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Circulation Patterns and Zoning of The Gudang Lelang Fish Auction Place, Bandar Lampung

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ABSTRACT

This study explores the role of Teluk Betung, a key sub-district in Bandar Lampung, as a commercial center and its impact on the local economy, with a focus on Pasar Gudang Lelang. Known for its thriving trade and strategic location near Pelabuhan Panjang, Teluk Betung offers a wide range of commodities, significantly contributing to the city's economic growth. Among its markets, Pasar Gudang Lelang is crucial for fish trade, using a tiered auction system that supports fair pricing and direct transactions between fishermen and traders. Its evolution from a dedicated fish market into a broader community hub reflects its importance for local commerce and daily life in Bandar Lampung. The research employed a descriptive qualitative method to analyze the spatial organization, circulation patterns, and user behavior at Pasar Gudang Lelang. Data collection included direct observation, interviews, and literature review, providing insights into the market's layout and functionality. Findings reveal that while the market's linear circulation pattern facilitates navigation, there are issues such as congestion, inefficient zoning, and inadequate parking that hinder smooth movement and visitor comfort. Additionally, the integration of wet and dry zones needs improvement to maintain hygiene and better align with user needs. The study underscores the importance of thoughtful market design, including clear zoning, effective circulation paths, and improved wayfinding to enhance the market's functionality. These adjustments are crucial for preserving Pasar Gudang Lelang's role as a central trade hub while adapting to modern demands, ensuring its sustainability and continued relevance in Bandar Lampung's economic landscape.

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1. INTRODUCTION

Teluk Betung is a prominent sub-district in Bandar Lampung, known for its bustling commercial activities and dynamic marketplace. This area is a vital economic hub that offers a wide range of commodities, including food, clothing, and other everyday necessities. The economic potential of Teluk Betung is significant, contributing greatly to the growth and vibrancy of Bandar Lampung's economy. Within this commercial landscape, the sub-district is home to three key traditional markets (Ilmi et al., 2021) that play a pivotal role in sustaining the local economy. Among these markets, *Pasar Gudang Lelang* stands out as the biggest hub for the trade of fish (Wiraditama & Studi, Muliawati Handayani, 2024) positioning itself as a vital component of the city's supply chain.

Pasar Gudang Lelang, which translates to "Warehouse Auction Market," serves as a dedicated Fish Auction Place. Locally known as Gudang Lelang, this market is crucial for fishermen to conduct transactions with buyers through a tiered auction system (Sinaga et al., 2020). This system allows fishermen to auction their fresh catches of fish directly to traders, ensuring a fair pricing mechanism through competitive bids (Fania et al., n.d.). Its strategic location near *Pelabuhan Panjang*, a busy port since the Dutch colonial period, has historically contributed to its status as a thriving trade center. Pelabuhan Panjang, active since 1839, has long served as a docking point for ships from various regions (Lisa et al., 2022), such as Bugis, Aceh, Java, and Palembang. These boats brought their goods to Bandar Lampung, fostering a culture of vibrant trade and commerce that continues to this day.

In terms of its geographical positioning, *Pasar Gudang Lelang* is located on Jl. Ikan Bawal, within Kangkung Subdistrict, Bumi Waras District in Bandar Lampung City (Simbolon & Kesuma, 2022). Initially, the market was solely dedicated to the sale of fish. However, over time, it has evolved to include a diverse range of functions, such as residential areas for fishermen, fish landing facilities, roads, a health center, a local government office, and a thriving community market. The majority of the people of *Pasar Gudang Lelang* work as fishermen and traders (Siyadah et al., 2024). The market has become a go-to destination for Bandar Lampung residents seeking fresh fish. It is especially popular because of its proximity to the coast, allowing fishermen to deliver their catches directly, ensuring that the seafood sold here remains fresh and of high quality.

Pasar Gudang Lelang is a critical supplier for other markets in Bandar Lampung, such as Pasar Kangkung, Pasar Tugu, and Pasar Cimeng. The fishing activities typically start at night, with fishermen venturing out to the sea and returning in the morning with their catch. The market's peak hours begin around 1:00 PM, when the bustling atmosphere starts to build up, reaching its highest density towards the late afternoon. This timing aligns with the end of the workday for many buyers, creating a lively rush in the market. Auction market is conducted at one time, one place and one price (Kurniati et al., 2021). Fish auctions take place between 4:00 PM and 5:00 PM, making this window one of the most crucial periods for traders and buyers alike.

