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Pengukuran Walkability Index Pada Area Komersial Kampung Madras

Walkability Index of Kampung Madras Commercial Area

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Abstract

In most Indonesian cities, people tend to drive or using other modes than to walk. Recent studies revealed that this happened because the lack of walking infrastructure and environment. Kampung Madras, formerly known as 'Kampung Keling' is a commercial area located near the city center and easily can be reached by various modes of transportation. Kampung Madras has various types of different activities such as cultural activities and worship facilities like Shri Mariamman Temple and Pagaruyung Street as an Indian culinary spot. This research aims to assess walkability index of Kampung Madras Commercial Area using The Global Walkability Index to provide information in Kampung Madras about the walkway conditions. This research used a quantitative approach and employed field walkability survey method to assess walking environment quality. Global Walkability Index 9 parameters used as a field walkability survey tools. There are 100 respondents being interviewed. The result of this research is final walkability rating of Kampung Madras Commercial Area after averaging each 9 Global Walkability Index parameters is 44,4.

Keywords: kampung madras, commercial area, walkability, global walkability index.

1. INTRODUCTION

One of the daily physical activities most frequently performed is walking, because walking is not only for the purpose of exercising but also one of the modes of transportation (Ernawati, et. al 2016). Walking can be beneficial to the environment by reducing the use of land for roads and parking facilities, and reducing energy consumption and pollution (Ariffin & Zahari, 2013).

Medan is the capital city of North Sumatera. According to Central Bureau of Statistics or *Badan Pusat Statistik*, Medan has a population

of over 2.2 million within its city limits. Medan is the largest urban area outside of Java and the main gateway to the western part of Indonesia. Medan is a multicultural city and a busy trading city bordered by the Strait of Malacca. Medan also an important commercial and economic hub of Indonesia.

Zainul Arifin Street is the main corridor in Kampung Madras, formerly known as 'Kampung Keling'. Kampung Madras as a commercial area located near the city center and can be easily reached by various modes of transportation. Kampung Madras is the largest Indian Communities in Medan. They have

already settled from 19th century in Kampung Madras and came from India to work as a tobacco farm worker, stockmen and traders. Apart from commercial area, Kampung Madras has various types of different activities such as cultural activities and worship facilities like Shri Mariamman Temple and Pagaruyung Street as an Indian culinary spot. In most Indonesian cities, including Medan, people tend to drive or use other modes than to walk. Wibowo et. al (2015) stated that recent studies revealed that this happened because of the lack of walking infrastructure and environment. This kind of behaviour will lead to unsustainable lifestyle that will contribute to air pollution, congestion and many more. Nevertheless, pedestrians in Indonesia face many problems on the walkway (e.g. damaged manhole covers, street vendors, parking, etc). As a commercial area, there are high levels of activities in the pedestrian way or walkway in Kampung Madras. Basically, walkway is provided to accommodate all activities related to walking, e.g. those who walk alone, walk in group, walk with pet, with pushchairs, or even for running or just sightseeing (Wibowo et. al, 2015). This research aims to assess walkability index of Kampung Madras Commercial Area using The Global Walkability Index to provide information about the walkway conditions in Kampung Madras.

1.1 Walkability

Walkability is becoming a buzzword in planning today as new urbanism ideas are spreading throughout the profession (Azmi & Karim, 2012). Walkability is a term used to describe and measure the connectivity and quality of walkways, footpaths, or sidewalks in cities (Leather et. al, 2011). Walkability is a concept which is known as measurement of the pedestrian-friendly's degree of an area, this term recently has been focused by urban designer and planners to make a sustain environment to communicating, recreation, and shopping by pedestrian base (Rafiemanzelat et. al, 2017). Southworth (2005) defined walkability as the extent to which the built environment supports and encourages walking by providing for pedestrian comfort and safety, connecting people with varied destinations within a reasonable amount of time and effort, and

offering visual interest in journeys throughout the network. Southworth also stated that walkability is the foundation for the sustainable city; without it, meaningful resource conservation will not be possible. The term walkability can reflect the overall conditions in any area, so that it can be evaluated at the location-scale, road sections, even environmental scale (Agradiana & Hartanti, 2020).

