

Perception Study on the Facilities for Walking. (Case Study of Bandarlampung, Indonesia)

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Abstract—Urban transport is single-handedly responsible for emitting approximately around one fourth of global carbon dioxide in the atmosphere. Therefore by improving the development of non-motorized transport modes, the emission could be substantially decreased. The non-motorized transport modes are often referred as low carbon transport mode as they emit zero to low level of carbon. Cycling and walking are the most popular form of low carbon transport with the later often receives less attention in conventional urban development. On previous studies, authors identified key-elements of Pedestrian Profile, Pedestrian Activity, and Pedestrian Environment which are being introduced by authors as its abbreviation, PL.AC.E. Authors designed a comprehensive questionnaire based on the framework as the tool for data collection and then analyzed it using statistical procedures. This method aimed to identify the propensity of each key-attribute in order to understand the characteristic of each key-attribute. On this study authors focused on analyzing the key element of Pedestrian Environment and utilized the evaluation method with the case study of the city of Bandar Lampung in Indonesia. The questionnaire was distributed to 189 respondents directly and via online form. Based on the propensity of the responses, authors concluded that the case study area represented a rather low level of service of the environment for pedestrian specifically of its walking facility. Keywords—perception; walking; city; facility; Bandarlampung.

1. Introduction

Nowadays the lifestyle of global citizen is characterized by their need and demand of transportation modes that could accommodate their day-to-day commuting activities in the fastest, easiest, and most personal way. Fast means that it could take people to their destination within the shortest time. Easy means that it would offer the most comfort feeling to the people when using/doing it and also be easily accessed or owned. Personal means that the transport modes could be taken independently by each individual. Driven by technology development and industrialization, these three requirements were easily met by the motorized vehicles such as car and motorcycle. The advancement of the automobiles has changed the civilization in a very massive way. Unfortunately this advancement also came with a devastating negative impact. Urban transport, generated by the motorized vehicle, is single-handedly responsible for emitting approximately around one fourth of global carbon dioxide in the atmosphere.

2. Previous Studies

2.1 Challenges on Urban Mobility

The increase of travel demand due to economic development and urban sprawl leads to environmental degradation. The reason is that this increase generated the increase of car or other motorized vehicles usage since the alternative transportation modes such as public transportation and non-motorized transportation modes are not yet well developed globally. At the end each vehicle emits significant volumes of air pollutants and CO₂ (Matsumoto, 2005).

Fuel combustion in the transport sector is a major cause of carbon dioxide emission. Ever increasing numbers of vehicles account for 24% of escalating emissions, half of which are generated in urban transport (Schipper, 2010). This phenomenon could be reflected from the fact that the average Americans spent 19.3% of their family income on transportation expenses. And from this percentage,

94.8% was used for the possession and maintenance of private cars. Average Japanese spent lesser on transportation but still they spent 71.3 % on private transportation (WBCSD, 2004).

2.2 Low Carbon Urban Mobility

In recent days, people in all over the world mostly had abandoned walking. Journeys taken by walking had fallen by 10% from 34% to around 24% during 1976 - 2010 in Germany and continued to decrease by small percentage afterward. A higher decrease from 46% to 22% was occurred in the United Kingdom during 1975/76 – 2012 while in Denmark it decreased by 5% during 1975 – 2008 (Hass-Klau, 2015). Furthermore numbers of journeys by other low carbon mobility choice such as cycling in such countries were not increased significantly to balance the trend.

However ideally walking and cycling are the important elements in the concept of low carbon city, as they can easily reduce the current level of carbon emission when replacing or complementing the other transport modes. They are the key-elements in short distance trips and also longer trips if they were combined well with a reliable public transportation, as seen in Figure 1 (Midgley, 2011). Both walking and cycling are considered as low (or even zero) carbon mobility as they don't emit Carbon dioxide directly.

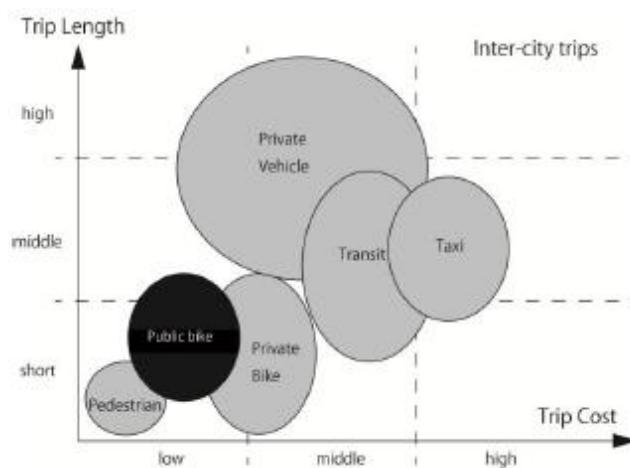


Figure 1. Role of public bike system in urban mobility (Midgley, 2011).

