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AVAILABILITY AND QUALITY OF DENPASAR CITY REGIONAL PEDESTRIAN PATHS AS AN EFFORT TO IMPROVE BALI TOURISM

**Ni Komang Indra Mahayani^{1*}, I Nyoman Warnata²,
Putu Padma Sthri Meila Utami³**

Faculty of Engineering and Planning, Warmadewa University^{1*23}
indramahayani5@gmail.com

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Abstract

Creating a compact and pedestrian-friendly city, some urban areas require land that is structured so that it is easily accessible, so that pedestrians can find their destination while walking. A phenomenon that is often found is misuse of the function of pedestrian facilities. Misuse of pedestrian facilities is a frequent problem. One of the quickest methods to solve this problem is to have accessibility for pedestrians. This can increase the attractiveness of a city that provides facilities for residents and tourists to carry out activities. The aim of this research is to identify the quality and availability of pedestrian paths desired by users. Using quantitative methods by distributing questionnaires randomly, data analysis techniques are descriptive statistical analysis. The results of this research conclude that the Denpasar City area has different criteria regarding the quality and availability of desired pedestrian paths. Pedestrian path users hope to make the city pedestrian-friendly and should be designed with wide pedestrian dimensions. Making a pedestrian-friendly city requires attention to safety, beauty and pedestrian amenities. This illustrates that there is no walkable city that users want in Denpasar City. Further research is looking for places in Denpasar City that are suitable for walking for residents and tourists.

Keywords: Pedestrian Quality, City, Tourism, Pedestrian Friendly

1. INTRODUCTION

Urbanization is very important in the era of globalization because every year more and more people live in urban areas. Urbanization causes urban populations to increase and urban areas to become wider so that the expansion of urban areas is closely related to urban sprawl. Urban sprawl occurs due to changes in space requirements, transportation system capabilities, housing development, and the existence of infrastructure. In suburban areas, residential areas are spread out in a disorderly manner and are not integrated with each other. This causes empty space both between residential areas and the city center and between residential areas and the city center (Slaev, Aleksandar, & Nikiforov, 2013). Because high procurement costs are not proportional to the number of users, infrastructure provision becomes inefficient (Arifin, Surya, & Salim, 2020). Therefore, urban sprawl is the process of growth of peripheral areas that are separated from the city core, namely the

growth of a city that is not compact which results in inefficiency of city facilities and infrastructure.

Compact cities are a method of managing urban growth that focuses on land use and activities in the city center. Attract other activities and land uses closer to the city center, creating dense spaces or areas. This leads to efficient use of space in urban areas (Horn, 2015). Apart from that, compact cities are seen as a solution to achieve a sustainable environment by paying attention to three things: a centralized city form, an efficient transportation system, and quality of life. Concentrated urban areas produce high-density compact housing or high-density compact housing, which is the concept of a compact city. Supporting the implementation of compact cities from this aspect is an efficient transportation system and quality of life (Jenks , Burton , & Williams K, 1996). A city grows and develops rapidly because of its economy. The acceleration of economic development causes a decline in environmental quality which leads to the urban sprawl phenomenon where cities grow without good planning. Due to the expansion of urban areas, land consumption is growing rapidly (Desiyana, 2017).

Additionally, urbanization is influenced by many issues, such as local and international migration. Unplanned urbanization may be without growth or without control. Urbanization without growth indicates inefficient urban services, which causes income to be spent on expensive living costs such as basic services. Planning inadequacies (congestion, rivers full of rubbish, sewage, poor air quality), expansion of urban space that increases infrastructure costs, or building codes that limit the increase in population density are some of the causes of uncontrolled urbanization. To address carbon emissions in cities, urban sprawl caused by uncontrolled urbanization must be prevented. One of the main components in creating a compact city and preventing urban sprawl is a walkable city. Walkability and performance are four ways to support pedestrian activities as the main focus in efforts to improve environmental quality (Hall, Ram, & Shoval, 2017). is defined as a city that relates to walking space, connected to public transportation facilities, and safe from traffic and social crimes (Southworth, 2005). Streets in a pedestrian-friendly city prioritize pedestrians rather than motorized vehicles.

