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Perceptions of the Urban Walking Environments

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Abstract

Walkability is the basis of sustainable city. Walking is the socially equitable mode that is most accessible to the masses. However, the advent of transportation technology, such as automobile and superhighway has degraded the pedestrian environment. The aim of the paper is to examine the characteristics or attributes that could promote walking activity via people's perception. This paper combines survey questionnaire and walkability audit to gauge perception of the urban walking environment. Findings indicate that the proximity of destinations, good weather condition, safety and well-designed pedestrian facilities can significantly contribute to better perceptions of the walking environment.

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1. Introduction

Walkability is the basis of sustainable city. Walking is the socially equitable mode that is most accessible to the masses. Besides, it is also the most environmental friendly transportation mode. To support walking activity, the built environment should be planned in such a way that it would encourage people to walk. However, the advent of transportation technology, such as automobile and superhighway has degraded the pedestrian environment. As a result of degradation, the pedestrian environment lost its intimate scale and becomes devoid of public life. This vicious cycle created a further desertion of the pedestrian space and consequently, the life of once vibrant community becomes a disconnected one. Of late, the health benefits of walking have led to extensive research on the influence of the built

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environment on travel mode. Recent development has also seen the safety of pedestrians becoming an issue worldwide since pedestrians are vulnerable road users. Pedestrians are always at a higher risk compared to other road users. Over one million people annually are estimated to have died in road crashes and the road users such as, pedestrians, motorcyclists and cyclists, represent the majority of fatalities worldwide (Bhattacharya et al., 2006). Also, pedestrians, bus passengers and minibuses, and cyclists from poor and developing country bear the highest burden of injuries and fatalities (Nantulya & Reich, 2002). Pedestrians make up 15 to 20 percent of the deaths in road accidents in industrialized countries and 40 to 50 percent in developing countries (Gunnarsson, 1995). The increasing number of motorized vehicles on the road has a negative impact on the safety of pedestrians.

Many studies have shown that characteristics of the pedestrian environment play a major role in determining the respond from users. Although there is growing evidence that the neighbourhood environment can influence walking in many western countries, the amount of such evidence is very much limited in Malaysia. Against this backdrop, the aim of the paper is to examine the characteristics or attributes that could promote walking activity via people's perception. This article gives insights as to how future efforts in promoting walking need to address several aspects of the urban environment.

2. Literature review

Walking is the most primary form of transporting (Grignaffini et al., 2008). Walkability is a measure of how friendly an area is to walking. It takes into account the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security and comfort for walking. Walkability is a fundamental concept in sustainable urban design. The benefits of walking can be discussed from three perspectives: economic benefits, social benefits and environmental benefits (Litman, 2004). From the economic perspective, walking can improve accessibilities especially for the non-drivers, hence reducing the transportation cost. In term of social benefits, walking can increase neighbourhood interaction and community cohesion. It also improves the opportunity to preserve cultural resources and preserve the aesthetic of an area. Likewise, walking can be beneficial to the environment by reducing the use of land for roads and parking facilities and reducing energy consumption and pollutions.

Findings from some studies such as smart growth stated that improving the built environment did not cause people to walk more (Shokoohi et al., 2011). However, there are other studies that stated otherwise. As an example, Parks and Schofer (2006) mention that network design helps determine the ability of pedestrians to reach their destinations, which correspond to the state of the built environment. According to them, grid networks with short blocks allow for relatively direct routes, while long blocks and curvilinear streets lengthen pedestrian trips by requiring circuitous routes. Sidewalks are also an essential component of good pedestrian design in areas where automobile traffic is quite heavy. Lack of sidewalks implies pedestrians must either walk in the roadway, which decreases safety, or walk alongside the road in an unfriendly environment.

Other than grid networks and sidewalks, setbacks and parking also play a role in creating a pedestrian friendly area (Park and Schofer, 2006). Small building setbacks make commercial establishment and residences easily accessible to pedestrians, while large setbacks increase the effort required to reach buildings from the street, which in turn provide a less interesting streetscape. Streets with a large amount of frontage taken up by parking make pedestrian access to buildings more difficult by requiring pedestrians to cross a parking lot.

Researchers in planning and transportation have identified land-use mix (diversity of uses and access to facilities), residential density and street connectivity as the fundamental aspects for creating walkability indices (Frank and Pivo as cited in Leslie, 2005). On the same notes, higher population density, greater connectedness of streets (higher number of intersections) and mixed land use has also been linked with

higher rates of walking and bicycling trips for transportation (Saelens et al. as cited in Leslie, 2005). The results of a study by Clark et al. (2013) also demonstrate that population density and to a lesser extent, pedestrian infrastructure can affect the rate of walking.

