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Curb parking in Campus and Stimulating Students to use Public Bus within Universiti Kebangsaan Malaysia (UKM) Campus

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ABSTRACT

Given the great demand for parking and the implicationsin the environmental of commuting, universities not in the Universiti Kebangsaan Malaysia (UKM) only but around the world are implementing strategies to reduce dependence on private vehicles and increase the use of alternative modes of transport. That it must be that the system provides transportation comfort, save the time and be a friend of the environment. Were distributed in n= 80 samples for a survey of students to know the behavior of the student for transportation provided on campus. Noted in the questionnaire that focused on graduate students because they represent the largest proportion. In this questionnaire was to know about student behavior and prevent parking on campus and what is reason that prevents students from turning to public transport within the campus. The results shows that 65% use own vehicle and 35 % use public bus which shows the size of problem.

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1. INTRODUCTION

Many countries, including Malaysia, transport systems in urban areas, are important elements of the urban fabric. They ensure that people have access to goods and services, jobs and entertainment, to be distributed efficiently and shipping it enables the local economies to prosperBrick [1]

In many cases, the expansion of owning car is the biggest expansion of the building as it is because difficult to add extra parking, because of topographic conditions, earth is limited or the cost of build parking. The significance of its deteriorating impact manifests as traffic congestion, air pollution [2], pressure on energy resources such as gasoline, as well as increase in annual road accident [3]. In University KebangsaanMalaysia (UKM) The total number of master and PhD students registered from 2007/2008 to 2009/2010 is 20770846 student, according to (registration office, 2010) is 32920 and the percentage of cars registered to the preparation of parking available in campus is 43.6%. These results adopt a size problem [3]. This study will focus on decrease parking problem and model shift from initiatives vehicle to public transport in UKM campuses.

The main aim of this study is to analyze the student behavior and to know their considerations in choosing their mode of transport which can be summarized as: To determine which kind of transport used from student in UKM campus and evaluate what is the best way to curb parking in UKM campus, To identify the inefficient factors in public mode of transportation that prompted the postgraduate students to use private car in UKM campus and design measures through which the barriers will be taken in UKM campus, To develop suitable a model for the students to shift from private car use to public transport and to predict future transport predict use and the effects and policy measures impacts on car use, road accident, environmental degradation and traffic congestion in UKM, To evaluate price this could be imposed by the university administration to the students to use the parking within the campus [4].

Environmental impacts produced by the exhaust of cars, is one of the factors that led governments to encourage the use of public transport. Cities vary greatly in terms of carbon dioxide (CO2) emission and other motor vehicle pollutants. Whereas the transportation produced CO2 in the New York metropolitan area totaled 3,378 kilograms per capita in 1990, it was 5,193 kilograms in the Houston area (Newman and Kenworthy 1999:120) [5]. Despite improvements in car fuel economy and emissions controls standards, a doubling of miles driven during the 1980s and the 1990s and large negated the impact of these technological innovations. Furthermore, the catalytic converter "effectively breaks down the nitrous oxides that contribute to smog and local air pollution. it creates nitrous oxide, benign in smog creation but 300 times more potent than carbon dioxide as a greenhouse gas"[6].

Provided the private car ownership and use have not been restrained or controlled in Kuala Lumpur. Unless deliberate and tough policies are instituted to discourage car ownership and usage, like in Singapore, Tokyo and Seoul which is still difficult in many major cities because of the employment and revenue (both tax and export revenues) generated by the motorcar industry [4]. The strong link that exists between the motorcar industry and other industries (such as steel, oil, rubber, and insurance), the increasing power and influence of the car lobby as well as the existing deficiencies in public transport, attempts to develop transport systems that are sustainable will continue to be an illusion [3].