Table 1. Denpasar City Population Increase in the Last 3 Years

Subdistrict	Population of Denpasar City in the Last Three Years		
	2018	2019	2020
South Denpasar	299,050.00	305.380.00	311,590.00
East Denpasar	157,890.00	160.150.00	162.220.00
West Denpasar	269.030.00	273,640.00	278.020.00
North Denpasar	204.630.00	207,930.00	211.070.00
Total Denpasar City	930,600.00	947.100.00	926,900.00

Source: Bali Province Central Statistics Agency (BPS)

According to the table above, Denpasar experienced a large population explosion and regional extensification. The increasing population growth every year has a negative impact on the city of Denpasar in aspects of life and development. It can be seen in table 1. The population in 2020 will reach 1 million people, with increasing population growth many problems arise, especially related to spatial planning, increased land conversion and crime. The Denpasar city area is the smallest city compared to cities in Bali. Cities are

getting bigger with an inefficient quality of life. The inefficiency of a city causes the level of productivity to decrease due to economic agglomeration and the productivity of quality of life. With diverse job skills, a small city will have a strong agglomeration effect.

The uncontrolled number of vehicles passing by has changed the city of Denpasar, one of the cities in Indonesia. Pedestrians have nowhere to go when walking because the land is disorganized and difficult to access. In addition, many facilities are inadequate for pedestrians. In cities, pedestrian safety is starting to be neglected because motorized vehicles and many facilities are inadequate to meet pedestrian needs. Abuse of pedestrian facilities is a frequent phenomenon. Pedestrian lanes are still considered parking areas, motorbike traffic on the road is congested, and many street vendors use them for trading. One of the quickest ways to solve this problem is to have easy access for pedestrians so that it can increase the attractiveness of a city, allowing residents to move around. The research objective is to determine the quality and availability of pedestrian paths in the city of Denpasar.

2. LITERATURE REVIEW

Urban sprawl often occurs in urban areas where population density increases as a result of increased economic activity and population (Mattern, 2005). Apart from land use, expanding residential development causes increased levels of pollution (Wilson, 2002). Economic, social, and environmental are the three impacts of urban sprawl. One of the modes of transportation that must be considered in a sustainable or livable city (Liveable City) (Schlossberg & Brown, 2003). Walkable neighborhoods are safe and well-served environments, filled with the qualities that make walking a positive experience. A positive walking experience means roads, sidewalks and pedestrian paths are comfortable and attractive (Kozchinsky, 2013). Walkability is a function of urban design and micro-level physical features of the built environment and emphasizes macro-level features of urban form (Humberto, et al., 2019). Both approaches described focus on micro-level quality taking into account aspects such as comfort, inclusivity and friendliness of urban spaces (Rob, Edmar Joaquiun, Thiago, & Nathalia, 2021). From the above definition of walkable in this research, one concept is to create an urban area that can be reached on foot in a comfortable and attractive way so as to increase people's perception of the city and support the city's sustainability. A high level of walking comfort in terms of pedestrian facilities is the key to city sustainability. All pedestrian facilities are designed to provide high quality services to enhance their safety, comfort and attractiveness. Pedestrian facilities are divided (Thanan, Wibowo, & Tinumbia, 2017) into two (2) categories: Main facilities consist of pedestrian paths, such as sidewalks and crossings, and supporting facilities consist of supporting facilities, for example protection or shade, signs, seating, rubbish bins, drainage, lighting, and others. The importance of pedestrian facilities is a mode of transportation that can make a city sustainable with the accessibility of a livable city. Ten similar studies from 2011-2020 conducted measurements of the walkability index (Leather, 2011), (Yoppy, 2013), (Thanan, Wibowo, & Tinumbia, 2017), (Endarwati, 2018), (Kim, 2019). Knowing the level of satisfaction with the comfort and facilities available on pedestrian paths walkability research has been carried out (Juriah & Ujang, 2014), (Triantoro, 2020), (Ridhani & Christanto, 2015), (Setianto & Joewono, 2018). Security, comfort, aesthetics and access are four things that must be considered (Hafnizar, Izziah, & Saleh, 2017). Pedestrian-friendly conditions and their availability are described in this study.