A highly walkable environment invites walking by means of a richly connected path network that provides access to the everyday places people want to go to; comfort and safety from crime and; attractive and engaging space to be in, and visual connection with the life of the place; linkage with other transportation modes; the path system is sufficiently complex to be explorable over time, offering varied visual experiences with repeated encounters. It supports walking for utilitarian purposes such as shopping or journey to work, as well as for pleasure, recreation, and health (Southworth, 2005). The walking environment must be able to facilitate pedestrians with simultaneously useful, safe, comfortable and interesting (Speck, 2018). The provision of well-connected pedestrian network and accessible public transit can increase opportunities for tourism activities where visitors can have enjoyable walking experience strolling through the places within the city on foot (Zakaria & Ujang, 2015).

Improvements in walkability and increases in walking can promote mental and physical health, stress reduction, stronger bones and mental alertness and creativity (Forsyth & Southworth, 2008).

Therefore, walkability has also begun to gain interests from various groups of society in Indonesia (Winayanti et. al, 2015)

1.2 Global Walkability Index

The Global Walkability Index is widely used as a method to measure the quality of walkway or pedestrian-way. The Global Walkability Index is developed by Krambeck (2006) for World Bank (Leather et. al, 2011). The GWI provides both qualitative and quantitative analysis of walking conditions including safety, security, and convenience of the walking environment. This analysis provides a better understanding of the current walkability

of Asian cities and is able to identify ways to improve pedestrian facilities (Leather et. al, 2011)

2. RESEARCH METHODS

This research used quantitative and qualitative approach and employed field walkability survey method to assess walking environment quality with Leather et. al (2011) parameters in Table 1. Then, pedestrian interviewed survey to validate the result of field walkability survey and to collect pedestrians’ perception and preferences. There are 100 pedestrians as samples being interviewed. Then, this research also analysed existing government policies, strategies and plan about pedestrian facilities. This research assessed walking environment conditions according to the Global Walkability Index (Krambeck, 2006) parameters slightly modified by Leather et. al (2011) to make them more applicable in the Asian cities context.

Table 1. Field Walkability Survey Parameters

Parameter	Description
Walking path modal conflict	The extent of conflict between pedestrians and other modes such as bicycles, motorcycles, and cars on the roads.
Availability of walking paths	Reflects the need for, availability and condition of walking paths.
Availability of crossings	The availability and distances between crossings to describe whether pedestrians tend to jaywalk when there are no crossings or when the distances between crossings are too long.
Grade crossing safety	This refers to the exposure of pedestrians to other modes while crossing, the time spent waiting and crossing the street and the sufficiency of time given to pedestrians to cross signalized intersections
Motorist behaviour	The behavior of motorists towards pedestrians, which may well indicate the kind of pedestrian environment there is in that area.
Amenities	The availability of pedestrian amenities such as benches, street lights, public toilets and trees. These amenities enhance the attractiveness and convenience of the pedestrian environment and in turn, the city itself.

Disability infrastructure	The availability, positioning and maintenance
Obstructions	The presence of permanent and temporary obstructions on the pedestrian pathways. These ultimately affect the effective width of the pedestrian pathway and may cause inconvenience to the pedestrians.
Security from Crime	The general feeling of security from crime in the street.

Source: Leather et. al(2011)

Author rated each parameter based on the road condition in a questionnaire from 1 to 5 (1 very poor; 2 poor; 3 fair; 4 good; 5 very good). The result for each of the parameter was translated into a rating system from 0 to 100. The final walkability ratings was derived by averaging each of 9 walkability parameter ratings in this area. Then, the final walkability ratings categorized in 0-100 rating (0-20 very poor; 21-40 poor; 41-60 fair; 61-80 good; 81-100 very good).

This research took place in Zainul Arifin Street, the main corridor which 650 meters long with the highest level of activities in the walkway in Kampung Madras. The field walkability survey and pedestrian interviewed survey were conducted from 3 to 7 p.m. to seize the peak-hour pedestrian movement.



