

SWOT ANALYSIS ON EXISTING PEDESTRIAN CONDITIONS IN KENDARI, INDONESIA

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Abstract

Pedestrian paths in city parks are public spaces that always attract city residents to visit. The presence of this city park must heed efforts to arrange pedestrian paths that support the walkability of visitors, considering that generally, city parks are located in the city center and with an unlimited age range of visitors. The current paper highlights the evaluation of the performance and satisfaction of pedestrian path users in public green spaces using the Importance Performance Analysis (IPA) analysis tool and the Customer Satisfaction Index (CSI) analysis tool, followed by conducting a Focus Group Discussion (FGD) to obtain models and strategies for pedestrian paths. Optimal. The results help identify the performance of pedestrian paths and indicate the satisfaction index of pedestrian path users. The comfort of pedestrians on public open space roads needs to be improved. In terms of security, the height of the pedestrian path must be distinguished from the vehicle lane. This study reveals that the performance of existing pedestrian paths classified as good category are facilities for pedestrians with special needs (guiding block), availability of road markings, available crossing lanes, security systems (CCTV, security posts), speed control facilities, and cleanliness level. Those classified as adequate category are pedestrian path dimensions, pedestrian path lighting, the difference in the height of the pedestrian path with the road body, availability of pedestrian markings and signs/signals, the surface texture of materials, seating, climate (shade), shelter, vegetation/shade plants, the number and quality of rubbish bins. Those with poor category are the availability of ramps, pedestrian paths connected to urban transportation elements, continuity of pedestrian paths, barriers on pedestrian paths, crossings, and noise reduction facilities. In addition, the pedestrian path user satisfaction index for services is mostly fairly satisfying (65.57%).

Keywords: Infrastructure, Pedestrian Paths, Public Green Open Space (RTH)

INTRODUCTION

From social, health, and urban mobility perspectives, it is shown that pedestrians play a vital role in the metropolitan area [1]. Walking represents the oldest means of transportation, the most universal and sustainable way of accessing cities, which goes back to the perceptions of city dwellers [2]. It means that walking promotes good relations between individuals and the urban environment by participating in cultural and commercial walking activities, appreciating the beauty of architecture, or interacting with other pedestrians [3].

Public open space areas must constantly be an attraction for city residents. It is like an oasis in the urban space that is growing more and more crowded [4]. As part of the urban space, public open spaces should be planned to be responsive, accessible to all ages and genders (democratic), and meaningful. Therefore, this research seeks to contribute by optimizing public green open space management through the arrangement of circulation paths to support the

walkability of visitors in city parks as part of the green open space sub-system [5]. Various urban renewal projects have emerged in recent years to bring pedestrians back into the center of public space design, specifically by reducing the use of private vehicles for daily mobility [6]. Promoting active modes of transportation improves citizens' physical and mental health [7] and reduces emissions and congestion in cities [8]. Therefore, active modes of transport, such as walking and cycling, are required to improve air quality and encourage more sustainable and integrated mobility in cities [9].

METHOD

This study used SPSS version 31 for data analysis. The performance of the existing pedestrian lanes was evaluated to understand users' opinions on their current use, as well as the expectations of public transportation users on the future public transportation service. The criteria used in analyzing the performance of existing pedestrian lanes were based on established standards for operating pedestrian lanes. The performance of public transport services was assessed using the Importance Performance Analysis (IPA), while the satisfaction of public transportation users was assessed using the Customer Satisfaction Index (CSI) analysis.

This study was conducted on pedestrian lanes in public green open spaces and included 399 respondents. The questionnaires were distributed directly to the respondents. Pedestrian users were selected as respondents because they are related to the condition of the pedestrian lane. The sample in this study were all parties involved, i.e., individuals and groups who have the power to influence directly and have competence in pedestrian paths, as well as parties involved in pedestrian paths. The Focus Group Discussion (FGD) was conducted with a team of experts in urban planning, urban planning and built environment, as well as practitioners from the Public Works and Spatial Planning Regional Office [10].

