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Determination of Logistics Service Storage Warehouse Location within the City Spatial Planning System (Case Study in Bekasi City)

Sigit Budiyanto[1*], Irwan Prasetyo[1], Zefri[1]
[1]Program Magister Teknik Kajian Pembangunan Perkotaan dan Wilayah Fakultas Teknik, Universitas Krisnadwipayana
*Corresponding author e-mail: sigit.budiyanto07@gmail.com

ABSTRACT

This research highlights the importance of strategically determining logistics service warehouse locations within the urban spatial planning system. This research aims to identify the characteristics of existing logistics services, assess the location determination of logistics service storage warehouses, and create opportunities for logistics service providers seeking to establish a presence in the area. The study applies location theory for site selection, the nearest neighbour ratio analysis, and the analytical hierarchy process to determine criteria and select alternative locations for logistics service storage warehouses. The results of the analysis in identifying characteristics—such as location, company operations, company management, and settlement patterns—indicate that these factors influence the distribution pattern of logistics services. The dominant criterion is the market, with a score of 0.542, as any business activity must consider its target market. In the case study sample, Jatiraden (scoring 0.618) is identified as the most potential location, meeting criteria related to market, cost, human resources, infrastructure, and institutional factors. The conclusion drawn is that using three-wheeled vehicles for logistics service distribution is an alternative for distributing to uniformly shaped residential areas. These vehicles can carry more load and have better mobility due to the typically wider accessibility in uniform settlement patterns. By ensuring logistics warehouses are strategically located, both logistics service providers and urban planners can reduce traffic congestion, optimize resource management, and streamline the distribution process.

Keywords: Location Theory, Storage Warehouse, City Spatial System, NNR, AHP.

ABSTRAK

Penelitian ini menyoroti pentingnya penentuan lokasi gudang layanan logistik secara strategis dalam sistem tata ruang kota. Penelitian ini bertujuan mengidentifikasi karakteristik jasa logistik eksisting, mengkaji penentuan lokasi gudang penyimpanan jasa logistik eksisting dan menjadi sebuah peluang bagi pelaku jasa logistik yang ingin berlokasi di wilayah tersebut. Penelitian ini menggunakan teori lokasi untuk penentuan lokasi, analisis nearest neighbour ratio dan analytical hierarchi process dalam menentukan kriteria serta alternatif lokasi terpilih gudang penyimpanan jasa logistik. Hasil analisis dalam identifikasi karakteristik yaitu lokasi, operasional perusahaan, manajemen perusahaan, pola pemukiman mempengaruhi pola distribusi jasa logistik. Kemudian kriteria yang lebih dominan yaitu pasar (market) dengan nilai yang didapat (0,542) karena dalam melakukan kegiatan usaha apapun, harus melihat siapa market dari kegiatan usaha yang dijalankan. Pada lokasi kasus studi sebagai sampel yaitu Jatiraden (0,618) yang paling berpotensi sesuai kriteria terkait pasar, cost, sumberdaya manusia, infrastruktur dan kelembagaan. Kesimpulan yang didapat untuk hal operasional menggunakan kendaraan roda tiga dalam distribusi jasa logistik menjadi alternatif dalam mendistribusikan wilayah pemukiman yang berbentuk seragam (uniform). Muatan lebih banyak dan mobilitas lebih mudah karena aksesibilitas kendaraan dalam pola pemukiman seragam (uniform) cenderung lebar. Dengan memastikan gudang logistik berlokasi strategis, baik penyedia layanan logistik maupun perencana kota dapat mengurangi kemacetan lalu lintas, mengoptimalkan pengelolaan sumber daya, dan menyederhanakan proses distribusi.

Kata kunci: Teori Lokasi, Gudang Penyimpanan, Sistem Tata Ruang Kota, NNR, AHP.

1. INTRODUCTION

Technological advancements increase every year, bringing changes to planning processes. In today's digital era, human needs can be met solely through smartphones. These needs include clothing, food, shelter, and medicine. Logistics activities are essential in fulfilling these needs, as logistics can be defined as a crucial process in supply chain management, involving various activities to optimize the flow of goods and information. The primary goals are to achieve operational efficiency, enhance customer service, reduce costs, and manage inventory control.

To meet these needs, it is necessary to have a location or hub where goods or information provided by logistics services can be gathered. Logistics services also require storage warehouse locations that are close to residential areas to efficiently distribute and ensure effective and efficient delivery to these locations (Triatmaja, 2016). When planning the determination of logistics service storage warehouse locations, it is essential to consider economic, social, and environmental aspects (Sugandhy, 1999) so that urban planning in an area can be more organized into specific zones. Spatially, the determination of logistics service warehouse locations must also refer to Regional Regulation No. 13 of 2011 on the Spatial Planning of Bekasi City for the Years 2011-2031, ensuring that government policies and company regulations are aligned to produce good spatial planning outcomes in accordance with Law No. 26 of 2007 on Spatial Planning.

