



Safety Attributes For Public Transport Users In Cities

¹Rohana Sham, ²Muhammad Zaly Shah Bin Muhamad Hussein, ³Hairul Nizam Ismail, ⁴Suhana Mohamad, ⁵Khairunnisa Rahman

¹Universiti Teknologi Mara – Segamat, Johor

²Universiti Teknologi Malaysia – Skudai, Johor

³Universiti Teknologi Malaysia – Skudai, Johor

⁴Universiti Teknologi Mara – ,Johor

⁵Universiti Teknologi Mara – Segamat, Johor

ARTICLE INFO

Article history:

Received 25 April 2014

Received in revised form

18 May 2014

Accepted 28 May 2014

Available online 2 June 2014

Keywords:

Measuring, Fear, Urban, Public Transport, City

ABSTRACT

This paper will discuss purely on the research methods used in this study where major independent and dependent variable of the study will be discussed especially on the methods of measurement on each variable involved in the environment management. It comprises of the information on the research design, sample selection through population and sampling, data collection, measurement techniques on each variables involved, instrumentation and method used for data analysis. The statistical method such as descriptive analysis, correlation, cross tabulation and a confirmatory analysis using AMOS used in analyzing the data was also discussed. Moreover the detail of an on board survey will also be discussed as a methods of data collection during the field work. The main aim of this paper is to describe the interrelationship factor between transport and urban environment that affect women's fear. A set of questionnaire were used to measure the level of fear of women travellers based on several constructs of fear towards crime. The major contribution of this paper is the measurement procedure being carried out to meet the target objective of the study. A set of women commuters were selected and questionnaire were personally administered to ensure the validity of the sampling. A new psychological approach used in measuring the fear will also be discussed. This paper concludes with a detail measurement involve in measuring each variable involved in the study.

© 2014 AENSI Publisher All rights reserved.

To Cite This Article: Rohana Sham, Muhammad Zaly Shah Bin Muhamad Hussein, Hairul Nizam Ismail, Suhana Mohamad, Khairunnisa Rahman., Safety Attributes For Public Transport Users In Cities. *Aust. J. Basic & Appl. Sci.*, 8(8): 99-104, 2014

INTRODUCTION

As Malaysia is moving in line with the Government Transformation Program and The National Key Result Area, public transport has seen as one of the national agenda where the target to achieved at least 50% shift from private to public transport to happen in 2020. Apart from that, a great amount of safety issues have been put into consideration in every town planning including the National Key Result Area (Datuk Seri Hishamuddin Hussein, 2012 in New Straits Times). He also mentioned that the primary areas the National Key Result Area (NKRA) is people safety. A further analysis on the crime occurrence in Malaysia had shown that crime occurrences in Malaysia has shown a dramatic increase in the statistics of crime being recorded particularly in urban area. Thus this scenario had resulted in a higher feeling of fear towards crime when travelling in urban area is concern. Whether the crime have actually happen to women or not, hearing, viewing, analysing current state of criminal behaviour leads to a higher level of fear among the women travellers.

As current literature debate on the methods to evaluate the feeling of fear among women travellers in city centre, therefore this paper starts with the main aim to determine and describe the inter relationship factors that affect the level of fear for working women commuters who live in an urban area. Where specifically the objectives of the research is to determine the inter relationship between public transport service characteristics, infrastructure and social structure factors that contribute towards the level of fear among women travelers.

However this paper only discussed the method use in measuring the fear of crime among women travellers who used the stage bus services in the city centre. It comprises of the information on the research design, sample selection through population and sampling, data collection, measurement of variables, instrumentation and method used for data analysis. The statistical method such as descriptive analysis, correlation, cross tabulation and AMOS used in analyzing the data was also discussed.

This study utilizes a quantitative method as it involved with a bus passenger survey in which a personally administered questionnaire was used as the methodology. Respondents were selected through quota sampling

technique. In total, only working women aged between 18 to 56 years who depend on bus service to commute to workplace were considered in the survey.

