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EVALUASI POTENSI *TRANSIT-ORIENTED DEVELOPMENT* DI KAWASAN STASIUN PURWOKERTO BERDASARKAN ENAM PRINSIP TOD

EVALUATION OF TRANSIT-ORIENTED DEVELOPMENT POTENTIAL IN THE PURWOKERTO STATION AREA BASED ON SIX TOD PRINCIPLES

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Abstrak

Stasiun Purwokerto merupakan simpul transportasi utama di Kabupaten Banyumas yang berpotensi dikembangkan sebagai kawasan Transit Oriented Development (TOD). Namun, kawasan sekitarnya belum sepenuhnya menunjukkan kesiapan spasial dan fungsional sesuai prinsip TOD, seperti konektivitas moda, kepadatan, fungsi campuran, serta infrastruktur pejalan kaki dan ruang publik. Padahal, kebijakan nasional mendorong implementasi TOD di kawasan perkotaan strategis. Penelitian ini bertujuan mengevaluasi kesiapan kawasan dalam radius 800 meter dari Stasiun Purwokerto berdasarkan enam prinsip TOD menurut standar ITDP (2017): *walkability*, *mixed-use*, *connectivity*, *density*, *transit service*, dan *public space*. Metode yang digunakan adalah deskriptif-kualitatif dengan skoring 0–5 dan pembobotan indikator. Hasil menunjukkan bahwa tingkat kesiapan kawasan tergolong rendah (46,8%), dengan kekuatan pada konektivitas dan layanan transit, sementara aspek lainnya masih terbatas. Studi ini merekomendasikan perbaikan infrastruktur pejalan kaki, integrasi moda transportasi, serta penyediaan ruang publik untuk mendukung pengembangan TOD yang berkelanjutan di kota sekunder..

Kata kunci: evaluasi spasial, kota sekunder , Stasiun Purwokerto , *Transit Oriented Development, walkability*

Abstract

Purwokerto Station serves as the primary transportation hub in Banyumas Regency and holds significant potential for development as a Transit-Oriented Development (TOD) area. However, the surrounding zone has yet to fully meet the spatial and functional standards outlined in TOD principles, particularly in terms of walkability, land-use diversity, and public space provision. This study evaluates the readiness of the area within an 800-meter radius from Purwokerto Station, based on six TOD principles established by ITDP (2017): walkability, mixed-use, connectivity, density, transit service, and public space. Using a qualitative-descriptive approach, the evaluation applied a technical scoring system (0–5) with weighted indicators. The overall TOD readiness score was 46.8%, indicating low compliance. While connectivity and transit services showed relative strengths, other aspects lagged significantly. This research contributes a context-specific assessment for secondary cities and recommends integrated improvements in pedestrian infrastructure, land-use planning, and public space provision to support sustainable TOD implementation.

Keywords: *Purwokerto Station, secondary city, spatial evaluation, Transit-Oriented Development, walkability*

I. INTRODUCTION

Purwokerto is a strategic urban center located in Banyumas Regency, Central Java, which has experienced rapid growth as a hub for education, commerce, and public services in the western region of the province. The presence of Purwokerto Station as a major transportation node plays a pivotal role in facilitating both regional and local mobility. Its central location and connectivity to various modes of transportation present a substantial opportunity for the surrounding area to be developed based on the principles of Transit-Oriented Development (TOD). TOD is an urban planning approach that emphasizes

the integration of high-capacity public transportation systems with compact, multifunctional land use that is pedestrian-friendly and supported by inclusive public spaces [1] [2].

Despite its strategic advantages, the area surrounding Purwokerto Station has yet to demonstrate the spatial and functional integration expected of TOD principles. Pedestrian infrastructure remains fragmented and discontinuous; the integration among various transport modes such as BRT, urban minibuses, and app-based motorcycle taxis is suboptimal; and the availability of vibrant public spaces is significantly limited. This disconnect between the area's development potential and the actual implementation of national urban mobility policies—such as Presidential Regulation No. 55 of 2018 on the National Transportation Master Plan and Ministerial Regulation No. 94 of 2013 on TOD Development Guidelines—highlights the need for a thorough assessment of the station area's readiness for integrated and sustainable TOD-based development[3][4].