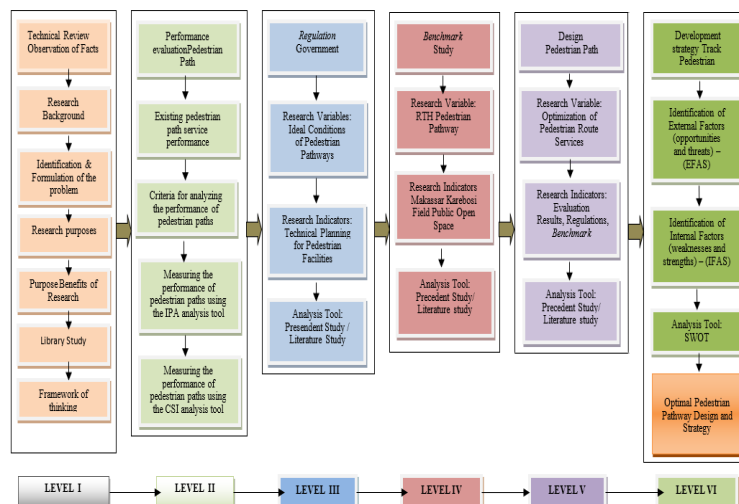


Figure 1: The Flowchart of the Study

The discussion resulted in specific qualitative data on pedestrian lanes. Free discussion among participants is the key to achieving great results, which is the main difference from conducting group interviews [11]. Thus, the FGD was an optimal tool for the current analysis, i.e., understanding the priorities and utilization of pedestrian lanes that affect their walkability. The FGD was prepared following several recommendations [12] and [13] which were adjusted with the case of pedestrian lanes in public open space areas. SWOT analysis was conducted to provide a strategic response on an optimal pedestrian lane [14]. The analysis is a strategic planning method used to evaluate a plan's strengths, weaknesses, opportunities, and threats [15]. SWOT analysis can be applied by analyzing and sorting out the factors that affect the four aspects, then applying them to the SWOT matrix [16].

RESULT AND ANALYSIS

Importance Performance Analysis (IPA)

1. Performance Value and Importance

A study on the level of service using the Importance Performance Analysis (IPA) method was carried out on users of pedestrian lanes in the Kendari public open space area with 399 respondents. The assessment attributes were mapped in a Cartesian diagram which is divided into Quadrant I (top priority), Quadrant II (maintain achievement), Quadrant III (excessive), and Quadrant IV (low priority). The result shows that the attribute having an excellent level of performance is the climate attribute (shade) on the pedestrian lane, with a total average performance value of 3.42. This fact shows that the shade at the pedestrian lanes that used soft landscape materials, already applied to public green space areas, concurs with the wishes of respondents or users of pedestrian lanes. In contrast, the cleanliness variable obtained the lowest performance value, i.e., 2.90, primarily related to the quantity and quality of waste bins. This condition happened because the management neglected the pedestrian lane's cleanliness.

Related to interests or expectations, the attribute with the highest value is the safety variable, i.e., the pedestrian lane condition item, with an importance value of 3.91. It is assumed that safety affects various aspects, such as security, comfort, and safety; therefore, it received the highest expected value, according to the respondents.

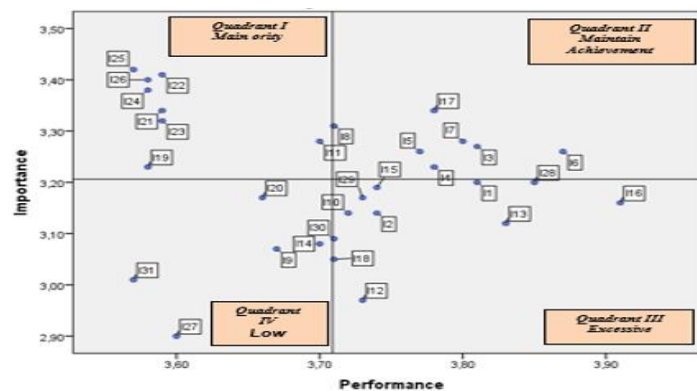


Figure 2: The Cartesian Diagram for the Importance Performance Analysis (IPA)

The average value of service attributes is mapped into several quadrants: Quadrant I with eight attributes, Quadrant II with seven attributes, Quadrant III with ten attributes, and Quadrant IV with six attributes. The lowest interest or expectation value is the path-supporting variable, i.e., the toilet and bus stop items, at a value of 3.01. The result indicates that the users most need this item.

The assessment result of each service variable is based on the level of importance and satisfaction of pedestrian lanes. The result allows the management to focus on efforts to improve and optimize the variables and items considered necessary by respondents or users. Thus, optimal service can be realized on the pedestrian lanes in Kendari.