3. RESEARCH METHODS

The steps or research methods to obtain data are used scientifically to produce the goals to be achieved. Quantitative methods are used in research. Data from a sample of the study population were analyzed and interpreted using this method. To assess the availability and quality of pedestrian paths, this study used three criteria:

Table 2. Criteria That Will Be Used to Assess the Availability of Pedestrian Quality in Urban Areas

Traffic Density			Road Size			Pedestrian Size		
Crowded	Currently	Quiet	Wide	Currently	Narrow	Wide	Currently	Narrow

Source: Personal Analysis, 2022

In this table there are three (3) criteria using 4 walkability parameters. The parameters used are:

- | | |
|--------------------------------------|---|
| Security | <ol style="list-style-type: none"> 1. Crossing Security 2. Security Against Criminal Actions 3. Vehicle Behavior towards Pedestrians |
| Comfort | <ol style="list-style-type: none"> 1. Obstacles blocking pedestrian paths (for example street vendors and motorized vehicles - cars or motorbikes) 2. Availability of Quality and Disability Facilities 3. Pedestrian Path Cleanliness |
| Beauty | <ol style="list-style-type: none"> 1. Material 2. Form 3. Plant Arrangement |
| Supporting Facilities
(Amenities) | <ol style="list-style-type: none"> 1. Protector or Shade (Plants or Roof) 2. Lighting 3. Traffic signs 4. Seating and Trash cans |

Primary and secondary data are the data sources used in this research.

1. Primary data
 Initial data sought by observation and looking pictures in the field, then questionnaire was made from the pictures according to walkability criteria and parameters.
2. Secondary Data
 This data was taken and used to support the results of primary data analysis seen from book literature and journals related to research.

The sampling technique for this research used a simple random method (random sampling) with (several hundred) 100 respondents. The questionnaire will be divided into four regions: North Denpasar, East Denpasar, South Denpasar and West Denpasar. Using the Likert method to process questionnaire data using a five-point scale, where 5 is considered very good, 4 is considered good, 3 is considered fair, 2 is considered bad, and 1 is considered very bad.

4. FINDINGS AND DISCUSSION

Pedestrians have the same rights as other people using vehicles, they require special attention. The demand for facilities specifically designed for pedestrians is influenced by the supply and quality of pedestrians so that the number is increasing. If the provision and quality of pedestrians is good, facilities specifically designed for pedestrians are needed. A survey conducted on 105 respondents who looked at the condition of traffic, sidewalks and roads through pictures showed the following results:

4.1 North Denpasar

There are 4 images that will be analyzed according to image 1. It can be seen in the criteria image in North Denpasar, image 1 that traffic density is moderate, with wide roads and medium pedestrian sizes. image 2 medium traffic density, medium road size and narrow pedestrian size. Image 3 with criteria for heavy traffic density, wide road size and medium pedestrian size. Image 4 traffic density is light, road size is wide and pedestrian size is narrow.


No	Gambar	Kepadatan Lalu Lintas			Ukuran Jalan			Ukuran Pedestrian		
		Ramal	Sedang	Sempit	Lebar	Sedang	Sempit	Lebar	Sedang	Sempit
DENPASAR UTARA										
	GAMBAR 1									
1		✓			✓				✓	
	GAMBAR 2									
2		✓				✓				✓
	GAMBAR 3									
3		✓			✓					✓
	GAMBAR 4									
4			✓		✓					✓

Figure 1. Analysis of the North Denpasar area according to the criteria
Source: Personal Analysis, 2022

It can be seen in the picture of the criteria in North Denpasar image 1, medium traffic density, with wide roads and medium pedestrian sizes. Image 2 medium traffic density, medium road size and narrow pedestrian size. Image 3 with criteria for heavy traffic density, wide road size and medium pedestrian size. Image 4 traffic density is light, road size is wide and pedestrian size is narrow.