Previous TOD-related studies have primarily focused on major metropolitan cities like Jakarta, Bandung, and Surakarta, where emphasis is placed on mode integration and land-use efficiency[5][6][7][8]. However, limited scholarly attention has been given to medium-sized cities such as Purwokerto, particularly in terms of evaluating spatial and functional readiness based on the TOD standards developed by the Institute for Transportation and Development Policy (ITDP). In addressing this knowledge gap, the present study offers a comprehensive evaluation that incorporates local spatial characteristics as well as existing planning regulations, such as the Detailed Spatial Plan (RDTR) and the Regional Spatial Plan (RTRW). The novelty of this research lies in its context-specific analysis of TOD readiness in a secondary city, employing measurable technical indicators to inform evidence-based planning.

This study adopts six core TOD principles as formulated by Peter Calthorpe (1993) and standardized by ITDP (2017), namely: walkability, mixed-use, connectivity, density, transit service, and public space[1][9]. These principles were selected due to their conceptual comprehensiveness in assessing spatial integration, mobility quality, and urban livability. They are interdependent and collectively contribute to the formation of an efficient, inclusive, and ecologically sustainable urban environment. Empirical studies in Tomohon and Leuwi Panjang, for example, demonstrate that TOD failure often stems not solely from the lack of transport options, but from poor pedestrian environments and inadequate public space provision[5][10]. Therefore, the application of these six principles is essential for a holistic assessment of TOD implementation readiness.

The study area is defined as an 800-meter radius from the center of Purwokerto Station, following the ITDP's ideal TOD catchment standard, which corresponds to a 10–15 minute walking distance. To accommodate spatial variability, this radius is divided into four directional segments: the north segment includes Kober Subdistrict; the east encompasses Jalan Bank and Pasar Manis; the south covers the Sukajadi area; and the west consists of Jalan KS Tubun and Porka Field. The evaluation of the six TOD principles was conducted through a descriptive-qualitative approach, employing a scoring technique based on technical indicators from ITDP and the Ministry of Public Works Regulation No. 03/PRT/M/2014. The findings were then visualized using charts and graphs to systematically illustrate the strengths and weaknesses of each segment in relation to TOD compliance.

II. LITERATURE REVIEW

Transit-Oriented Development (TOD) is an urban planning concept focused on the integration of land use with public transportation systems. TOD promotes the development of compact, mixed-use, and pedestrian-friendly environments within a walkable radius of approximately 400–800 meters from a transportation hub [11][12]. The primary objective of TOD is to reduce dependence on private vehicles, enhance land-use efficiency, and foster sustainable mobility patterns [7]. This concepst is underpinned by six key principles: walkability, mixed-use, connectivity, density, transit service, and public space, which are designed to operate in a cohesive and integrated manner [1].

A. Walkability

Walkability refers to the measure of pedestrian comfort and safety within an urban area. Well-designed pedestrian infrastructure must include continuous sidewalks, sufficient lighting, a sense of safety, and accessibility features for individuals with disabilities. Poor-quality pedestrian environments have been shown to negatively influence public willingness to use public transportation options [13] .

B. Mixed-Use

Mixed-use refers to the integration of multiple land-use functions—such as residential, commercial, and social—within a single area. In the context of Transit-Oriented Development (TOD), mixed-use planning supports round-the-clock urban activity and promotes vibrant urban life [14][15]. The presence of such functional diversity enables residents to live, work, and engage in daily activities within the same locality, thereby reducing the need for long-distance travel and optimizing land-use efficiency.

C. Connectivity

Connectivity refers to the ease of transfer between different modes of transportation, such as railways, BRT Trans Banyumas and Trans Jateng, urban minibuses, and online motorcycle taxis. High-quality connectivity enhances travel efficiency and user convenience. According to [16] successful TOD relies on physically, institutionally, and fare-integrated transportation systems. Rafi'i and Prayogi [15] further emphasize that pedestrian pathways and public transportation networks must be planned in a cohesive and integrated manner.

D. Density

Density pertains to the concentration of population and built environment around transportation nodes. High-density areas facilitate the efficient provision of public services and infrastructure, while simultaneously fostering local economic activity [14]. An appropriately dense urban environment also supports the viability of public transit systems by concentrating demand within walkable proximity.

E. Transit Service

Transit service encompasses the quality, frequency, accessibility, and affordability of public transportation within TOD zones. Reliable and regular services are crucial to the success of TOD implementation. Key challenges include optimizing feeder services and achieving seamless schedule and route integration between different transit modes [14] [16].

