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Station-Area Accessibility and Rail-Property Value Capture for Urban Regeneration in Yangon

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ABSTRACT



Urban rail can support local economic development when station areas are accessible, connected and integrated with surrounding land uses. This study examines Ma Hlwa Gone Station on the East Wing of the Yangon Circular Railway as a case of railway-led urban regeneration. It applies an implementation-oriented TOCC framework combining TOD principles, compact urban form, Rail + Property mechanisms and institutional coordination. A mixed-methods approach was used, including GIS catchment analysis, field observation, land-use assessment, nine stakeholder interviews, policy review and STEEP evaluation. The findings show that railway-owned land, an established residential population and active local businesses provide development potential. However, poor walkability, weak YCR-YBS integration, fragmented land use and divided institutional responsibilities constrain value creation. The study argues that R+P should be introduced gradually, following accessibility improvements, clearer land management and inter-agency coordination. The framework offers an exploratory approach for station-area regeneration in Southeast Asian developing cities.

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Highlights:

- Evaluates walkability and accessibility within the 400–800 m station catchment.
- Assesses multimodal integration and land-use conditions around Ma Hlwa Gone Station.
- Develops integrated station-area strategies based on TOD + compact city planning, R+P and governance coordination.

Contribution to the field statement:

This study contributes to railway-oriented urban development by integrating accessibility, compact urban form, governance coordination and R+P mechanisms within a practical station-area framework for phased regeneration in Yangon.

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1. Introduction

Urban rail systems are strategic infrastructure for sustainable mobility, compact urban growth and local economic development. Railway stations can influence surrounding land-use intensity, pedestrian

activity, property markets and investment patterns. In principle, the accessibility created by rail investment may increase nearby land and property values, allowing part of that increase to be captured and reinvested in transport infrastructure and public improvements (Li & Love, 2022; Li et al., 2022; Xuto et al., 2023). These benefits do not arise automatically. The scale of transit-related value uplift depends on station accessibility, land-use mix, property type, project stage, market conditions and institutional capacity (Lee, 2022; Rojas, 2024; Zhang et al., 2024).

Current frameworks consider density, diversity, urban design, destination accessibility, distance to transit, demand management, walkability and the balance between transport-node functions and surrounding urban activities (Gao et al., 2025; Su et al., 2021; Yen et al., 2023). In many high-density Asian cities, TOD is also closely associated with urban renewal, land redevelopment, public–private coordination and land value capture. Taipei has used station catchments and floor area ratio incentives to connect public transport planning with redevelopment and land-use regulation (Yen et al., 2023). Neighborhood quality, access to amenities, pedestrian conditions and the wider urban environment may also influence property values (Su et al., 2021).

Ma Hlwa Gone Station, located on the East Wing of the YCR, illustrates these conditions. The station lies within an established urban area surrounded by residential communities, local businesses, public transport services and railway-related land assets. The area also faces substantial implementation barriers. Sidewalks are discontinuous, road crossings are unsafe and connections between YCR and YBS operations are poorly coordinated. Some railway-related land is underused or managed without a clear relationship to wider station-area development.

1.1 Background and Context

Although the YCR is undergoing upgrading works, including civil works, signaling improvements and multimodal integration. Poor pedestrian infrastructure, inadequate station facilities and weak multimodal integration remain common issues across the YCR corridor. Sidewalks are often discontinuous and poorly maintained with passenger amenities are limited. Informal street vendors, roadside parking and fragmented access routes can reduce station accessibility and the overall quality of the pedestrian environment.

Previous studies for YCR have demonstrated that integrating transport investment with land-use planning can improve for the accessibility and support compact urban development, enhance land values and promote sustainable urban growth. However, the application of these concepts remains limited in Yangon and other rapidly urbanizing cities in SEA region. Furthermore, limited research has examined how railway-owned land can contribute to socio-economic development and urban regeneration through the R+P approach.

