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Barriers and Motivations for Sustainable Travel Behaviour: Shah Alam residents' perspectives

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Abstract

This study revealed the barriers and motivations to using sustainable transportation for daily trips. A total of 384 respondents was selected for this survey, represented the 36 sections of Shah Alam. The reasons provided as barriers to cycling and walking are hot weather, surrounding safety factor, unsatisfactory cycling tracks and poor condition of pedestrian lanes. Among the reasons respondents are not motivated to use public transport are inefficient services and expensive fares. However, the majority stated that the increase in petrol prices and tolls would be key factors to reduce car use and more provision of public transport would encourage them to use public transport.

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Keywords: Barriers and motivations; sustainable transportation; travel behaviour.

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1. Introduction

The current unsustainable development in the transportation sector calls for changes in travel behaviour. So far, attempts to influence individual behaviour towards a more sustainable mobility are often ineffective. An increasing involvement of psychological and sociological theories in transport research is aimed at a deeper understanding of causes and effects of travel behaviour. Although there is a wide public presence and comprehensive knowledge about environmental and sustainability issues, these are not adequately reflected in individual travel decisions.

The increase in population and vehicle ownership in Shah Alam prompted this work as these growths denote that the city will experience traffic congestion problems similar to Kuala Lumpur if Shah Alam does not implement the use of sustainable vehicles. In Malaysia, cars showed the highest growth rate between 1991 and 2009, with an average annual growth rate of about 9%, followed by two-wheelers (7%), whereas public transport modes (buses, taxis, and rental cars) registered a much lower growth rate of about 5% during this period. If the current trend continues, cars are expected to become the most dominant mode of transport in Malaysia in the coming years (Ministry of Transport Malaysia, 2010).

A number of studies have shown that some people might not always drive out of need, but because of choice (Handy et al., 2005). Seeing car features gives a psycho-social value, causing everyone to want to use a car rather than other modes of transportation. Investigating the reasons for this gap can lead to an improvement of efficiency of sustainable mobility measures. On the back of this background, this paper is focused on the identification of motives and barriers to adopting sustainable travel behaviour.

2. Sustainable travel behaviour

Although no common accepted definition of sustainability, sustainable development or sustainable transport is available (Beatley, 1995), it is generally accepted that sustainable development, and more specifically, sustainable transport, implies finding a proper balance between (current and future) environmental, social and economic qualities (Steg, L. and Gifford, R., 2005). A popular definition for sustainable transport was developed by the European Conference of Ministers of Transport (ECMT 2004), which stated that a sustainable transportation system is one that is accessible, safe, environmentally-friendly, and affordable.

Many projects aimed for more sustainable mobility are either not or only partly successful. Sustainable mobility requires considerable changes in individual travel behaviour. One of the main reasons of unsuccessful sustainable mobility project is the habitual character of individual travel behaviour (Moller, 2002). Socio-psychological factors like attitudes towards the environment and certain modes of transport or the importance of moral obligation and environmental beliefs are the main influencing variables for daily travel. Erikson et al, 2008 in their studies successfully used interventions to interrupt habitual travel behaviour and induced a deliberate consideration of travel alternative and increased the moral motivation towards a more sustainable mobility.

However, Anable (2005), Hagman (2003), and Tertoolen et al., (1998) suggested that although information about the negative environmental effects of car usage raises some awareness, this awareness is usually insufficient to change behaviour. For example, even though the majority of Shah Alam residents are aware of the dangers of motor vehicles on the environment, they still refuse to use more sustainable modes, such as walking or cycling (Nasrudin, 2013). The current transport nature and the need to go through changes in society and lifestyle patterns that generate a variety of travel needs have caused most people to be very dependent on car travel (Anable, 2005). A large support for measures to reduce car usage and increase car consumption criticism would help to increase an individual's willingness to reduce car usage. Steg and Gifford (2005) presented some constraints and motives for

changes in travel behaviour. One important barrier for behavioural changes is its frequent association with additional effort or decreasing comfort. Cars are seen as convenient, reliable, secure, and able to provide access to more destinations than public transport. These factors influence the desire of residents to own a car (Hiscock et al., 2002).

The reduction of car use is a specific problem because the attractiveness of a car is based on many variables associated with comfort, such as convenience, independence, flexibility, perceived safety, or privacy. Another barrier is the difference between the short-term perspective of individual users and the long-term perspective of society, creating a social dilemma as cars are also seen to give status and social values, such as competence, skills, and masculinity (Hiscock et al., 2002). The advantages of individual car use make it attractive to continue driving, but the increasing negative effects from traffic and the general need for a sustainable transportation system requires massive reduction of car use. Lensink (2005) concluded that obtaining a more sustainable transportation system requires more attention to be paid to the interaction among infrastructure planning, traveller's decision behaviour, and transportation energy use in government transportation policies.