The Cartesian diagram in Figure 2 shows the variables affecting user satisfaction in four sections.

a) Quadrant I (Top Priority)

Variables or items that affect the satisfaction of pedestrian path users in public open spaces are included in this quadrant and must be prioritized. Customers consider these factors very important, but their implementation could have been more satisfactory; therefore, it is necessary to improve these attributes.

b) Quadrant II (Maintain Achievement)

It is necessary to maintain the variables or items that affect the satisfaction of pedestrian path users or respondents in this quadrant because the implementation level corresponds with users' interests and satisfaction.

c) Quadrant III (Excessive)

Variables or items that affect the satisfaction of pedestrian path users or respondents in this quadrant are considered excessive in their implementation. This condition is mainly because users or respondents consider them less important in fulfilling the level of satisfaction of lane users. In practice, pedestrian lane users or respondents receive more service than expected; therefore, improving this factor is not a priority.

d) Quadrant IV (Low Priority)

Variables or items affecting the satisfaction of pedestrian path users or respondents in this quadrant are considered less critical and unnecessary for users or respondents. The quality of the implementation is considered moderate.

2. Customer Satisfaction Index (CSI)

The satisfaction index is measured using the average value of each service item's level of importance and satisfaction. CSI determination is necessary because the result can be used as a reference to determine the service value and status based on the Customer Satisfaction Index (CSI) scale.

Table 1: The Customer Satisfaction Index (CSI) Categorization for Each Variable

No.	Kode	Atribut	Nilai CSI	Skala/Kategori
1.	P1	Accessibility	64,08 %	Quite satisfied
2.	P2	Connectivity	65,15 %	Quite satisfied
3.	P3	Circulation	63,72 %	Quite satisfied
4.	P4	Security	62,56 %	Quite satisfied
5.	P5	Safety	63,28 %	Quite satisfied
6.	P6	Noise	64,00 %	Quite satisfied
7.	P7	Beauty	67,11 %	satisfied
8.	P8	Climate/Shade	67,95 %	satisfied
9.	P9	Cleanliness	61,12 %	Quite satisfied
10.	P10	Factors supporting public green space	61,77 %	Quite satisfied

The Customer Satisfaction Index (CSI) is used to determine the overall level of user satisfaction by taking into account the importance level of the accessibility attributes. The level of user satisfaction is assessed by comparing the performance perceived by the customer with the satisfaction (importance) of the service quality of the pedestrian lane. Table 1 shows the Customer Satisfaction Index (CSI) for the accessibility variable.

Table 1 shows that eight variables fall under the "quite satisfied" category. This satisfactory level indicates that pedestrian path users felt the public open space area needed to meet their expectations. The CSI values of the above eight variables are 51.00% - 65.99% (Quite Satisfied). These variables include accessibility, connectivity, circulation, security, safety, noise, cleanliness, and supporting factors for pedestrian lanes in public open spaces. This result indicates that the eight variables need follow-up actions to improve the services.

3. Experts

Apart from using observations, in-depth interviews, and simulations with respondents at pedestrian lanes in public open spaces, data collection was carried out by interviewing experts to confirm the study result regarding the suitability between the accessibility design of public open spaces and the convenience of pedestrian lane users.

The author has conducted a Focus Group Discussion (FGD) with experts that discussed the pedestrian path design, as well as the suitability between the accessibility design of the public open space and the convenience of the pedestrian lane. The FGD was conducted to agree on the model of pedestrian lanes in public open spaces.

Expert 1 agreed with the proposed design and model. Overall, activities at the pedestrian lanes in public open spaces are similar to the design of pedestrian paths that comply with the standards in the Regulation of the Minister of Public Works and Public Housing No. 2 of 2018. The author's design is an upgraded version of the standard prepared by considering the field

conditions and facts regarding the users' needs. The expert agreed that adding curbs, buffer zones, and bicycle lanes are necessary. He also suggested placing bus stops for public transport on arterial routes. Bus stops are designed according to pedestrian lane users' interests and expectations, making it easier for them to get on and off the bus safely and not in risky locations, such as crossroads.

Expert 2 also agreed with the author's design and model. The model already referred to the standard in the Regulation of the Minister of Public Works and Public Housing No. 2 of 2018. He suggested that the pedestrian lane design should be developed based on road classification, such as arterial, collector, local, and environmental [17]. In addition, the expert suggested that the design be developed according to the users' needs. Finally, the expert recommended focusing on environmental support around the pedestrian path, so users feel comfortable walking there.