F. Public Space

Public spaces are open, accessible areas intended for community interaction, recreation, and cultural engagement. These spaces should be designed based on principles of inclusivity, safety, and strong connectivity to transportation hubs and surrounding urban functions. Enhancing public space quality contributes significantly to improving the urban environment and social well-being [16].

G. Regulations and Policies Related to TOD

The development of TOD-based urban areas in Indonesia is supported by several governmental policies. Presidential Regulation No. 55 of 2018 [4] on the National Transportation Master Plan emphasizes the importance of integrating transportation systems with spatial planning. Meanwhile, the Ministry of Transportation Regulation No. 94 of 2013 [3] provides technical guidelines for TOD development, including pedestrian network planning and intermodal integration. At the local level, Banyumas Regency Regulation No. 2 of 2011 concerning the Regional Spatial Plan (RTRW) serves as a key legal framework for controlling land use around the Purwokerto Station area.

Several previous studies have applied TOD evaluation frameworks in various urban contexts across Indonesia. For instance, Legowo and Sumadio (2021) assessed the TOD index along the Bogor–Jakarta commuter line, emphasizing intermodal connectivity and access efficiency[12]. F. Dwi et al. (2023) examined mixed-use development and spatial integration in Leuwi Panjang Terminal, Bandung, while Kalangie et al. (2023) developed a TOD implementation model for Tomohon, a secondary city in North Sulawesi[5][10]. Another study by Khairunnisa et al. (2021) explored TOD outcomes in the Dukuh Atas area of Jakarta, highlighting improvements in land value but noting the limited quality of public space and walkability infrastructure[17].

Despite the growing body of TOD research in major metropolitan areas, a significant knowledge gap persists regarding the readiness of secondary cities to adopt TOD frameworks. Existing studies are largely concentrated in high-density, well-funded urban regions with established transit infrastructure. In contrast, medium-sized cities such as Purwokerto remain understudied, particularly in terms of evaluating TOD potential based on spatial-functional integration and local planning regulations (RDTR/RTRW). Furthermore, many studies focus on one or two TOD principles, rather than assessing the comprehensive six-principle framework endorsed by ITDP (2017).

This research aims to address that gap by conducting a holistic evaluation of the TOD readiness

within an 800-meter radius of Purwokerto Station. Unlike previous research relying heavily on quantitative indexing, this study employs a qualitative-descriptive approach with segment-based spatial analysis and technical scoring, grounded in ITDP standards and local urban policies. By doing so, the study not only contributes empirical insights into TOD implementation in secondary cities but also offers a replicable methodological framework for similar contexts in Indonesia and beyond.

III. METHODOLOGY

This research employs a qualitative descriptive approach, utilizing literature-based analysis and secondary data evaluation. This method is selected due to its suitability in urban and spatial planning studies, which require an in-depth understanding of spatial, social, and regulatory contexts [9]. An overlay analysis was applied within an 800-meter radius of the Purwokerto Station area to identify actual zoning patterns and the potential alignment of land uses with TOD principles. The evaluation focuses on the quality of walkability, mixed-use development, connectivity, density, transit service, and public space, based on the Transit-Oriented Development (TOD) framework developed by Calthorpe [9].

The selection of this method is grounded in the nature of the problem, which is not amenable to quantitative measurement alone. Instead, it requires observation and interpretation of spatial, regulatory, and visual data. Moreover, this approach supports a normative-evaluative perspective, where the existing conditions are assessed against the ideal principles of TOD.

A. Data Collection Methods

Data were collected through document analysis and literature study, which included the following sources :

1) Study Area and Spatial Scope

The study focuses on an area within an 800-meter radius from the center of Purwokerto Station. This distance follows the TOD Standard by the Institute for Transportation and Development Policy (ITDP), which defines a walkable area as being within 10 to 15 minutes on foot. The 800-meter radius is considered ideal for promoting public transport use and encouraging people to walk.

To capture spatial diversity and local contextual differences, the 800-meter catchment was further divided into four segments based on cardinal directions. The north segment includes the Kober subdistrict and nearby residential areas. The east segment covers Jalan Bank, Pasar Manis, and commercial zones. The south segment includes the Sukajadi area and Sawangan, which are more mixed in use. The west segment consists of Jalan KS Tubun, Porka Field, and the road to Bumiayu. This division helps the study observe and compare TOD conditions more clearly in each part of the area.