Due to its historical and economic significance, *Pasar Gudang Lelang* plays a key role in the local identity of Bandar Lampung. Therefore, efforts to preserve and maintain this market are vital to ensuring its sustainability. Proper management and thoughtful urban planning are essential to balance the preservation of its rich history with the demands of modern commerce.

The market's location directly along the coastline is intentional, facilitating easy access for fishermen to bring in various types of marine catches, such as fish, shrimp, squid, and other seafood. This direct access has made *Pasar Gudang Lelang* a preferred destination for consumers in search of fresh seafood, appealing to both locals and visitors from outside the Teluk Betung area. Its reputation as a center for fresh, high-quality seafood has made the

market increasingly popular, contributing to its high traffic levels, especially during the afternoon peak hours. The market's popularity, however, comes with challenges such as congestion, overcrowding in specific areas, and parking space shortages. These issues often diminish user comfort and can lead to a decline in the overall market quality.

The densely populated residential areas surrounding *Pasar Gudang Lelang* add to the market's challenges, creating a perception of overcrowding and reducing the area's aesthetic appeal. One of the core issues lies in the lack of integration between the market's interior design and circulation routes, leading to inefficient movement within the space. Traditional markets like *Pasar Gudang Lelang* are often characterized by disorganized circulation patterns and suboptimal cleanliness management, which can negatively impact the healthiness of the environment for both vendors and shoppers (Sugari et al., 2020). Improving these aspects is critical for enhancing the market's user experience and ensuring its long-term viability as a center for trade.

The importance of *Pasar Gudang Lelang* to the community of Bandar Lampung is one of the primary reasons it has been selected as the subject of this study. Understanding the spatial organization of the market, including circulation patterns and spatial layout, is key to identifying how the market functions on a daily basis. Effective circulation and layout not only influence the flow of goods and services but also shape the behavior and interaction patterns of the market's users—both visitors and sellers. As a public space, a market needs to accommodate diverse user needs at different times, making the proper zoning of market facilities crucial to achieving smooth and efficient circulation (Kiasati & Handajani, 2018).

By focusing on these criteria, *Pasar Gudang Lelang* can continue to serve as an essential market for Bandar Lampung, preserving its cultural heritage while adapting to the needs of a growing urban economy. User behavior within the market can be influenced by two main design elements: zoning and accessibility (Antara et al., 2015).

2. LITERATURE REVIEW

The criteria for a good traditional markets related to circulation patterns and zoning are also important. The criterias for circulation include; (a) circulation arrangements that make it easier for visitors to move freely, (b) all facilities must be accessible and usable by everyone, including people with disabilities and the elderly, (c) access for vehicles for loading and unloading goods must be in a location that does not cause congestion, (d) entrances and circulation must be provided to ensure the accessibility of all facilities in the market, both trading spaces and public facilities, including to overcome the dangers of fire and disasters, (e) each stall has a hallway that is at least 1.5 meters wide, (f) the circulation path uses a double loaded system, (g) pathways within the market should be wide enough to accommodate at least two people side by side, with the path width being no less than 30% of the width of adjacent stalls and other objects, (h) circulation paths must be designed hierarchically, and (i) circulation nodes must be provided for long circulation (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021; Menteri Kesehatan Republik Indonesia, 2020).

The criterias for zoning include; (a) separate the commodities into categories such as wet food, dry food, ready-to-eat, and non-food, (b) ensure the route is easily accessible to all consumers and does not cause congestion in any specific location, (c) display a sign with zoning information, and (d) commodities should be strategically zoned to ensure ease of access to all market stalls. For example, placing core commodity zones in less visible areas can act as a magnet, drawing visitors deeper into the market and thereby supporting the viability of other products (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021).

The criterias for parking include; (a) clear separation between the parking area and the trading area, (b) separately based on vehicle type, (c) clear entry and exit signs, (d) available closed rubbish bins every 10 meters separated between dry and wet waste, (e) there are vegetation, (f) vehicles transporting live animals may not enter the market parking area and have their own parking area, (g) no puddles and (h) the size of the parking area must be able to accommodate visitor vehicles according to the character of market visitors (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021; Menteri Kesehatan Republik Indonesia, 2020).

3. METHODS

This research used a descriptive qualitative method to focus on the characteristics and conditions of the market. Primary data was gathered through direct observation and interviews with traders and visitors. Observations helped understand daily activities and how space is used in the market, while interviews provided insights into the experiences and challenges faced by both sellers and buyers. The study also involved measuring the size of the market and mapping out key areas like stalls and pathways to see how the layout affects movement and accessibility.