2. LITERATURE REVIEW

A sustainable development should provide a transmission system and access to all the urban population in a safe and environmentally friendly transport, this is a complex and difficult when the needs and demands of the people belonging to different income groups. For example [7], if a large proportion of the population cannot use motorized transport cars - then the government should provide a secure infrastructure for the small buses may need to add some improvements this can be done by increasing the number and cut wages, in terms of the quality of buses as means comfort and come by bus and a small modern air-conditioned and do not affect the environment at all. All measures can lead to restriction of movement of users of private cars. Model shift can be derived from transport demand modeling by changing different factors, influencing the model choice such as transport costs or time of trips [8]. However, such studies are not undertaken to determine a maximum modal shift potential [9]. In most cases they are carried out with the objective of showing the influence of different policies on the transport demand for different transport modes. There are a range of models for determining the passenger transport demand in the EU. According to these models can be provisionally subdivided into the following rough groups [1],[10]: Regional input/output models: The demand for transport is supported factors of economic activity in the country and a link between the adoption of the region's economy and transport volume among all regions, Trip Generation (short distance) mobility (national models): such kinds of models are mainly used to determine the trip mobility according to clusters based upon income, household and motorization characteristics for short distances on the national level., Regional gravitational models: these models could be used for regional economy and spatial planning, Logit/Utility based models: these kinds of models attempt to determine a probability of making one or another choice of transport organization[11],[12].

3. RESEARCH METHODOLOGY

Many reasons are standing behind making the privet cars most popular mode of travel Such as; travel time, economic factors, reliability and being comfortable [5],[13]. The most acceptable reason for why people prefer privet transport rather than other is car offer opportunities not available by any other means of transport. The previous studies showing us there is minimization in the cost and travel time for the privet cars users, so our challenge is to develop balanced model to reduce the gap between the privet means of transport and the other models. To get a complete transportation planning us should concern about the most prevalent of the road users and how to design convenient and safe ways according to the main factors that affecting the level of service of people; design, location and the users.

3.1. Research Design

Research strategy being used is quantitative in character.Basically, this research is based on the primary and secondary data. Following that, the study revolves around the existing Method being used in Malaysia, to gauge uses public transport facilities. After that, case study and analytical Model choice behavior and the shift from private to public transportation mode were analyzed using through data collection being interpreted using SPSS and logit model choice model that approach is mainly used on a local level. The survey information included socio-economic characteristics of individuals, trip information of individuals, and attitudes and perceptions on travel and policy measures [6]. Socio-economic information included household income, individual's income, age, gender, vehicle ownership, and total number of members in household, occupation and education level [14]. Trip information of individuals included the purpose of the trip, mode of travel, total travel time and travel cost ,Improving the Frequency ,Suitable Waiting Time at the Minibus Stops ,Distance for the Residential Located etc. A logic model was developed alternatives namely, bus, train and car, with the aim of comparing the utility of these travel modes and to identify the factors that would influence car users to move from travelling by car to choosing the public transport alternative [6],[15]. The explanatory variables were: age, gender, income, and travel time, travel cost and car ownership

In several counties surveys are carried out concerning the mobility behavior of the population. In such contexts the willingness to undertake a modal shift was rarely surveyed [13]. It is very likely that the train companies, national and public transport companies have such data for analysis, but the competitive aspects of the situation make it difficult to obtain these data [14]. The details of the road user's behavior that we got from the data collection and the procedure of the data analysis to establish the model the determinant variables that were used [16].

3.2. Model structure

The logit model was used a final model to investigate mode choice behavior of travelers of modes of transport and to determine the tradeoffs travelers make when considering their mode of transport[3],[6],[8]. The proposed model that contained all was used to determine the dependent variables.The logistic functional form is commonly identified as a single-layer "perception" or single-layer artificial neural network. A single-layer neural network computes a continuous output instead of a step function. The derivative of pi with respect to X is computed from the general form:

$$y = \frac{1}{1 + e^{-f(X)}} \tag{1}$$

Where f (X) is an analytic function in X. With this choice, the single-layer network is identical to the logistic regression model. This function has a continuous derivative, which allows it to be used in back-propagation.