Research Design:

According to Remenyi, William, Money, & Swartz (1998), although there are numerous factors to be considered when choosing an appropriate research methodology, the selection of the method depend entirely upon the topic to be researched and specific research questions to be answered. They further added that a qualitative approach is more appropriate when the researcher is trying to understand and explain a phenomena rather than search for external causes. In addition, Salkind (2003) contended that a qualitative research is more preferable research to choose because there were no statistical analyses involved. However, in contrast, when questions related to the relationship between variables is involved and answering a research questions with some theoretical and previous research supports deems a questionnaire study, a quantitative approach is more appropriate (Chadwick, Bahr & Albrecht, 1984). Therefore this study proceeds with a quantitative approach.

The research started by first defining the population of the study. From there, a sample size was determined using a statistical formulation of appropriate sample size. At the same time, an instrument in the form of questionnaire was design to gather the required information on perception towards travel safety. A pilot test was conducted prior to actual survey to check on the validity and reliability of the questionnaire design. Once the samples were selected through quota sampling, the instrument was personally administered to the randomly selected respondents at respective bus stop for in Kuala Lumpur. The technique used was in reference to Brantingham and Brantingham (1981) recommendation of conducting research through a cone of resolution where focus of the study was directed towards the top hot spot bus stop location. After completing the data collection, the questionnaires were compiled for the purpose of data editing, cleaning as well as data coding. Data processing and analysis were done using a Statistical Package for Social Science (SPSS). A descriptive and inferential statistical analysis were utilized to study the relationship between service characteristics, women's travel pattern, infrastructure provision and level of safety for different location.

Population and Sampling:

The target population in this study consists of all women within the age of working group who commute to work by bus service. These women live in Malaysian capital area with a 100% scale of the urbanization process and a high population density, namely Kuala Lumpur. Hence, the samples were randomly selected accordingly to the criteria set up in quota sampling from those major urban areas selected.

The justification of choosing those particular areas is due to the fact that, these areas are defined as urban areas by The Town and Country Planning Department (2006) based on the number of population in each area in which has exceeded the minimum population of 10,000. In addition these areas also match another criteria of an urban area set by the Town and County Planning Department (2006) where the settlements are approved and areas are committed to development and supply with urban facilities.

In order to determine the sample size, the number of female population for the areas is required. Since there is no population frame available on the female riding the bus in this major urban areas, Black (2004) contended that a quota sampling can be useful. Eventhough quota sampling is a non-random sampling technique, Black (2004) claimed that if the quota is filled by randomly selecting elements and discarding those not from a stratum, a quota sampling is essentially a version of stratified random sampling. Malhotra and Birks (2003) pointed out that a quota sampling is a non probability sampling technique that involved a two stage judgemental sampling. The first stage consist of developing control categories or quotas of population in which was filled by using available, recent or applicable elements. In another words, the first stage of the quota sampling select people with the characteristics that a research is looking for. In this study it would refer to women within the working age who live in urban areas and use bus services to commute to work. In the second stage, sample element are selected based on convenience or judgment. To be able to get a sample for this study, any women waiting at bus stop who fulfil the stated criteria above was selected as a respondent.

To be able to decide on the sample size, a total population was first identify using a statistics given by population and Housing Census Malaysia 2010. Based on the statistics by Department of Statistics, Population and housing Census Malaysia (2010), total female population in Kuala Lumpur is 802,572

Based on the table proposed by Krejcie and Morgan (1970) on the sample size for any given population, a total sample of 384 is recommended. Thus this study adopt this approach and use 384 as a total sample size. Although in some area of the study, the total population differ from one area to another area, the selection of the sample were supported by Stoker (1989) who had pointed out that the more homogeneous the population elements, the smaller the sample may be. He then proposed a sample size from 50 to 100 respondents. Therefore this research proceed with 100 as sample size from each area of study. This was further back up by Emory (1985) who further explain that a sample of 100 drawn from a population of 5000 has roughly the same estimating precision as sample of 100 drawn from a population of 200 000 000. Moreover Roddick *et al.*, (1983) give the following rules of thumb by stating that no sample should be less than 40. In 1993 Kent further

supported the idea of choosing 100 as a sample by stating that for a quantitative analysis a sample of at least 100 should be obtained even to calculate only percentage.