3. Methodology

A total of 384 respondents were selected for this survey, which represented the 36 sections of Shah Alam, by using the stratified random sampling method. The selection of the sample was calculated based on the total population, which amounted to 336,590, with 95% degree of confidence and 5% of margin of error. Distribution of the questionnaire was made from house to the house as well as approaching respondents at recreation centres and shopping centres selected from each section. However, some residents refused to answer the questionnaire due to the time factor as the questionnaire was quite detailed and required about 15-20 minutes to complete.

This study revealed barriers and motivations to using sustainable transport for daily trips based on the purpose of the journey such as trips for work, education, shopping, recreation, and other trips. In this survey, respondents were provided with a survey form with several sub-item tests to determine the level of readiness to reduce car usage and use sustainable vehicles (walk and cycle, and to use public transport). The respondents were asked to give an opinion on the factors that could motivate them to reduce car usage and adopt sustainable vehicles. Respondents were also asked to provide reasons why they are not motivated to use more sustainable mode of travelling. However, the limitation of this study were some of the residents refused to answer the questionnaire due to the time factor because the questionnaire are quite detail and takes about 15-20 minutes to answer.

4. Findings and discussion

4.1. Barriers and motivations to walk and cycle

The worst urban traffic congestion usually occurs during periods of travel to and from work. Congestion exists partly because many car owners find it more convenient to travel to work by car than by public transport, even in congested condition. This situation also occurs in Shah Alam, where the results of this study showed 53.1% of respondents uses a car for commuting to work, compared to 8.8% who uses public transport. This indicated that Shah Alam is still far away to hit the target of sustainable mode of travelling.

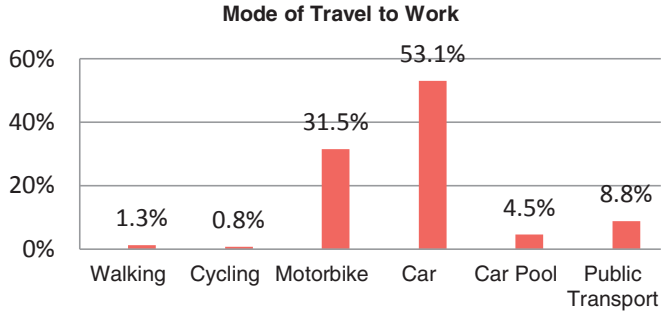

Figure 1: Mode of travel to work by Shah Alam's residents

From Figure 1, it was evident that not only a low percentage uses public transport, but there are a low number of people who walk or cycle to work. Many of Shah Alam residents do not walk or cycle even for a short trip. The majority of them prefer to use a car for their daily routine trips to nearby areas such as to the grocery store, recreation parks and a trip to the mosque, even though the distance is less than 0.5 kilometres. Figure 2 showed that 47% of respondents use cars and 34% ride motorcycles. Meanwhile, walking only recorded 14% and cycling 5% for short trips to the grocery store, recreation parks, and mosques.

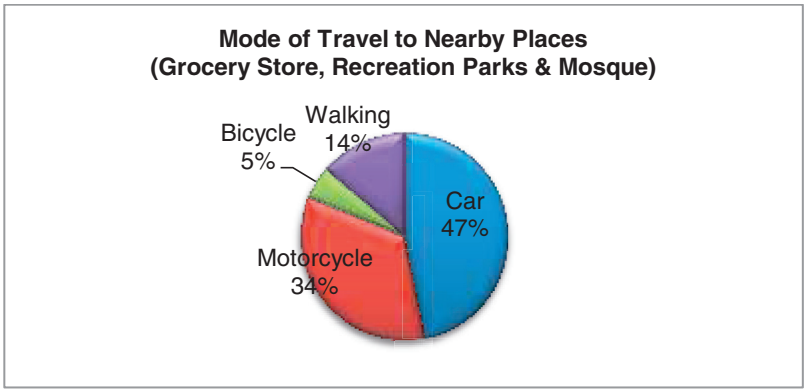

Figure 2: Mode of travel to nearby places

This study has identified a number of barriers to the practice of walking and cycling among residents. When respondents were asked the reasons they do not like to walk or cycle, the majority of respondents provided negative feedback. Table 1 showed these reasons.