Expert 3 suggested that the pedestrian path model should be developed from the Regulation of the Minister of Public Works and Public Housing No. 2 of 2018. He also suggested repairing and adding facilities to the area to ensure better safety and ease of mobility [18]. The design of a pedestrian lane for the disabled remains integrated into the proposed model with a priority for supporting facilities such as the availability of ramps, guiding blocks, buffer zones, curb ramps, road markings, and traffic signs.

The experts provided several recommendations for arranging environmental and child-friendly pedestrian lanes in urban public open spaces based on the design concept of pedestrian paths.

Based on the Model and Type of Road

a) Accessibility

Pedestrian lanes need to provide opportunities for users to develop a sense of socialization, recreation, and freedom. Therefore, a sense of security, comfort, and ease of access is needed [19].

b) Connectivity

The access to public transportation and the connection path with crossing lanes will support the mobility of pedestrian lane users.

c) Circulation

Circulation means rotation. In this case, it is related to the dimensions of the pedestrian path, namely size, width, height, and slope.

d) Security

CPTED (Crime Prevention through Environmental Design) is a concept that is developed in a certain way to reduce or prevent crime. The concept has several elements, such as Natural Surveillance, Natural Access Control, Territory Strengthening, Lighting, CCTV (Closed Circuit Television) Cameras, and many more [20].

e) Safety

Sidewalks should be equipped with safety facilities (barriers or separators), signals, and signs for motorists to be aware of pedestrians. It is also necessary to widen the furniture line.

f) Convenience

Pedestrians need to avoid discomfort caused by climate and weather conditions. Pedestrian paths are public spaces; therefore, people that pass should be protected from the weather, especially extreme weather, such as hot sun, wind, and rain, when they stop to wait for public transportation or rest on available benches. Protection is provided by placing trees and shelter in certain locations [21].

g) Noise

The high level of noise from passing motorized vehicles can cause discomfort for pedestrians. It can be minimized by providing plants around the pedestrian lane. Noise can be reduced by setting a barrier between the noise source and the users. The plant arrangement on the sidewalk should be adjusted with the width of the land, starting from the shoulder of the road up to the threshold of the drain or right-of-way area.

h) Beauty

Beauty must be designed by considering the pedestrian lane's shape, color, plant composition, and elements to obtain optimal comfort. This need can be fulfilled by placing aesthetic elements like flowers, floor ornaments, and other aesthetic objects along the lane to make pedestrians comfortable. Trees and parks along the path, as well as the surrounding scenery, will attract pedestrians [22].

i) Climate

The climate is a state of nature that occurs at a given time. Microclimatic factors that affect human comfort are temperature, solar radiation, humidity, and wind. Rainfall and solar radiation in the tropics can interfere with pedestrian activities, so shelters and gazebos are needed.

j) Cleanliness

The placement and number of waste bins on pedestrian paths are critical. Waste bins are placed every 20 meters at meeting points, such as intersections, with the amount adjusted to the needs. The materials are high-durability materials such as metal and precast concrete.

k) Supporting Factors for Pedestrian Lanes

The pedestrian lane design not only focuses on the aesthetic aspect but also emphasizes the comfort of pedestrians. Therefore, complementary elements that provide comfort

for pedestrians are needed, such as paving blocks, lights, signs, sculptures (vocal points), bollards (barriers), benches, shade trees, telephones, kiosks, shelters and canopies, clocks, waste bins, bus stops, and utilities. The arrangement of aesthetic elements on pedestrian lanes that consider the size, dimension, and human scale will shape the image and character of the city and ultimately create a friendly and comfortable environment for pedestrians.

The author proposed an ideal pedestrian path model based on the discussions with experts and the characteristics of the research area according to field observations.

SWOT Analysis

SWOT analysis is a strategic method used to evaluate a plan's strengths, weaknesses, opportunities, and threats. The analysis is carried out by analyzing and sorting out the factors that affect the four aspects, then entering them into the SWOT matrix [23]. The SWOT analysis shows how strengths can take advantage of existing opportunities, how to overcome weaknesses that prevent taking advantage of existing opportunities, how strengths can deal with existing threats, and how to overcome weaknesses that can make threats become real or create new threats [24].