To check on the validity of the questionnaire, a pilot test was first conducted prior to the actual survey. The unit of analysis is individuals therefore, the research treats each bus passenger's response as an individual data source. During the pilot test, around 30 respondents from Kuala Lumpur urban areas were chosen to respond to a set of questionnaire designed to tap on the travel safety issues. The number of respondents selected for the pilot study was based on the sample size given by Rea and Parker (2005) who indicated that the sample size for the pretest is generally in the range of 20 to 40 respondents. A group of everyday bus users were captured as the respondents during the pilot study to counter check whether they had difficulties in answering the question posted to them. Moreover, the group was selected based on the recommendation made by Gerber (2010) who had suggested that future research should examine the everyday experience of anxieties, worries and fears about personal safety and victimization threat affecting the daily commuter in urban areas.

Based on the feedback from the respondents involved in the pilot study, small changes had been done to the existing questionnaire where translation to Bahasa Melayu was done in order to fulfil the need of respondents who had difficulties in understanding English language. Translation is needed to elicit response from the respondents in the language they were more comfortable with in order to provide a deeper understanding of an issues (Brislin, 1976). After the translation process, the questionnaire is tested again before it was used in the actual data collection.

Data Collection:

During the actual data collection, a personally administered questionnaire technique was used because through this technique, doubt can be clarified at that particular point and the response rate is almost 98% ensured (Dixon & Leach, 1978). This is due to the ability to collect the questionnaire immediately after they are completed. Moreover, the anonymity of respondent is high. Gerald *et al.*, (1994) used the same technique to look into the perception and experience of bus riders with problem around buses. The same technique was used by Lusk (2003) to further examine on the perception of safety towards crime among the bus riders.

This study was a cross-sectional study since the data are gathered just over a period of a week for each area. In order to get the real respondents who commute to work by bus, the distribution of the questionnaire have to take place at the residential bus stop during the weekdays. Even though this method of data collection is time consuming, but with the existence of a few enumerators, it can be considered as successful as the response rate is high. They are given a full training before distributing the questionnaire to the respective respondents.

Measurement of Variables:

According to Bowling (2000) a likert scale is considered to be the most appropriate scale if the study intend to measure a person's attitude. Therefore, perception items in this study were measured using the likert scale from 1 to 5. The rationale for choosing a seven scale item is mainly due to the statement by Rea and Parker (2005) who indicated that deciding on the point of rating scale used in any study is subjective as a likert scale entails a five, seven, or nine point rating scale in which the attitude of the respondent is measured on the continuum from one extreme to another with an equal number of positive and negative response possibilities and one middle or neutral category. However, Rea and Parker (2005) further pointed out that when it is suspected that a great number of respondent will choose a middle response and the research required that respondents choose between alternatives, they indicated that an even numbered scale with few choices will work well. Based on that statement, the combination of both odd and even scale was used in this study. Scale from 1 to 5 which represent "very dissatisfied" to "very satisfied" was used to measure the satisfaction for both, bus service characteristics and the infrastructure provision. The same scale from 1 to 5 was also used to measure the level of safety indication starting with "very unsafe" to "very safe". A graphic rating scales starting from 0 to 10 were used to further tap on the women's feeling of fear with "not fear at all" to "very fear".

Instrument:

A set of questionnaire was designed to gather the relevant information on issues pertaining to women's travel safety. The respondents were urban working women who travelled by bus to work. The survey itself consisted of three sections with specific questions targeted for the particular section topic. These sections were on transport service, Infrastructure and social structure and their fear of crime. The questions used in the instrument were taken from previous similar empirical studies of fear of crime survey conducted in Liverpool. The justification of adopting the instrument used in previous crime survey research, is based on the fact that the questionnaire was designed to measure a number of variables including age, time, gender and prior victimization experience especially for women while travelling by public bus. For the question on service characteristics, infrastructure and social structure, several ideas were developed from the fear indicator discussed by Ferraro and LaGrange (1987). However the question designed were subjected to wording modification and addition of some items that were relevant to urban public bus passenger sector under the three underlying dimensions

suggested by Ferraro and LaGrange. Eventhough there have been a number of studies that measured fear of crime from different perspectives as discussed in previous chapters, many studies failed to capture the essence of fear due to the fact that they relied on the question like "Are you worried about being a victim of crime" as the only basis in understanding the fear. Victimization items were adapted from Austin *et al.*, (2002) and were then modified accordingly to the Malaysian Urban scenario.