Given the annual increase in parcel volumes and the growing number of logistics service companies, there was a disorganization of warehouse storage locations in the Jatisampurna Subdistrict, Bekasi City, from 2017 to 2021. The increase in logistics service companies also means an increase in vehicle volumes on certain roads, leading to traffic congestion, road narrowing due to illegal parking, and the inability of heavy vehicles to access storage warehouses, which in turn causes traffic jams or road damage. Therefore, the purpose of this research is to examine the existing logistics service warehouse locations, considering that location significantly impacts the medium- or long-term costs incurred by logistics service companies. On the other hand, it also allows for an understanding of the urban spatial structure and patterns.

The analytical methods used include qualitative descriptive analysis to assess the characteristics of logistics service storage warehouses, which include spatial location analysis, company operations, company management, residential patterns in the city, residential patterns in the nearest neighbour ratio (NNR), and the existing logistics service

distribution patterns. Quantitative methods are also employed to analyze location criteria and determine logistics service warehouse locations using the Analytical Hierarchy Process (AHP) method (Firsan, 2017). The results of this study are expected to serve as a reference for logistics services in determining warehouse locations within a more organized urban spatial planning system. Additionally, the study is aimed at supporting government policies and regulations related to logistics service storage warehouses, creating a balance that allows companies to contribute to regional development through economic activities.

Logistics is a key component in ensuring the availability of essential goods, such as food, clothing, shelter, and medicine, by managing the flow of goods from suppliers to consumers. Efficient logistics is critical in urban areas, where the distribution of goods plays a vital role in meeting the increasing demands of a growing population. The location of logistics warehouses is crucial for minimizing operational costs and improving delivery times, directly affecting the efficiency of the entire logistics operation.

This research aims to explore the best strategies for determining logistics warehouse locations in Bekasi City, using tools such as Nearest Neighbor Ratio (NNR) analysis and the Analytical Hierarchy Process (AHP). By identifying the key criteria affecting warehouse locations—market proximity, infrastructure, costs, and institutional policies—this study contributes to the logistics industry's strategic planning and informs urban planners about integrating logistics facilities into city layouts for sustainable development.

2. METHODOLOGY

2.1. Research Location

This research was conducted by sampling in the urban area, specifically in Jatisampurna Subdistrict, Bekasi City. The analysis method employed is qualitative descriptive to analyze the characteristics of logistics service storage warehouses, aiming to understand their location (spatial analysis), operations, company management, urban settlement patterns, nearest neighbor patterns, and existing logistics service distribution patterns (Sugiyono, 2018). A quantitative method is used to analyze the criteria for location determination and to assess logistics service storage warehouse locations within the city spatial planning system (Pontoh, Nia, & Kustiwan, 2009; Sugiyono, 2019).

2.2. Research Object

Geographically, Jatisampurna Subdistrict is located in the southern part of Bekasi City. Its strategic location offers significant advantages, particularly in terms of communication and transportation, as it serves as a gateway to Bogor Regency, East Jakarta, and Depok City. The convenience and completeness of transportation infrastructure in Jatisampurna make it one of the key areas for trade and services. According to Bekasi City Regional Regulation No. 04 of 2004 on the Establishment of Administrative Areas for Subdistricts and Urban Villages, Jatisampurna Subdistrict is divided into five urban villages. The subdistrict spans an area of approximately 19.43 km² (1,943.74 hectares).

2.3. Analysis of Logistics Service Storage Warehouse Characteristics

This analysis uses Geographic Information Systems (GIS) to identify the characteristics of logistics services, focusing on location, operations, and company management (Zefri, 2021). The analysis of logistics service characteristics involves comparing variables. The results are derived from surveys, observations, and interviews with logistics service providers, revealing distinct characteristics for each logistics service, based on the behavior patterns of logistics providers themselves (Nasution & Arman, 2006). Subsequently, data analysis is conducted using the Nearest Neighbour Ratio (NNR) method, which is an analysis used to explain the distribution pattern of location points by considering the number of points, the area size, and distance. The final result of this analysis is an index (T), and the nearest neighbor distribution index is obtained through Equations (1)-(3) (Ariyanti, 2017; Iungman et al., 2021; Planillo, Fiechter, Sturm, Voigt-Heucke, & Kramer-Schadt, 2021).

$$T = \frac{J_u}{J_h} \tag{1}$$

$$J_h = \frac{1}{\sqrt{2P}} \tag{2}$$

$$P = \frac{A}{N} \tag{3}$$

Keterangan :

T: Nearest neighbor parameter

Ju: The average distance measured between one point and its nearest neighbor

Jh: The figure obtained from the area size divided by the number of points

P: Point density per square kilometer

A: Area size in square kilometers

N: Number of points

Criteria:

- If T < 0.7, the settlement pattern is clustered.
- If 0.7 ≤ T ≤ 1.4, the settlement pattern is random.
- If T ≥ 1.4, the settlement pattern is uniform.