Table 1: Percentage of reasons why respondents do not like to walk or cycle

Reasons	Total	Percentage (%)
Hot weather	226	58.9
Walking and cycling is exhausting	202	52.6
Walking and cycling is not safe	156	40.6
Driving a car is more convenient	103	26.8
No proper cycle tracks and poor pedestrian walkways	83	21.6

About 58.9% of respondents do not like to walk because of the "hot weather", 52.6% considered walking and cycling as "exhausting" and about 40.6% do not like to walk or cycle because it is "not safe." They also indicated that driving a car was more convenient than walking. "No proper cycle tracks and poor pedestrian walkways" is also one of the reasons that they refuse to walk. These findings are similar to Rose and Marfurt (2007), which revealed that distances and other aspects like weather conditions, physical abilities, and safety issues are often influenced by individual perception.

However, this study also identified the motivation to encourage residents to walk and cycle. Among them are location and safety factors. When respondents were asked on their preferred characteristics of a recreation area, the majority indicated that it must be near to home (62%) and short distance to walk (23%). This showed that the population would be willing to walk to the recreational activities if it is located near to the resident's house. In the study by Nasrudin and Nor (2012), parents were asked about the elements they would consider before allowing their children to walk or cycle to school. The majority of the respondents stated that safety of the surroundings was the main factor. Furthermore, a distance of less than one mile is also a factor. This clearly showed that location plays a big role in walking and cycling decision.

4.2. Barriers and motivations to use public transport

Among the reasons respondents refuse to use public transport are punctuality problem, inefficient public transport services, and expensive fares. Beirao and Cabral (2007) conducted a qualitative study on public transport and car users, in order to understand the attitudes of travellers towards transport and to explore the perception of public transport service quality. They found that increasing public transport usage necessitates that services should be designed in such a way that accommodates the service levels required by customers, in order to attract potential users. It was evident based on Oliver (1999) as cited by Kamaruddin et al (2012), when a customer is satisfied with the services, the customer will hold a commitment to re-buy or re-patronize a preferred service consistently in the future. Paulley et al. (2006) described a range of factors that affect the demand for public transport; concentrating on the effects of fares, quality of service, income, and car ownership.

In this study, we have identified several barriers in using public transport. When respondents were asked their reason for not using public transport, 43.2% of respondents stated that they were "more comfortable using the car." This was followed by the second highest rated reason, "waste time waiting for public transport." Among other reasons included inefficient public transport and expensive fares. Of the reasons given by the respondents, they clearly showed that the low quality of public transport services in Shah Alam has resulted in users not being inclined to use the service.

Table 2: Reasons for not using public transportation

Reasons for Not Using Public Transportation	Total	Percentage (%)
More comfortable using the car	172	43.2
Waste time waiting for public transport	106	26.6
Public transport is not efficient	67	16.8
Expensive fares	32	8.0
Others	21	5.3

Table 3: Level of willingness to use public transport if the services are improved

N	Minimum	Maximum	Mean	Std. Deviation
384	1 (strongly ready)	4 (not ready)	1.87	0.626

However, the current study also found that the majority of respondents are willing to use public transport if the services are improved. The improvement in public transport system would motivate them to use public transport as alternative to using a private car. Table 3 showed the willingness level had a mean of 1.87 and a standard deviation of 0.626.

The current placement of transport service locations that are remote from residential areas, plus no connection and access to the services have resulted in the under-utilisation of public transport. Less efficient public transport facilities prevent people from using the facility. It is estimated that only 61% of Klang Valley residents live within 400 meters of a bus route (a reasonable walking distance). Roughly, of more than 4,000 bus stops in the Klang Valley, about 40% of them do not have covered connection route or do not have signboard. Lack of facilities to access overhead bridges and public transport facilities, plus the difficulty of crossing roads due to traffic congestion, have led to the use of public transport as less well received (Government Transformation Programme (GTP), 2011).

This study has proved the role of public transport location as the main factor to attract users to use the service. Table 4 showed the chi-square analysis, of which the value 62.669 is significant at the 0.05 level ($p = 0.00$). A significant relationship was observed between the frequency of use of public transport and the proximity to public transport stations. This showed that the closer the public transport is to home, the more frequently respondents would use the public transport.

Table 4: Frequency of using public transportation based on public transportation station distance

Frequency of Using Public Transport	Distance To Public Transport Station					
	0.5-1km	1-2 km	2-3 km	3-4km	> 5km	Total
Every day	11	1	5	5	8	30
	36.7%	3.3%	16.7%	16.7%	26.7%	
3-4 times a week	4	12	9	10	3	38
	10.5%	31.6%	23.7%	26.3%	7.9%	
1-2 times a week	10	7	3	3	7	30
	33.3%	23.3%	10.0%	10.0%	23.3%	

Occasionally	53	29	24	21	18	145
	36.6%	20.0%	16.6%	14.5%	12.4%	
Never	25	21	19	16	60	141
	17.7%	14.9%	13.5%	11.3%	42.6%	
Total	103	70	60	55	96	384

Chi-square = 62.669 Significance =0.00

In this study, we also have identified several key features that are required for better public transportation from a consumer's perspective. Through the list of features, we have asked the respondents to provide feedback on their most preferred features. The findings showed that all the characteristics listed are the most important features needed to produce excellent public transport services.