The descriptive method helped describe the real conditions (Zellatifanny & Mudjiyanto, 2018) of the market, identifying problems such as crowded areas and potential solutions. To add more context, secondary data was collected by reviewing literature about circulation patterns and zoning in markets like Gudang Lelang Market. This helped compare the market's design and management to other similar markets and provided a basis for improving its layout.

By combining primary and secondary data, the study offered a complete view of Gudang Lelang Market, capturing both its physical structure and how people interact within the space.

4. RESULTS AND DISCUSSION

4.1 Circulation Patterns

A circulation pattern is a connection between spaces in one or a row of buildings that are specifically designed so that circulation in space can be used optimally (Kusuma, 2020). Circulation patterns are divided into five types: linear, radial, spiral, grid, and network (Francis D. K. Ching, 2007). The Gudang Lelang Market uses a linear circulation pattern, which makes it easy to navigate and is statistically efficient (see Figure 1). This pattern is chosen due to the small and not extensive nature of the market. Accessibility to all commodities in the market is good, as they are located along the circulation route for easy access by visitors.

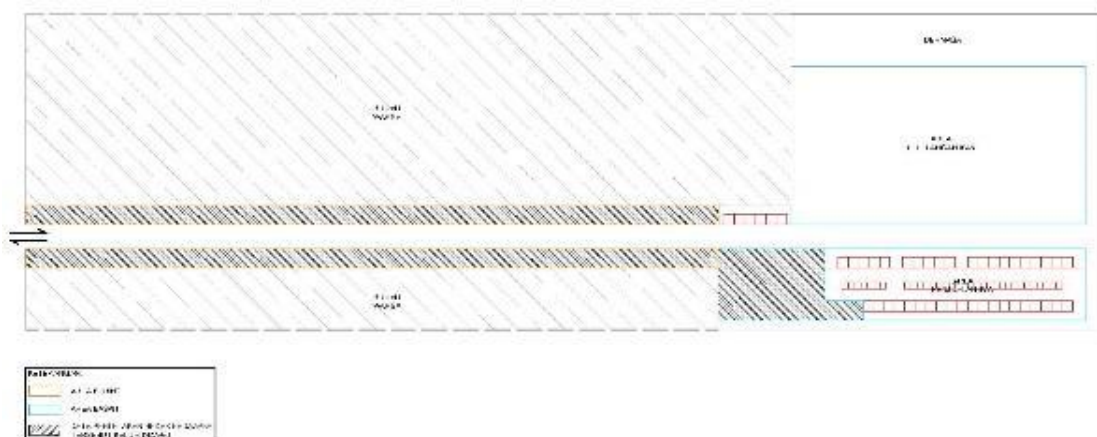


Figure 1. Gudang Lelang Market
(Source: Author, 2024)

Based on measurement in the location, the following data of circulation with is obtained; (a) dry area: 2 m, (b) wet area (outside fish sales area): 2,3 m and (c) fish sales area: 1,2 m. The positioning of the sales tables in the fish sales area is irregular and causes congestion in certain parts, making it difficult for visitors to move around. Loading and unloading of goods should be done in a way that does not cause congestion. Currently, goods are being loaded and unloaded in a manner that disrupts visitor circulation. There is a lack of clear signage at the Gudang Lelang Market, leading to confusion among visitors. This contributes to congestion, particularly at the market entrance. Wayfinding functions as a guide to unknown spaces (Wicaksono et al., 2020). The width of the aisles in the fish sales areas is only 1,2 m, which is does not meet the standard requirement of 1.5m (see Figure 2), making it difficult for two people to move around freely.

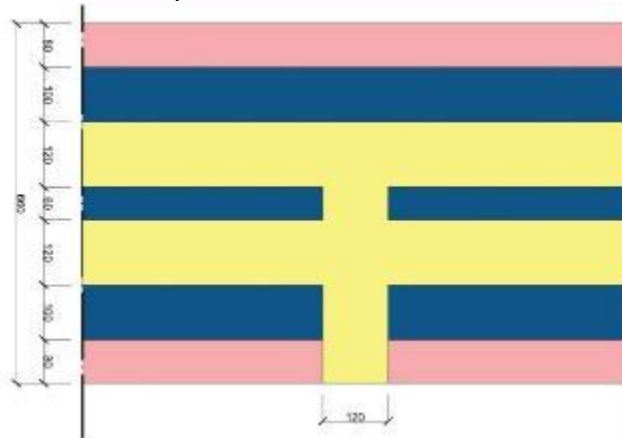


Figure 2. Circulation Measurements of Fish Sales Area
(Source: Author, 2024)

