CHAPTER II

LITERATURE REVIEW & THEORY

2.1. Transportation Mode

Public transportation is referred to transferring persons and/or goods from one origin place to destination place by using provided motor vehicle to be used publicly that is chargeable (Peraturan Pemerintah Nomor 41 tahun 1993). In transport planning there is need to accurately forecast travel behavior between attributes of the transportation system (Gärling, Gillholm and Gärling, 1998) and the decisions of individuals for travel (Jang, 2003). Jakarta as capital city of Indonesia has been a center of any variety of disciplines especially economics activities. The economics growth has affecting the behavioral of population in Jakarta, and shopping has been one of the most frequent type of urban travel. The transaction in shopping area in Jakarta has contribute huge impact for Indonesia's economic growth. This activity has major impact in transportation sector as well, considering as most of the people are using private transportation to travel the shopping area. According to Abubakar, I (2017) stated that the percentage of public transportation in Jakarta is only at 24% of total travel mode and the rest is using private transportation. and referring to Dinas Perhubungan Provinsi DKI Jakarta, in 2010 the number of passenger vehicle is ±7,3 million units (98,8%) meanwhile the public transportation is 89.270 units (1,2%). Along with the demand of travel mode and to increase the number of public transportation user in Jakarta, the government has been concerned about this issue, hence the Mass Rapid Transportation Jakarta

(MRTJ) infrastructures are still under-construction and will be operated commercially to support urban mobility in 2019.

The lack of interest of using public transportation in Jakarta has become serious problem, due to low rate of satisfactions in terms of service quality, transit delay and traveling time (Najid, 2013). Few studies have been done to examine the factors that affect the low rate of public transportation interest and high rate interest of automobile (Jang, 2003; Thøgersen and Møller, 2008; Murray, Walton and Thomas, 2010; Chuen, Karim and Yusoff, 2014; Berg *et al.*, 2015; Fu and Juan, 2017). This study analyses the potential car ownership and discourage the car users to use transportation mode along with reducing the traffic congestion through examining the preferences of car ownership towards public transportation.

2.2. Definitions of Traffic Congestion

Road traffic congestion is a central problem in most developing regions (Jain, Sharma and Subramanian, 2012). According to Rahane and Saharkar, (2014) in their study mentioned that congestion is both a physical phenomenon related to the manner in which vehicles impede each other's progression as demand for limited road space approaches full capacity and a relative phenomenon relation to user expectation *vis-à-vis* road system performance. The effects that are caused by traffic congestion, it prevents the road user move freely and slows down the speed that might cause the disruption of business in urban areas. Jain, Sharma and Subramanian, (2012) stated that the situation has worsened for developing regions due to the following reasons:

1. Unplanned cities: Roads tend to be narrow and poorly built. As cities grow in an ad-hoc manner, no provision is made towards scaling road capacities, eventually resulting into several bottleneck roads, which remain congested for extended periods of time. Furthermore, many developing countries have witnessed an explosive growth in their vehicular population resulting in a failure of conventional traffic management strategies.
2. Poor discipline: Drivers often are not trained sufficiently to follow lane discipline. The impact of poor lane discipline, especially at traffic junctions, deteriorates the already overcrowded junction situation. Furthermore, drivers frequently jump red lights and block the intersection, causing further traffic congestion. These problems are compounded by the fact that traffic law enforcement is poor, thereby providing no incentive for drivers to follow the rules.
3. Alternate traffic means: Countries with fast growing economies have witnessed a surge in the number of vehicles across major cities. These cities seldom have efficient mass transit systems, forcing people to operate private vehicles. This problem is compounded by the social stigma, where people view operating a private vehicle as a sign of prosperity, while public transport is viewed as being used by the lower echelons of society.
4. Archaic management: Traffic junctions are often unmanned, thereby allowing drivers to drive in a chaotic manner. Even if a junction is

controlled by a cop or a traffic light, the traffic junctions are largely independent of any traffic management strategy, only optimizing the respective junction traffic flow, in the direction of maximum traffic build up. Furthermore, these approaches enhance traffic mismanagement in already congested roads, accelerating congestion collapse.

5. Tighter budgets: A significant amount of investment is required to set up a traffic management infrastructure which can scale with the increasing traffic. Such an infrastructure not only involves measuring and analyzing real-time traffic data but also focuses towards enhancing congestion detection, solving real time congestion and forecasting congestion scenarios. In developing countries, ravaged by corruption and bureaucracy, there are multiple hurdles before the money actually progresses towards such large initiatives.

2.3. Preferences

The study to approach the decision making in transportation mode through the preferences of non-public transportation users as well as public transportation users to level up the quality service of public transportation, policy changes, etc. However, there have been limited studies on shoppers' preferences towards transportation mode for shopping purpose in Jakarta with accompanying structure of shopping activity. In most cases of study involving preferences towards transportation mode, researchers developed the study in the choice of transport mode to work (for example: Petrunoff *et al.*, 2013; López-Sáez, Lois and Morales,

2016). On the other hand, shopping activities are more complex, it consists of factors influencing someone to do shopping such as duration, travel distance, and travel mode with sets of alternatives. Moreover, it may take a lot of considerations such as accompanying structures that involves more than one person or even group of people and family as well as heavy bags / goods that have been purchased. These considerations are affection on how shoppers in decision making for shopping trip. From this standpoint, car usage has practically benefits with respect to transportation mode.