The following functional form is used to determine the dependent variables.

$$P = \frac{1}{1 + D\,e^{\alpha(\mathrm{variable})}} \tag{2}$$

$$P(t, a, m, n, \tau) = a\frac{1 + m\,e^{-t/\tau}}{1 + n\,e^{-t/\tau}} \tag{3}$$

The special case of the logistic function with a = 1, m = 0, n = 1, τ = 1, namely

$$P(t) = \frac{1}{1 + e^{-t}} \tag{4}$$

For real parameters a, m, n, and τ. These functions find applications in a range of fields, including economics [15].A logistic function or logistic curve is the most common sigmoid curve. It models the "S-shaped" curve (abbreviated S-curve) of growth of some set: Here P denotes a set [13]. Later we will use P to denote a function which varies over time. Normally such a function is written P(t). However, such a function may also be read as a set of ordered pairs of the form <t, P (t)>. By convention mathematicians are wont to write P to denote such a set. *P, where P might be thought of as population.*The initial stage of growth is approximately exponential; then, as saturation begins, the growth slows, and at maturity, growth stops [17].

$$P(t) = \frac{1}{1 + e^{(-t)}} = \frac{1}{1 + exp^{(-t)}} = (1 + exp(-t))^{-1} \tag{5}$$

$$P` = p(1-p) \tag{6}$$

The function P has the intuitively appealing quality that

$$1 - P(t) = p(-t) \tag{7}$$

Pilot survey data obtained from question related to proportion of people board on minibus with respective to a series of proposed travel time reduction has been used to calibrate the logit model with var = time factor[18].

$$P = \frac{1}{1 + D\,e^{\alpha(\text{var})}} \tag{8}$$

Let p(t) be the probability of success when the value of the predictor variable is t. Then let

$$P = \frac{1}{1 + D\,e^{\alpha(r)}} \tag{9}$$

Algebraic manipulation shows that

$$\frac{1-P}{P} = D\,e^{(\alpha \cdot r)} \tag{10}$$

$$\ln\left[\frac{1-P}{P}\right] = \ln D + \alpha^{(r)} \tag{11}$$

The above equation investigates the calibration process based on the values of D and α values which were extracted from ANOVA Table using Microsoft Excel. These results applied to the final equation shown below and then the results were used for model validation.

$$P = \frac{1}{1 + D\,e^{\alpha(\text{variable})}} \tag{12}$$

4. RESULTS AND ANALYSIS

The analysis characteristic of use privet vehicle and public transport by test and measure data collected from UKM campus. Constituent variables with respect to their proportional percentage were defined with the help SPSS software model and logit choice model. Studies are focused on graduate students.

Results for questionnaire analysis by SPSS are indicated in table1 which illustrate the response of the car users to shift from private cars to public modes by improving the parking fees. It is clear to observe the percent of car users how aimed to shift from private mode to public was increased from around 15 % to 100% when the travel cost is improved by 65%.

Table 1. Results for questionnaire analysis by SPSS

Improving travel cost	Frequency	Percent	Valid Percent	Cumulative Percent
15%	7	13	13	13
30%	15	15.8	15.8	28.8
45%	13	17.7	17.7	46.5
60%	20	20.4	20.4	66.9
75%	25	33.1	33.1	100
Total	80	100	100	

Relationship between reductionparking fees and the share percentage is illustrated in Fig.1. It is demonstrated that the sharing percentage was directly proportional with reduction of travel cost. This may be attributed to the fact that money is an important issue. Improving the travel cost for the bus in the national university of Malaysia (UKM) by reduction the travel costincrease utilizations of the public transportation minibus use [15].