Figure 1. Zainul Arifin Street Map



Figure 2. Zainul Arifin Street

3. RESULT AND DISCUSSION

3.1 Field Walkability Survey

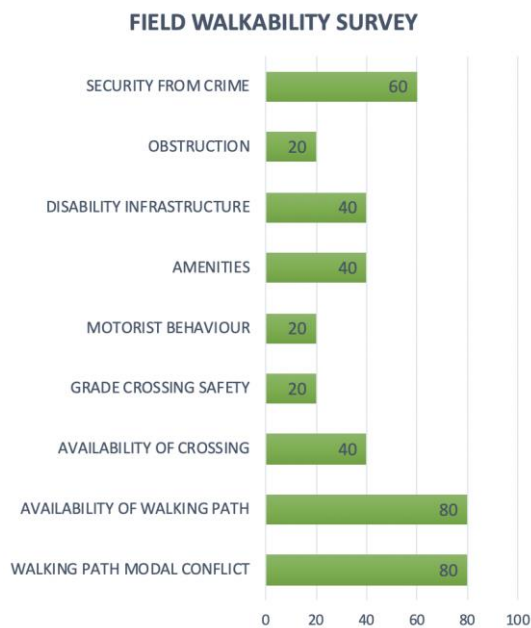


Figure 3. Field Walkability Survey

After field walkability survey was conducted, there are grade crossing safety, motorist behaviour and obstruction got the lowest scores. The grade crossing safety is related to motorist' behavior because there is a big chance pedestrians to be in collision with vehicle mainly motorcycles and *angkutan kota (angkot)* which is driving recklessly and there is no pedestrian call button or pedestrian signal found. There are too many obstructions found in the walkway from street vendors, from a small stand to a bigger one that using whole walkway dimension (See Fig. 4), motorcycle parking to destroyed concrete column (See Fig. 5).



Figure 4. Obstruction



Figure 5. Obstruction

Availability of crossing only got 40 because Zainul Arifin Street is a high level of activities but only gets two crossings, in front of Sun Plaza Medan and in front of Dinar Hadi. Amenities also got 40 because there are no presence of benches and public toilets. Vegetation on the walkway also unorganized and not alluring (See Fig. 6 & 7)



Figure 6. Amenities

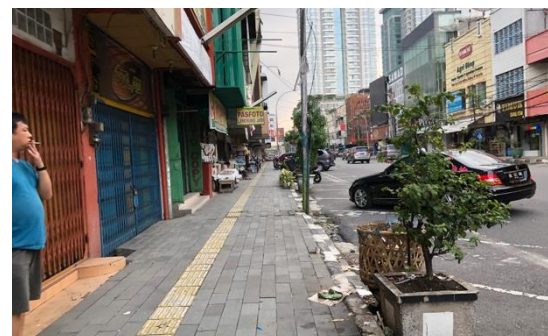


Figure 7. Amenities

Disability infrastructure got 40 although there are already braille tactile pavings for blind pedestrians' but they cannot accommodate pedestrian who are using wheelchair because

no ramp is found between the sidewalk and the road.

During the daylight, Zainul Arifin Street is tends to be safe because there are quite often activities in the corridor which will enhance surveillance. During the night time, when activities are slightly decreased and many of the shops or offices are closed, this corridor does not have much things to offer except Pagaruyung and other culinary spots (See Fig. 8), so it appears to slightly dangerous even though there are many ‘watchmen’ who work as parking operators and security of other buildings.



Figure 8. Pagaruyung
Source: magdalene.co (2020)

There is no significant conflict between the walkway and the road because the walkway is 0,25m higher than the road. The only conflict is with motorcycle which are parked on the walkway.

All along the Zainul Arifin Street, both sides of the walkway is available, there are only 12 meters long that walkway is not available (See Fig. 9). Walkway surface is non-slipped material so it is safe to use during or after rain. Dimension of the walkway is 1,5 - 3,5 meters and most of the walkways is 3,5 meters wide.



Figure 9. Walkway conditions

The final walkability rating of Kampung Madras Commercial Area after averaging each 9 Global Walkability Index parameters is 44,4.

Compared to other cities commercial area walkability ratings such as Jakarta, Hanoi and Manila (Leather et. al, 2011), Kampung Madras got the lowest rating. However, compared to other cities’ commercial area walkability ratings like Padang and Mataram (Winayanti et. al, 2015) Kampung Madras got the highest rating.