Besides the car usage is predicted to get higher number and in line with the economic progress, the symbolic affection appears as significant factor among various motivations of car usage. Belgiawan *et al.* (2014) have attempted the study across 6 countries that consist of 3 developed countries and 3 undeveloped countries with the result that income appears not to be a good explanatory factor for car purchase intensions as the motivations among undergraduate students including Indonesia. They also found that the undergraduate students mostly have high desire in purchasing cars after graduation in developing country in the nearly 10 years later. Meanwhile, considering the ageing population, the study conducted under Berg *et al.* (2015) identified four reasons why car was particularly significant among the newly retired, they are: (1) having much or heavy things to carry, (2) combining errands in different places, (3) accompanying others and offering support to others, and (4) for recreation and vacation. The previous study explores how retirement as a key event in later life can influence travel behavior. From this

standpoint, it comes to conclusion that these two generations seemly rely on private transport.

Murray, S. J., Walton, D. and Thomas, J. A. (2010) in their study stated that this may limit the level of increase in ridership, as some potential users will not use PT due to their negative perceptions of PT and PT users, or due to perceiver social norms regarding PT use. This finding leads to conclusion that by reducing inaccurate perceptions and prejudice toward public transportation user will affect the car owners in using transport mode and from this finding, the lessons can be taken as consideration that increasing the quality of transport mode may not be the only task to increase the users of public transportation. To effectively achieve the goals and from the previous studies showing factors on decision making towards transportation mode for shopping purpose, the preferences of car ownership in Jakarta should be conducted to learn the behavior and preferences of car user towards public transportation in Jakarta for shopping purpose.

2.4. Theory

2.4.1. Method of Analysis

There are 3 methods of analysis to determine the results, those are:

1. Chi-square test of independence

   The Chi-Square test of Independence is used to determine if there is a significant relationship between two nominal (categorical) variables. This method is done to determine whether the available transportation modes are practical for every activities. In other word, the transportation

mode is distributed uniformly, and there are no significant differences for the frequency in using the transportation modes. Additionally, the hypothesis null is that there are no significant differences among transportation for the given activity. The value of result from the calculation then will be compared to the distribution of Chi square table to check whether the Hypothesis null is accepted or rejected. The formula to calculate the Chi square is:

$$x^2 = \sum \frac{(fo - fe)\text{^}2}{fe}$$

Note: fo : Observed frequency

Fe : Expected Frequency

2. Mean

Mean is performed to show the mean value of instrument data. In this study, the respondent will be asked for scoring rating on the given transportation modes with some conditions as the data, with differential scale of "1" (Very Bad) to "5" (Very Good) based on personal views of transport mode for shopping purpose. The result of the rating presents the preferences of respondent. The study is expecting the results from car and non-car owners that will be compared to each other in every aspect/dimension. The formula to calculate the mean is:

$$\overline{X} = \frac{\sum_{i=1}^{i=n} X_i}{n}$$

Note: $\overline{X}$: Mean value

n : Number of data

X_i : Value of respondent number i

3. Standard Deviation

Standard deviation is used to show the amount of variation of the collected data. If the standard deviation value is high, so the variation answer of collected data is high. Similary, if the standard deviation value is small, so the variation answer of collected data is small. The formula to calculate the standard deviation is:

$$SD = \sqrt{\frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}}$$

Note: SD : Standard deviation value

x : Value of respondent number i

$\bar{x}$: Mean value

n : Number of data

2.4.2. Steps of Analyzing

In analyzing the recorded data from respondent, several steps were taken:

1. After collecting the questionnaires that has been fulfilled by the respondents, the answers are being checked to avoid the insufficient data. Then, the respondents answers are inputed in Microsoft Excel 2016.
2. Questionnaire used in this study is based on the questionnaire that were developed by Ibrahim, M (2003) and Prillwitz, J (2009). Therefore, the reliability and validity test are analyzed in this study and number of respondent is determined by using Slovin equation with respect to South Jakarta population (N) in year of 2015 which is 2.185.711 and error tolerance (e) is 10%. Thus, number of respondent (n) is:

   n = N/(1+Ne^2)

   $$n = \frac{2.185.711}{(1 + (2.185.711 \times 10\%)^2} = 99.995$$

   n = 100 respondents
3. Cronbach's alpha is performed for test the reliability of questionnaire for each transportation modes namely: Car, Trans Jakarta, MRT, Taxi/Online, Motorcycle/Online, and Walking by using SPSS 17.0
4. Chi-square test of independence, Mean and standard deviation are calculated.
5. Chi-square test of independence is performed on section one.
6. The rating analysis using mean and standard deviation is used to know the answer of the objectives research: Identify the preferences of car

ownerships towards transportation mode in Jakarta for shopping trip and Identify the environmental awareness of car ownership.

7. Discussion, conclusion, and suggestion are given.