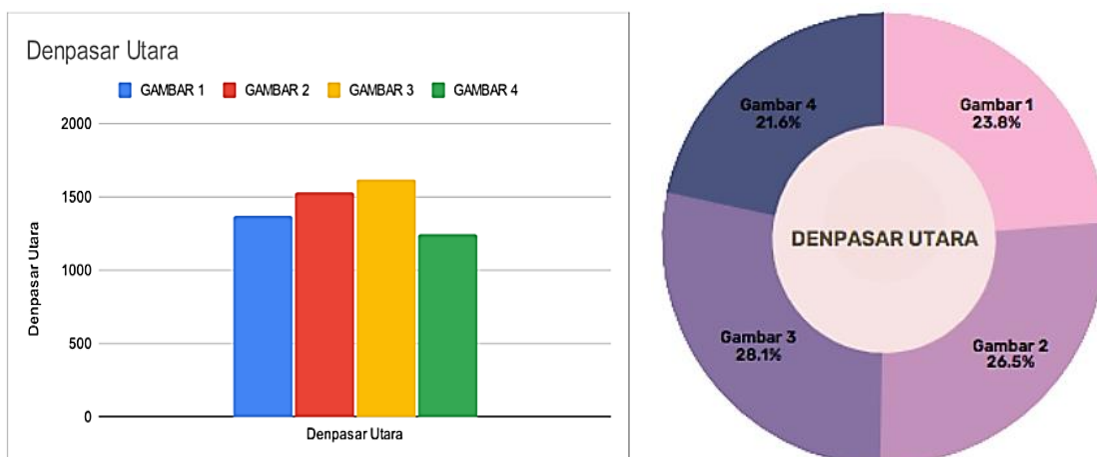


Figure 2. North Denpasar User Diagram Results
Source: Personal Analysis, 2022

In the North Denpasar area, there is a diagram with image 3 that users want with a percentage of 28.1% for a pedestrian-friendly area with the criteria of heavy traffic density, wide road size and medium pedestrian size.

4.2 East Denpasar

No	Gambar	Kepadatan Lalu Lintas			Ukuran Jalan			Ukuran Pedestrian		
		Ramal	Sedang	Sepi	Lebar	Sedang	Sempit	Lebar	Sedang	Sempit
DENPASAR TIMUR										
1	GAMBAR 1	✓			✓			✓		
2	GAMBAR 2	✓			✓				✓	
3	GAMBAR 3	✓			✓			✓		
4	GAMBAR 4		✓		✓				✓	

Figure 3. Analysis of the East Denpasar Region According to Criteria
 Source: Personal Analysis, 2022

It can be seen in the image of the criteria in East Denpasar, image 1. Crowded traffic density, with wide roads and wide pedestrians. Image 2 The traffic density is busy, the road size is wide, and the pedestrian size is medium. Image 3 with the criteria for heavy traffic density, medium road size and wide pedestrian size. Image 4 Medium traffic density, wide road size and medium pedestrian size.

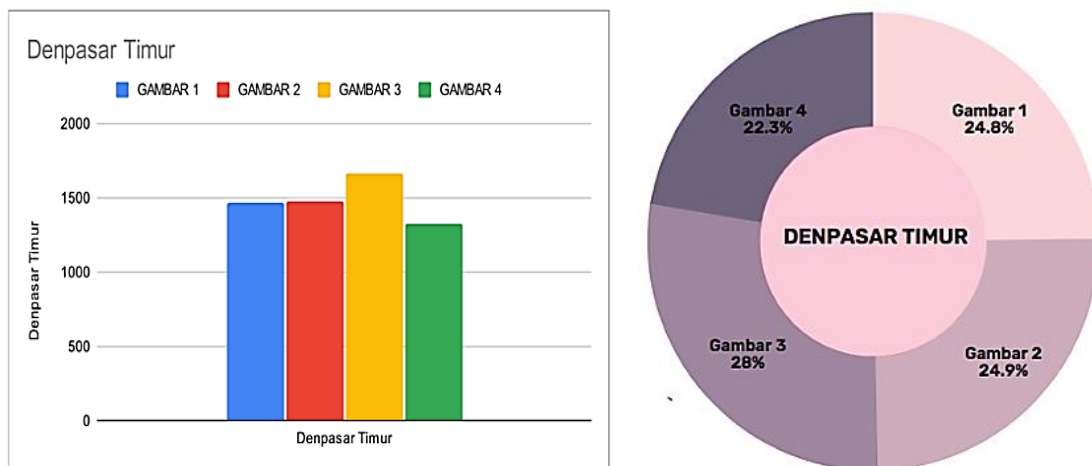


Figure 4. East Denpasar User Diagram Results
 Source: Personal Analysis, 2022

In the East Denpasar area, there is a diagram with image 3 that users want with a percentage of 28% for a pedestrian-friendly area with the criteria of heavy traffic density, medium road size and wide pedestrian size.