Figure 10. Walkability Ratings Comparison

3.2 Pedestrian Interviewed Survey

3.2.1 Respondents Profile

Majority of respondents are in the age group of 15-30 years old (49%), followed by 30-45 years old (29%), >45 years old (18%), 0-15 years old (4%). From 100 respondents, there are 52% of males and 48% of females.

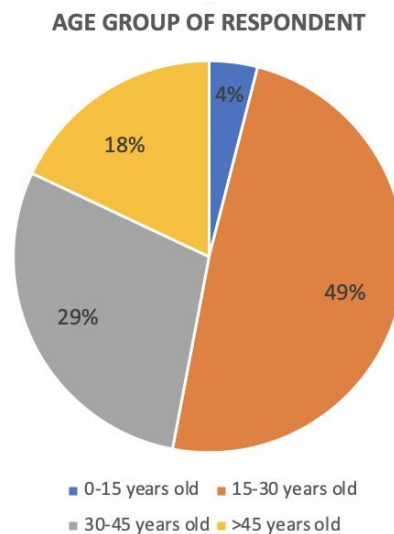


Figure 11. Age Group of Respondent

Most respondents have monthly income IDR 2-4 Million (40%), followed by IDR 0-2 Million (29%), IDR >6 Million (18%), IDR 4-6 Million (13%).

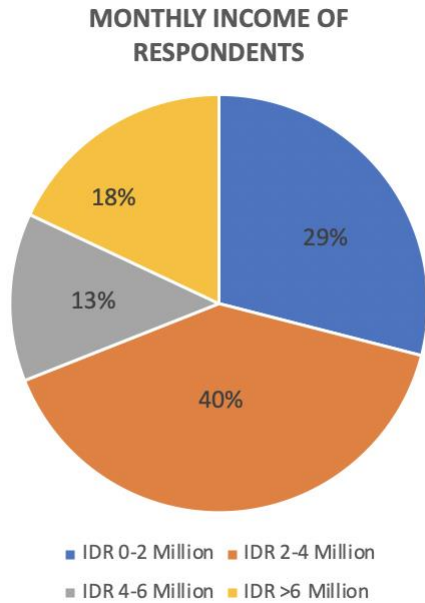


Figure 12. Monthly Income of Respondent

Main purpose of respondents in Zainul Arifin Street is to eating/ having meals (37%), followed by working/ going to school (22%), shopping (19%), others (e.g.) (9%), passing by (8%) and sightseeing (5%) (See Fig. 13)