2) Planning Documents and Regulatory Frameworks

This includes the *Spatial Plan (RTRW)* of Banyumas Regency, *Detailed Spatial Plan (RDTR)* of Purwokerto City, and national policies such as *Presidential Regulation No. 55 of 2018* [4] concerning the National Transportation Master Plan, and *Ministerial Regulation No. 94 of 2013*[3] on TOD Area Development Guidelines.

3) Scientific Literature

Comprising peer-reviewed journal articles that address the concepts of TOD, walkability, mixed-use, connectivity, density, transit service, and public space .

4) Spatial and Visual Data

Including satellite imagery, street and land-use maps, and visual documentation obtained from *Google Earth* and *Google Street View*, which were used to assess the physical and functional conditions of the study area.

B. Data Analysis Methods

The analysis was conducted using a deductive qualitative approach, applying TOD principles as the main analytical framework. The analysis involved the following stages :

1) Evaluation of TOD Principles

The six core indicators of TOD—walkability, mixed-use, connectivity, density, transit service, and public space—were used as evaluation criteria. Each aspect was broken down into sub-indicators based on the standards established by ITDP (2017) [1] .

2) TOD Evaluation Visualization

Assessment results for each indicator were visualized using radar charts and bar graphs. These visual tools were employed to clarify the performance of each aspect and to facilitate comparisons between

the existing conditions and the ideal TOD benchmarks.

3) Technical Discussion by Aspect

The current conditions were compared with ideal TOD standards using a numerical scoring system ranging from 0 to 5. This method was used to empirically identify gaps and development opportunities.

Suitability analysis of TOD principles was performed through scoring (0–5) for the six key aspects: walkability, connectivity, mixed-use, density, transit service, and public space, based on the ITDP TOD Standard reference. Each indicator is scored using a non-linear ordinal scale, defined as follows in Table 1.

Unlike linear Likert scales (1–5), this non-linear scale (0–5) is designed to capture both presence and quality of TOD-related infrastructure and services. Score 0 indicates a critical lack of infrastructure (e.g., no sidewalks at all), while score 5 reflects optimal, integrated performance. The scale emphasizes technical readiness rather than subjective agreement, making it suitable for spatial planning assessments.

Once individual scores were obtained, they were aggregated, and the total score was interpreted against a maximum score of 30, as illustrated in Table 2.

Tabel 1. TOD Assessment Technical Indicators

TOD Aspect	Technical Indicators	Assessment Scale	Score	Scoring Criteria
Walkability	a. Minimum sidewalk width ≥ 2 meters b. Continuous sidewalks between blocks c. Availability of ramps/tactile paving d. Street lighting e. Shading (canopy/trees)	Low – Medium – High	0-5	0 : No sidewalks 1-2 : Narrow/disconnected sidewalks 3-4 : Moderately complete 5 : Fully accessible, disabled-friendly
Mixed-Use	a. Housing-to-commercial ratio ≥ 30:70 b. Functional diversity (≥ 3 different functions within 500m) c. Access to public facilities	None – Partial – Complete	0-5	0: Monofunctional 1–2: Two functions 3–4: Three dominant functions 5: Balanced and active mixed-use throughout the day
Connectivity	a. Number of transport modes within a 400–800 m radius b. Intermodal transfer time < 5 minutes c. Availability of integrated transit shelters	Poor – Fair – Good	0-5	0: Only one mode 1–2: Two modes, unintegrated 3–4: Three modes, partially integrated 5: Fully integrated modes
Density	a. Residential density > 100 people/ha b. Land use intensity (FAR/Building coverage) c. Percentage of vacant land	Low – Medium – High	0-5	0: Predominantly vacant 1–2: Low-rise buildings dominate 3–4: Medium density 5: High-rise, intensively used buildings
Transit Service	a. Frequency of main mode (≥ 6/hour) b. Availability of digital/real-time schedules c. Walking distance to station ≤ 500 m	Poor – Fair – Optimal	0-5	0: Infrequent and distant transit 1–2: Present but inefficient 3–4: Active but lacks information 5: Efficient, digital, accessible
Public Space	a. Public open space > 10% of total area b. Availability of parks, plazas, or green corridors c. Visibility of social activities	None – Limited – Active	0-5	0: No public space 1–2: Present but enclosed/limited 3–4: Open but underutilized 5: Active, safe, inclusive