1. IFAS

Strength

a) The Strategic Location of the Public Open Space

The public open space corridor is located in the heart of Kendari, which makes the area accessible. Its location, which is opposite Kendari City Park and the public service mall, is also close to urban activity centers, such as offices, as well as education, shopping, and cultural centers, making it easier for tourists or visitors to reach the area. In addition, this area is also traversed by public transportation Route 1, Route 2, and Route 3 from Terminal C at the Old Town.

b) The Public Open Space as a Tourist and Heritage Area

The public open space is an area that provides several tourism activities, such as shopping, culinary, and historical tours, making the area attractive to tourists. Shopping is the main reason for visiting the public open space where visitors can shop at street vendors. In addition, visitors can go on culinary tours at night because food vendors open their stalls around 6 p.m. The type of food available is local specialties. Visitors visit the Southeast Sulawesi State Museum for historical tours, located at the front of Segment 3.

c) The Public Open Space as a Small and Medium Enterprise (SME) Area

The public open space is also managed as Kendari's SME area. The products offered there are made by the local community. Travelers visiting Kendari can obtain souvenirs by visiting the area. The products offered are only made by the local people of Kendari and Southeast Sulawesi; products from outside the province are unavailable.

d) The Public Open Space as a Sport Area

Light sport is an activity carried out in a public open space. The people of Kendari use this area for jogging and exercising, especially on the weekends.

e) The Public Open Space as an Integrated Transportation

Various modes of inner-city transportation traverse the pedestrian area at the public open area. Public transportation that traverses this area has destinations to various places far away.

Weakness

a) Parking Condition

Many tourists who visit the public open area park their vehicles irregularly. As a result, the parking area provided by the management could not accommodate tourists' vehicles. There is a lack of parking lots due to inconsistencies in land use for the public open area. The parking area for two-wheeled and four-wheeled vehicles are in Segment 1, Segment 2, Segment 3, and Segment 4 on Abdullah Silondae Street, Abu Nawas Street, and Tebaununggu Street. The existing parking area could not meet the capacity, so many two-wheeled vehicles use the pedestrian paths around the public green open area as parking lots. Meanwhile, four-wheeled vehicles used parking lots at the surrounding government offices as alternative parking locations.

b) The Availability of Social Facilities

Social facilities are provided by the government or private sector for people in a specific area. Social facilities that are urgently needed in the public green open area are places of worship, especially mosques, and public toilets. The facilities already exist in the area. The mosque is located north of the area and in front of Segment 2. However, public toilets are not available within the area, so people use the public toilet at the Al Muhajirin mosque, Kendari. The visitor survey shows that the facilities did not meet visitors' needs.

c) Condition of Street Vendors

Street vendors are unique features that have their charm for the public open space, but the increasing number of traders makes the area crowded and congested. Street vendors tend to operate on pedestrian paths. Currently, the public open space area is busy with tourists, and the street vendor stalls tend to make it difficult for tourists to move around. The increasing number of street vendors caused the public open space to become more disorganized and created a negative and unorganized city image.

d) Lack of Response to Users of Pedestrian Lane in Public Open Space

2. EFAS

Opportunities

a) The Increase in Tourist Visits to Kendari

Kendari is one of the tourist destinations in Indonesia. Apart from being famous as the city of lulo, derived from the name of a traditional dance of the Tolaki tribe, Kendari is known for its natural beauty and cultural charm. This condition attracts tourists to visit Kendari. It is not surprising that the number of local and foreign tourists who visit Kendari increases annually.

b) The Increase in Kendari's Economic Income

Based on statistical data until the end of 2021, Kendari's development target achievement on a macro basis has been increasing.

c) Kendari Often Holds Various Cultural Events in the Public Open Space Courts

Activities often held in the public open space are Quran Recital Competition (MTQ) in 2007, Kendari's birthday, Southeast Sulawesi's birthday, music concerts, and cultural and art performances.

d) Various central government regulations encourage and prioritize public green open space development.

e) The policy to develop parking lots around the public open space area

f) The increasing movement of visitors to the public open space area

g) An area that is friendly to pedestrians and disabled people

Integrating public transportation into the public open space causes many people to opt to use public transportation that can easily be reached on foot. Bus stops were designed to be close to buildings, creating a walkable pedestrian and disabled-friendly area. However, this pedestrian-friendly area still needs to be improved because the road infrastructure and sidewalks have many potholes and need to be fixed; hence, the area is still risky to pedestrians.

Threats

a) Development of Tourism Destinations in Kendari

Kendari, one of Indonesia's tourist destinations, offers various tours to attract tourists. In recent years, tourism has begun to be developed in several areas in Kendari. This step is taken so that tourism activities are centered in more than just the provincial capital, as well as to promote and empower communities around tourist destinations. Apart from the city center, tourists currently choose to visit other areas, such as tourist villages currently developing in Kendari, as well as natural destinations, such as beaches and mountains.