This can be represented in the continuum diagram shown below:

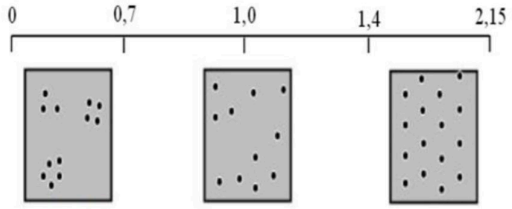

Figure 1. Continuum Nilai Nearest Neighbour Statistic
Source : Bintarto, Khakim (2012) Herliatin (2016)

This study employs two primary methods: the Nearest Neighbor Ratio (NNR) and the Analytical Hierarchy Process (AHP). The NNR method is used to analyze the spatial distribution of logistics service warehouses by comparing the actual distribution of warehouses to a random distribution, with values closer to 1 indicating uniform patterns. In this research, we calculated NNR by mapping logistics warehouse locations and using GIS to measure the distances between each warehouse and its nearest neighbor. This allows us to determine whether the warehouses are clustered, random, or uniformly distributed.

The AHP method was applied to determine the relative importance of various criteria in selecting logistics warehouse locations. A hierarchy of factors was constructed, with the top-level goal of identifying the optimal warehouse location. Below this were key factors such as market proximity, infrastructure, cost, and human resources. Weights were assigned to these criteria based on expert input and survey data, and the AHP framework was used to score and rank the alternative locations.

2.4. Criteria Analysis and Determination of Logistics Service Storage Warehouse Locations

Decision-making on alternative locations is based on predetermined criteria, and the formulation of the logistics service storage warehouse location concept within the city spatial planning system can be achieved using the Analytical Hierarchy Process (AHP) method. Through hierarchy, a complex and unstructured problem is broken down into groups and arranged into a hierarchical form (Firsan, 2017). A hierarchy is defined as a representation

of a complex problem in a multi-level structure, where the highest level is the objective. Below the objective level are the criteria level, sub-criteria, and so on until the final level, which represents alternatives. Respondents selected for this study are aged 22-40 years, consisting of individuals with income, e-commerce users, private employees, entrepreneurs, and government officials. The analysis of the consistency ratio must be <0.1; if it is >0.1, the survey must be repeated (Al-Adwan & Yaseen, 2023). If the consistency index value is <0.10, the results can be considered valid, and the priority scale determination is consistent enough to be implemented as a policy for a targeted objective. The criteria analysis and determination of logistics service storage warehouse locations within the city spatial planning system is carried out using the AHP method by breaking down a multi-factor or multi-criteria problem through the identification of logistics service characteristics and the opportunities available in determining locations within the city (Wu et al., 2022).

3. RESULTS AND DISCUSSION

3.1. Characteristics of Logistics Service Storage Warehouses

3.1.1. Location

Spatially, the current warehouse locations are in accordance with the spatial structure, as they are situated on commercial land. These warehouse locations are in trade and service areas based on Law No. 7 of 2014 concerning Trade. Figure 1 shows the existing location map of logistics service providers in Jatisampurna Subdistrict, which is the focus of this study. There are two logistics warehouses—J&T and Anteraja—where the land use pattern is linear (Linear Development) within Jatiraden Village, meaning it follows the main transportation network, develops segmentally, and is efficient. On the other hand, the Sicepat logistics warehouse has a random land use pattern (Leap Frog Development) in Jatirangga Village, meaning it develops sporadically and inefficiently (Nasution, 2006).

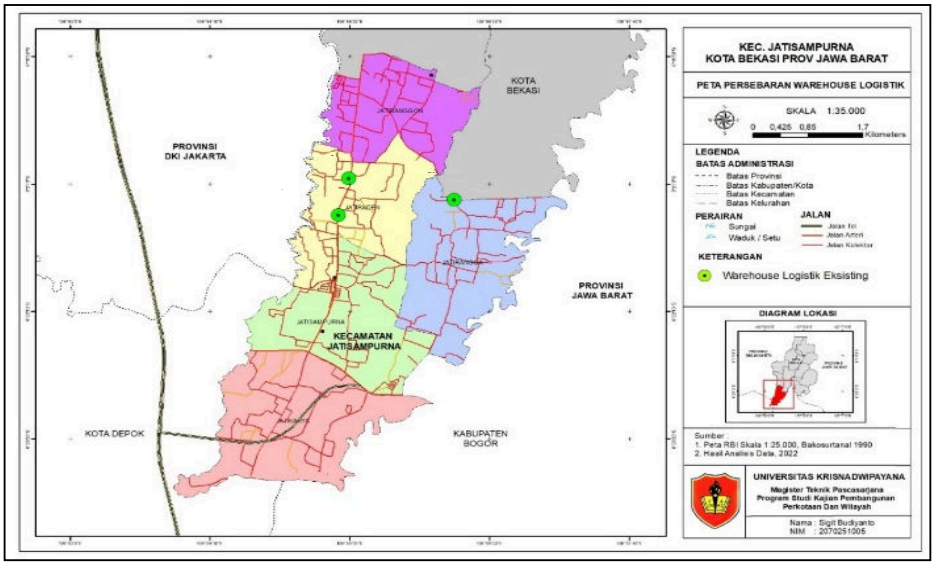

Figure 2. Map of existing logistics service storage warehouses in Jatisampurna Subdistrict, Bekasi City
Source: Primary Data, 2023.