Tabel 2. Interpretation of Total TOD Assessment Score (Maximum Score: 30)

Total Score	Level of TOD Compatibility
0–10	Very Low (Not aligned with TOD principles)
11–17	Low (Requires significant improvements)
18–23	Moderate (Has potential for TOD development)
24–27	High (Suitable for TOD implementation)
28–30	Very High (Ideal as a TOD-oriented area)

4) Weighting of TOD Criteria

To enhance analytical precision, each TOD principle is assigned a specific weight, reflecting its strategic importance in the TOD framework. The weights are determined through literature triangulation (ITDP, Calthorpe, and national TOD guidelines) and expert consultation. The weight distribution Tabel 3.

Tabel 3. Weight Distribution of TOD Principles

TOD Principle	Weight (%)
Walkability	15%
Mixed-Use	15%
Connectivity	20%
Density	15%
Transit Service	20%
Public Space	15%
Total	**100%**

5) Policy Contextualization

The findings are correlated with spatial planning and transportation regulations to assess whether the existing conditions normatively support the implementation of Transit-Oriented Development (TOD).

IV. RESULTS AND DISCUSSION

A. Evaluation of TOD Principles

This analysis aims to assess the extent to which the area surrounding Purwokerto Station complies with the principles of Transit Oriented Development (TOD), as formulated by the Institute for Transportation and Development Policy (ITDP). The evaluation was conducted using a scoring system across six key dimensions: walkability, mixed-use development, connectivity, density, transit service, and public space. The assessment is based on observable technical indicators derived from spatial and functional data, including the Detailed Spatial Plan (RDTR), satellite imagery, and relevant technical regulations.

To support a comprehensive evaluation of the Purwokerto Station area in relation to Transit Oriented Development (TOD) principles, Figures 1 through 5 and Table 4 are presented as complementary visual and analytical tools. These components provide both qualitative and quantitative insights into the spatial, functional, and infrastructural conditions within the 800-meter TOD boundary. Figure 1 displays satellite imagery delineating the official study area, offering a macro perspective on land distribution, transportation corridors, and built-up density. Figure 2 illustrates the spatial structure based on the official RDTR (Detailed Spatial Plan), highlighting the predominance of residential and commercial zones, which informs the analysis of land-use diversity and density.

Figures 3 to 5 document on-site visual conditions related to walkability and mixed-use patterns in key corridors, such as Jalan Pemuda, Jalan Bank, and Jalan Kober. These images capture deficiencies in pedestrian infrastructure and the lack of functional integration, which are key to TOD performance.

Complementing the visual data, Table 4 presents a detailed scoring matrix that quantitatively assesses six core TOD aspects: walkability, mixed-use, connectivity, density, transit service, and public space. The table includes technical indicators,

evaluation scores, categorical classifications, and descriptive remarks. Together, these figures and the table establish an empirical basis for identifying development gaps and formulating strategic planning recommendations aligned with TOD standards.

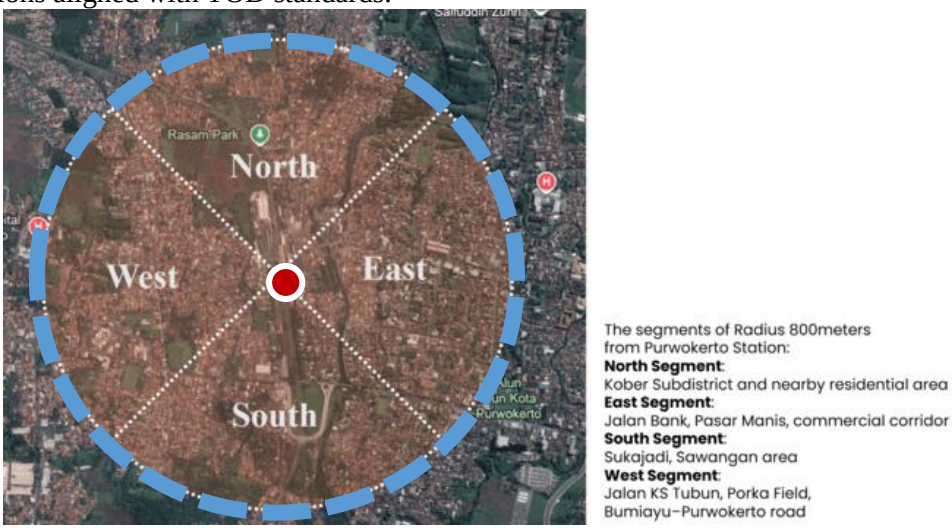

Figure 1. Satellite Imagery within an 800-Meter Radius of Purwokerto Station Area and Their Segments
Source : Google Earth