4.3 South Denpasar

No	Gambar	Kepadatan Lalu Lintas			Ukuran Jalan			Ukuran Pedestrian		
		Ramai	Sedang	Sepi	Lebar	Sedang	Sempit	Lebar	Sedang	Sempit
1		√				√		√		
2			√			√			√	
3		√					√	√		
4			√			√	√			

Figure 5. Analysis of the South Denpasar Region According to Criteria
Source: Personal Analysis, 2022

You can see in Figure 5 the criteria found in South Denpasar, image 1 medium traffic density, with narrow roads and medium pedestrian sizes. Image 2 traffic density is low, the road size is, and the pedestrian size is narrow. Image 3 with the criteria for heavy traffic density, narrow road size and wide pedestrian size. Image 4 Traffic density is light, road size is narrow and pedestrian size is wide.

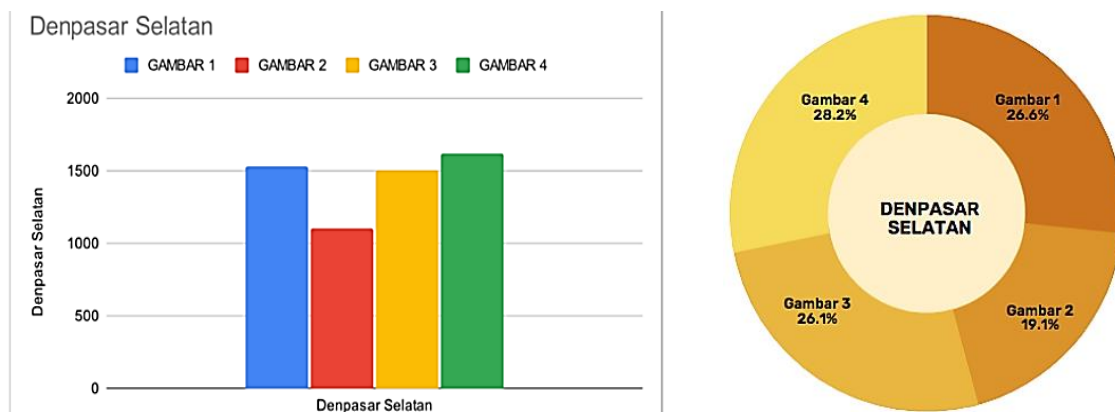


Figure 6. South Denpasar User Diagram Results
Source: Personal Analysis, 2022

In the South Denpasar area, there is a diagram with image 4 that users want with a percentage of 28.2% for a pedestrian-friendly area with the criteria of low traffic density, narrow road size and wide pedestrian size.

4.4 West Denpasar

No	Gambar	Kepadatan Lalu Lintas			Ukuran Jalan			Ukuran Pedestrian		
		Ramal	Sedang	Sepi	Lebar	Sedang	Sempit	Lebar	Sedang	Sempit
1			✓					✓		✓
2				✓					✓	
3		✓						✓		✓
4				✓				✓		✓

Figure 7. Analysis of the South Denpasar Region According to Criteria
 Source: Personal Analysis, 2022

You can see in Figure 7 the criteria found in South Denpasar, image 1 medium traffic density, with narrow roads and medium pedestrian sizes. Image 2 traffic density is low, the road size is narrow, and the pedestrian size is narrow. Image 3 with the criteria for heavy traffic density, narrow road size and wide pedestrian size. Image 4 traffic density is light, road size is narrow and pedestrian size is wide.