3.1.2. Operational

The logistics service providers distribute parcels to residents using two- and four-wheeled vehicles, handling an average number of parcels per day, including the capacity of parcels on four-wheeled vehicles, arrival times, and loading times. This is regulated under Ministerial Regulation No. 74 of 2015 concerning the Operation and Management of Transportation Services and Government Regulation No. 74 of 2014 concerning Road Transport (Wahid, 2016). In planning the distribution routes, Sicepat has prepared 31 two-wheeled vehicles and six four-wheeled vehicles, with a capacity of 160-250 parcels per day. Parcels are delivered from Hub-Bojong Menteng to Drop Point-Jatirangga, covering 11.4 km. J&T has prepared 36 two-wheeled vehicles, one four-wheeled vehicle, and one eight-wheeled vehicle, with the same capacity, delivering parcels from Hub-Bantar Gebang to Drop Point-Jatiraden (15.2 km). Anteraja has 17 two-wheeled vehicles and one six-wheeled vehicle, with a capacity of 60-110 parcels per day, delivering from Hub-Graha Intirub Halim to Drop Point-Jatiraden (20.1 km).

3.1.3. Company Management

Regarding wages, all three logistics providers adhere to Government Regulation No. 36 of 2021 on Wages, meaning employee salaries comply with current regulations. Employees work 12-hour shifts to distribute parcels. Sicepat employs 39 workers, J&T 38 workers, and Anteraja 21 workers. The highest regular parcel price is Sicepat at IDR

12,000/kg/parcel, followed by J&T at IDR 10,000/kg/parcel, and Anteraja at IDR 8,000/kg/parcel.

3.1.4. Urban Settlement Distribution Patterns

The settlement distribution pattern in urban areas initially follows a linear pattern due to the relatively low population density, forming clusters. As the population increases, new, randomly distributed settlements emerge. Housing developments by property services within cities lead to uniform settlement patterns, facilitated by prepared land use, infrastructure, and accessibility. In densely populated areas, land use tends to become more uniform.

3.1.5. Nearest Neighbour Settlement Patterns

Settlement patterns in Jatisampurna Subdistrict were analyzed using the Nearest Neighbour analysis on ArcGIS, converting residential plots into points and using the Average Nearest Neighbour method to calculate the Nearest Neighbour Ratio (NNR). Table 1 shows the distribution patterns of the three logistics service providers. The NNR values determine the distribution patterns, balancing urban spread.

Table 1. NNR values and distribution patterns of logistics service providers in several villages in Bekasi City

No	Logistics Service Provider	Urban - Villages	NNR	Distribution Pattern
1	Sicepat Express	Jatikarya	2,1	Uniform
2	Sicepat Express	Jatisampurna	0.8	Random
3	Sicepat Express	Jatirangga	0,6	Clustered
4	Sicepat Express	Jatiranggon	0,8	Random
5	Sicepat Express	Jatiraden	0,6	Clustered
6	J&T Express	Jatikarya	1,5	Uniform
7	J&T Express	Jatisampurna	0,4	Clustered
8	J&T Express	Jatirangga	0,9	Uniform
9	J&T Express	Jatiranggon	1,3	Clustered
10	J&T Express	Jatiraden	0,3	Random
11	Anteraja	Jatikarya	1,4	Uniform
12	Anteraja	Jatisampurna	0,3	Clustered
13	Anteraja	Jatirangga	0,8	Random
14	Anteraja	Jatirangga	1,4	Uniform
15	Anteraja	Jatiraden	0,2	Clustered

Source: Primary Data, 2023.

The table above is based on Figure 4, which depicts the logistics service distribution map in Jatisampurna Subdistrict. The distribution patterns were calculated using the NNR (Nearest Neighbour Ratio) formula within the continuum of the average nearest neighbour statistic (T). Each logistics service provider operates in five different urban villages within

Jatisampurna Subdistrict. As a result, 15 distinct distribution patterns were identified, corresponding to the three logistics service providers operating within the subdistrict.

