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# The Model of Pedestrian Arrangement in the Commercial Corridor of Pattimura Street, Medan

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**ABSTRACT**

The development of Medan City is challenged by unplanned growth that triggers urban sprawl, particularly along the commercial corridor of Pattimura Street. The change of residential functions into commercial areas triggers various problems such as congestion, decreased quality of the visual environment, crowding, and degradation of the vitality of the area. This study aims to formulate a humanist pedestrian arrangement model in the corridor with a smart growth approach and community participation as a local force (genius loci). This research prioritizes the concept of linkage, both visually, structurally, and collectively, in redesigning pedestrian space. By promoting local wisdom as the basis for revitalization, the results of this study are expected to guide public policy based on community development in the management of sustainable commercial areas in Medan City.

**Keyword:** *Pedestrian*Arrangement, *Strip Development, Urban Sprawl, Pattimura Medan*

**ABSTRAK**

Perkembangan Kota Medan saat ini dihadapkan pada tantangan pertumbuhan yang tidak terencana yang memicu terjadinya urban sprawl, terutama di koridor komersial Jalan Pattimura. Alih fungsi kawasan permukiman menjadi kawasan komersial menimbulkan berbagai persoalan, seperti kemacetan lalu lintas, penurunan kualitas lingkungan visual, peningkatan kepadatan aktivitas, serta melemahnya vitalitas kawasan. Penelitian ini bertujuan untuk merumuskan model penataan jalur pejalan kaki yang humanis di koridor tersebut dengan menggunakan pendekatan smart growth dan mengedepankan partisipasi masyarakat sebagai kekuatan lokal (genius loci). Penelitian ini memfokuskan pada penerapan konsep linkage secara visual, struktural, dan kolektif dalam perancangan ulang ruang pejalan kaki. Dengan menjadikan kearifan lokal sebagai dasar revitalisasi, hasil penelitian ini diharapkan dapat menjadi masukan bagi perumusan kebijakan publik berbasis pengembangan masyarakat dalam pengelolaan kawasan komersial berkelanjutan di Kota Medan.

**Kata Kunci:** Penataan Pejalan Kaki, Pengembangan Jalur, *Urban Sprawl*, Pattimura Medan

## 1. Introduction

The development of a city is always characterized by two patterns of growth: planned growth as regulated in the government's formal spatial plan, and unplanned growth carried out independently by the community. This phenomenon becomes more complex when urban sprawl symptoms appear in the core area of the city, one of which is triggered by the massive growth of commercial functions. In Medan City, the phenomenon of fast-growing centers is evident in the city center through the construction of shop houses (ruko) as a form

of commercial building typology. One of the areas that shows this phenomenon is the Pattimura Street corridor. The dynamics of this area's development are strongly influenced by the presence of the Universitas Sumatera Utara (USU) educational institution and its supporting facilities, ease of accessibility, and high traffic intensity. The use of road space as a trading area has also encouraged the rapid growth of shophouses in this corridor. However, the conversion of the function of the area from residential to trade has caused a number of problems, including the decline in infrastructure quality, congestion, the use of pedestrian paths by street vendors, and the emergence of portable stalls and tents that narrow the space for public movement. This phenomenon reflects the form of strip development as part of urban sprawl (Shih, 2017).

The problem of strip development has been examined from various perspectives, such as the behavior of public spaces (Zahrah et al., 2016), control of land use change (Kushidayati & Ariastita, 2017), factors causing changes in designation (Irawati & Haryanto, 2015; PP & Suwandono, 2014), dualism of commercial land use (Radhinal & Ariyanto, 2017), to aspects of the urban landscape related to community values (Wolf, 2009). All of these studies indicate the irregularity of the area due to the uncontrolled growth of shophouses. The degradation of environmental quality caused by strip development demands a comprehensive revitalization approach. Initial studies in the Pattimura Street corridor showed that the construction of shophouses by the community caused a loss of visual unity in the face of the corridor and the absence of a spatial sequence capable of building place attachment. Therefore, a street arrangement decomposition strategy is needed, especially for pedestrian elements, so that this corridor can become a public space that has productive vitality.

This research aims to formulate a pedestrian planning model in commercial areas experiencing urban sprawl with strip development characteristics, especially in the Pattimura Street corridor. This condition can be overcome through the concept of area rejuvenation known as smart growth. This concept emphasizes the matching of social, cultural, environmental, and local wisdom elements in a unified area planning, especially in optimizing pedestrian functions. The main focus of smart growth includes increasing neighborhood livability, ease of access and reducing congestion (better access/less traffic), strengthening existing cities, equitable distribution of development benefits (shared benefits), cost efficiency, and preservation of open space (Shrivastava & Sharma, 2012). In operational terms, regional planning can utilize visual linkage theory (Bacon, 1967), structural linkages (Rowe & Koetter, 1979), and collective linkages (Trancik, 1991), and Street Square-based spatial organization (Krier & Rowe, 1979), combined with elements of local habituation on pedestrian paths.

Prioritizing research excellence that refers to the Strategic Plan of the Universitas Sumatera Utara, namely the disclosure of local wisdom, this research is expected to contribute to the development of basic science of locality-based area revitalization. The findings of this research can also be used as guidelines for city governments and policy makers in anticipating the dynamics of urban growth through a community development approach, especially in sustainably structuring pedestrian public spaces.

However, most existing studies on strip commercial development and urban corridors in Indonesia still focus on land-use change, traffic problems, or visual impacts in a rather sectoral way and rarely provide a comprehensive pedestrian-based design model. There is still a lack of research that specifically addresses how smart growth principles, linkage theory (visual, structural, and collective), and the concept of genius loci can be operationalised in the redesign of commercial corridors affected by urban sprawl in Medan. This study fills that gap by developing a corridor-based pedestrian arrangement model that integrates these theoretical perspectives with the everyday socio-cultural practices of local communities.