Retting et al. (2003) provides a review of the literature examining the effect of micro-scale built environment measures on crashes. They conclude that changes to the built environment can have an impact on the occurrence of pedestrian crashes. These measures include speed control, separation of pedestrians from the roadway and increased visibility of pedestrians. Their analysis suggests that physical changes to the built environment can significantly decrease the rate of pedestrian–vehicle crashes.

Ultimately, according to Manaugh (2011), walkability measures vary by trip purpose and socio-economic characteristics of residents. Hence, walkability can be interpreted as a match between residents' desires and expectations for types of destinations, their willingness to walk a given distance and the quality of the path. It is further noted that neighborhoods that find this match between built form and residents' needs will likely have more people walking in them. Similarly, in a cross-sectional study by Gebela et al. (2009), they found that adults of lower socio-economic status, who had children in the household, or who were overweight were more likely to perceive a high-walkable neighborhood as low-walkable. Their other study (Gebela et al., 2011) shows the importance of perception in encouraging people to walk. The study found that those who perceived high walkability, dwelling density or land use mix as low decreased their walking for transport significantly more than those with matched perceptions. It concluded that those who misperceived their neighborhood to be less walkable can negatively and significantly affect their walking for transport and for leisure.

Other than the built environment, weather conditions are shown to affect walking. The results concerning the weather variables find that average temperature and total precipitation impact walking (Clark et al., 2013). This study that was done in Canada suggests that increasing walking as a mode of transport might be difficult to achieve in climates where there are consistently low temperatures or high amounts of precipitation. In a study done by Campos et al. (2003), lighting, footway width, footway gradient, weather, proximity to transport facilities or signage show a higher degree of importance in encouraging people to walk. Both of the studies by Clark et al. and Campos et al. were conducted in countries with cold climate, therefore the weather mention in the studies was associated with coldness. However, a study done in Hong Kong, which experience higher temperature than Canada and United Kingdom also found that the respondents suggested to have a weather proof environment to satisfy their needs as pedestrian (Hung et al., 2010)

Other than the built environment and weather conditions, safety is also a point of concern for pedestrian. Individuals who live in area that are more walkable and have lower crime rates tended to walk more (Doyle et al., 2007). There are many studies that correlate safety to the rate of walking. Appleyard (2003) for example, illustrated that pedestrian activity is associated with the level of personal safety within a neighbourhood.

3. Research methodology

This paper combines survey questionnaire and walkability audit to gauge perception of the urban walking environment. The respondents for the survey questionnaire came from several neighbourhoods in the Klang Valley. A total of 155 survey questionnaires were distributed to the neighborhoods in Petaling Jaya, Kuala Lumpur and Putrajaya. The respondents were randomly chosen among the residents of the neighborhoods. Finally, 126 survey questionnaires were used in the analysis.

The walkability audit identifies concerns for pedestrians related to the safety, access, comfort, and convenience of the walking environment. It is an assessment of the walkability or pedestrian access of an

external environment. Walkability audits are often undertaken in street environments to consider and promote the needs of pedestrians as a form of transport. They can be undertaken by a range of different stakeholders such as local community groups, transport planners and engineers. A good walking audit can deliver tailor-made recommendations on how to improve street environments and utilize the resources on a maximum level in planning the urban environment.

There are several processes of walking audit and they can be tailored to suit the stakeholders. For this research, students of a postgraduate level class in urban management were engaged to conduct the walkability audit. The first step was reviewing several audit guides. Next, the class had a discussion on the criteria and the conduct of the audit to standardize and orientate their perceptions of the walking environment. Afterwards, audit briefing was conducted to provide the students with reinforcement of knowledge beyond what they have learned from their discussion. The students were then divided into six groups to cover several areas in the Klang Valley. The survey questionnaire gauges residents' perceptions and attitudes about the pedestrian environment. The main activities of the walkability audit for this research are observation and image recording. The data from the walkability audit and the survey questionnaire were then triangulated to give credibility and validity to the research findings.

4. Results

Many studies have shown that walking frequency is very much influenced by the built environment. The studies show that a conducive environment for walking would attract active walking. Hence, one of the survey questions was to gauge the frequency of walking to examine the level of walking activity among the respondents.

Table 1. Survey results on respondents' walking frequency.

Frequency of walking	Frequency	Percentages
Everyday	80	63.5
2-3 times a week	25	19.8
Once a week	11	8.7
Sometimes (less than once a week)	7	5.6
Never	3	2.4
Total	126	100

Table 1 shows that the majority of the respondent (63.5 percent) walk every day, while 19.8 percent walk 2-3 times a week. A much smaller percentage (8.7 percent) of the respondents walks once a week, while 5.6 percent walk sometimes. Only 2.4 percent of the respondents chose 'never' as their frequency of walking. Although the result do not established the walking distance, it shows that majority of the respondents walk frequently.

Table 2. Survey results on respondents' activities/destination for walking.