The circulation intended for pedestrians is also being used by vehicles and for transporting goods (see Figure 3). Vehicle circulation should have separate access from pedestrian areas. In existing conditions, there are no clear signs to separate parking areas and pedestrian routes. Sales's motorcycle are often parked in pedestrian areas, leading to congestion in certain areas (see Figure 4). This is not in compliance with accessibility regulations, as vehicles for loading and unloading goods should be placed in locations that do not cause congestion. However, in practice, goods are being loaded and unloaded anywhere, disrupting the circulation area for visitors. These interventions by traders are a result of the personalization of public spaces. The traders are making these interventions to expand the market and utilize space (Antara et al., 2015).



Figure 3. Motorcycle Enter The Wet Area
(Source: Author, 2024)



Figure 4 Motorcycles Park Inside The Market
(Source: Author, 2024)

Table 1. Comparison of Circulation Criteria and Existing Condition

Circulation Criteria (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021; Menteri Kesehatan Republik Indonesia, 2020)	Existing Circulation Condition
1. Circulation arrangements that make it easier for visitors to move freely.	1. The mixed circulation of motorized vehicles, pedestrians and services means movement is not free
2. All facilities must be accessible and usable by everyone, including people with disabilities and the elderly.	2. Does not apply universal design 3. Goods are being loaded and unloaded anywhere
3. Access for vehicles for loading and unloading goods must be in a location that does not cause congestion.	4. Circulation can reach all market areas, but there are no evacuation routes
4. Entrances and circulation must be provided to ensure the accessibility of all facilities in the market, both trading spaces and public facilities, including to overcome the dangers of fire and disasters.	5. The width of the hallway is only 1.2 meters, making it difficult for two people to move around freely.
5. Each stall has a hallway that is at least 1.5 meters wide.	6. Double loaded circulation system
6. The circulation path uses a double loaded system	7. There is no circulation nodes for pedestrian from mainway
7. Pathways within the market should be wide enough to accommodate at least two people side by side, with the path width being no less than 30% of the width of adjacent stalls and other objects.	
8. Circulation paths must be designed hierarchically	
9. Circulation nodes must be provided for long circulation	

(Source: Author, 2024)

4.2 Zoning

Zoning in markets involves organizing similar commodities in specific areas to make it easier for visitors to find what they need (Pradhipta et al., 2020). In Gudang Lelang Market, zoning is divided into wet areas and dry areas (see Figure 5). The wet area is for commodities that need water and require a hygienic place, such as meat, fish, fruit, and vegetable, while the dry zone is for grocery, household appliance, and clothing needs (Kusuma, 2020). However, the implementation of zoning in this market is not entirely effective, as there are still several stalls that do not comply with the zoning. There are stalls selling fish in the dry area and one groceries stall in the wet area, which does not meet the criteria for zoning. A Mixed zone between the dry area and the wet area can cause the market to become dirty (Amanda Akbar et al., 2022). On the other hand, in terms of the accessibility and affordability of all commodities in the market, the zoning is quite good. The core commodities are located at the

back of the market, requiring visitors to pass through other stalls first, which allows them to explore other commodities in the market.