- b) The Community Disapproves the Development of Pedestrian Lane in the Public Green Open Space

The community considers the development requires a substantial budget and is worried that employment may be moved elsewhere (street vendors being transferred).

3. Strategic Concept

The concept of a pedestrian lane within the public open space was developed based on the interests and satisfaction of users while also considering various internal and external factors [25]. The open space will provide pedestrian lanes that accommodate users such as workers and students who pass through the lanes. The development concept was prepared based on Kendari's current conditions.

The development concept is also integrated with various modes of public transportation, making it accessible to all levels of society [26]. The re-planning of the pedestrian lane at the public open space in Kendari is intended to increase people's interest in activities such as walking, exercising, and many more. One of the reasons for the low utilization of pedestrian paths in Kendari is the public's poor perception of the path's service. Additionally, pedestrian lanes are less attractive because the currently available pedestrian paths cannot accommodate activities on the paths at the former MTQ public open space. This condition happened because, initially, the area was not designed for public activities, causing inconvenience to its users. Considering the issues related to the pedestrian lanes at the public open space in Kendari, the paths are then designed to serve all the community's needs. Pedestrian paths are expected to be accessible, safe, and comfortable, as well as give users a good impression and experience.

The planning of this area also focuses on the psychological aspects of street users, where the design is prepared to provide comfort for the community. The comfortable design is not only for specific Segments but in all areas, including bus stops, lanes for the disabled, and corridors that connect transportation modes with pedestrian paths. The planning also includes a pedestrian path on the connecting lane between the bus stop and the parking lot. This design is intended to facilitate lane users, including the general public and people with disabilities, to access bus stops easily and safely. The development of pedestrian paths in the public open area has the concept of being "Safe, Comfortable, and Accessible". This concept emphasizes that all community groups can access pedestrian paths.

- a) Safe

Pedestrians need protection from traffic accidents, criminal threats, and other physical threats. Traffic accidents are threats that need serious attention. In addition, they need protection from accidental falls due to tripping or height differences between the surface of the road elements [27].

- b) Comfortable

The pedestrian path design needs to be made so that people are comfortable using them. This design is realized by providing comfortable seats, shelves for placing luggage, CCTV, entertainment shows, regional music shows, and other components that can

increase user comfort. In addition, it is necessary to provide facilities that support the mobility of people with special needs, from bus stops to pedestrian paths [28]. There is a guiding block on the pedestrian path; therefore, it is safe for people with disabilities, children, pregnant women, and the elderly. Furthermore, priority seats for people with special needs, which can be folded and have hooks for wheelchairs, are available. Therefore, people with disabilities can independently access pedestrian paths.

4. Accessibility

Accessibility for pedestrian lane users includes elements such as elimination of obstacles, width and free space, bow and rest areas, slopes or grades, curb ramps, as well as surface and textures [29]. Ease of access applies to everyone, including those with special needs, such as wheelchair users, the blind, and the elderly. Pedestrian accessibility is an essential factor in making an area walkable or pedestrian-friendly [30].

CONCLUSION

The quantitative and qualitative data analysis of the 28 assessment variables shows the performance of the existing pedestrian paths in Kendari, consisting of three categories: good, moderate, and bad for each variable. Meanwhile, the satisfactory index for pedestrian path users fell in the "quite satisfied" category at 65.57%. The study result is expected to be an input for the government regarding the future improvement of pedestrian path services. The development of pedestrian paths in the public open area uses the concept of "Safe, Comfortable, and Accessible". This concept emphasizes pedestrian paths that all groups can access. The weakness of this study is that it still needs to add research variables, such as supporting factors for pedestrian paths so that the number of variables in this study becomes complete.

Recommendations that can be given to the government are the need for the equitable development of pedestrian paths in open spaces and routine maintenance of the paths. The development or maintenance of pedestrian paths focuses on nine aspects of effectiveness: connectivity, accessibility, circulation, security, comfort, safety, climate or shade, beauty, and cleanliness. Meanwhile, further research is recommended to study the effectiveness of city green open spaces and examine the factors influencing the interest in walking on pedestrian paths. The development of pedestrian paths in the public open area has the concept of being "Safe, Comfortable, and Accessible". This concept emphasizes that all community groups can access pedestrian paths.

ACKNOWLEDGEMENTS

This work is supported by the Government of Kendari, especially the Kendari Office of Public Works and Spatial Planning, the Office of the Research and Development of Southeast Sulawesi Province, the Kendari Environment Office, and all parties who have provided data and information support in this study.

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