Activities/Destination	Frequency	Percentages
For shopping/errands	67	53.2
To get to work	51	40.5
For exercise/health	42	33.3
To get to school/college	37	29.4
To get to the bus stop	32	25.4
For pleasure/to walk pets	30	23.8

On why and where they walk, the respondents can choose more than one answer from a given list of attributes. The results show that the majority (53.2 per cent) walks to do shopping/errands (refer to Table 2). The next popular choice on the reason for walking is 'to get to work' (40.5 percent). 33.3 percent walk for exercise/health, while 29.4 percent of the respondents walk in order to get to school/college. 'To get to the bus stop' registered 25.4 percent of respondents and finally, 23.8 percent of the respondents walk for pleasure/to walk pets.

Table 3. Survey results on the factors that prevented the respondents from walking more often.

Attributes	Frequency	Percentages
Places too far away	56	44.4
Crime Issues	47	37.3
I have to carry things	44	34.9
Weather is not good	40	31.8
Too many cars	21	16.7
Cars drive too fast	21	16.7
Travel with small children	20	15.9
Drivers don't stop	18	14.3
No sidewalk	17	13.5
Sidewalk in poor condition	16	12.7
Difficult to cross the street	15	11.9
No curb ramps	8	6.4
Not enough lighting	8	6.4

The next fundamental question to gauge people's perception in order to provide a better walking environment is the scenario that prevents them from walking. Similar to the previous question, the respondents can choose more than one answer to the question on what prevent them from walking more often. Table 3 indicates that the majority (44.4 percent) cited 'places too far away' as the reason that prevents them from walking more often. The next popular choice is 'crime issues' with 37.3 percent stated this as the reason for walking less often. 34.9 percent cited 'I have to carry things', while 31.8 percent stated 'weather is not good' as the reason that prevented them to walk more often. There are not many differences in term of percentages registered for other attributes such as 'too many cars', 'cars drive too fast', 'travel with small children' and 'drivers don't stop'. For the attributes 'no sidewalk' and

‘sidewalk in ‘poor condition’ both registered quite a similar number of respondents; 17 (13.5 percent) and 16 respondents (12.7 percent) respectively. Both ‘no curb ramps’ and ‘not enough lighting’ are cited by only 6.4 percent of the respondents as the attributes that prevented them from walking more often.

Another important question to look into the need of the respondent is their motivation to walk. In this case, the circumstances that would encourage them to walk must be explored so that a better walking environment could be provided. Using the same method as the previous two questions, the respondents are given the option to choose more than one answer from a given list of attributes. The results in Table 4 show that the majority (55.6) cited ‘weather is good’ as the circumstance that encourage them to walk. This is followed closely by ‘less risk from crime’ with 54.8 percent. ‘Sidewalk in good condition’ is another prerequisite that carry a higher percentage with 46.0 percent of respondents opted for that. 30.2 percent of the respondents cited ‘less car on the street’ as the reason that could motivate them to walk. ‘Wide sidewalk’ and ‘enough lighting’ registered almost the same number of respondents; 35 (27.8 percent) and 34 (27.0 percent) respondents respectively. 21.4 percent of the respondents chose ‘can find many amenities/activities along the way’ as the attribute that could encourage them to walk, while 19.8 percent of the respondents cited ‘good traffic signal/signage for pedestrian’ as their preferred scenario that would motivate them to walk. Surprisingly, ‘cars are slow’ seems to be a less popular attribute that could encourage the respondents to walk (18.3 percent).

Table 4. Survey results on the factors that encourage the respondents to walk.

Attributes	Frequency	Percentage
Weather is good	70	55.6
Less risk from crime	69	54.8
Sidewalk in good condition	58	46.0
Less car on the street	38	30.2
Wide sidewalk	35	27.8
Enough lighting	34	27.0
Can find many amenities/activities along the way	27	21.4
Good traffic signal/signage for pedestrian	25	19.8
Cars are slow	23	18.3

5. Discussion

On the question of what prevents them from walking, ‘places too far away’ registered the highest percentage. People would be more likely to perceive a destination as far away when there are not many interesting activities along the way. Several studies have shown that mixed land use and greater connectedness of streets are linked to higher rates of walking. Greater connectedness of streets which are associated to network design also plays an important role in encouraging people to walk. In this context, short blocks allow for relatively direct routes and small building setbacks make commercial establishment and resident easily accessible to pedestrian. All of this scenario can have an impact on people’s perception on travel distance.