In line with this gap, the study addresses the following research questions: (1) How do the physical and spatial characteristics of the Jalan Pattimura commercial corridor influence pedestrian behaviour and the use of public space? (2) How can visual, structural, and collective linkages be strengthened through incremental pedestrian interventions along the corridor? and (3) What type of pedestrian arrangement model is appropriate for supporting a more liveable and humanist strip commercial area in Medan City? Specifically, the objectives of this research are: (1) to identify the spatial structure, activity patterns, and existing problems of the Jalan Pattimura commercial corridor; (2) to analyse the degradation and potential of the pedestrian environment in relation to smart growth and linkage principles; and (3) to formulate a phased pedestrian arrangement model that integrates smart growth, linkage theory, and local wisdom as a basis for sustainable

corridor management in Medan City. The novelty of this study lies in its explicit integration of these three perspectives into a concrete design model for a strip development corridor under urban sprawl conditions.

### *1.1 Strip Commercial Development*

The phenomenon of strip commercial development is one of the manifestations of urban sprawl, a form of development that exceeds the available land capacity and develops uncontrollably. The increasing intensity of built-up land development is known to contribute to the escalation of the degree of urban sprawl in urban areas (Jaeger & Schwick, 2014). Three typical forms of urban sprawl, namely commercial strip development, leapfrog development, and low-density single-dimensional development (Holcombe, 1990). In the case of strip commercial development, the symptoms are seen in the growth of commercial areas that spread linearly along both sides of the main road or arterial road. As with other forms of urban sprawl, this phenomenon is characterized by sporadic, uncontrolled development, resulting in an unorganized visual image. Every shop or building unit has direct access to the street, creating traffic disruptions and contributing to congestion.

Furthermore, the presence of strip commercial development also has the potential to encourage the emergence of a form of leapfrog development in the surrounding area, which is characterized by a leap of development to the periphery without adequate infrastructure continuity. In the socio-economic and ecological context, this phenomenon brings a variety of locality-specific negative impacts, such as environmental degradation, increased traffic volume, urban decline, and loss of community activity centers and historical sites. Strip development is generally characterized by high density with two- to three-storey buildings, limited parking areas, and rows of vehicles parked along the street. In addition, some of the stores in strip developments are evolving into lifestyle centers and recreational shopping. This transformation has an impact on the social capital of the community because of the change in the function of public space into private space. Social activities that were previously carried out in outdoor spaces slowly moved into enclosed buildings, resulting in a decrease in the quality of residential life that was pushed into a fully commercial area.

### *1.2 Smart Growth - Alternative Commercial Area Arrangement*

The arrangement of the area aims to integrate all space-forming elements, such as buildings, vegetation, waterways, traffic systems, billboards, and other environmental elements, in a harmonious manner to create an attractive and comfortable visual setting for the community (Cullen, 2012). In the context of structuring commercial areas, various approaches have been developed to overcome the problems caused by uncontrolled regional growth, such as the phenomenon of urban sprawl. One of the most influential approaches is the smart growth concept, which was initially developed in North America and later expanded to Central Asia. This concept is in line with other ideas such as compact city, urban intensification, district regionalism, and new urbanism, all of which aim to optimize urban space sustainably and efficiently.

In Europe, more specific approaches, such as circular flow land use management, have also been developed to respond to the challenge of urban sprawl. This concept emphasizes the importance of inner-city redevelopment and brownfield development as a more sustainable spatial utilization strategy (Shrivastava & Sharma, 2012). According to Smart Growth America, a sustainable development advocacy group in the United States, there are six main objectives of smart growth, namely: improving neighborhood livability, better access/less traffic, enabling pre-existing cities, suburbs, and towns to thrive, sharing benefits, lower costs/lower taxes, and preserving open space. This approach is an important basis for designing areas that are not only physically livable but also socially inclusive and economically efficient.

### *1.3 Strip Paths*

Corridors are an important element in the city's spatial structure, formed by rows of buildings or other space-forming elements along the left and right sides of a road. The row creates an elongated space that serves as a link between areas or areas of the city while displaying the physical and visual quality of the environment (Zahnd, 1999). From an architectural perspective, a corridor is not only understood as a path of movement, but also as a space formed by building masses, vegetation such as trees, and street furniture that together present a certain visual character and atmosphere in an urban area.

The quality of a corridor is strongly influenced by its physical and non-physical specifications, such as the shape and form of buildings, the relationship between mass and space (figure-ground), the road system, and the presence of pedestrian paths (Krier & Rowe, 1979). These elements form the image of the corridor as an integral part of the city's architecture. As a space for human activity, the corridor has an important role in supporting pedestrian and vehicle movement (circulation), parking areas, and supporting the sustainability of commercial activities. In addition, corridors have a significant visual influence on the physical form and

structure of the city. The scale of the corridor space is determined by the proportion of its forming elements, such as the width and length of the street, the shape of the pedestrian path, the height of the building, and the design of the building's mass and facade. All these elements contribute to the function and aesthetics of the corridor as a dynamic and identifiable public space.

### *1.4 Principles of the City Corridor Arrangement System*

In urban planning, corridors have an important role as connecting spaces that are not only functional but also function visually and emotionally. The physical form of the corridor can function optimally if it fulfills five main elements, namely comfort, relaxation, passive engagement, active engagement, and discovery. These elements contribute to the quality of users' experience of urban space, especially in transitional spaces such as corridors (Moughtin, 2003).

The spatial structure of the urban corridor is formed by the composition of the building mass interacting with open space. This pattern of relationship between building mass and open space can be explained through the figure-ground approach, where the shape of the city is read through the configuration of solid and void (Zahnd, 1999). The prominence and setback of buildings within the corridor result in a diverse and dynamic quality of outdoor space. This massing pattern can create visual walls that shape the image of public space and serve as a tool for recognizing the texture and spatial pattern of an urban area (Trancik, 1991).