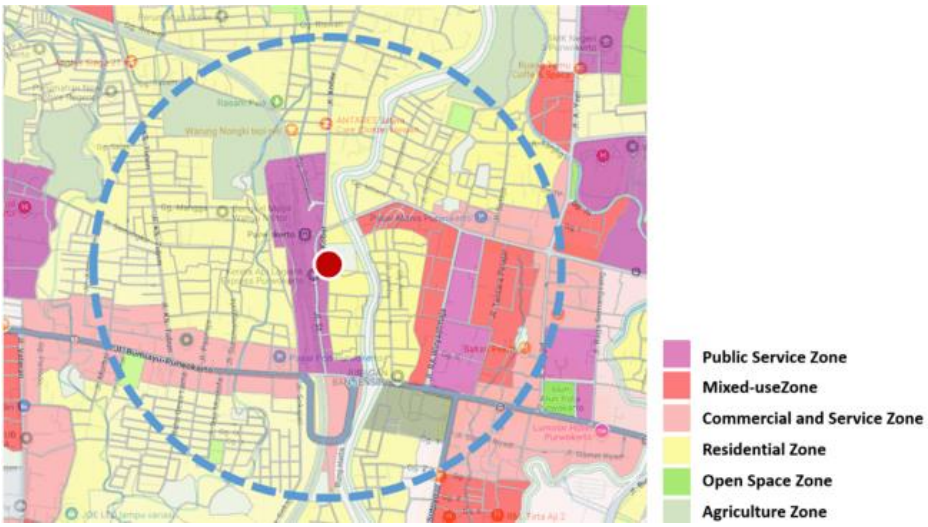

Figure 2. Spatial Pattern Based on Urban Spatial Plan (RDTR) of Purwokerto. The land use pattern is predominantly comprised of residential and commercial zones.
Source : https://perizinan.banyumaskab.go.id/peta

Figure 3. Pedestrian Path Conditions Around the Station (Jalan Pemuda). Sidewalks are discontinuous, narrow, lack inclusivity for persons with disabilities, and are poorly equipped
Source : Google Streetview

Figure 4. Mixed-Use and Density Around the Station Area (Jalan Bank).
The area is primarily characterized by commercial and service-related land uses.
Source : Google Streetview

Figure 5. Mixed-Use and Density Around the Station Area (Jalan Kober).
The land use is predominantly residential in nature.
Source : Google Streetview

Tabel 4. Analysis of Technical Indicators for TOD Evaluation

Aspek TOD	Technical Assessment Indicators	Score (0–5)	Weight (%)	Weighted Score	Remarks
Walkability	Continuous sidewalks, ≥2 m width, disability access, street lighting, shading elements	2	15%	0.30	Pedestrian pathways are discontinuous, narrow, lack accessibility features for persons with disabilities, have inadequate lighting and minimal shading.

Mixed-Use	Residential, commercial, and public functions within a 500 m radius	2	15%	0.30	Land use is still dominated by residential areas, followed by trade and service zones, with no vertical integration of functions.
Connectivity	≥3 transport modes, physical integration within 800 m radius	3	20%	0.60	Several transport modes are available, but there is no integrated system in terms of physical infrastructure, information, or fare platforms.
Density	Population density >100 people/Ha, vertical development, intensive land use	2	15%	0.30	Buildings are low-density, with many vacant plots and a lack of vertical function optimization.
Transit Service	Frequency >6/hour, station access ≤500 m, mode integration and digital information available	3	20%	0.60	The train service is active, but it lacks supporting multimodal coordination and digital information availability.
Public Space	≥10% of the area as active public space such as parks, plazas, or open interaction zones	2	15%	0.30	Public open space is minimal. Social interaction areas such as parks and plazas are nearly absent.
Total Score		14 / 30	100%	2.40/5	Equivalent to 46.8% TOD readiness

The scoring results indicate that the Purwokerto Station area achieved a total score of 14 out of 30, suggesting that the area has not yet adequately met the core principles of TOD. Among the six aspects, connectivity and transit service performed relatively well, whereas walkability and public space emerged as the weakest dimensions requiring urgent attention..