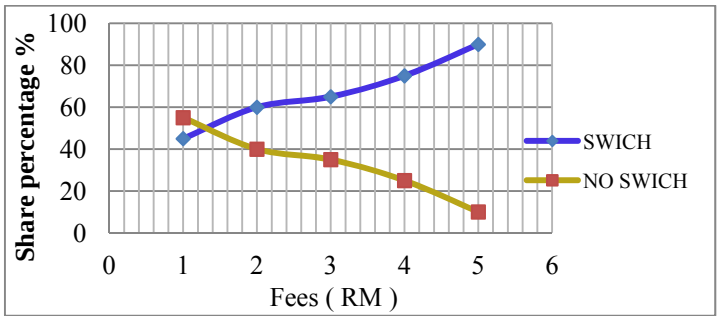

Fig.1. Relationship between sharing percentage and Parking Fees

Results for data calibration by regression statistics are given in table 2 and results for survey illustration is indicated in table 3.

Table 2. An illustration Survey results and data calibration

Improving Travel Cost	Survey results (P)	(1-P)/P	ln(1-P)/P
15%	0.153	5.6	1.8
30%	0.186	4.4	1.5
45%	0.331	2	0.8
60%	0.173	4.8	1.6
75%	0.155	5.5	1.7

Table 3. an illustration Survey results and logit model result

Improving Travel Cost	Survey results (P)	Results form logit model
15%	0.153	0.17
30%	0.339	0.35
45%	0.67	0.69
60%	0.843	0.9
75%	0.998	1.033064

Based on results indicated table 2 and table 3 which were used to model the survey results, it was found that survey results that were collected by questionnaires and results were modelled by SPSS and the aforementioned equations were so approximated as it is shown in Fig.2. Therefore, it is demonstrated that the reduction in travel cost will be the key factor in shifting the people from private cars to public modes

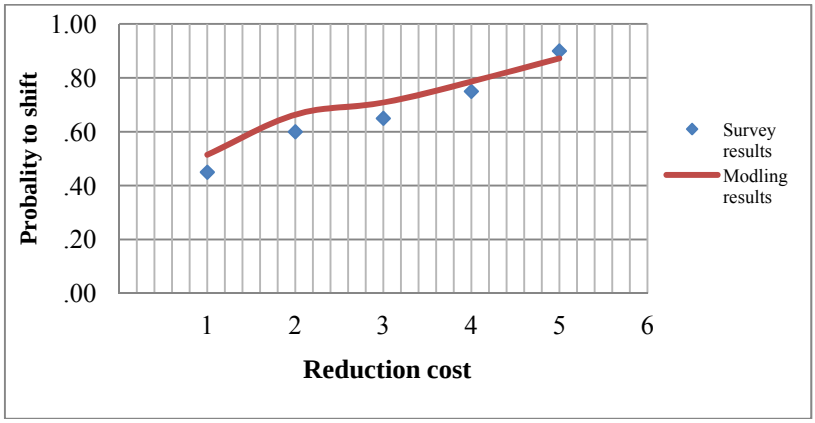

Fig.2. Relationship between reduction cost and the probability shift

Relationship between reduction shorter traveling time and the share percentage is illustrated in Fig.3. It is demonstrated that the sharing percentage was directly proportional with reduction of traveltime. Travel time is considered an important reason for mode choice. Using public bus services is perceived as a waste of time by almost all private vehicle users. Figure 3 showed that a time reduction of twenty percent in current minibus transportation servicing will attracted (8%) of people to board on the minibus whilea time reduction of seventy percent will attracted (82%) of people to use the public bus service, This indicates the possibility of an increase in the use ofbuses service [13].

