425295

Boxall, P. C., Adamowicz, W. L., Swait, J., Williams, M., & Louviere, J. (1996). A comparison of stated preference methods for environmental valuation. *Ecological economics*, *18*(3), 243-253. http://dx.doi.org/10.1016/0921-8009(96)00039-0

Coast, J., & Horrocks, S. (2007). Developing attributes and levels for discrete choice experiments using qualitative methods. *Journal of Health Services Research & Policy*, *12*(1), 25-30. http://dx.doi.org/10.1258/135581907779497602

Coast, J., Al-Janabi, H., Sutton, E. J., Horrocks, S. A., Vosper, A. J., Swancutt, D. R., & Flynn, T. N. (2012). Using qualitative methods for attribute development for discrete choice experiments: issues and recommendations. *Health economics*, *21*(6), 730-741. http://dx.doi.org/10.1002/hec.1739

de Bekker-Grob, E. W., Ryan, M., & Gerard, K. (2012). Discrete choice experiments in health economics: a review of the literature. *Health economics*, *21*(2), 145-172. http://dx.doi.org/10.1002/hec.1697

Hall, J., Viney, R., Haas, M., & Louviere, J. (2004). Using stated preference discrete choice modeling to evaluate health care programs. *Journal of Business research*, *57*(9), 1026-1032. http://dx.doi.org/10.1016/S0148-2963(02)00352-1

Hanley, N., Wright, R. E., & Adamowicz, V. (1998). Using choice experiments to value the environment. *Environmental and resource economics*, *11*(3-4), 413-428. http://dx.doi.org/10.1023/A:1008287310583

Hensher, D. A., Rose, J. M., & Greene, W. H. (2005). *Applied choice analysis: A primer*. Cambridge University Press. http://dx.doi.org/10.1017/cbo9780511610356

Hensher, D. A., Rose, J. M., & Greene, W. H. (2012). Inferring attribute non-attendance from stated choice data: implications for willingness to pay estimates and a warning for stated choice experiment design. *Transportation*, *39*(2), 235-245. http://dx.doi.org/10.1007/s11116-011-9347-8

Hess, S., Hensher, D. A., & Daly, A. (2012). Not bored yet-Revisiting respondent fatigue in stated choice experiments. *Transportation research part A: policy and practice*, *46*(3), 626-644. http://dx.doi.org/10.1016/j.tra.2011.11.008

Hiligsmann, M., van Durme, C., Geusens, P., Dellaert, B. G., Dirksen, C. D., van der Weijden, T., ... & Boonen, A. (2013). Nominal group technique to select attributes for discrete choice experiments: an example for drug

treatment choice in osteoporosis. *Patient preference and adherence*, *7*, 133. http://dx.doi.org/10.2147/PPA.S38408

Kløjgaard, M. E., Bech, M., & Søgaard, R. (2012). Designing a stated choice experiment: the value of a qualitative process. *Journal of Choice Modelling*, *5*(2), 1-18. http://dx.doi.org/10.1016/S1755-5345(13)70050-2

Kometa, S. T., Olomolaiye, P. O., & Harris, F. C. (1994). Attributes of UK construction clients influencing project consultants' performance. *Construction Management and Economics*, *12*(5), 433-443. http://dx.doi.org/10.1080/0 1446199400000053

Kragt, M. E. (2013). *Evidence-based Research in Environmental Choice Experiments* (No. 153335).

Lagarde, M. (2013). Investigating Attribute Non-Attendance and Its Consequences in Choice Experiments with Latent Class Models. *Health economics*, *22*(5), 554-567. http://dx.doi.org/10.1002/hec.2824

Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated choice methods: analysis and applications*. Cambridge University Press. http://dx.doi.org/10.1017/cbo9780511753831

Malaysian transportation statistics. (2013). Retrieved February, 2014, from http://www.mot.gov.my/en/Publication/Pages/Official.aspx

Mangham, L. J., Hanson, K., & McPake, B. (2009). How to do (or not to do)… Designing a discrete choice experiment for application in a low-income country. *Health Policy and Planning*, *24*(2), 151-158. http://dx.doi.org/10.1093/heapol/czn047

Portney, P. R. (1994). The contingent valuation debate: Why economists should care. *The Journal of Economic Perspectives*, 3-17. http://dx.doi.org/10.1257/jep.8.4.3

Quiggin, J. (1998). Individual and household willingness to pay for public goods. *American Journal of Agricultural Economics*, *80*(1), 58-63. http://dx.doi.org/10.2307/3180268

Rose, J. M., & Bliemer, M. C. (2009). Constructing efficient stated choice experimental designs. *Transport Reviews*, *29*(5), 587-617. http://dx.doi.org/10.1080/01441640902827623

Sambasivan, M., & Soon, Y. W. (2007). Causes and effects of delays in Malaysian construction industry. *International Journal of project management*, *25*(5), 517-526. http://dx.doi.org/10.1016/j.ijproman.2006.11.007

Shaari, M. S., Pei, T. L., & Rahim, H. A. (2013). Effects of Oil Price Shocks on the Economic Sectors in Malaysia. *International Journal of Energy Economics and Policy*, *3*(4), 360-366.

Whittington, D. (2010). What have we learned from 20 years of stated preference research in less-developed countries? *Annu. Rev. Resour. Econ.*, *2*(1), 209-236. http://dx.doi.org/10.1146/annurev.resource.012809.103908

Zeng, S. X., Shi, J. J., & Lou, G. X. (2007). A synergetic model for implementing an integrated management system: an empirical study in China. *Journal of cleaner production*, *15*(18), 1760-1767. http://dx.doi.org/10.1016/j.jclepro.2006.03.007