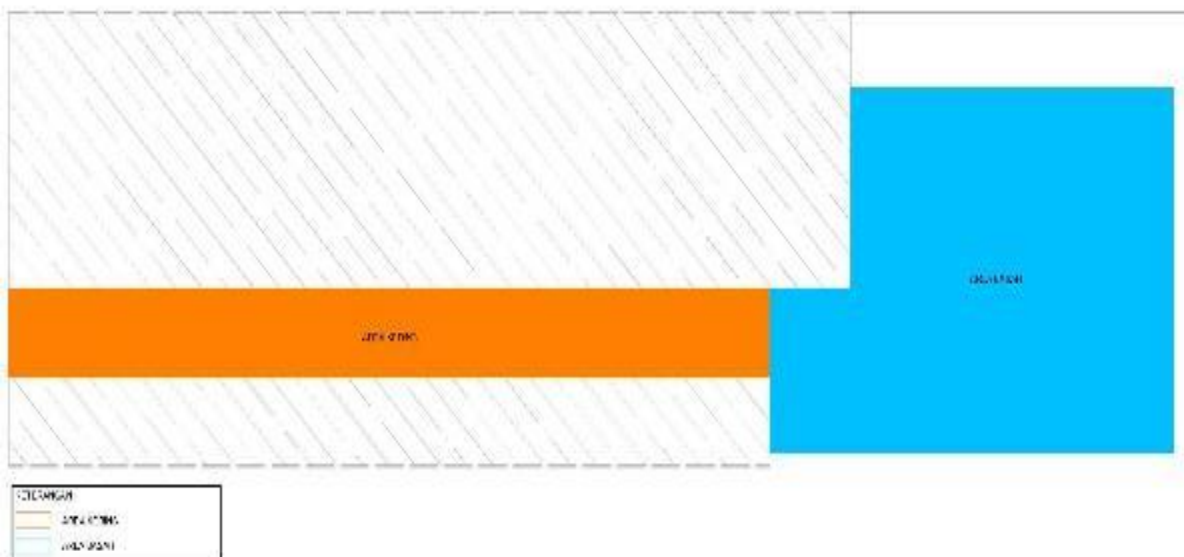


Figure 5. Zoning of Gudang Lelang Market
(Source: Author, 2024)

Table 2. Comparison of Zoning Criteria and Existing Condition

Zoning Criteria (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021)	Existing Zoning Condition
1. Separate the commodities into categories such as wet food, dry food, ready-to-eat, and non-food.	1. There is still a mixing of wet and dry areas
2. Ensure the route is easily accessible to all consumers and does not cause congestion in any specific location	2. There is congestion at the entrance of the wet area
3. Display a sign with zoning information.	3. No sign of zoning information
4. Commodities should be strategically zoned to ensure ease of access to all market stalls. For example, placing core commodity zones in less visible areas can act as a magnet, drawing visitors deeper into the market and thereby supporting the viability of other products.	4. The core commodities are located at the back of the market, requiring visitors to pass through other stalls first, which allows them to explore other commodities in the market.

(Source: Author, 2024)

4.3 Parking

At the Gudang Lelang Market, parking is allowed along the road leading to the market entrance, which often causes traffic jams (see Figure 6). Additionally, parking issues arise when the current capacity cannot meet the demand (Pradhipta et al., 2020). The parking capacity at the Gudang Lelang Market is insufficient for visitors, causing congestion on Jalan Ikan Bawal. Two-wheeled vehicles have parking near the market, while four-wheeled vehicles have to park farther away. Security is considered adequate, with parking attendants present in every parking area. However, there is a restriction on parking for four-wheeled vehicles near the market from 14:00-18:00, and the area is reserved only for two-wheeled vehicles from 12:00-18:00. This decision is based on the parking attendants' preference and the potential for higher profits from two-wheeled vehicles. Comparison of parking criteria and existing condition at Gudang Lelang Market can be seen in Table 3.



Figure 6. Parking Area along The Entrance
(Source: Author, 2024)

Table 3. Comparison of Parking Criteria and Existing Condition

Parking Criteria (Agus S. Ekomadyo, 2012; Badan Standarisasi Nasional, 2021; Menteri Kesehatan Republik Indonesia, 2020)	Existing Parking Condition
1. Clear separation between the parking area and the trading area.	1. No separation between the parking area and the trading area
2. Separately based on vehicle type.	2. Separated at certain hours
3. Clear entry and exit signs	3. Same entry and exit route, no signs.
4. Available closed rubbish bins every 10 meters separated between dry and wet waste	4. Open rubbish bins
5. There are vegetation/softscape	5. No vegetation/softscape
6. Vehicles transporting live animals may not enter the market parking area and have their own parking area.	6. Puddles when rain
7. No puddles	7. The parking area is not enough to accommodate vehicles.
8. The size of the parking area must be able to accommodate visitor vehicles according to the character of market visitors.	

(Source: Author, 2024)

5. CONCLUSIONS

After conducting the research, it was determined that several aspects of the circulation pattern and zoning of the Gudang Lelang Market do not meet established standards. In terms of circulation patterns, there is a lack of clear organization, leading to vehicle congestion and trader interference in circulation areas. Additionally, there is a need for improved wayfinding in circulation areas. Zoning is not effectively arranged, resulting in unclear boundaries between wet and dry areas, as well as a lack of separation between different types of food routes. Furthermore, the current parking area fails to adequately accommodate parking needs, causing congestion when entering and exiting the area. We hope this study will serve as a valuable resource for the planning and redesigning of the circulation, zoning and parking areas of the Gudang Lelang Market.

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