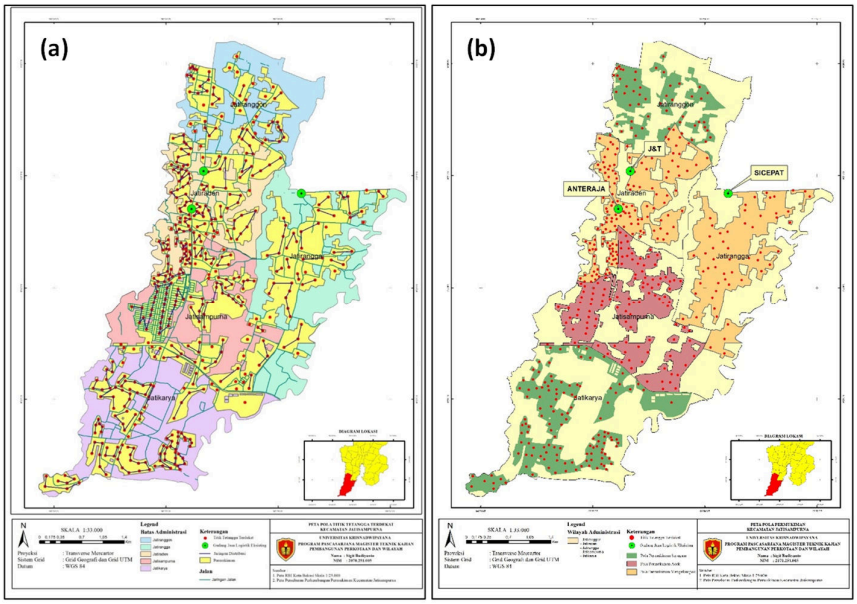

Figure 3. (a) Nearest neighbor pattern map, and (b) Settlement pattern map within the city spatial planning system.
Source: Primary Data, 2023.

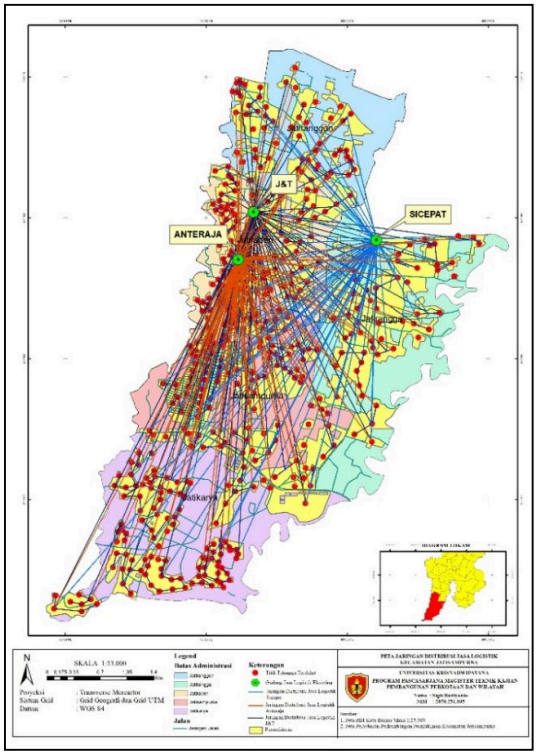

Figure 4. Logistics service distribution map in Jatisampurna Subdistrict, Bekasi City.
Source: Primary Data, 2023.

3.2. Criteria Analysis and Determination of Logistics Service Storage Warehouse Locations

The criteria for logistics warehouse location were identified through surveys, observations, and interviews. These criteria include market, institutional factors, human resources, infrastructure, and cost.

3.2.1. Market

The role of the market is the primary target and goal of any business process, especially in economic activities. Logistics service providers understand their role as parcel distributors from warehouses to customers. From a spatial planning perspective, logistics providers consider several factors, including population density, proximity to residents, city traffic, the distance between warehouses, improving competitiveness, and customer responsiveness. Being close to residential areas facilitates the mobilization of customer needs and helps reduce both time and transportation costs (Susantono, 2013).

3.2.2. Institutional Factors

The role of institutional factors is rooted in the policies, laws, or regulations established by the government or companies. Selecting a logistics storage warehouse location in compliance with applicable regulations is essential for urban development, aiming for harmony and alignment. These regulations include government policies, industrial regulations, political systems, and security measures. Institutional factors significantly influence business location permits and the transportation fleet used for logistics service storage warehouse location decisions. Industrial relations at the chosen location also become an important consideration in selecting the site (Prasetyo & Lestari, 2015; Strategy, 2019).

3.2.3. Human Resources

The role of human resources is crucial as the workforce in urban areas. The availability of labor is a key factor in the distribution of parcels to residents. A skilled workforce contributes to economic circulation, enhances economic stability, improves the well-being of the population, and reduces unemployment in the area where the logistics storage warehouse is located. Securing highly qualified human resources that meet the standards of logistics service providers is essential for effectively operating logistics storage warehouses in urban regions.