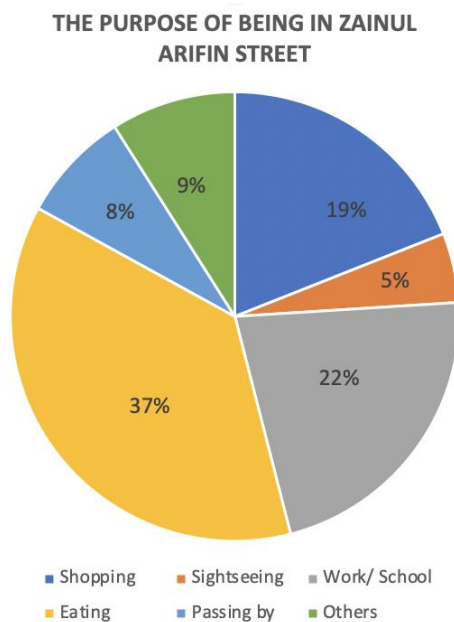


Figure 13. The Purpose of Being in Zainul Arifin Street

3.2.2 Travel Characteristics

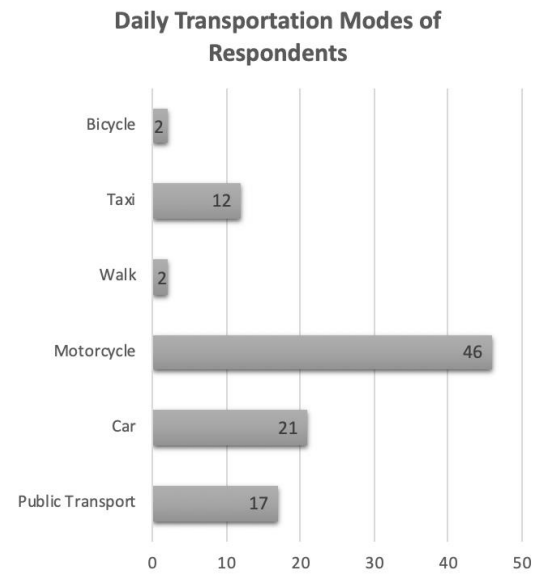


Figure 14. Daily Transportation Modes of Respondent

Majority of the respondents were using their own vehicles as daily transportation modes, motorcycle (46%), car (21%) and bicycle (2%). other respondents using public transportation (17%), taxi (12%) and walk (2%) as their daily transportation modes.

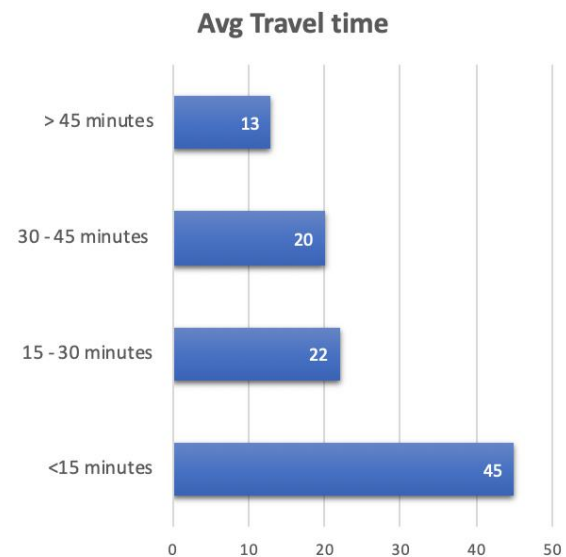


Figure 15. Respondents Avg Travel Time

Majority of one way average travel time estimated by the respondents is less than 15 minutes (45%), followed by 15 – 30 minutes (22%), 30 – 45 minutes (20%), more than 45 minutes (13%). Related to average travel

length by respondents, most average travel length estimated by the respondents is less than 1,5 kms (64%), 1,5 – 3 kms (28%), 3 – 4,5 kms (6%), 4,5 – 6 kms (2%)