This study proposes a Transit-Oriented Compact City (TOCC) station-area planning framework that integrates compact city theories, TOD principles, and the R+P model. TOCC is here not treated as a new theory or a TOD replacement, but as an implementation-oriented framework that links three related dimensions: TOD for land-use and transport integration, compact city planning for efficient and mixed-use urban form, and R+P for land value capture and railway-related development.

1.1.1 Evolution of TOD toward an Implementation-Oriented TOCC Framework

TOD evolved from a concept by integrating transport infrastructure, land use, pedestrian accessibility and urban economic development. Later TOD studies expanded on the idea through the 3D, 5D, and 6D principles including density, diversity, design, destination accessibility, distance to transit and demand management. These principles indicate that TOD is not only about locating development near the station but also about creating as a station-area environment where land use, mobility and public space function together (Al-Kodmany et al., 2022; Gao et al., 2025; Ibrahim et al., 2026; Yen et al., 2023).

Recent Asian studies show that TOD performance depends on station accessibility, land-use diversity, pedestrian quality, commercial activity and institutional capacity (Gao et al., 2025; Gunawan et al.,

2020; Hasibuan & Mulyani, 2022; Iamtrakul et al., 2025; Sapsangthong et al., 2025; Su et al., 2021; Yen et al., 2023).

Commercial activity also plays an important role in TOD evolution. Gao et al. (2025) found that rail station centrality is associated with commercial agglomeration around stations in Chengdu. This finding is relevant to station-area planning because it links TOD not only with mobility and housing, but also with commercial clustering and urban economic restructuring.

Trolese et al. (2023) showed that station areas, accessibility is also influenced by walkable conditions and the quality of the surrounding environment. Recent research by (Iamtrakul & Chayphong 2024; Iamtrakul et al., 2025) found that higher accessibility within TOD catchment areas is generally associated with greater concentrations of urban activities and land-use diversity. The findings suggest that accessibility should be evaluated not only by distance to transit but also by the relationship between transport infrastructure and surrounding urban functions. Hasibuan and Mulyani (2022) found that TOD implementation in Jakarta remained constrained by early-stage policy development, land-use change limitations, and limited private sector participation.

1.1.2 Urban Economy, Land Value Capture, and Rail + Property

Urban rail investment can generate economic value by improving accessibility, reducing travel costs, increasing land-use intensity and attracting residential and commercial activities around stations. LVC refers to mechanisms that allow public authorities or transit agencies to recover part of the land or property value increase generated by public infrastructure investment. These mechanisms include betterment levies, development charges, joint development, air rights, land leasing and R+P models (Berawi, Saroji, et al., 2020; Chang & Phang, 2017; Gong et al., 2021; Li & Love, 2022; Li et al., 2022; Sharma & Newman, 2020). Li et al. (2022) argued that urban rail projects are often difficult to sustain through fare revenue and conventional public funding alone.

Under an R+P model, a railway corporation participates directly in property development around stations and uses real-estate revenue to support rail investment and operations. However, recent studies caution against treating this model as universally transferable. J. Yang et al. (2020) argued that R+P programmes in mainland China were not only profit-oriented tools but also mechanisms for reducing municipal cash-flow burdens and providing public goods such as affordable housing.

Li and Aveline-Dubach (2025) further challenged the assumption that Shenzhen's R+P model was automatically sustainable or replicable. They showed that its performance depended on exceptional local conditions. This point is relevant to Yangon because the presence of railway land alone does not guarantee successful value capture.

Value-capture implementation is also a political and institutional process. van Zoest and Daamen (2024) argued that value capture should not be viewed merely as a technical funding tool. Research on long-term rail funding likewise confirms that rail systems need diversified and stable revenue sources. Xuto et al. (2023) showed that rail funding cannot rely only on fares or direct grants because fare revenue is vulnerable to political control, ridership changes, inflation and service costs. These conditions remain underdeveloped in Yangon, supporting the need for a TOCC framework that connects TOD principles with LVC-oriented implementation.