Also both of them involve physical activity thus they can improve health condition of the practitioners. When conducting walking or cycling apparently social interaction is also occurred more than when driving a car or motorbike. This is also another advantage in creating a humanized city. Cities with pedestrian and cyclist are without doubt more lively and livable compared to motorized cities (Nuzir, 2016).

A well-known urban planner, Jan Gehl, suggested these factors to be addressed in order to create walk-ability such as: a continuous and complete pedestrian network; reliable feeling of safety that means protection from motorized traffic; security through collective surveillance and activity, especially in darkness; direct pedestrian routes with sufficient space – wide sidewalks – and no obstacles; stimulating and detailed facades, services and facilities facing the pedestrian streets; comfort, such as low noise, good air quality, cleanliness and weather protection; pedestrian facilities, like clean drinking fountains and toilets; green spaces, flower beds, trees, etc.; seating: formal, informal, and commercial seating; features that invite leisure activities and play; and art that generates identity with the town (and region) (Hass-Klau, 2015).

3. Research Hypothesis

Reflecting to the current preference of urban transport service which is fast, easy, and personal, walking as a transport mode has been under rated. Within certain setting such as compact spatial planning and well connected network of public transportation, walking could avoid traffic jams and arrive at destinations faster than motorized transport modes. With a good urban design and walk-able

infrastructures, the pedestrian could enjoy ease and meaningful walking experience without any physical barriers.

And above all transport modes, walking is the most personal mean of transport since basically it relates and depends to the individual ability. Therefore authors would assume that under the appropriate urban setting, walking is the future of low carbon urban mobility and one of the main solutions for global climate change. Yet how to understand and to generate this appropriate urban setting remains a big question mark for urban planner and researcher.

3.1 Framework of PL.A.C.E.

In our previous study, we proposed the framework of PL.A.C.E. (Profile, Activity, and Environment) when studying about pedestrian (Nuzir & Dewancker, 2016). Author proposed that the key-element of Pedestrian Profile could be defined by investigating key-attributes as follow: age; financial income; physical condition; gender; mobility choice; employment and education background; social cultural capital; pedestrian type; and public transportation usage. Author further proposed that the key-element of Pedestrian Activity could be defined by investigating key-attributes as follow: walking-related purposes; social interaction; walking intensity; walking habits; and transport modes interaction. The last but not the least important is the key element of Pedestrian Environment of which could be defined from several key-attributes as follow: spatial planning; walk-ability; neighborhood livability; traffic safety; pedestrian facilities (hard elements); pedestrian facilities (soft elements); and environmental quality. Naturally these key-attributes are interrelated to each other thus the key-elements could not be entirely independent as well.

3.2 The Key-attribute of Pedestrian Facilities

In regard to the cost for developing infrastructures for walking, it is acknowledged that it will be a lot cheaper than the cost needed to develop road infrastructure for motorized vehicles. For this reason, building facilities for walking is the most popular action by the local government in its effort to improve walk-ability. However it requires extra and innovative efforts to particular elements since walking is still somehow vanishing from our cities. There on this study, authors focused on the key-attribute of Pedestrian Facilities as a part of the key-element of Pedestrian Environment.

4. Research Methodology

On this study authors utilized the evaluation method using questionnaire with the case study of the city of Bandar Lampung in Indonesia. The questionnaire was distributed directly during a public event using an online form. Additionally the online form was also shared on authors' social media to gather more responses. However from 235 initial responses, only 189 responses were considered valid. The period of data collection was from 18th of August 2015 to 23rd November 2015.

<https://docs.google.com/forms/d/e/1FAIpQLSf3qDuUP92nDLC6lJai3n2YQARHsW4RJQfwBmb9U4SzkSeofA/viewform>

5. Results

On this study authors focused to understand responses specifically related to the key-attribute of Pedestrian Facilities which were reflected from the responses of the questions on: seating place or rest area, street lighting, pedestrian warning/guidance signage, width of sidewalk, walkway physical condition, pavement, access to open spaces or parks, and greeneries along the sidewalk. As the responses were indeed the personal assessment of the facilities for walking, thus authors would refer this as a perception study.