To be able to check the dependable, consistent, stability, trustworthy and predictable of the questionnaire design, a reliability test should be carried out (Salkind, 2003). Therefore the questionnaire in this study was further refined by reliability analysis. For a reliability test in this study, the internal consistency reliability test was adopted because Salkind (2003) contended that the internal consistency involved with a measurement of how consistent each item measures the same underlying construct. Through this test, the researcher is able to look at the consistency of respondent's answer to all the items in a measurement unit. A Cronbach's coefficient alpha is the most popular test to be applied under internal consistency reliability where it indicates that the higher the coefficient is, the better would be the measuring instrument. Another reason for adopting the Cronbach's alpha was that the travel safety in this study was measured using a multiple item construct such as feeling of safe and feeling of fear while 'walking', 'waiting', 'while in vehicle' and 'while travelling during different time of the day'. The results of the Cronbach's alpha test for the instrument used in this study was in the range of 0.6 to 0.8. Eventhough Bohrnstedt and Knoke (1988) indicate that a Cronbach's Alpha of at least 0.7 or higher would lead to a more reliable index, Hair *et al.*, (1998) revealed that the Cronbach's alpha of 0.7 is only the generally agreed upon lower limit for Cronbach's alpha value. They further argued that although the value of Cronbach's alpha may decrease to 0.6, it is still acceptable for an exploratory research. This implies that the instrument designed is reliable. Besides a Confirmatory factor analysis using AMOS will also be conducted to counter the validity issues.

Data Analysis:

For the purpose of analysing the data collected through questionnaire, SPSS is used as the analysing tool. A descriptive analysis such as percentages and frequency counts is done at the first stage of data analysis. This provides a descriptive picture of respondents' profile, travel behaviour and overall satisfactory level on current bus service and infrastructure supply. For the inferential analysis, this study proceed with a parametric test as Molthusky (1995) pointed out that a parametric test provide a more robust result. However, he highlighted that in order to proceed with the parametric test, the data must first met with the assumption of normal distributed. According to Hair *et al.*, (1998), for a large sample size, a statistical theory provides some assurance in the normality distribution where the central limit theorem shows that the means will be normally distributed even if the underlying values are not. Therefore, in this case, normality assumption can be relaxed as the sample size for the study are large. In 1993 Kent further define a large sample size by indicating that a minimum of 300 sample are considered as a large sample size.

Below were some of the discussion on the statistical analysis used in this study.

Cross Tabulation:

Cross tabulation is adopted in this study because it is considered as one of the simplest techniques for describing sets of relationships. It is a joint frequency distribution of observations on two or more sets of variables. The cross tabulation analysis allows to test for differences in two groups' distribution across categories.

Correlation Analysis:

According to Black (2004), correlation is a measure of the degree of relatedness of variables. Correlation analysis was used in this study to show how strong the correlation between independent variables and dependent variables being tested. A Spearman's rank correlation was use in order to proceed with the correlation analysis. This is because Black (2004) contended that when the data of analysis involved with ordinal level data or ranked data or ranked data, a Spearman's rank correlation is appropriate. In order to analyse the degree of association of two variables, the 'r' values can be used. The interpretation of 'r' values is similar with the interpretation of Pearson r where a positive correlation indicates that high values of the variables tend to be associated with high values of the other variables, and low values of one variables tend to be associated with low values of the other variables. A correlation value of +1 indicates a high positive correlation whereas a correlation value -1 indicates high negative correlation. A negative correlation indicates that a high value of one variables tend to be associated with low values of the other variables and vice versa.

Regression Analysis:

Regression analysis is a asset of statistical procedures used to predict and explain the value of dependent variable based on the value of one or more independent variables (Fah and Hoon,2009). They also reported that there are two types of regression analysis that a researcher can choose in testing the hypothesis. However if the

independent variable is more than one, a multiple linear regression analysis is deemed suitable. This is due to the fact that data for the dependent variable is continuous in nature whereas the independent variables are continuous or discrete in nature.

Following are the summary of the data measures and analysis used in this study.

Table Error! No text of specified style in document.:1: Summary table of data measures and analysis.