1.1.3 Transit-Induced Property Value Uplift: Evidence and Limitations

Li and Huang (2020) found that rail-related housing premiums in Wuhan were stronger than in the areas with greater land-use diversity and mixed-use density. Evidence from Seoul also shows that benefits vary across land types and value levels: office and apartment land received stronger gains, while lower-value residential and commercial land benefited less (Lee, 2022). Rojas (2024) distinguished between direct accessibility benefits and indirect effects generated by subsequent development around stations. Wider evidence likewise shows considerable variation in rail-related property effects across cities and market conditions (Panwar & Fandian, 2025; Rennert, 2022; Vichiensan et al., 2022; L. Yang et al., 2020). As Ma Hlwa Gone is not yet a fully developed TOD area, this study does not attempt to measure actual property-value uplift.

Evidence on commercial and residential property also shows that value uplift is not uniform. In Shanghai, rail access had a positive effect on commercial property prices, but the scale of that effect differed across locations, submarkets, built environments and travel patterns (Zhang et al., 2024). Dziauddin (2023) similarly found spatial variation in commercial property effects in Greater Kuala Lumpur. Studies in Jakarta provide a more cautious Southeast Asian perspective, reporting mixed relationships between transit proximity and residential property values (Berawi, Miraj, et al., 2020; Ibrahim et al., 2026).

1.2 Research Gap and Relevance to Yangon

Table 1 compares the main literature streams, their limitations and their relevance to the Yangon case.

Table 1: Research gaps and relevance to Yangon.

Literature stream	Main focus in previous studies	Key limitation or gap	Relevance to this study
TOD and station-area planning	Integration of land use and transport through density, diversity, design, accessibility, and transit connectivity (Li & Huang, 2020; Su et al., 2021; Yen et al., 2023)	Many studies emphasize station proximity and built-environment indicators but give less attention to implementation barriers in weak-governance contexts.	This study examines how TOD principles can be adapted to Ma Hlwa Gone Station, where rail infrastructure exists but pedestrian access and land-use integration remain weak.
Compact city planning	Efficient urban form, mixed-use development, density, urban containment, and sustainable mobility (Gao et al., 2025; Hasibuan & Mulyani, 2022)	Compact city concepts are often discussed at city or corridor scale, with limited application to existing railway station areas in developing cities.	This study applies compact city thinking at the station-area scale by assessing walkability, land-use conditions, and local activity concentration.
Rail + Property and land value capture	Use of railway-related land, property development, and value capture (Li et al., 2022; J. Yang et al., 2020; Xuto et al., 2023)	Most R+P and LVC studies focus on successful or mature cases such as Hong Kong, Tokyo, Shenzhen, and other high-capacity institutional contexts.	This study explores whether railway-related land at Ma Hlwa Gone can support socio-economic development and future value capture under Yangon's institutional constraints.
Transit-induced property value uplift	Measurement of land and property value impacts using hedonic pricing, DID, spatial models, and meta-analysis (Lee, 2022; Rojas, 2024; Zhang & Yen, 2020; Zhang et al., 2024)	Evidence shows mixed results, and value uplift varies by property type, location, distance, built environment, and market condition. Few studies translate these findings into practical planning strategies.	This study does not assume automatic value uplift. It assesses value capture potential based on accessibility, land-use readiness, local activities, and governance conditions.
Southeast Asian TOD implementation	TOD implementation, rail accessibility, urban development, and travel behavior in contexts such as Jakarta and Bangkok (Berawi, Miraj, et al., 2020; Hasibuan & Mulyani, 2022; Iamtrakul et al., 2025; Ibrahim et al., 2026)	Research remains limited for existing railway station areas outside major MRT/LRT corridors, especially where formal value capture mechanisms are weak.	Yangon provides a developing-city railway case where station-area regeneration depends on improving walkability, multimodal integration, and institutional coordination.
Integrated station-area implementation framework	Some studies examine TOD, compact city planning, R+P, or LVC separately.	Limited research integrates accessibility, compact urban development, railway-owned land, socio-economic activities, and governance coordination within one analytical framework.	This study addresses this gap by developing an integrated station-area planning approach for Ma Hlwa Gone Station based on TOD principles, compact city planning, R+P mechanisms, and governance coordination.