5.1 Seating Place or Rest Area

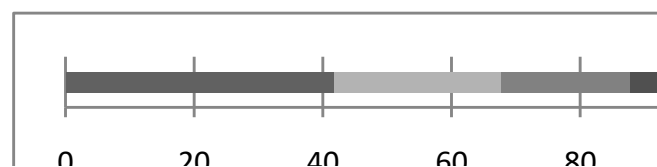


Figure 2. Responses toward the condition of seating place or rest area.

The respondents were asked about the availability and the condition of the seating place or other kinds of rest/stop area. Mostly they stated that the seating place is not available (41.8%) or only few available (25.9%). Other respondents were not either sure (20.1%) or confirming the availability (12.2%) either in not good condition (8%) or good condition (4.2%). Please refer to Figure 2.

5.2 Pedestrian Crossing or Bridge

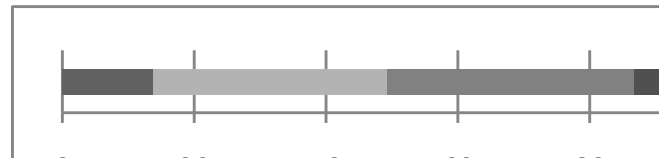


Figure 3. Responses toward the condition of pedestrian crossing or bridge.

Next, the respondents were asked about the availability and the condition of the pedestrian crossing (*zebra cross*) or pedestrian bridge. Mostly they were not sure (37.6%) or they stated that such facility is only few available (35.4%), and not available (13.8%). Other respondents confirmed the availability either in not good condition (9%) or good condition (4.2%). Please refer to Figure 3.

5.3 Street Lighting

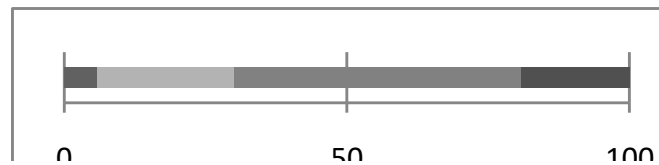


Figure 4. Responses toward the condition of street lighting.

Next, the respondents were asked about the condition of the street lighting. Mostly they were not sure (50.8%). Then others stated that the street lighting is under bad maintenance (24.3%) or even very bad maintenance (5.8%). Other respondents stated that the street lighting is under good and very good maintenance (19.1%). Please refer to Figure 3.

5.4 Signage of Pedestrian Warning or Guidance

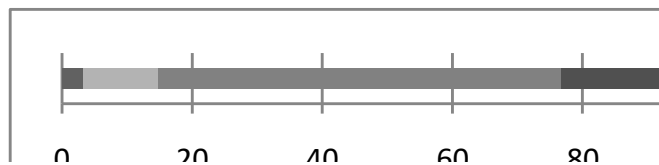


Figure 5. Responses toward the condition of signage for pedestrian.

The respondents then were asked about the condition of the signage for pedestrian warning or signage. Mostly they were not sure (61.9%). Then the others stated that the signage were visible ranging from visible (21.2%) to very visible (2.1%). Other respondents confirmed that the signage were invisible (11.6%) and very invisible (3.2%). Refer to Figure 5.

5.5 Width of Sidewalk

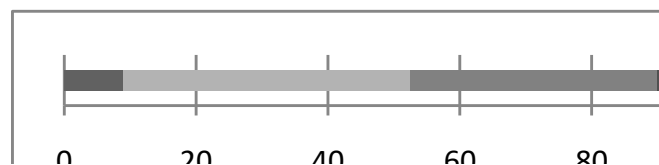


Figure 6. Responses toward the width of the sidewalk.

As for the next question the respondents were asked about the width of the sidewalk or the pedestrian way. Mostly they stated that the sidewalk is narrow (43.4%) followed by the fact that they were not sure of the answer (37.6%) Then the others stated that there was also very narrow sidewalk (9%). The respondent also stated that the sidewalk is already wide (8.5%) and very wide (1.6%). Please refer to Figure 6.