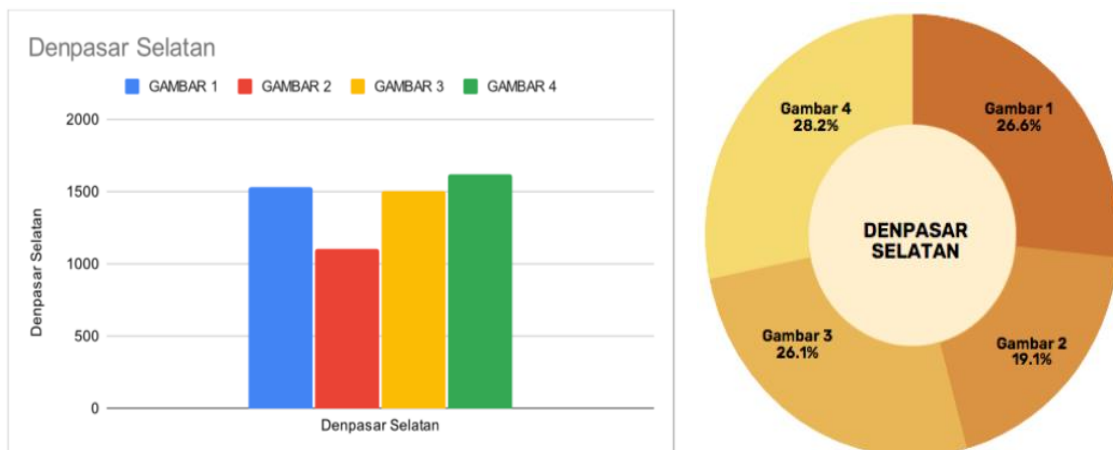


Figure 8. South Denpasar User Diagram Results
 Source: Personal Analysis, 2022

In the South Denpasar area, there is a diagram with image 4 that users want with a percentage of 28.2% for a pedestrian-friendly area with the criteria of low traffic density, narrow road size and wide pedestrian size.

4.5 West Denpasar

No	Gambar DENPASAR BARAT GAMBAR 1 GAMBAR 2 GAMBAR 3 GAMBAR 4	Kepadatan Lalu Lintas			Ukuran Jalan			Ukuran Pedestrian		
		Ramai	Sedang	Sepi	Lebar	Sedang	Sempit	Lebar	Sedang	Sempit
1		✓			✓			✓		
2		✓			✓				✓	
3		✓			✓			✓		
4			✓		✓				✓	

Figure 9. Analysis of the West Denpasar Region According to Criteria
Source: Personal Analysis, 2022

You can see in Figure 9 the criteria in West Denpasar, image 1 medium traffic density, with medium road size and wide pedestrian dimensions. Image 2 traffic density is busy, the road size is medium, and the pedestrian size is narrow. Image 3 with the criteria for medium traffic density, medium road size and medium pedestrian size. Image 4 traffic density is light, road size is medium and pedestrian size is narrow.

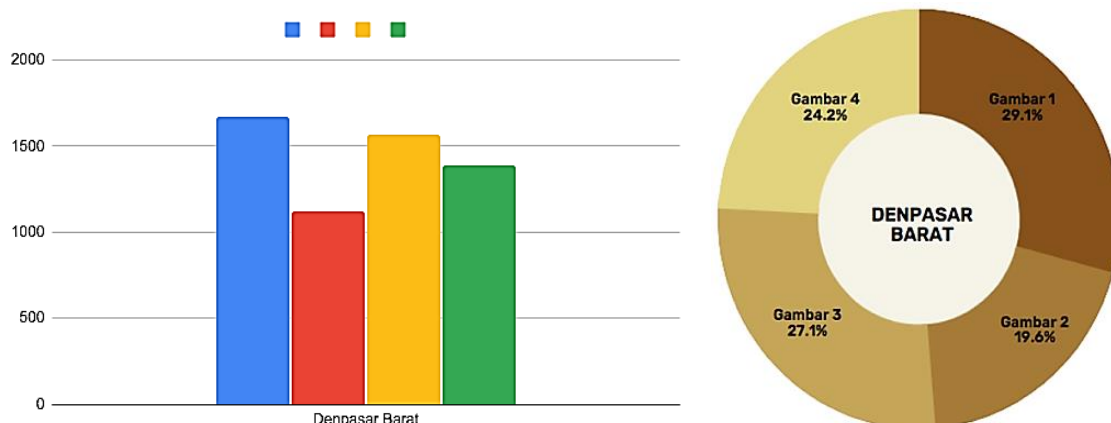


Figure 10. West Denpasar User Diagram Results
Source: Personal Analysis, 2022

Denpasar area, there is a diagram with image 1 that users want with a percentage of 29.1% for a pedestrian-friendly area with the criteria of medium traffic density, medium road size and wide pedestrian size.