The central research gap bypasses the absence of TOD, compact city, or R+P concepts: it is the lack of an integrated framework that apply these concepts to existing railway station areas in developing-city contexts. This study addresses this gap by identifying the physical, economic, and institutional conditions required for station-area regeneration and future land value capture.

1.3 Objectives and Hypotheses

The objectives of the study are;

1. To evaluate walkability and accessibility within the 400-800 m station catchment area.
2. To assess multimodal integration and land-use conditions
3. To develop integrated station-area planning strategies for Ma Hlwa Gone Station based on TOD principles, compact city planning, R+P mechanisms and governance coordination.

The study hypothesizes that Ma Hlwa Gone Station possesses conditional potential for railway-led urban regeneration through the TOCC and R+P framework, but realizing this potential requires improvements in pedestrian accessibility, multimodal connectivity, land-use integration and institutional coordination.

1.4 Significance and Structure of the Paper

The study contributes to the socio-economic dimensions of contemporary urbanization by linking station accessibility and railway-owned land with local business activity, livelihood protection and the reinvestment of land-related value. It applies an implementation-oriented TOCC framework that combines TOD principles, compact urban form, R+P mechanisms and governance coordination. Rather than assuming that rail proximity automatically generates land-value uplift, the study identifies the physical, economic and institutional conditions required for future value creation and capture. The paper is organized into 5 sections: introduction, materials and methods, results, discussion and conclusion.

2. Materials and Methods

2.1 Study Design and Setting

This study adopts a mixed-method case-study approach to examine Ma Hlwa Gone Station on the YCR. A walkability index was developed from 4 dimensions: accessibility, comfort and safety, sidewalk and crossing conditions and multimodal connectivity. Each dimension received equal weight to provide a balanced assessment of pedestrian conditions within the 400 m and 800 m catchments. The index was used because distance alone cannot explain actual accessibility. Locations within a standard TOD catchment may remain difficult to reach when sidewalks are poor, crossings are unsafe, physical barriers are present, or connections between modes are weak.

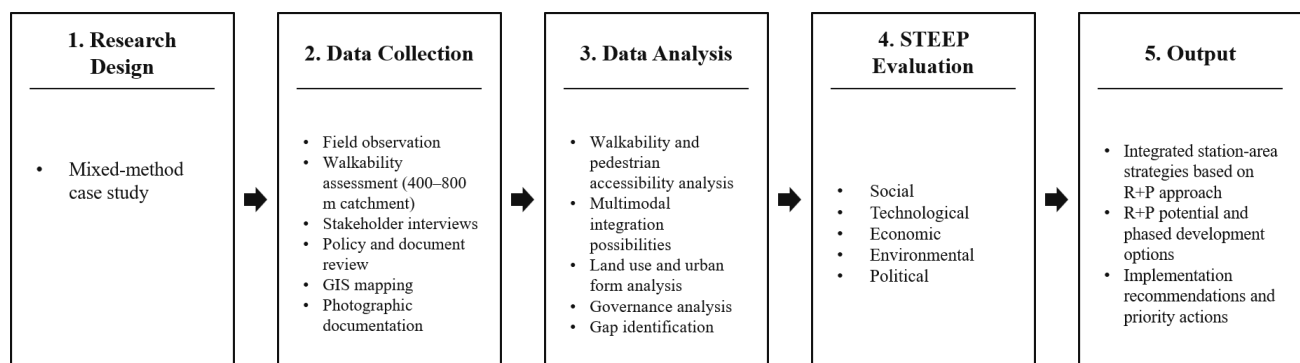


Figure 1. Methodology framework of the paper.

$$WI = \frac{A + C + S + I}{4}$$

Where:

WI = Walkability Index

A = Accessibility

C = Comfort and Safety

S = Sidewalk and Crossing

I = Intermodal/Multimodal Connectivity

Equation 1. Walkability Index of the Station.

