Reducing employee travelling time through smart commuting

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Abstract. Extremely congested roads will definitely delay the arrival time of each trip.This certainly impacted the journey of employees. Tardiness at the workplace has become a perturbing issue for companies where traffic jams are the most common worker excuses. A depressing consequence on daily life and productivity of the employee occurs. The issues of commuting distance between workplace and resident area become the core point of this research. This research will emphasize the use of Geographical Information System (GIS) technique to explore the distance parameter to the employment area and will focus on the accessibility pattern of low-cost housing. The research methodology consists of interview sessions and a questionnaire to residents of low-cost housing areas in Melaka Tengah District in Malaysia. The combination of these processes will show the criteria from the selected parameter for each respondent from their resident area to the employment area. This will further help in the recommendation of several options for a better commute or improvement to the existing routes and public transportations system. Thus enhancing quality of life for employees and helping to reduce stress, decrease lateness, absenteeism and improving productivity in workplace.

1. Introduction

The urbanisation have urges nearly half of world population to life in the urban area where people are moving from the countryside to live and work in the big towns and cities such as Kuala Lumpur, Johor Bahru, Penang and Melaka in order to get better educational and work opportunities[1]. As a rapidly growing country, the number of private vehicle ownership automobile increasing each year. Due to this phenomenon, there several challenges that needs to be faced such as overcrowding, constant traffic jams, and inflation in the price of essential goods such as housing, greater strain on services [2]. One of the problems is related to transportation cost affordability among the citizen especially the lower income groups. The increased in gas and oil price has given significant for this people to use public transportation as daily commuting method [3]. Considering this trend, urban transportation issues are of foremost importance to support the passengers and loads mobility requirements of large urban accumulation due to urbanisation. Traditionally, the focus of urban transportation has been on passengers as cities were viewed as locations of utmost human interactions with intricate traffic patterns linked to commuting, commercial transactions and leisure/cultural activities [4].

1.1. Traffic congestion

The traffic congestion on the road is highly occurs during the peak hour or the rush hour that normally happens twice a day which is once in the morning and once evening. This is because of the

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standardized working hours as the employee so to work in the morning and coming home in the evening. There is also a third peak hours which occurs during the afternoon. This phenomenon happens because of the lunch break and the end of the morning school sessions. The heavy traffic during these hours usually occurs at the school area and food centers [5].

1.2. Government Transformation Programme (GTP)
Since the standard of Malaysia's public transportation is poor than other developed countries, people tend to choose travelling by private car to their destination. As an initiative to improve the standard of Malaysia's public transport, Government Transformation Programme (GTP) have been introduce by Malaysian Government on 2010. This programme focused on improving the quality of public transportation in term of services, punctuality, number of coverages, comfortability and safer environment of commuting [6]. Besides that, the programme managed to reduce the numbers of traffic congestion as the purpose to allure people to used public transport for healthier lifestyles as it can reduce the number of car on the roads also allowed people to walk more steps in their daily movement [7].

1.3. Geographic Information Systems (GIS)
Geographic information systems (GIS) played important role in analysis and visualization of data that able to integrate multiple sources such as road network and measure distance and movement between home and work place. This application of geographic information system technique can be apply to analyze and visualize urban travel pattern such as comprising distance and flow from the home location to the working place that showed a powerful visualization and data manipulation capabilities that will shows the patterns and trends [8]. By using the data that being collected, the accumulated cost of travelling or mapping distance can be calculated. This will give a good guide on selecting the nearest route and cost less based on this distance analysis using GIS.

2. Aim and objectives
The aim of this research is to determine the accessibility pattern to the workplace for the working family in urban low-cost housing. Based on the aim, the objectives of this research are:

i.   To explore the workplace distance criteria parameter for working family in urban low-cost housing.
ii. To determine the workplace distance for working family from the location of urban low-cost housing using GIS technique.
iii. To propose smart commuting to workplace using Geographical Information Systems (GIS)

3. Study area
Central Malacca is one of the State of Malacca district (Figure 1). This area is the busiest in the Malacca State as this iswhere the tourisms area located.
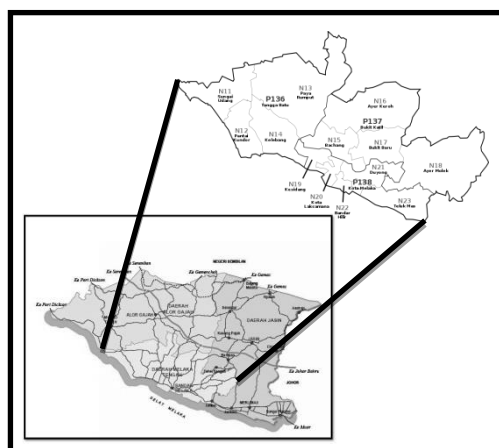

Figure 1. Central Malacca, Malaysia.