B. Segment-Based Performance within the 800-Meter Radius

To further contextualize the findings, the 800-meter TOD zone was divided into four spatial segments: North, East, South, and West. Each segment exhibited unique characteristics and varying levels of TOD principle compliance. Table 5 summarizes the relative performance per segment.

Tabel 5. Segment-Wise Readiness Based on TOD Evaluation

Segment	Key Characteristics	Best Performing Aspects	Weakest Aspects
North	Residential dominance (Kelurahan Kober)	Connectivity	Mixed-use, Public Space
East	Commercial corridor (Jalan Bank, Pasar Manis)	Density, Transit Service	Walkability
South	Urban fringe area (Sukajadi)	Transit Service	Connectivity, Walkability
West	Institutional and green area (KS Tubun, Porka)	Public Space	Density, Mixed-use

From the segmental analysis, it was evident that no segment achieved a balanced TOD profile. The eastern segment showed the highest relative density and transport access, while the western segment

exhibited potential in public space development. However, all segments underperformed in terms of walkability and functional integration, suggesting a systemic issue in spatial connectivity and pedestrian infrastructure.

C. TOD Evaluation Visualization

Data visualization was utilized to identify the distribution of strengths and weaknesses across TOD aspects through radar and bar charts.

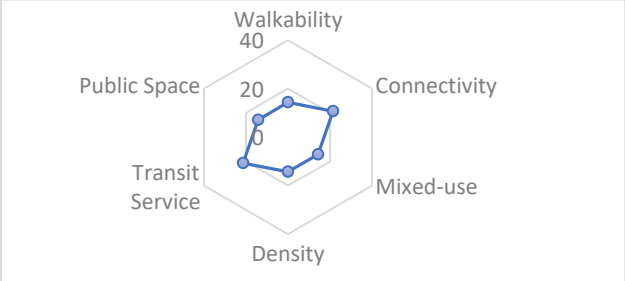

Figure 6. *Radar Chart of TOD Evaluation*

The radar chart illustrates the proportional development of each TOD component. An asymmetrical shape in the chart indicates uneven development, suggesting that certain dimensions are lagging significantly behind others.

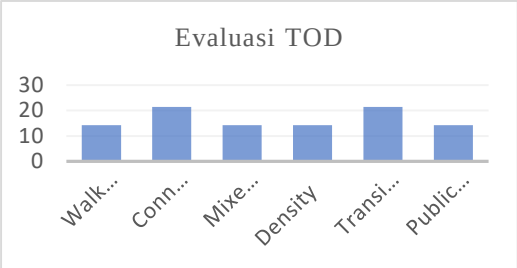

Figure 7. *Bar Chart of TOD Evaluation*

The bar chart presents a more explicit and comparative view across dimensions, helping to identify the most and least dominant aspects. As shown, the highest scoring aspects are connectivity and transit service. Moderate to low scores are observed in walkability, mixed-use, and density. Public space recorded the lowest score among all dimensions.

D. Technical Discussion by Aspect

The evaluation of Purwokerto Station's surrounding area was conducted using a qualitative scoring approach based on the six TOD principles. The total score reached 14 out of a possible 30, equivalent to a 46.8% compatibility level with TOD standards. This score falls into the moderately low category, indicating that the area cannot yet be comprehensively classified as a TOD zone:

1) Walkability (Score: 2/5 , Low)

Despite its central location, sidewalks around the station are narrow, discontinuous, poorly shaded, and lacking in accessibility for people with disabilities. In some streets, pedestrian pathways are entirely absent. This contradicts the standards set forth in the Ministry of Public Works Regulation No. 03/PRT/M/2014 and ITDP guidelines, which emphasize pedestrian comfort and safety [14]

2) Connectivity (Score: 3/5, Moderate))

The area is served by a variety of transport modes—railway, Trans Jateng BRT, urban minibuses, and online motorcycle taxis—but lacks physical integration (e.g., shared shelters), fare unification, and adequate multimodal information systems. Bus stops are scattered and not directly connected to the station [18].