5.6 Greeneries along the Walkway

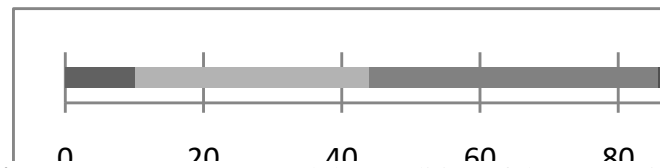


Figure 7. Responses toward the condition of the greeneries.

The respondents were also asked about the condition of the greeneries along the walkway. Mostly they were not sure of the answer (41.8%). Then the others stated that there were only few amount of greenery available (33.9%) and many available (14.3%). Other respondents confirmed the availability of very less greeneries (10.1%). Please refer to Figure 7.

5.7 Pavement

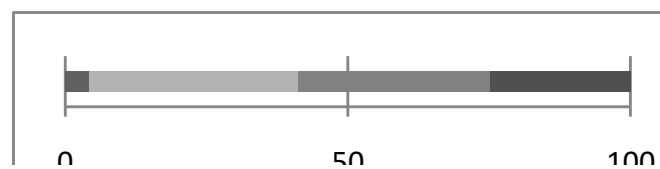


Figure 8. Responses toward the condition of the pavement.

And the last, the respondents were asked about the pavement. Mostly they stated that the pavement was under bad maintenance (37%) or they were not sure (33.9%). Other respondents confirmed that the pavement was good (24.9%) or under very bad maintenance (4.2%). Please refer to Figure 8. The key-attribute of “access to open spaces or parks” and “walkway physical condition” would not be discussed since they are not directly referred to certain facilities for walking.

6. Discussion

In this part, authors would discuss the results of the responses reading related to the key-attribute of Pedestrian Facilities which consist of groups of facilities as follow:

- a) Seating place or rest area
- b) The responses indicated that respondents understood clearly the type of facility which was being asked. However it is clear that the seating place or area for resting is not available at the walking area.
- c) Pedestrian crossing or bridge
- d) The responses indicated that the respondents were not familiar with the facility thus the result showed a high percentage of uncertainty. This might come to the fact that the pedestrian crossing or bridge is barely available and the function is not demanded.
- e) Street lighting
- f) The responses indicated that the respondents were not familiar with the facility thus the result showed a high percentage of uncertainty. This result is related to the tendency of walking during daytime (Nuzir & Murwadi, 2017). Therefore they have the tendency to overlook the street lighting. The other indication is that this facility is generally not available as well.
- g) Pedestrian warning/guidance signage
- h) Huge percentage of uncertain responses indicated that the respondents are unfamiliar and mainly not aware of this facility. The responses stating that this facility was visible could be as a result of misinterpretation of the term pedestrian signage with other road signage.
- i) Width of sidewalk
- j) The responses clearly indicated that the respondents were mainly unsatisfied with the width of the pedestrian way. The uncertainty might come from either the unavailability defined physical form of the walkway (no designated pedestrian area) or the confusion of defining the value of wide or narrow for the pedestrian area since there is no comparison.
- k) Greeneries along the sidewalk

- l) The responses indicated that there was another uncertainty arose toward the availability of greeneries along the sidewalk. Authors would argue that this uncertainty is possibly as a result of common understanding that excludes greeneries (trees, shrubs, flowers, etc) from the list of pedestrian facilities. And after all, the greeneries were mainly non existence along the pedestrian way.
- m) Pavement
- n) The responses indicated that mainly the pavement of the pedestrian way within the walking area was not in a good appearance and unappreciated by the respondents.

7. Conclusion and Future Work

From the analysis, we could confirm that the facilities for walking within the walking area in Bandarlampung in general did not satisfy the perception of the respondents. Despite that there are various types of pedestrian way in various levels of maintenance and physical shapes, the result indicated that the respondents were not yet confident enough towards the availability the pedestrian facilities, not to mention their level of services. The respondents also showed uncertainty when evaluating certain facilities due to their unfamiliarity towards its function or the visibility of certain facilities.

This conclusion of the perception study would confirm the visible and quantified investigation in regard to the availability and the condition of basic facilities for walking. This qualitative finding complemented the quantitative assessment and served as an important base for developing a walk-able urban setting. Authors would suggest this multi-approach in urban development since authors believe that advance condition of urban infrastructure does not necessarily in line with the content perception of the users i.e. the citizen.

Furthermore in order to address the perception study of the environment for walking, authors would further continue the assessment of the responses of other key attributes from the key-element of Pedestrian Environment. This study would complete the layers thus we could fully understand the state of the art of walking within the case study.

8. Acknowledgment

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