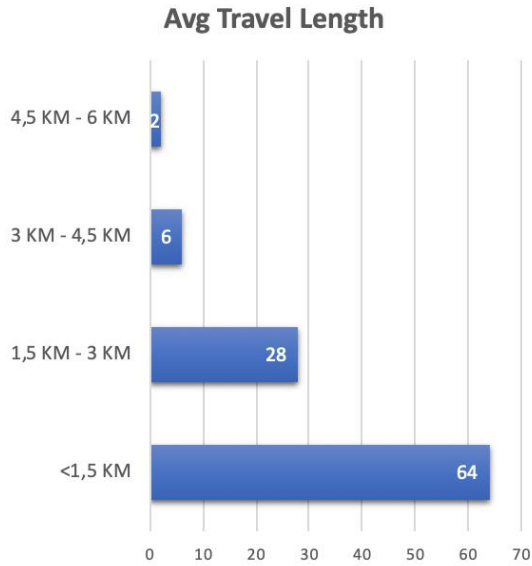


Figure 16. Respondents Avg Travel Length

3.2.3 Pedestrian Preferences

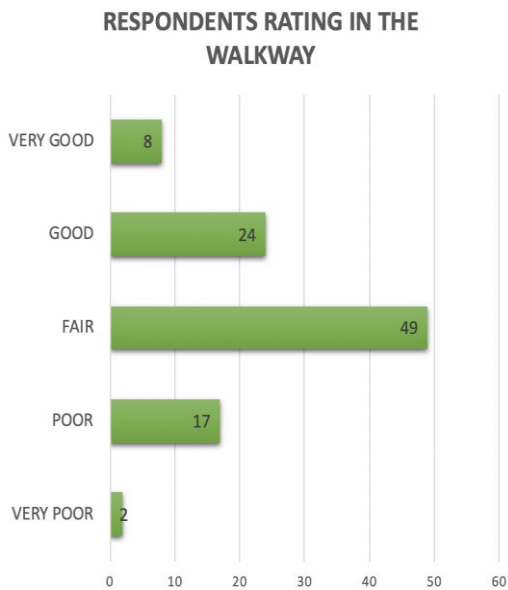


Figure 17. Respondents Rating in The Walkway

Respondents were asked how they would rate Kampung Madras' walking environment in 5 rating systems (very poor; poor; fair; good; very good). About 49% of respondents rated this walkway in "fair" category meanwhile 24% respondents considered the facilities in "good". 17% respondents rated it as "poor"

and 8% rated it as "very good" and the other 2% rated "very poor".

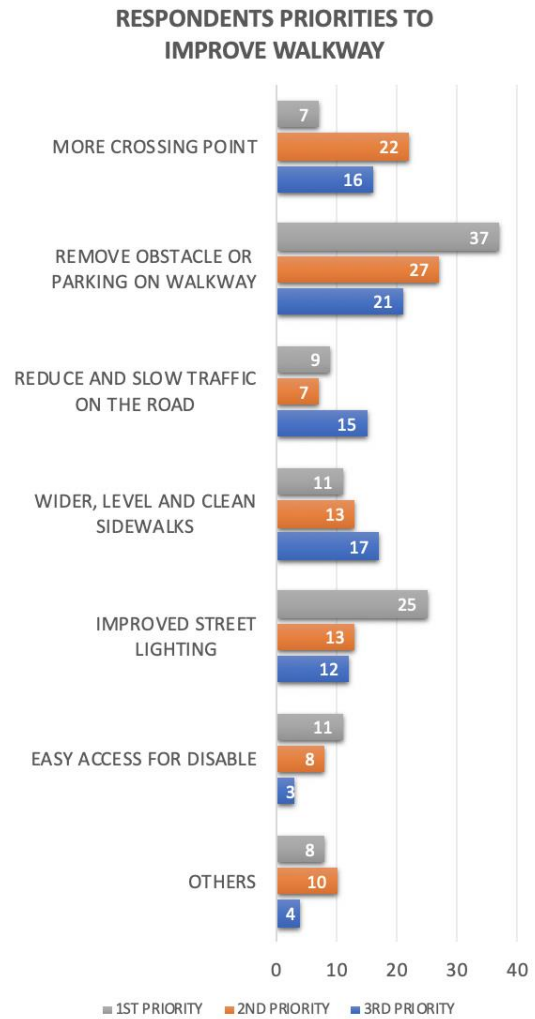


Figure 18. Respondents Priorities to Improve Walkway

Then, respondents were asked which pedestrian facilities need to be improved. They were asked to rank different types of facilities on a priority scale. Most respondents, 37 respondents out of 100 put 'remove obstacles or parking on walkway' as their first priority to improve the walkway. Then, 25 respondents put 'improve street lighting' as their first priority, followed by 11 respondents put 'wider, leveled and clean sidewalks', 9 respondents put 'reduce and slow traffic on the road', 8 respondents put 'others', 7 respondents put 'more crossing points' and only 3 respondents put 'easy access for disable as their first priority'. Most respondents feel street vendors, parking areas and other

obstacle on the walkway were disturbing and decreased the sense of comfort to walk. Meanwhile, 22 of 25 respondents who put 'improved street lighting' as their first priority to improve walkway are females. It can be concluded that most females do not feel safe to walk during the night time. Only 7 respondents who put more crossing point as their first priority, because in Indonesia, it is common to cross the street from any point except from crossing point. Then, all of the 7 respondents are females. Who feel quite risky to cross the street outside the crossing point.

3.3 Government Policies

There are many laws mention the right of pedestrian one of it is Law Number 38/ 2004 about roads, which state that walkway are given to pedestrians. Then Article 25 of Law Number 22/ 2009 about traffic and vehicles, stated that every public road must be equipped with road equipment such as facilities for pedestrians and persons with disabilities.