Table 5. Minimum density for different types of transportation mode

Densities defined by some studies	Population density (Persons/Hectare)	Source
Minimum density for encouraging people to walk to daily activities	130-400	Cities and automobile dependent research by Newman and Hogan on various cities
Minimum density for tram service	240	Local Government Management-Board Sustainable Settlement Guide
Minimum density for bus service	100	Local Government Management-Board Sustainable Settlement Guide

Density is another factor that makes places to be far away from one another. According to Kenworthy and Laube (as cited in Barter 2004), the urban density for Klang Valley is low with 58 persons per hectare. Table 5 shows that low densities cannot efficiently support the community to walk to daily activities, while Table 6 shows the density for new development in the Klang Valley. The densities for new development in Klang Valley do not cater to the needs of a walkable community. This means that new developments in the Klang Valley do not provide the potential densities needed to encourage residents to walk to access opportunities. They do not provide a comfortable distance for those who rely on walking as well as other non-motorised transport modes.

Table 6. Density for new development in the Klang Valley

New Township	Acreage (hectare)	Population	Density (person/hectare)
Putrajaya	4,581	300,000	65
Cyberjaya	7,001	370,000	53
Bukit Jelutong	892	31,068	35
Kota Kemuning	736	32,715	44
Berjantai Bistari	11,736	500,000	43

‘Weather is good’ registered the highest percentage in the survey question related to the attributes that would encourage the respondents to walk. This shows that weather plays a fundamental role that could motivate the respondent to walk. Studies in other countries have also demonstrated the importance of weather condition in encouraging people to walk. Extreme weather such as high precipitation, low and high temperature can prevent people from walking. Therefore, the fluctuation of the Malaysian climate could pose a serious threat to pedestrians and walkability agenda. In fact, based on the questionnaire distributed, majority of the respondents cited the weather condition as the main factor that could encourage them to walk and expectedly, among the top scenario that prevented them from walking is the bad weather. Man- made shaded sidewalks are available in some areas in the Klang Valley. The walking audit shows that Putrajaya is one of the areas that provided man-made shaded sidewalk. Other than man-made shaded sidewalks, natural shaded sidewalk or tree-lined sidewalk could provide the much needed protection from the unpredictable weather.

One of the key components of a walkable neighborhood is the sidewalk. Several studies have shown that sidewalks play a role in creating a pedestrian friendly area. To encourage people to walk particularly in an automobile dependent urban area is almost impossible without proper sidewalks. During the walking audit it was found that several important aspects of sidewalks that would encourage people to walk are not implemented. Many of the areas are either without proper sidewalks or they are in bad

condition. Besides, the existing sidewalks are narrow and the existence of street furniture makes them even narrower. In several places, the sidewalks are not continuous, prompting pedestrian to walk on a dangerous road or terrain. In Putrajaya, due to the world class physical infrastructure, the walkability agenda seems to be achievable. However, during the walking audit, it was observed that the pedestrian pathways were not fully utilized. Most of the walkways are deserted and under-utilized. The lack of activities along the walkway may contribute to this state of affairs. The result of the survey questionnaire shows that the presence of many amenities and activities along the pedestrian walkway can help in encouraging the respondents to walk. Thus, the lack of those amenities and activities can have repercussion toward walkability attractiveness of the area.

Crime is also one of the factors that discourage people from walking. The study result pointed that 'less risk from crime' is one of the criteria that motivate people to walk. Besides, 'crime issues' was also a popular choice among the respondent when asked on the attributes that would prevent them from walking more often. Findings from many studies have indicated the importance of safety or perception of safety in encouraging people to walk. Many of these studies also showed that perception of safety is very much linked to socio-economic status. It seems that people with low-economic status possess a more negative perception of and tend to perceive an area of having a high crime rate. The result of the research may be different from other places due to the difference in culture and perception. Even among the respondent in the different area within the Klang Valley can produce a diverse result. As an example, surprisingly, too many cars, cars drive too fast and difficult to cross the street are not a popular scenario that prevented the respondents from walking more often. Whereas, in other studies, they have shown that traffic speed has been one of the factor that prevented or discourage people from walking. These other studies have put forward measures such as speed control, separation of pedestrians from the roadway and increased visibility of pedestrians to reduce the chances of pedestrian meeting with accident.

Since this is only a preliminary study of looking at people's perception of the urban walking environment in the Klang Valley, there are limitations involved. The limitation of the study is that it does not associate demographic background of the respondents with their perception of the urban walking environment. Other than that, it covers areas that most likely only have middle to high income residents. This in turn may affect the findings of the study. Future study would include these acknowledged limitations.

6. Conclusion

This paper presents the findings of a study combining walkability audits and a survey-based respondent to examine the influence of built environment characteristics, on people perceptions of urban walking environment. Findings indicate that the proximity of destinations, good weather condition, safety and well-designed pedestrian facilities can significantly contribute to better perceptions of the walking environment. In planning a walkable city to promote sustainable transport in the Klang Valley, planners should look into a plan that promotes crime prevention and safety, density that would encourage people to walk to activities and man-made or natural environment that provide ease of walking.

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