Uncontrolled development of the city of Denpasar has turned a lot of agricultural land into residential areas. City development compares sprawl with a compact city by building a quality environment that is comfortable for pedestrians and integrated with attention to pedestrian safety and security.

5. CONCLUSION

The results of the research concluded that twenty images of the city center and each area had different criteria or identification. There is one area that stands out the most in terms of percentage, namely 29.1%, which is in West Denpasar, which has the criteria of medium traffic density, medium road size and wide pedestrian size. From this percentage, users expect the pedestrian size to be wider, while the narrower the road size is to make it safer for pedestrians, it is an effort to make the city more *walkable* because the wider road size causes vehicle speeds to be faster. The availability of quality pedestrian paths is one of the developments in a compact city so that it can reduce dependence on private vehicles and provide efficient pedestrian path facilities. After getting the road design that users want, further research into what kind of community service areas users want to walk on.

REFERENCES

- Desiyana, C. (2017). Urban Sprawl Dan Dampaknya Pada Kualitas Lingkungan : Studi Kasus Di Dki Jakarta. *Jurnal Komunikasi Visual ULTIMART*, 16-24
- Endarwati. (2018). Walkability pada Pusat Pelayanan (Kota Malang)
- Hafnizar, Y., Izziah, I., & Saleh, S. (2017). Pengaruh Kenyamanan Terhadap Penerapan Konsep Walkable Di Kawasan Pusat Kota Lama. *Jurnal Teknik Sipil*, 271-284
- Hall, C., Ram, Y., & Shoval, N. (2017). *The Routledge international handbook of walking*. Routledge
- Horn, A. (2015). Urban Growth Management Best Practices: Towards Implications for the Developing World. *International Planning Studies*, 131-145
- Humberto, M., Rodrigo, L., Giannotti, M., Claudio, L. M., Daniel, A. C., & Henrique, P. (2019). Walking and Walkability: Do Built Environment Measures Correspond with Pedestrian Activity? *Ambiente Construído*, 23-36
- Jenks, M., Burton, E., & Williams K. (1996). *The Compact city: A Sustainable Urban Form?* London: Spoon Press
- Juriah, & Ujang. (2014). Kepuasan berjalan kaki di Pusat Kota Kuala Lumpur
- Kim, et. al. (2019). Walkability score dan kepuasan pejalan kaki (Kota Seoul)
- Kozchinsky, J. (2013). The Walkable Neighborhood: A Literature Review. *International Journal of Sustainable Land Use and Urban Planning*, 42-63
- Leather, j. (2011). Walkability and Pedestrian Facilities in Asia Cities
- Pradana. (2015). Walkability jalur pedestrian (Universitas Brawijaya Malang)
- Ridhani, & Christanto. (2015). Walkability Index jalur pejalan kaki (Poros Medan MerdekaThamrinSudirman Jakarta)
- Rob, S., Edmar Joaquiun, G., Thiago, L., & Nathalia, O. (2021). Walkability: a review of trends. *Journal of Urbanism: International Research on Placemaking and Urban Sustainability*

- Schlossberg, M., & Brown, N. (2003). Comparing transit-oriented development sites by walkability indicators. *Transportation Research Record. Journal of the transportation research board*, 34-42
- Setianto, S., & Joewono. (2018). Penilaian fasilitas pejalan kaki (Kampus di Kota Bandung)
- Southworth, M. (2005). Reclaiming The Walkable City. *Jurnal Internasional of Urban Desain and Planning*, 131
- Thanan, N., Wibowo, S., & Tinumbia, N. (2017). Pengukuran Walkability Index Pada Ruas Jalan Di Kawasan Perkotaan. *Jurnal jalan-Jembatan*
- Triantoro. (2020). Tingkat Walkability jalur pedestrian (Kota Makassar)
- Yoppy. (2013). Walkability Index Kawasan Pendidikan Margonda Depok