3) Mixed-Use (Score: 2/5, Low)

The land use in the area remains dominated by residential and informal commercial functions (e.g., terminals, shop houses, parking). The absence of vertical housing and public facilities results in low activity outside business hours. Recommendation: The RDTR should be revised to encourage the integration of residential, commercial, and social functions within the core TOD zone [14][19].

4) Density (Score: 2/5, Low)

Population and building density within the 800-meter radius remain low. The area still contains many vacant lots and one-story buildings, such as open parking lots and storage facilities. This contradicts TOD principles, which advocate for spatial intensification near transit nodes [20] [14].

5) Transit Service (Score: 3/5, Moderate)

While the railway provides regular national and regional routes, feeder transportation services are not well-organized. Moreover, schedules for non-rail modes are neither digitally accessible nor visibly displayed [10][17].

6) Public Space (Score: 2/5, Very Low)

Active public spaces are virtually non-existent within an 800-meter radius. Purwokerto's main square (Alun-Alun) and Andhang Pangrenan Park are located outside the TOD catchment area. Public

spaces play a vital role in creating inclusive and human-centered urban environments

E. Planning and Policy Implications

Based on the TOD principle evaluation, the Purwokerto Station area demonstrates a low readiness level for TOD-based development. The following are implications for planning and policy:

Tabel 6. Implications for Planning and Policy

TOD Aspect	Key Issues	Policy Basis	Planning Direction
Walkability	Sidewalks are narrow, discontinuous, and non-inclusive	Ministry of Public Works Regulation No. 3/2014	Rehabilitate sidewalks in accordance with TOD standards (≥2 meters wide), with adequate lighting and inclusive ramps for persons with disabilities.
Connectivity	Transportation modes lack physical and system integration	Ministry of Transportation Regulation No. 94/2013	Develop integrated transit shelters, unify transport modes and fare systems, and implement a multimodal digital information system.
Mixed-Use	Area functions are not diverse; dominated by informal trade and transport activities	Spatial Plan of Purwokerto (revision needed)	Revise the spatial plan to promote the integration of residential, commercial, and social functions within the core zone of the station.
Density	Vacant land remains underutilized; low-density buildings dominate	ITDP Standard, revisions to Spatial Plan and FAR regulations	Encourage vertical development and intensify land use through development incentives (e.g., revised Spatial Plan and FAR) in the local spatial plan.
Transit Service	Local transport services are uncoordinated; limited service provision	Presidential Regulation No. 55/2018	Add feeder BRT services, integrate electronic ticketing, and provide real-time transit information.
Public Space	Lack of parks, plazas, and social interaction spaces	ITDP TOD Standard (≥10% public space)	Create active public spaces (parks, plazas, green open spaces) within a 500–800 meter radius; develop small plazas and pedestrian-based social areas.

V. CONCLUSION

A. Conclusion

This study evaluated the readiness of the Purwokerto Station area for Transit-Oriented Development (TOD) within an 800-meter radius, based on six core principles established by ITDP (2017): walkability, mixed-use, connectivity, density, transit service, and public space. The results indicate a relatively low overall readiness score of 46.8%. While the area shows moderate strengths in connectivity and transit service, it still faces substantial limitations in walkability, functional land-use diversity, and the availability of inclusive public spaces. The segmentation analysis across four directional zones further revealed that none of the segments met a balanced TOD profile, underscoring inconsistencies between spatial plans and actual on-site conditions. These findings suggest that the Purwokerto Station area requires substantial improvement in both physical infrastructure and planning integration to fulfill the essential criteria of a TOD-compliant urban environment..

B. Recommendation

To support TOD implementation in the Purwokerto Station area, the following actions are recommended:

1) Upgrade pedestrian infrastructure to ensure safety, continuity, and accessibility for all users.
2) Revise local zoning policies to encourage vertical mixed-use development and reduce spatial fragmentation.
3) Improve multimodal integration by connecting rail, BRT, and local transport through shared stops and unified signage.
4) Encourage higher land-use intensity through incentives for infill development on underutilized lots.
5) Create active public spaces that support social interaction and are connected to transit corridors.
6) Strengthen institutional coordination by integrating TOD into local development plans and forming a dedicated TOD task force.

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