### *1.5 Place Spirit Identity (Genius Loci)*

The concept of place in planning and environmental architecture studies has a fundamental role in shaping the human experience of space. Place is understood as an individual or group's perception of a location that has a certain meaning physically and emotionally (Relph, 1976). Relph emphasizes that the quality of a place is determined by the power of the spirit or “soul of place”, that is able to attract attention and encourage human involvement in activities in the environment. In the realm of environmental psychology, the relationship between people and places is classified into three main forms, namely place attachment, place identity, and place dependence.

The spirit of place is a non-physical force that creates a deep impression of urban space. Therefore, to maintain a sense of place, it is necessary to identify the image, character and meaning of the place. Spirit of place can be created through natural and man-made environmental attributes, such as landform, topography, vegetation, cultural elements, and historical artifacts that reflect the interaction between culture and environmental conditions (Garnham, 1985; Schulz, 1980). The concept of imageability is the physical quality of a place that allows people to form a strong mental image of the city environment. Imageability is influenced by five important elements in the city structure, namely paths (movement paths), edges (physical boundaries), nodes (important meeting points), districts (areas with certain identities), and landmarks (visual markers) (Lynch, 1960). These elements contribute to shaping the character and identity of the area, including the road corridor, thus making the urban space not only a place of transit but also a meaningful space capable of generating emotional and cultural attachment for its users.

### *1.6 Pedestrian*

Pedestrian, from the Latin word pedestres, is a reference to a person walking. Pedestrian paths or better known as sidewalks, come from the French, Trotoire, which means a small road 1.5 to 2 meters wide, extending along public roads or large roads. In urban planning theory, Kevin Lynch classifies pedestrian paths as one of the city-forming elements, namely the Path element, which functions as a barrier or link between areas or blocks in the city area (Lynch, 1960). The existence of pedestrian paths not only functions as an aesthetic element that gives a positive impression of a city, but also plays an important role in providing a safe and comfortable space for pedestrians to move without fear, both for fellow users of the path and motorized vehicles on the road (Cozens, 2002).

According to the Universal Declaration on the Human Rights of Pedestrians, every individual is entitled to adequate protection when using pedestrian paths, and the urban environment should not harm or inconvenience pedestrians. In reality, many urban pedestrian paths do not meet the expectations of the public. Some of the main problems that are often found are the size of the path that is too narrow, the inappropriate height of the path (usually 20-30 cm higher than the road surface), the unevenness of the path surface, and the change in the function of the pedestrian path into an area for street food merchants (Banerjee & Loukaitou-Sideris, 2011). This impacts the comfort and safety of pedestrians, who should have a safe space to move around. In Medan city, for example, pedestrians are often forced to walk on the road due to damaged or missing pedestrian paths, putting them at high risk of coming face-to-face with motor vehicles.

This indicates the importance of structuring pedestrian paths that are safe and comfortable for pedestrians in an effort to reduce stress and improve urban quality of life.

## 2. Method

The research method used in this study follows a mixed-method approach, which combines quantitative and qualitative methods in a descriptive–exploratory manner (Creswell & Clark, 2017). This approach is in accordance with the main objective of this research, which is to formulate a model for structuring commercial areas in the Pattimura Street corridor, Medan City. The study area covers approximately ±1.2 km of the Pattimura Street corridor in Medan Selayang Sub-district, starting from the Iskandar Muda Street intersection to the Pajus USU Book Market intersection. For analytical purposes, this corridor is divided into three observation segments, namely: Segment 1 (Iskandar Muda Intersection – USU Campus Intersection), Segment 2 (USU Campus Intersection – Mosque), and Segment 3 (Mosque – Pajus Market). Data collection was conducted through mapping, direct observation, and visual documentation in the form of digital photo recordings in three time frames (morning, afternoon, and evening). The focus of observations included traffic conditions, pedestrian infrastructure, and the visual spatial layout of the area. These observations were enriched with a retrospective approach, digital mapping, and visual documentation to increase the validity of field data. In addition to qualitative observations, simple quantitative measurements were carried out at representative points in each segment of the corridor. The indicators measured included the effective width of the sidewalk or road shoulder used by pedestrians, the proportion of street frontage occupied by on-street parking and informal stalls, and peak-hour traffic volume. These measurements complement the qualitative sketches and photographs, and support the synthesis of ideal versus existing pedestrian conditions presented in Table 3.

The second stage is data analysis, which is carried out with a structuralist functional approach (Ricoeur, 1976). The analysis was conducted by grouping pedestrian infrastructure, vegetation elements, and transportation routes into functional categories. This analysis is strengthened by the cross-tabulation method and SWOT analysis to identify the strengths, weaknesses, opportunities, and challenges of the existing conditions of the area. The results of the analysis are presented in the form of interpretative narratives, graphic visualizations, and sketches of the area. The third stage is a discussion of design, which is structured through a spatial arrangement approach to describe programmatic concepts, outdoor space design, and pedestrian arrangements that are responsive to the dynamics of the area. The structuring process is based on the principle of incremental planning and refers to the concept of visual linkage (Bacon, 1967), structural linkages (Rowe & Koetter, 1979), and collective linkages (Trancik, 1991). The arrangement of space composition also considers the principle of street and square (Krier & Rowe, 1979) and local habituation along the corridor. This stage produced narrative documents, conceptual sketches, posters, and guidelines for the design of the area.

The main objects of this research are pedestrian-related architectural elements that have changed function on both sides of the Pattimura Street corridor, which is a commercial zone with a disorganised strip-development character. The research location includes three main segments: segment 1 (Iskandar Muda-USU Campus intersection), segment 2 (USU Campus-Mosque intersection), and segment 3 (Mosque- Pajus Market) (Figure 1).