3.2.4. Infrastructure

The role of infrastructure is to connect urban economic growth centers based on the principle of integration, rather than uniformity, through intermodal supply chain systems. It fosters economic growth by improving accessibility from economic hubs to their surrounding areas (hinterland). The broad distribution of development benefits (inclusive and equitable growth) is achieved by enhancing connectivity and basic services to underdeveloped, remote, and border areas, thereby promoting balanced development. Road networks play a critical role in determining the location of logistics service storage warehouses, as they influence the types of transport fleets used. Logistics companies adjust their vehicles to match the infrastructure, ensuring efficient parcel distribution from hub warehouses to drop points. Infrastructure considerations extend beyond road construction, encompassing warehouse space capacity, efficient goods management systems, transportation facilities for workers, telecommunications systems, as well as energy and water supply (Vinayanti, Subchan, & Mudjiati, 2012).

3.2.5. Cost

The role of cost refers to the expenses incurred from both operational and management aspects of the company. Businesses always prioritize profitability in their operations. The costs associated with determining the location of logistics warehouses include land or space rental fees, vehicle costs, standard wages for workers, warehouse maintenance expenses, insurance costs, tax incentives, and more. Therefore, there are many financial considerations in choosing a location, as companies must carefully assess these costs to avoid financial losses when selecting a logistics warehouse location.

3.3. Hypothesis Analysis of Logistics Service Provider Location Criteria

Table 2 presents the results of hypothesis testing for several parameters in selecting logistics service locations. The consistency values obtained are as follows: C1. Market (0.542), C2. Cost (0.155), C3. Human Resources (0.140), C4. Infrastructure (0.116), and C5. Institutional Factors (0.048). The Consistency Index (CI) is 0.06. Next, the Ratio Index (RI) is calculated based on Saaty's theory (1988), where the ratio index is determined by the matrix order (number of criteria) (Liu, 2022). Since the matrix consists of five criteria, the RI is 1.12. With the CI and RI values obtained, the Consistency Ratio (CR) is then calculated as follows.

Table 2. Results of hypothesis testing for several parameters in logistics service location selection.

Kode	Hipotesis penelitian	Consistency value
C1	Market	0,542
C2	Cost	0,155
C3	Human Resource	0,140
C4	Infrastructure	0,116
C5	Institutional Factors	0,048
CI		0,06
CR		0,05

Source: Primary Data, analysis results from Data Expert Choice v.11, 2023.

The CR value obtained is 0.053, or 5%, indicating that the hierarchy built for selecting alternative logistics warehouse locations based on the five criteria is consistent, as the consistency test result is less than 10%. In determining the location of logistics service storage warehouses, stakeholders should not only focus on how the parcels will be distributed but also consider the spatial planning that has been regulated by the government, as outlined in the Bekasi City Spatial Structure Plan map in accordance with Regional Regulation No. 13 of 2011 on the Spatial Planning of Bekasi City. This regulation designates specific areas for urban development(Sujana, 2011).

Based on the characteristics of existing logistics service storage warehouses, the identified criteria, and observations at several potential locations, three locations have been selected as alternative sites for logistics service storage warehouses: (1) Jatisampurna Village, (2) Jatiraden Village, and (3) Jatiranggon Village.

3.4. Hypothesis Analysis of Alternative Location Criteria

Table 3 contains the data from the hypothesis test analysis for determining alternative locations for logistics service providers. From the results of the hypothesis test for alternative locations, the following consistency values were obtained: C1. Jatiraden (0.618), C2. Jatisampurna (0.231), and C3. Jatiranggon (0.150). The Consistency Index (CI) is 0.5, as shown in **Figure 5**. Next, the Ratio Index (RI) is calculated based on Saaty's theory (1988), where the ratio index is determined by the matrix order (number of criteria) (Liu, 2022). Since the matrix consists of 3 criteria, the RI value is 0.58. With the obtained CI and RI values, the Consistency Ratio (CR) is then calculated, with the results as follows.

Table 3. Results of the hypothesis test for determining alternative locations for logistics service providers

Code	Hipotesis	Consistency value
C1	Jatiraden	0,618
C2	Jatisampurna	0,231
C3	Jatiranggon	0,151
CI		0,5
CR		0,08

Source: Primary Data, analysis results from Data Expert Choice v.11, 2023.

The CR value obtained is 0.08, or 8%. This indicates that the hierarchy built for selecting alternative logistics warehouse locations based on the three criteria is consistent, as the consistency test result is exactly <10%. The triangular graph leans more toward C1 Jatiraden (0.618). Referring to location theory, the best location for business activities is one that closely aligns with the desired criteria. This highlights the importance of thoroughly considering location in any business activity, as selecting the right business location requires careful evaluation.