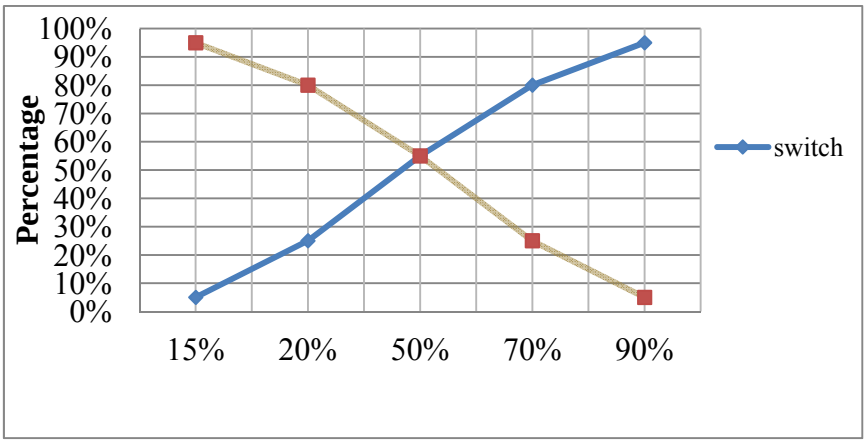

Figure 3. Switching To Public Transport if the Travel Time Improved by Reduction

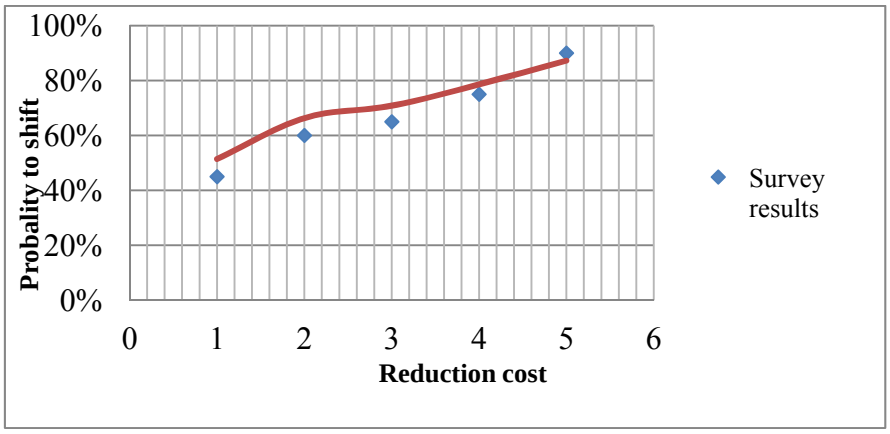

Fig. 4. improving travel time for the Bus to encourage uses

Results for sensitivity ratio between independent and dependant variables are shown in table 4. It is obvious to observe that the sensitivity ratio for 44% model shift whereas for 65 % pensive improvement in the will be the key factor in shifting the people from private cars to public modes facility, whilethe sensitivity ratio was 0.6.

Table 4. sensitivity ratio

Changes in independent variable	Changes in dependent variable	Sensitivity Ratio
65% travel cost reduction	44% model shift	0.6
70% Travel Timereduction	78% model shift	1.1

Supportive reason for switching from private vehicle to public transportation fees and improves public transportation service. Majority of postgraduate student indicated interest switch to public transport if the parking are near and have good facility at the low cost.

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5. CONCLUSION

A range of systems to help encourage students to use public transport and reduce to rely on private cars, including:

- Restrictions on private car users within the campus
- A charge for parking on campus
- Improve public transport within the campus Contribute to more stable sustainable system.

Main results indicate that in order to use public transport entered the campus, should be compatible with the service levels required by customers. as well as to develop long waiting buses on campus and abroad. Moreover the development of parking, these factors were considered as the most important factors to

choose the means of transport and a shift from private car use.Therefore, Sensitivity ratio between dependent and independent variables is (0.6-1.1) indicated high level of results confidence.

RECOMMENDATIONS

There are things that help car users not to switch to public transport and stay in their own cars for a number of reasonssuch as time, convenience, availability, etc…, but he and with frequent traffic accidents, congestion and environmental pollution has forced some to turn to public transport up until he became in some cases, indicating awareness of the culture of the citizen.

1- In the survey found that the majority of students wish to work to improve the means of transportation provided to them, as well, but the car users found that the positions assigned to them does not check the requirements for a number of reasons the most important distance from places of study.
2- Improve parking facility, Parking behavior can be formulated as parking choice probility witch is influenced by improve parking security; decrease the time from parking to faculty by increase number of buses.
3- Give incentives to students who use public transport within the campus this would affect the decision of the user to convert to public transport.

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