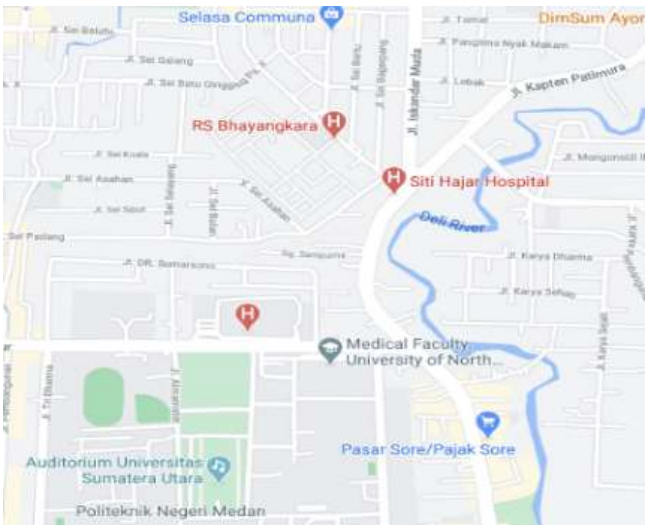


Figure 1. Research Location of Commercial Area on Pattimura Street Medan
(Source: Google Maps (Maps, 2025)

**Segment 1**

The length of this segment is about 500 meters (Figure 2), namely from the Iskandar Muda intersection to the Universitas Sumatera Utara campus intersection. In this segment, there is Siti Hajar Hospital, shops and other service sellers. Circulation activities in this segment are jammed almost every day, especially during the morning and evening rush hours.

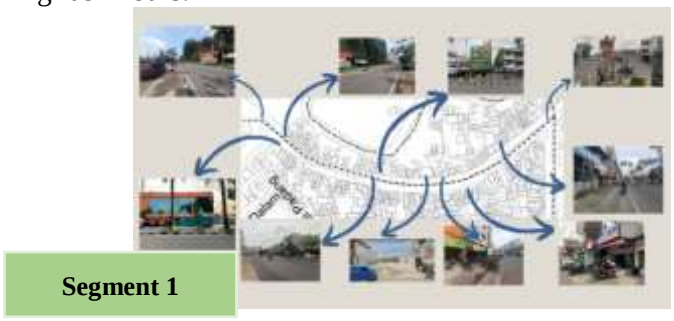


Figure 2**.** Segment 1 (Iskandar Muda Intersection - USU Campus Intersection)
(Source: Author's Analysis, 2020 updated 2024)

The area lacks adequate road elements such as curbs, shoulders, gutters, and pedestrian paths. The unavailability of pedestrian paths causes inconvenience for pedestrians, while road shoulders are often used informally by traders, disrupting vehicle and pedestrian mobility (Figure 3a). There are also no dedicated parking facilities, so vehicles are often parallel parked on the road shoulder (Figure 3b). This adds to congestion and impedes traffic flow. The street is dominated by shops that cater to student needs, such as photocopying, stationery, and workshops (Figure 3c). Shop buildings are generally designed as business premises and are very close to or directly adjacent to the road, reducing space for pedestrians and adding to spatial irregularity.


Figure 3. (a) Pedestrian Path Condition; (b) Parking Lot Condition; and (c) Shop Condition
(Source: Author's Analysis, 2020 updated 2024)

**Segment 2**

The length of this segment is about 588 meters, starting from the Universitas Sumatera Utara campus to the mosque (Figure 4). The circulation activity in this segment is almost the same as the activity in segment 1, which is always congested in the morning and evening hours, due to the graveyard in this area also being one of the problems in this segment.

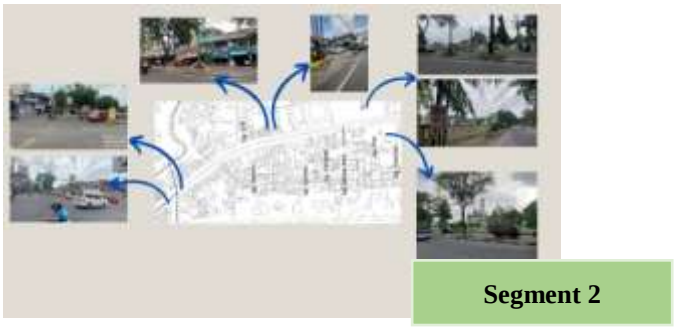


Figure 4. Segment 2 (USU Campus Intersection - Mosque)
(Source: Author's Analysis, 2020 updated 2024)

This area lacks street elements, such as curbs, shoulders, drainage channels, and pedestrian paths (Figure 5a). The road body is often used as a parking area, while the road shoulder is used informally by traders, disturbing the comfort and safety of pedestrians and vehicular traffic. Dedicated parking facilities are not available (Figure 5b). Vehicles are parallel parked on the road shoulder on both sides, which narrows the road space and adds to the irregularity.

Along the street are shops that serve the needs of the community in Padang Bulan, including the afternoon market and other daily businesses (Figure 5c). The shop buildings are designed as business premises and are positioned very close to the road, some even directly adjacent to the road body due to the absence of sidewalks.


Figure 5. (a) Pedestrian Path Condition; (b) Parking Lot Condition; and (c) Shop Condition
(Source: Author's Analysis, 2020 updated 2024)

**Segment 3**

The length of this segment is about 334 meters, starting from the mosque to the Pajus Market (Figure 6). Circulation activity in this segment is similar to that in segment 1, which is always congested in the morning and evening hours.


Figure 6. Segment 3 (Mosque - Pajus Market)
(Source: Author's Analysis, 2020 updated 2024)

Road segments in the Pajus Market area are not well organized, with untidy roadside curbs that cause inconvenience to road users (Figure 7a). Traffic congestion often occurs in the afternoon to evening, mainly due to activities at Pajus Market. The area does not have dedicated parking, so vehicles are parked parallel on the shoulder of the road, narrowing the road space and exacerbating congestion (Figure 7b). Shopping activities are centered at Pajus Market, which provides various needs of Universitas Sumatera Utara's students as well as culinary delights popular among young people (Figure 7c).