Table 5: Mean and mode analysis of the importance of public transportation improvement features

Characteristics of Public Transport Improvements	Mode	Mean	Std. Deviation
Comfortable and spacious seat	1	2.01	1.746
More seats	1	1.98	1.597
More comfortable waiting area	1	1.86	1.494
More disabled-friendly	1	2.03	1.526
Facilities for the elderly	1	1.93	1.544
Facilities for babies and children	1	2.00	1.498
Enhanced security features	1	1.80	1.561
Quality on par with developed countries	1	2.00	1.427
More buses into isolated areas	1	2.07	1.620
Special bus routes to avoid a traffic jam	1	2.02	2.161
Introduce a system of free tickets	1	2.45	1.761
Lower fares	1	2.37	1.678
More frequent bus trips schedule	1	2.07	1.534
Use a 'Touch n Go' system to pay bus fare	1	2.67	2.119

**Minimum =1, Maximum=10*

4.3. Barriers and motivations to reduce car usage

Hiscock et al., (2002) conducted interviews with car owners and non-car owners in Scotland, to investigate the psycho-social benefits to people that seem to originate from their cars. They found that a car is seen as something that provides security from unwanted people and events, as well as providing autonomy for its convenience, reliability, and capability to provide access to more destinations than public transport. Similar to Nasrudin et al., (2013), in studying consumers' emotions and perceptions toward cars in Shah Alam, the majority of respondents considered driving a car as relaxing, safe, practical and offers a sense of freedom. They also agreed with the statement that cars offer socially desirable attributes, such as status and masculinity symbols.

To encourage residents to support a sustainable transportation programme, respondents were asked to give an opinion on the factors that would reduce the use of cars. Respondents were given several statements to choose from and rank which that would motivate them to reduce car use. The majority of them stated that the increase in petrol prices would be a key factor to reduce travel and car use. Other than that, more provision of public transport and affordable public transport fares would also encourage them to reduce car use and opt for public transport as the main mode of travel. They also stated that the increase in toll prices would also reduce frequent travel.

Table 6: Rank of opinions on matters that will cause car use reduction

Matters which causes reduction in car use	Rank					Mode
	1	2	3	4	5	
Petrol Price Increase	213	49	41	44	37	1
	55.5%	12.8%	10.7%	11.5%	9.6%	
Rising toll prices	44	92	70	56	122	3
	11.5%	24%	18.2%	14.6%	31.8%	
More Public Transport	55	80	110	89	49	3
	14.3%	20.8%	28.6%	23.2%	12.8%	
Cheaper public transport fare	35	79	63	124	83	4
	9.1%	20.6%	16.4%	32.3%	21.6%	
Car Tax increase	41	85	100	71	87	5
	10.7%	22.1%	26%	18.5%	22.7%	

5. Conclusion and recommendations

To achieve a more sustainable transportation system is a complicated task and could not be achieved in a short period of time. It involves a change in the psychological aspects of behaviour and perception. The habitual character of daily mobility is seen to be a major barrier for changes towards a more sustainable behaviour. A variety of socio-psychology variables are the main determinants for decisions pro and contra sustainable behaviour. However, the perception and behaviour can be nurtured and changed to be more environmentally responsible. If the lack of facilities is used as an excuse to behave unsustainable, then the deficiency should be improved to promote changes in the residents' behaviour.

For instance, cycling tracks should be developed to encourage people to use bicycles as a convenient mode of transport, especially for short trips. If the hot weather in Malaysia becomes an excuse for not

walking, then the development and maintenance of pedestrian lanes should be upgraded by installing covered walkways. In targeting the needs of different population groups, policy-makers should also consider the mechanism that would enable public transport to provide similar benefits as using a car, in order to make the former more attractive. Advertising campaigns, with the intent of increasing more sustainable transport usage, should focus on the environmental benefits of using sustainable transportation by labelling walking, cycling, and public transport as environmental symbols; thus countering the status symbol of cars.

More information is needed from the residents to find out their expectation of the sustainable transportation programme. Therefore, further studies are required to identify the motivation needed by the residents to encourage them to act more sustainable, for instance, in terms of the facilities and services.

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