Ministry of Public Works with Ministerial Regulations Number: 03 / PRT / M / 2014 about guidelines for planning, provision, and utilization of infrastructure facilities and travel networks in urban area also state the right of pedestrians. This regulation aims provide easiness for the development of infrastructure and facilities for pedestrian networks that are effective and efficient; and to provide guidance to achieve standardization of the quantity and quality of pedestrian network infrastructure and facilities. Ministry of Public Work with this regulation stated that "the use of pedestrian network infrastructure is only permitted for the use of social and ecological functions such as sport activities, social interactions, formal small business activities, exhibition activities in open spaces, green lanes, and pedestrian facilities" and they also stated that "minimum of 5 meters width of walkway can be used by formal small business activities with the ratio of walkway and formal small business activities is 1:1,5". It means that in 5 meters width of walkway, street vendors can use the walkway up to 3 meters out of 5 meters available.

There also Ministry of Public Work and Housing circular letter number 02/SE/M/2018 about technical planning for pedestrian

facilities. This circular letter discusses the provisions regarding pedestrian facilities located in the road use space (*Rumaja*), which includes: descriptions, types, functions, requirements, geometry, technical planning procedures, and factors that need to be considered in planning pedestrian facilities. This guideline was made to complement Ministry of Public Works Technical Guidelines Number 32/T/BM/1999 about pedestrian facilities planning guidelines on public road.

There are also local regulations like Medan Mayor Regulation number 9 of 2009 stated that "It is forbidden to build permanent or temporary buildings on the road, sidewalk, drainage and river border lines to sell / trade or live". But, since 11 years after the regulations issued by the local government, this regulations still hard to implemented.

There are still no regulations or guidelines from local government about pedestrian facilities. It is expected that after Ministry of Public Work and Housing circular letter number 02/SE/M/2018 about Technical planning for pedestrian facilities followed by local government to make more detailed regulations and guidelines that fit socio-cultural, economic and land availability of the city itself. Winayanti et. al (2015) also found on their study that local government in other Indonesia cities lack of guidelines about pedestrian facilities such as minimum standard and design guidelines.

4. CONCLUSION

The final walkability rating of Kampung Madras Commercial Area using Global Walkability Index parameters is 44,4.

The field walkability survey result show that in general, walkway infrastructure is adequate. But, there are 3 main problems in the walkway which are obstruction, motorist behaviour and grade crossing safety whose got the lowest score (20 out of 100). Also, result from the pedestrian interviewed survey states that, 37 out of 100 respondents put "remove obstacle or parking on walkway" as their first priority to improves walkway, and 25 out of 100 respondents put "improve street lighting" as their first priority. Then, there is a need for local government to make more detailed

regulations, policies and guidelines regarding pedestrian facilities that fit socio-cultural, economic and land availability of the city itself. Although local regulations to support the existence of pedestrian facilities, there is also a need of coordination amongst various stakeholders to ensure the right of pedestrian and existence of pedestrian facilities.

However, walkway, particularly in a commercial area that has a significant role and high pedestrian movement, the walking environment must be able to facilitate pedestrians with simultaneously useful, safe, comfortable and interesting (Speck, 2018). Kampung Madras Commercial Area final walkability rating is still below the other Asian cities commercial area like Jakarta, Hanoi, Manila. Walkability is the foundation of sustainable city (Southworth, 2005). Although, Shaaban (2019) states that improving walkability is not an easy task for public agencies, especially in developing countries. Furthermore, improving pedestrian facilities are not expensive compared to those of other transport infrastructure.

Several efforts that should be considered to develop better pedestrian facilities are as follows: (1) making motorcycle-only parking point in every 50 meters to avoid motorist to park their motorcycle on the walkway because along the Zainul Arifin Street, only car parking that provides by the government; (2) relocating street vendors to designed area; (3) improving street light to increase surveillance and to minimize the chance of being targeted by criminals; (4) adding walkway amenities such as benches; crossings; signages; vegetation; pedestrian call buttons; (5) improving disability infrastructure by making ramp between the walkway and the street; (6) local government should develop more detailed regulations, policies and design guidelines regarding pedestrian facilities at the city level that fit socio-cultural, economic and land availability of the city itself; (7) government should develop integrated public transportation system to decreasing the use of motorised vehicle.

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