4. Methodology

The research methodology consist of the interview sessions to the authorise personals and from the distribution of question survey forms as a qualitative analysis which are distributed to the resident of low-cost housing areas in Melaka Tengah District. The usage of GIS techniques in analysing the accessibility pattern to the employment area from their resident area will further enhanced the outcome of this research.   The combination of this process will display the criteria from the selected parameter for each respondent from their resident area to the employment area.   This will further help in the recommendation of several options for a better commuting or improvement to the existing routes and public transportation.
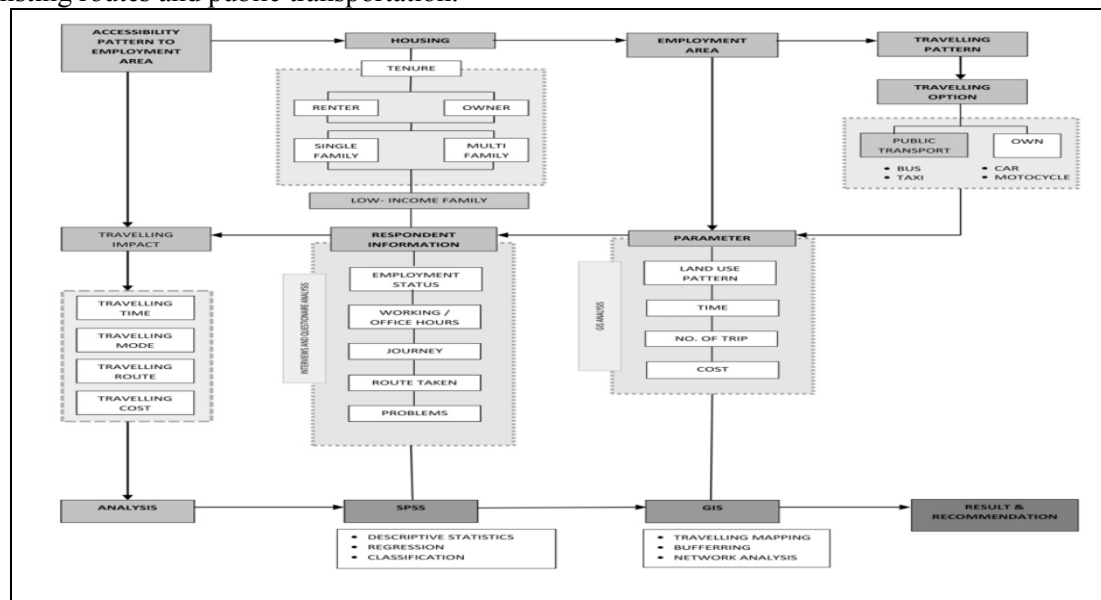

Figure 2. Research framework.

5. Pilot survey analysis

Pilot survey was done with distributing the questionnaire to several locations in Central Malacca such as Malacca Central, Rumah Pangsa Ujong Pasir, and Rumah Pangsa Bandar Hilir. Data collected were processed using SPSS statistical software to show these result:
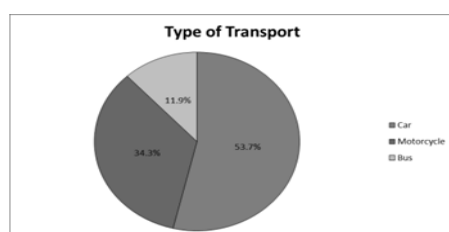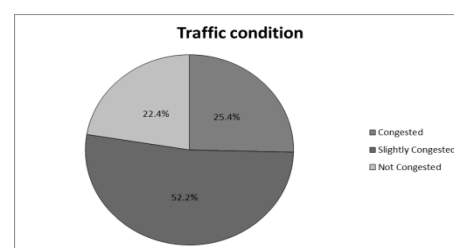

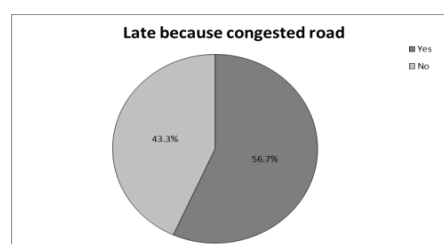**Figure 3.** Type of transport.

Figure 4. Traffic condition.

Figure 5. Late because of congested road.

These figure showed the percentage of respondents based on the question asked throughout the questionnaire .From Figure 3 showed that 53.7 percent of respondent using car to their employment area while 34.3 percent using motorcycle and 11.9 percent using public transportation. In Figure 4 explained about the traffic condition during their travelling session to or from their employment area. There are 52.2 percent of respondent said that the traffic is slightly congested and 25.4 percent said the traffic is congested while 22.4 percent said the traffic is not congested at all. Meanwhile in Figure 5, based on overall analysis showed that more than half respondents have been late to work because of the congested area which is 56.7 percent and the others have never been late to work due to congested road.

6. Conclusion

Extremely congested roads will definitely delay the arrival time of each trip.This certainly impacted the journey of employee especially to the workplace. Tardiness at the workplace has become perturbing issue for the companies where stuck in heavy traffic jammed are the most common worker excuses. A depressing consequences on daily life and productivity of the employee occurs due to this lateness problemsbecause of the traffic congestion from urbanisation process. The issues of commuting distance between workplace and resident area become the core point of this research. This research will emphasize the traveling pattern behavior and distance parameter to the employment area from their house using Geographical Information System (GIS) technique. This will further help in the recommendation of several options for a better commuting or improvement to the existing routes and also improving the public transportations system. Thus enhancing a better quality of life for employees that helps reduce stress, decrease lateness, absenteeism and improves productivity in workplace.

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