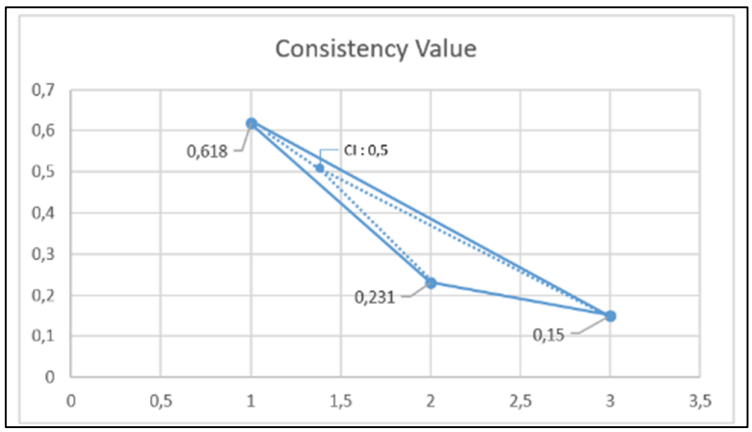

Figure 5. Consistency index values in the hypothesis test for determining alternative locations. *Source: Primary Data, 2023.*

The results of the NNR analysis showed that logistics warehouses in Jatisampurna are predominantly distributed in clustered patterns, particularly Sicepat Express and Anteraja, which indicates inefficiencies in their spatial distribution. In contrast, J&T Express tends to follow a more uniform distribution pattern, which is conducive to better resource management and operational efficiency. These findings suggest that logistics companies should aim for more uniform spatial distribution to minimize transportation costs and congestion in high-density urban areas.

Furthermore, the AHP analysis revealed that market proximity is the most critical criterion in determining warehouse location, followed by infrastructure availability and cost. The strategic placement of warehouses close to residential areas and transportation networks can significantly improve delivery efficiency and reduce operational costs. These findings provide actionable insights for logistics companies looking to optimize their warehouse locations and for urban planners to integrate logistics needs into city planning, leading to better economic and social outcomes for the region.

4. CONCLUSIONS

The characteristics of logistics services in urban areas adapt to the city's spatial planning system. This is observed in terms of location, operations, company management, settlement patterns, and logistics service distribution networks. J&T and Anteraja logistics services prefer a linear development land use pattern, while Sicepat opts for a separate location with a leapfrog development pattern. The city's settlement distribution in the spatial planning system tends to be uniform, as urban development initially stemmed from clustered or random settlement patterns before the area developed into a city.

The concept of determining logistics service warehouse locations in urban areas follows specific criteria, prioritizing market conditions (population, shopping centers, e-commerce users, and trade services aligned with spatial planning), cost (land rental rates, company income, operations, parcel prices, employee wages), human resources (availability of labor in the area, labor relations, and the logistics industry), infrastructure (transport networks, accessibility for vehicles, proximity to toll gates and hubs, ease of parcel distribution to residents), and institutional factors (government policies on land use related to warehouses and company regulations governing warehouse operations). Among the three alternative locations, Jatiraden was identified as the most suitable location, meeting the ideal conditions for the logistics service warehouse location concept in Bekasi City.

This study contributes to a deeper understanding of how logistics service providers can align their warehouse locations with urban spatial planning to improve both operational efficiency and regional development. Our findings indicate that logistics companies like J&T Express, Anteraja, and Sicepat Express can optimize their operations by adopting more uniform distribution patterns, reducing transportation costs, and improving service delivery times.

Additionally, this research highlights the critical role of urban planning in logistics. By integrating logistics facilities into city spatial plans, governments can mitigate traffic congestion, ensure smoother distribution routes, and promote economic growth in key areas. For instance, the selection of Jatiraden as an optimal location aligns with market needs and infrastructure accessibility, creating a win-win situation for both logistics service providers and urban developers.

As a recommendation, the selected location should be in the city center to ensure closer market access, reducing time and operational costs. However, the challenge of choosing a location in urban areas includes local government policies related to vehicle access, rising land rental costs, and increased competition among logistics services. The concept developed in this study can serve as a reference for logistics companies when determining warehouse locations within the city's spatial planning system. Additionally, it can be further developed into future research, as the challenges faced in each city are not always the same.

5. REFERENCES

Al-Adwan, A. S., & Yaseen, H. (2023). Solving the product uncertainty hurdle in social commerce: The mediating role of seller uncertainty. International Journal of Information Management Data Insights, 3(1), 100169. doi:10.1016/j.jjimei.2023.100169

Ariyanti, R. (2017). Analisis Perkembangan Permukiman di Kecamatan Laweyan Tahun 2006-2015. Universitas Muhammadiyah Surakarta, Surakarta.

Bowersox, D. J. (2020). Supply Chain Logistics Management, 5th edition (5th ed., Vol. 5). New York: McGraw Hill Education.

Chaboud, G., & Moustier, P. (2021). The role of diverse distribution channels in reducing food loss and waste: The case of the Cali tomato supply chain in Colombia. Food Policy, 98, 101881. doi:10.1016/j.foodpol.2020.101881

Firsan, H. J. (2017). Pemilihan Lokasi Gudang Penyimpanan Barang Jadi Menggunakan Metode Analytical Hierarchy Process (AHP). Universitas Muhammadiyah Malang, Malang.

Hayata. (2019). Kajian Model Pengoperasian Angkutan Barang Darat Di Wilayah 3T (Terdepan, Tertinggal & Terluar) Terpilih, Provinsi Papua Barat. Jakarta: Universitas Krisnadwipayana.