Figure 7. (a) Street Condition of Pajus Market; (b) Parking Lot Condition and (c) Shop Condition (Source: Author's Analysis, 2020 updated 2024)

**3. Discussion**

Based on the existing data and conditions in Segments 1 to 3, several potentials, as well as positive and negative points, can be identified along the Pattimura–Pajus corridor. The positive points and negative points are:

The positive points in this research area (+) are :

- Located in the city center and easily accessible
- There are many shops, ranging from photocopying/printing, stationery, as well as various daily necessities and other types of commerce, such as workshops
- There are gas stations, mosques, and banks in this area, so all needs can be accessed easily by road users
- The area is relatively shaded due to the presence of roadside trees and vegetation
- Pajus Market is one of the iconic places commonly visited to fulfill all the needs of students

While the negative points (-) are:

- There is no pedestrian on this road, so access for pedestrians is quite difficult
- The irregularity of public transportation stops on this road results in frequent traffic jams in this area
- There is no signage in this area, so this area is not a tourist destination in the city of Medan
- The lack of parking lots in this area results in the accumulation of vehicles in the Jamin Ginting area
- The Pajus Market is not organized, making it less convenient to visit

Table 1. The Problem, Potential, and Solution of Pattimura Area Pedestrian Pathway

| **Pedestrian Path** | | |
|---|---|---|
| Problem | Potential | Solution |
| There is no pedestrian path in this area | Become an attraction for road users if the pedestrian path is made safe and comfortable, so that it creates a high potential for tourism shopping | Improve the pedestrian path to be more neat and organized, and pay attention to drainage holes found at several points in the area |
| Addition of light illumination at night | Street users will feel safer and comfortable if they walk with sufficient lighting at night | The addition of lights around the pedestrian path so that it gets enough lighting and creates new photo spots in the area |

Table 2. The Problem, Potential, and Solution of Pattimura Area District

| **District (Area)** | | |
|---|---|---|
| Problem | Potential | Solution |
| Disorganized parking areas along the street | Parking lots that are not organized along the street can cause traffic congestion, reduce pedestrian space, and degrade the aesthetics of the area | Implement an organized parking system with clear markings, parking zones (e.g. parallel or angled parking depending on road width) |
| The Pattimura area is lacklustre at night because there is no special function in this area | Making this area sell food, goods and other services at night | Transforming the Pattimura area into a commercial function that is more lively at night, making this area a haji lane Street Singapore. |
| There is no special marker or atmosphere that attracts a public area | The existence of a special marker/ atmosphere when we enter a certain area will be the attraction of a place | To build a pedestrian bridge at the USU intersection, so that this area has a certain character |

Based on the analysis of the existing conditions in the Pattimura - Pajus Market Area in Table 1 and Table 2, the results of the priority arrangement of facilities and infrastructure, especially those related to pedestrian facilities, are obtained. The priority of arrangement starts from the arrangement of pedestrian paths in the corridor from Pattimura Intersection to Dr. Mansyur Street, accompanied by an increase in the quality of supporting facilities for pedestrian paths as a whole. In addition, this area also requires the arrangement of nighttime creative activities to support the social and economic activities of the community. The arrangement of motorcycle parking lots is important to reduce the use of road shoulders as parking areas. In addition, it is also planned to build a special lane for public transport along the Pattimura - Dr. Mansyur Intersection to improve accessibility and transportation efficiency. Efforts to create an area identity are also made through the construction of landmarks at the Pattimura - Dr. Mansyur Intersection point. The arrangement of green open spaces in the form of parks in the Iskandar Muda - Pattimura Intersection area is part of the strategy to improve environmental quality. Finally, a comprehensive arrangement of the Pajus Market area is needed to support the function of the area as a center of community activities, especially for students and small businesses. From an incremental planning perspective, the proposed interventions in the Pattimura – Pajus corridor are arranged in stages. Short-term actions focus on reclaiming basic pedestrian space by providing clear sidewalks, improving curbs and drainage, and organising on-street parking so that road shoulders are no longer used as informal stalls. Medium-term interventions introduce nighttime creative activities, organised motorcycle parking facilities, and a dedicated public transport lane, which together improve accessibility and social–economic vitality without requiring large-scale land acquisition. Long-term interventions include the development of landmarks at the Pattimura – Dr. Mansyur intersection, the upgrading of the Iskandar Muda – Pattimura park, and the comprehensive restructuring of Pajus Market as an integrated pedestrian–commercial hub. In this way, the physical design proposals operationalise smart growth principles and linkage theory step by step, allowing the area to adapt gradually while maintaining the everyday functions of the corridor.

The pattern of problems found in the Pattimura–Pajus corridor is consistent with previous studies on strip development under urban sprawl conditions (Shih, 2017; Wolf, 2009; Zahrah et al., 2016). Linear commercial growth along main corridors tends to produce fragmented visual images, uncontrolled access points, and congestion, similar to the traffic and parking problems identified in this study (Shih, 2017). Strip commercial areas also often lose their spatial quality when vegetation and public realm elements are neglected; in the Pattimura area, the remaining trees and green elements actually become important assets that can be strengthened in the proposed design (Wolf, 2009). Furthermore, the “grabbing” of public space in urban corridors reduces their liveability, which is clearly seen in the use of road shoulders and potential sidewalks by informal traders in the research area (Zahrah et al., 2016). Thus, the findings of this study validate and extend previous research by demonstrating how strip commercial problems appear in the specific context of Medan and how they can be addressed through a smart growth and linkage-based pedestrian arrangement model (Shih, 2017; Wolf, 2009; Zahrah et al., 2016).