Variables		Measures	Statistical Analysis
Independent Variables	Service characteristics	<ul style="list-style-type: none"> ○ Punctuality ○ Comfortability ○ Security ○ Information 	Descriptive, Frequency, Cross tabulation, Correlation Analysis, Confirmatory Analysis, Regression
Independent Variables	Infrastructure Design	<ul style="list-style-type: none"> ○ Street lighting ○ Pedestrian walkways ○ Fence ○ Visibility at bus stop ○ Bus stop location ○ Bus stop lighting 	
Independent Variables	Social Structure	<ul style="list-style-type: none"> ○ Poverty ○ Drug ○ Homeless ○ Prostitution ○ Unemployment 	
Dependent Variables	Fear Of Crime	<ul style="list-style-type: none"> ○ Feeling of safe ○ Fear of crime 	

ACKNOWLEDGEMENT

Alhamdulillah. Many thanks go to family and friends for the completion of this paper. Utmost thanks to Universiti Teknologi MARA Cawangan Segamat for the resources and Ministry of Higher Education for funding of the study under the Research Acculturation Grant (600-RMI/RAGS 5/3 (131/2012) provided. My heartfelt thanks also go to lecturer of Business Management from UiTM Malaysia and UiTM Johor Bahru for their support in completion of this paper.

REFERENCES

- Austin, D.M., L.A. Furr, M. Spine, 2002. The effects of neighbourhood conditions on perceptions of safety. *Journal of Criminal Justice*, 30: 417-427.
- Black, K., 2004. *Business statistics for contemporary decision making*: Leyh Publishing.
- Bohrnstedt, G.W. & D. Knoke, 1988. *Statistics for Social Data Analysis (2nd Edition ed.)*: Peacock Publisher, Inc.
- Bowling, A., 2000. *Research Method in Health: Investigating health and health services (2nd ed.)*. Philadelphia: Open University Press.
- Brantingham, P. J. & P.L. Brantingham, 1981. *Environmental Criminology*: Waveland Press.
- Brislin, R.W., 1976. *Translation: Application and Research* New York: Gardner Press.
- Chadwick, B., H.M. Bahr & S.T. Albrecht, 1984. *Social Science Research Methods*. Engelwood Cliffs, NJ: Prentice Hall.
- Department Of Statistic 2010. *Population and housing census of Malaysia: State Population Report*.
- Dixon, C. & B. Leach, 1978. *Sampling methods for geographical research*: Norvic Press.
- Emory, 1985.
- Fah, L.Y. & K.C. Hoon, 2009. *Introduction To Statistical Analysis in Social Sciences*.
- Ferraro, K.F. & R. LaGrange, 1987. The measurement of fear of crime. *Journal of Criminal Justice*, 57: 70-101.
- Gerber, M.M., H. Hirtenlehner, J. Jackson, 2010. Insecurities about crime in Germany, Austria and Switzerland: A review of research findings, *European Journal of Criminology*, 7(2): 141-157.
- Hair, J.F., R.E. Anderson, R.L. Tatham & W.C. Black, 1998. *Multivariate Analysis*: Prentice Hall.
- Ingalls, A., L. Gerald, D.T. Hartgen & W.O. Timothy, 1994. Public fear of crime. *Journal of Architectural and Planning Research*, 11(2): 129-136.
- Kent, R.A., 1993. *Marketing research in action*. London: Routledge.
- Krejcie, R.V. & D.W. Morgan, 1970. *Determining Sample Size for Research Activities. Educational and Psychological Measurement*.
- Lusk, A., 2003. *The bus top designs related to perceptions of crime*. New York: Collier Books.
- Malhotra, N.K. & F.D. Birks, 2003. *Marketing Research: An Applied Approach*: Prentice Hall.
- Moltulsky, H., 1995. *Intuitive Biostatistics: Choosing a statistical test*: Oxford University Press Inc.

Rea, L.M. & A.R. Parker, 2005. *Designing and Conducting Survey Research: A Comprehensive Guide* (Third ed.): A Wiley Imprint.

Remenyi, D., B. William, A. Money & E. Swartz, 1998. *Doing Research in Business Management*. London: Sage Publication. *Research* (2 ed.): Venton Publishing.

Ruddick, M.E., P.K. Sherwood & R.E. Stevens, 1983. *The marketing research handbook: A decision-oriented approach*. Englewood Cliffs: Prentice-Hall.

Salkind, N.J., 2003. *Exploring Research*. Upper Saddle River, New Jersey: Pearson Education Inc.

Stoker, D.J., 1989. *Basic sampling methods in Schnetler, J. (ed.) Survey methods and practice*. Pretoria: Human Sciences Research Council.

Town and Country Planning Department, 2006. *Urban areas by 2020*. Malaysia: Ministry of Housing and Local Government.