Hubbard, M., & Onumah, G. (2001). Improving urban food supply and distribution in developing countries: the role of city authorities. Habitat International, 25(3), 431–446. doi:10.1016/S0197-3975(01)00019-4

Iungman, T., Khomenko, S., Nieuwenhuijsen, M., Barboza, E. P., Ambròs, A., Padilla, CindyM., & Mueller, N. (2021). The impact of urban and transport planning on health: Assessment of the attributable mortality burden in Madrid and

Barcelona and its distribution by socioeconomic status. Environmental Research, 196, 110988. doi:10.1016/j.envres.2021.110988

Kuncoro, H. (2019). Logistik Perkotaan di Indonesia. Yogyakarta: UGM Press.

Liu, Q. (2022). Identifying and correcting the defects of the Saaty analytic hierarchy/network process: A comparative study of the Saaty analytic hierarchy/network process and the Markov chain-based analytic network process. Operations Research Perspectives, 9, 100244. doi:10.1016/j.orp.2022.100244

Nasution, H., & Arman, A. (2006). Managemen Industri. Yogyakarta: Andi.

Nasution, N. (2006). Managemen Transportasi. Bogor: Ghalia Indonesia.

Nurhidayati, E., & Hadari, N. (2022). Konsep Blue-Green Infrastructure (BGI) Melalui Permeable Pavements Pedestrian Dan Kolam Retensi Untuk Mitigasi Genangan Banjir di Kota Pontianak. Jurnal Planologi, 19(1), 92-110. doi:10.30659/jpsa.v19i1.18043

Planillo, A., Fiechter, L., Sturm, U., Voigt-Heucke, S., & Kramer-Schadt, S. (2021). Citizen science data for urban planning: Comparing different sampling schemes for modelling urban bird distribution. Landscape and Urban Planning, 211, 104098. doi:10.1016/j.landurbplan.2021.104098

Pontoh, K., Nia, N., & Kustiwan, I. (2009). Pengantar Perencanaan Perkotaan. Bandung: ITB.

Prasetyo, I., & Lestari, R. (2015). Transportasi Perkotaan yang didukung oleh Sistem Informasi. Bandung: ITB.

Santosa, I. B. D. A. N. (2019). Pengembangan Model Transportasi untuk Urban Logistik dengan Komponen Stationary Hub, Mobile hub, dan Last-Mile Delivery. Universitas Katolik Parahyangan, Bandung.

Soesilo, R., Firmansyah, Y., & Sartono, S. (2020). Penentuan Lokasi External Warehouse dengan Menggunakan Metode Center Of Gravity (Studi Kasus di PT. RPZ Surabaya). Jurnal Manajemen Industri Dan Logistik, 4(1), 58–66. doi:10.30988/jmil.v4i1.372

Strategy, E. (2019). Dampak Implementasi Enterprise Resource Sukabumi. Jurnal Penelitian Transportasi Darat, 21, 1–12.

Sugandhy, A. (1999). Penataan Ruang dalam Pengelolaan Lingkungan Hidup. Jakarta : Gramedia.

Sugiyono, S. (2018). Metode Penelitian Kualitatif. Bandung : Alfabeta.

Sugiyono, S. (2019). Metode Penelitian Kuantitatif. Bandung: Alfabeta.

Sujana, N. (2011). Kajian Pola Spasial Penggunaan Lahan dan Dampaknya Terhadap Sistem Transportasi di Kota Bekasi. Jakarta: Universitas Krisnadwipayana.

Susantono, B. (2013). Transportasi & Investasi. Jakarta: Buku Kompas.

Triatmaja, D. (2016). Penentuan Lokasi Gudang dalam Mendukung Distribusi Bantuan. Sinergi, 2, 27–36.

Vinayanti, E. R., Subchan, S., & Mudjiati, T. (2012). Pendekatan Goal Programming Untuk Penetuan Rute Kendaraan Pada Kegiatan Distribusi. Journal of Mathematics and Its Applications, 9(1), 1–15.

Wahid, Y. (2016). Pengantar Hukum Tata Ruang. Jakarta : Kencana.

Wahyudi, A., Asteriani, F., Muliana, R., Aulia, A. R., & Fikri, M. (2023). An Urban Form Study on Walking Choice (A Case Study in The Central Business District Jenderal Sudirman, Pekanbaru). Jurnal Planologi, 20(1), 81-104. doi:10.30659/jpsa.v20i1.24717

Wu, Y., Lin, Z., Liu, C., Huang, T., Chen, Y., Ru, Y., & Chen, J. (2022). Resilience enhancement for urban distribution network via risk-based emergency response plan amendment for ice disasters. International Journal of Electrical Power & Energy Systems, 141, 108183. doi:10.1016/j.ijepes.2022.108183

Zefri, Z. (2021). Dasar-dasar Sistem Informasi Geografis untuk Pengembangan Infrastruktur Wilayah. Depok: Ranka Publishing.