Primary qualitative data were collected through stakeholder interviews and field observations. These data provide insights into governance challenges, safety concerns and implementation barriers.

2.2 Study Participants

Table 2 summarizes the professional backgrounds and analytical roles of the nine interview participants.

Table 2: The lists of interviewed experts and stakeholders.

Stakeholder group	Professional background	Relevance to the study	Number of informants
Railway Sector (Chief Engineers)	Railway operations, infrastructure and land management	Railway conditions, railway-controlled land and implementation constraints	3
Urban planning and development	Land-use planning, station-area development and local governance	TOD planning, land-use integration and urban development conditions	3
Transport coordination/Multimodal	Public transport planning and multimodal integration	YBS-rail coordination and first and last-mile connectivity	1
Engineering and regulation	Engineering standards, building regulations and professional practice	Regulatory conditions and planning enforcement	1
Real estate sector	Property development, land market and value-capture mechanisms	Developable land, market conditions and R+P opportunities	1
Total			9

Ma Hlwa Gone Station was selected as a strategically important but underperforming station area on the YCR East Wing. The station also contains extensive railway-owned and railway-related land, which provides an opportunity to examine R+P and land-value-capture approaches under a relatively centralised ownership structure. The case therefore combines development opportunities with substantial implementation constraints.

2.3 Materials and Equipment

The study used spatial datasets, planning documents, field-survey materials and digital mapping tools. QGIS was employed to prepare station catchment, road-network, land-use, building and accessibility maps using data from YCDC, MIMU, JICA, YUTRA and Myanmar Railways.

Field observations were documented using a smartphone camera, printed base maps, observation sheets and field notes. The survey recorded sidewalk conditions, crossings, physical barriers, shade, lighting, roadside parking, street vending and connections to YBS and informal feeder services. Semi-

structured interview guides were prepared for relevant participants, while Microsoft Excel was used to organize observation scores, interview data and walkability calculations.

2.4 Procedures and Protocols

The study followed a mixed-method case-study procedure that combined GIS analysis, field observation, stakeholder interviews and document review. Ma Hlwa Gone Station was mapped in QGIS by using 400 m and 800 m catchments, with a 600 m intermediate zone used to examine changes in accessibility, land use and urban activity. Roads, buildings, transport stops, major destinations and railway-related land were mapped, while pedestrian access was assessed through the actual street network rather than straight-line distance. Field surveys were then conducted along the main access routes to verify spatial data and document sidewalk continuity, crossing safety, physical barriers, lighting, shade, roadside activities and connections to YBS and informal feeder services.

2.5 Data Analysis and STEEP

Walkability was assessed through 4 equally weighted components: station accessibility, comfort and safety, sidewalk and crossing conditions and multimodal connectivity. Scores were checked against GIS maps, photographs and field observations. Semi-structured interviews were conducted with 9 informants from railway, planning, transport, engineering, regulatory and real-estate sectors. Their responses were compared with planning documents and field evidence through triangulation. The combined findings were then organized under spatial, economic and governance themes and interpreted using the STEEP framework to identify implementation barriers and develop station-specific TOD and R+P recommendations.

3. Results

3.1 Station Area Walkability and Accessibility Conditions

Walkability and accessibility around Ma Hlwa Gone Station were generally poor. The assessment identified weaknesses in 4 dimensions that include accessibility, comfort and safety, pedestrian infrastructure and multimodal integration. These conditions limit the station's effectiveness as a transport node.