Recent literature on walkability and pedestrian infrastructure provides relatively consistent benchmarks for urban commercial corridors. Street design guides and empirical studies suggest that a minimum clear sidewalk width of 2.0 m, and preferably 2.5–3.0 m in high-activity commercial streets, is required to safely accommodate two-way pedestrian flows (Mulyadi, 2022; Ulhaq, 2024; UN-Habitat, 2020, 2025). At the same time, sidewalks should have a flat, obstacle-free surface, kerb ramps and, where possible, tactile elements to ensure accessibility for elderly pedestrians and persons with disabilities (Baobeid, 2021; Stefanidis et al., 2024). Studies conducted in hot and humid climates further highlight that continuous shade from trees, canopies, or building arcades is a crucial determinant of thermal comfort and walking persistence, with street greenery and canopy cover directly influencing pedestrians’ willingness to walk (Baobeid, 2021; Kumalasari et al., 2023; Ni et al., 2025; Sang et al., 2025). Beyond microclimate, walkability frameworks also emphasise the role of supportive street furniture and pedestrian-scale lighting, clear physical separation from motorised traffic, and safe connections to public transport stops within a reasonable walking distance in shaping perceived safety and comfort (UN-Habitat, 2020; Stefanidis et al., 2024; Vo et al., 2024).

When compared against these ideal conditions, the Jalan Pattimura corridor shows significant deficiencies. There is no continuous sidewalk that meets minimum width standards; instead, pedestrians share narrow, uneven road shoulders with parked vehicles and informal stalls, often walking directly adjacent to moving traffic. Shading is discontinuous, pedestrian-oriented furniture and lighting are largely absent, and there is

almost no physical buffer separating walkers from vehicles. Although the corridor benefits from a rich land-use mix and frequent public transport services, the lack of safe and comfortable pedestrian infrastructure prevents these advantages from fully translating into a genuinely walkable commercial environment. These gaps reinforce the need for the incremental pedestrian arrangement model proposed in this study, which prioritises continuous sidewalks, better shading, clear functional zoning of street space, and safer integration with public transport along the corridor.

Table 3 Comparison between ideal and existing pedestrian conditions in the Pattimura Street commercial corridor

| Indicator | Ideal condition (based on recent literature) | Existing condition in Pattimura Street corridor |
|---|---|---|
| Sidewalk width | Recent street design guides for walking and cycling recommend a minimum clear sidewalk width of at least 2.0 m, with wider paths (2.5–3.0 m) for commercial streets and corridors with heavy pedestrian flows (Mulyadi, 2022; Ulhaq, 2024; UN-Habitat, 2020, 2025). | Along most parts of Jalan Pattimura there is no continuous, dedicated sidewalk. Pedestrians walk on narrow road shoulders or directly on the carriageway. The effective pedestrian space is often less than 0.5 m and frequently interrupted by open drains, poles, and shop fronts. |
| Surface quality and accessibility | Walkable sidewalks should provide a flat, obstacle-free surface with kerb ramps and where possible tactile paving, to support universal accessibility, particularly for children, elderly people, and persons with disabilities (Baobeid, 2021; Stefanidis et al., 2024). | Pedestrian paths are formed by irregular road shoulders and fragmented patches of concrete or asphalt. There are no kerb ramps or tactile elements, and level differences between the carriageway and building entrances are not resolved in an accessible way. |
| Shade and thermal comfort | In hot and humid climates, recent walkability and thermal comfort studies emphasise the importance of continuous shade from trees, canopies, or arcades to reduce heat stress and support walking (Baobeid, 2021; Kumalasari et al., 2023; Ni et al., 2025; Sang et al., 2025). | The corridor has some large roadside trees, particularly near the campus and market segments, but shading is discontinuous. Many sections remain exposed to direct solar radiation and there are no added shading structures specifically designed for pedestrians. |
| Street furniture and lighting | Sidewalks on commercial streets should include benches, rubbish bins, and pedestrian-scale lighting in a furniture zone that does not obstruct movement, contributing to perceived safety and comfort (UN-Habitat, 2020; Vo et al., 2024). | Formal street furniture is very limited. Lighting is oriented to the carriageway rather than to pedestrians, and benches or trash bins are almost absent. Temporary seating or stalls placed by shop owners often encroach on potential walking space. |
| Safety and separation from traffic | Healthy pedestrian environments provide a clear physical buffer between pedestrians and motorised traffic (e.g., kerbs, planting strips, parking bays, or bollards) and safe crossing facilities at intersections and mid-blocks (Stefanidis et al., 2024; UN-Habitat, 2025). | There is almost no physical separation between pedestrians and vehicles. Road shoulders are used for on-street parking and informal stalls, forcing pedestrians to walk very close to moving traffic. Formal crossings are poorly marked or absent. |
| Integration with public transport and land-use mix | Recent walkability frameworks underline the need for safe and direct pedestrian access to public transport stops within 400–500 m, combined with a diverse land-use mix that supports everyday needs within walking distance (Baobeid, 2021; Kumalasari et al., 2023; Vo et al., 2024). | Public transport (angkot and online motorcycle taxis) stops directly on the carriageway without dedicated bays or safe boarding areas. Although the land-use mix is rich (shops, campus, mosque, market), the absence of continuous sidewalks and safe access reduces the effective integration between walking and public transport. |

*3.1 Pedestrian Path Sp. Pattimura - Dr. Mansyur*

Sidewalks, crosswalks and street furniture are important elements of pedestrian infrastructure that contribute to the comfort, safety and ease of walking mobility in urban areas. An ideal sidewalk should be physically separated from the roadway, thus providing dedicated space for pedestrians to move safely and comfortably without being disturbed by motorized traffic. Meanwhile, pedestrian crossings are designed as special facilities that allow pedestrians to cross the road safely, usually equipped with road markings, traffic lights or other safety elements (Figure 8). The presence of these facilities is essential in creating a pedestrian-friendly urban environment and supporting the creation of a sustainable transportation system.

Figure 8. Model of Arrangement and Atmosphere of Iskandar Muda - Pattimura Intersection

(Source: Author's Analysis)

**Pedestrian Path Facilities**

A walkable environment in the context of urban design should have a high level of accessibility, meaning that pedestrians can use the available facilities easily without experiencing obstacles that can slow down their destination. One important aspect related to accessibility is the distance between facilities. The distance referred to refers to the proximity between facility elements needed by pedestrians, thus supporting efficient and convenient mobility (Figure 9). In this study, the facilities discussed are those specifically designated for pedestrians. In addition, hand-washing facilities are also an important part that needs to be provided in pedestrian areas to maintain health and hygiene standards in public spaces, in order to support government programs in preventing the spread of COVID-19.

Figure 9. Model of Pedestrian Arrangement and Atmosphere on Jl. Pattimura
(Source: Author's Analysis)

**Nighttime Creative Activities**

The culinary business is one of the business sectors that continues to grow and is predicted not to experience a decline, considering the need for food consumption is an important basic need for individuals. Food consumption can become more complex when it is related to the cultural identity of a particular community. One interesting example is angkringan, a simple eatery that has its own charm. The warm atmosphere offered by angkringan creates an experience that makes visitors feel like coming back, thus forming a public space full of social interaction. The simplicity of the angkringan concept makes it a creative public space that allows city residents to interact in a family atmosphere created through the relationship between merchants and customers (Figure 10). To increase the attractiveness of this area as a nightlife destination, it is planned to add creative activity points that can support the existence of angkringan as one of the important elements in the social life of the city.

Figure 10. Model of Arrangement and Atmosphere of Night Culinary Creative Activities in Pattimura Area
(Source: Author's Analysis)

**Motorcycle Parking Lots**

Along with the planned development of nighttime creative activities on Jamin Ginting Street, especially in Segment 3, problems arise related to the lack of adequate parking facilities in this area. The lack of parking lots causes a buildup of two-wheeled vehicles, which has an impact on the inconvenience and disruption to the smooth traffic flow. Therefore, one of the proposed solutions is the construction of a new motorcycle parking facility that can accommodate visitor vehicles and support the smooth running of other activities in Segment 3 (Figure 11). This improved parking facility is expected to reduce congestion and increase convenience for visitors who come to enjoy the nighttime creative activities.

Figure 11. Model of Motorcycle Parking Lot Arrangement and Atmosphere in Pattimura Area
(Source: Author's Analysis)

*3.2 Public Transport Special Route on Sp. Pattimura - Dr. Mansyur*

The congestion that often occurs at the Pattimura-Dr. Mansyur intersection is caused by public transportation that stops carelessly on the edge of the pedestrian or road, as well as the absence of a special lane for public transportation. To overcome these problems, it is necessary to build a special lane designated for public transportation. This lane will consist of one or more traffic lanes dedicated to improving the smoothness of public transport and maximizing passenger movement in one lane (Figure 12). The main objective of developing these lanes is to attract private vehicle users to switch to public transport, thereby reducing traffic congestion. The proposed lane for this area is a dedicated lane that is separated from pedestrians by using a physical separator in the form of concrete, which aims to minimize the interaction between public transport and private vehicles. Thus, it is expected to reduce circulation conflicts and improve the efficiency of movement in the area.

Figure 12. Model of special arrangement of Pattimura-Dr.Mansyur public transport route
(Source: Author's Analysis)

*3.3 Landmarks on Sp. Pattimura - Dr. Mansyur*

In the study of physical elements of the city, landmarks cannot be understood solely as stand-alone objects, but must be seen in relation to the context of the development of the surrounding environment. The form, meaning and placement of landmarks are an integral part of a holistic urban design process. A landmark that is designed by considering its spatial and social relationship with its environment not only functions as a visual marker, but can also act as an element that strengthens the identity of the area and becomes a destination attraction for the community and visitors (Figure 13).

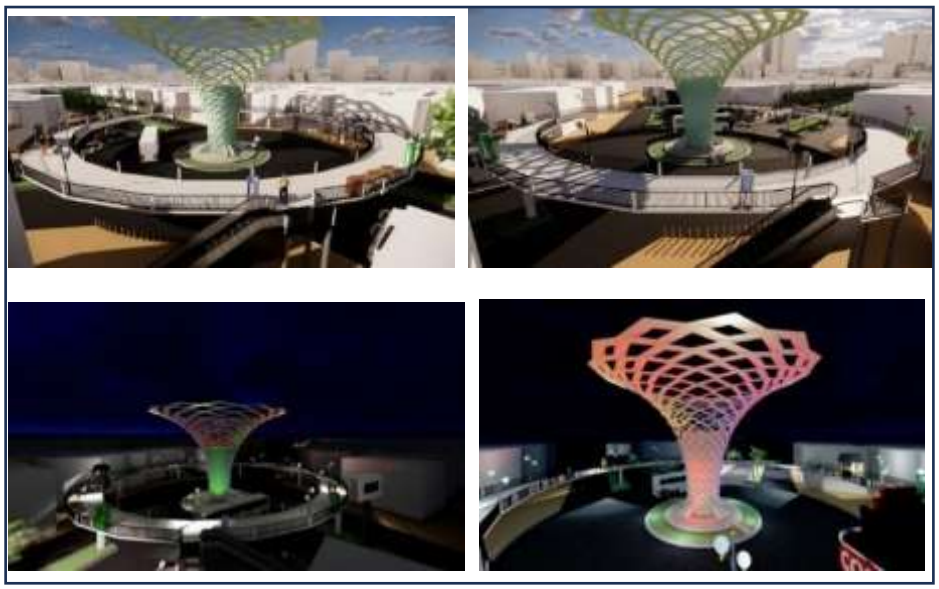

Figure 13. Model of Landmark Arrangement Pattimura - Dr.Mansyur (Day and Night)
(Source: Author's Analysis)

*3.4 Park on Sp. Iskandar Muda - Pattimura*

The public space has an important role in supporting various aspects of community life, including the economic, social, health, and environmental fields. The success of a public space is generally characterized by the high level of visitation and community participation in utilizing it. In urban areas, the need for space to interact is a special attraction that strengthens the function of public space as a place to meet and do activities together. City parks are one form of public space that functions as a means of recreational, educational, and other activities on an urban scale. Therefore, it is important to organize the park in the Iskandar Muda - Pattimura Intersection area. This arrangement includes updating the elements of the park as well as adding facilities such as a reading park that serves as an additional attraction and supports the creation of an inclusive and educative public space for the community (Figure 14).

Figure 14. Model arrangement of Sp. Iskandar Muda - Pattimura Park (Day and Night)

(Source: Author's Analysis)

*3.5 Pajus Market*

Pajus Market is one of the trading centers that provides various needs for students of the Universitas Sumatera Utara (USU) as the main users in the area. However, the current condition of the market is fairly poorly maintained, thus reducing its comfort and functionality as a public space. Therefore, it is necessary to reorganize Pajus Market to support the economic recovery of the community, including the arrangement of pedestrian paths (Figure 15), the arrangement of the Pajus Market atmosphere (Figure 16) and also the arrangement of Pajus Market parking (Figure 17). This arrangement aims to optimize the function of the

market as a means of people's trade that is safe, comfortable, clean, organized, and has better aesthetic value, to avoid the impression of slums and can become a more representative space for local economic activities.

Figure 15. Model of Pedestrian Arrangement of Pajus Market
(Source: Author's Analysis)

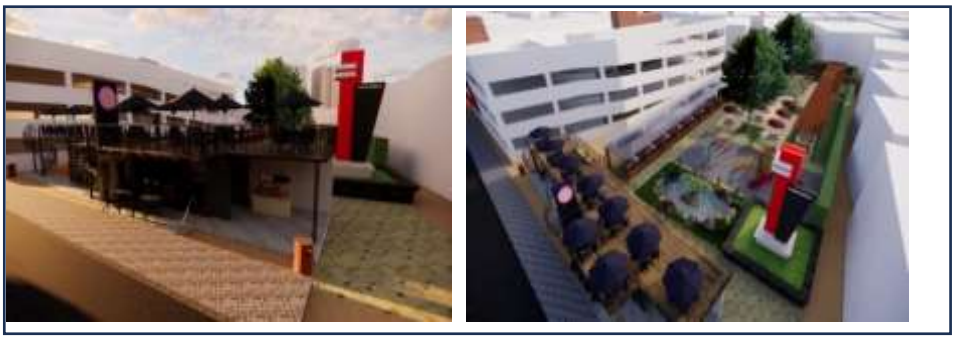

Figure 16. Model of Arrangement and Atmosphere of Pajus Market
(Source: Author's Analysis)

Figure 17. Model of Parking Building Arrangement Pajus, Alternative Parking Ex-Pedestrian Pattimura
(Source: Author's Analysis)

**4. Conclusion**

Based on the results of the pedestrian arrangement model design in the commercial area corridor of Pattimura Street, Medan City, this study confirms that the area requires a comprehensive and integrated approach to planning and design, especially in the provision of public and social facilities that support community activities. The quality of pedestrian facilities and infrastructure in the Pattimura–Pajus section is still very low. The absence of proper sidewalks and the lack of supporting elements such as seating, vegetation, accessible paths for disabled users, and basic sanitation facilities indicate that this corridor is still not pedestrian-friendly and tends to neglect the function of public space, even though the area has strong potential as a centre of trade and service activities that can significantly boost local economic growth. The research also reveals that the sporadic construction of shophouses by the community has caused the loss of visual unity in the corridor and weakened the potential for place attachment, leading to a decrease in the overall vitality of the area. To address this, a decomposition strategy of the street space structure is required, particularly for pedestrian elements, to recreate a productive and humane corridor. The proposed arrangement applies a smart growth-based design approach that is integrated with values of local wisdom and community development principles. Interventions such as continuous sidewalks, nighttime creative activities, organised motorcycle parking, dedicated public transport lanes, landmarks, urban parks, and the restructuring of Pajus Market are designed as a linked system that strengthens visual, structural, and

collective connections in the corridor. From a theoretical point of view, this study contributes by integrating smart growth, visual–structural–collective linkage theory, and the concept of genius loci into a corridor-based pedestrian planning model in an urban sprawl strip development context. Practically, the findings provide the Medan City Government and related stakeholders with phased design guidelines that can be adapted to similar commercial corridors in other Indonesian cities, offering a realistic reference for revitalising strip development areas while maintaining the livelihoods of informal traders and enhancing the quality of public spaces for everyday users.

This research has several limitations. First, it focuses on a single corridor case study, so the generalisation of the model to different urban contexts should be made with caution. Second, although some quantitative measurements (such as sidewalk width and traffic density) were conducted, more detailed simulations of pedestrian and traffic flows were not included. Third, stakeholder participation in the design process was limited to exploratory discussions and has not yet reached a co-design stage. Future research can therefore (i) test the proposed model in other commercial corridors with different socio-spatial characteristics, (ii) integrate microsimulation tools to evaluate the performance of pedestrian and traffic arrangements, and (iii) develop participatory design methods that involve communities, local businesses, and government agencies more intensively in the incremental implementation of smart growth principles.

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## 6. Conflict of Interest

The authors declare that there is no conflict of interest regarding the research, authorship, and publication of this article. The proposed area arrangement model is prepared independently for academic purposes and is not influenced by specific commercial or institutional interests. Nevertheless, the implementation of the model in the field may face challenges such as informal control over public spaces, relatively high maintenance costs, and the risk of the area becoming exclusive. These issues need to be carefully managed so that the realised corridor remains inclusive and accessible to all community groups.

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