The street network is significantly dense within the 400-800 m catchment area. However, physical barriers that include the railway corridor and discontinuous pedestrian routes affect on the accessibility to the station. The large urban blocks in Pathein Nyunt Ward also reduce route permeability and pedestrians need to use longer and indirect paths. Physical barriers and indirect routes reduce the effective walking catchment relative to the theoretical 400-800 m buffers. Figure 2 illustrates the road network condition of the study area.

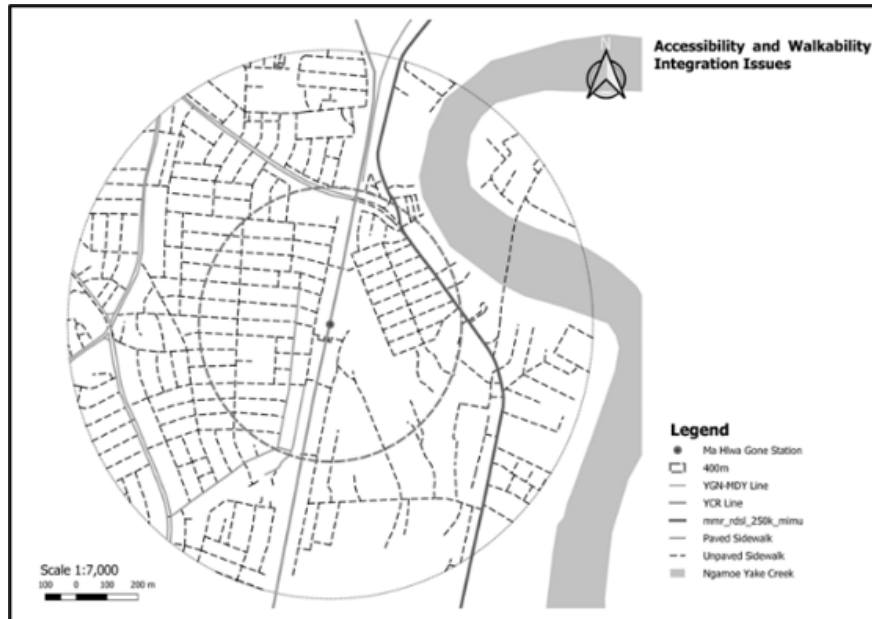


Figure 2. Road Network Condition of the study area.

Based on field observations, the pedestrian environment shows several critical issues and problems. The walkability assessment scores of the station are mentioned in Table 3.

Table 3: Walkability Assessment Scores of the station area.

Indicator	400m catchment	800m catchment	Main observation
Accessibility (A)	1	1	Access routes are indirect and affected by barriers.
Comfort and safety (C)	1	1	Limited shade, lighting, and pedestrian protection.
Sidewalk and crossing conditions (S)	1	2	Sidewalks are narrow, blocked, or discontinuous; formal crossings are limited.
Intermodal/Multimodal connectivity (I)	1	2	Bus and informal transport exist nearby, but transfer spaces are poorly organized.
Overall score	1.0	1.5	Poor walkability; wider catchment slightly better but still weak.

These findings indicate that accessibility is influenced by both distance and the quality of the pedestrian environment. The assessment considered sidewalk quality, safety, physical barriers, informal activities and multimodal connections in addition to walking distance. This provides a context-sensitive account of everyday walking conditions around the YCR. The results also indicate that Ma Hlwa Gone Station serves a large population within its wider walking catchment.

3.2 Land Use and Spatial Structure

The station area covers approximately 77.2 ha and is predominantly occupied by railway-related infrastructure and operational land uses. A substantial proportion of the study area consists of railway tracks, technical facilities, depot functions and service areas associated with the operation of YCR. These uses form the dominant spatial structure of the station area and significantly influence surrounding development patterns. While railway land plays an essential operational role, it also limits the availability of land for other urban functions and contributes to the separation of adjacent neighborhoods.

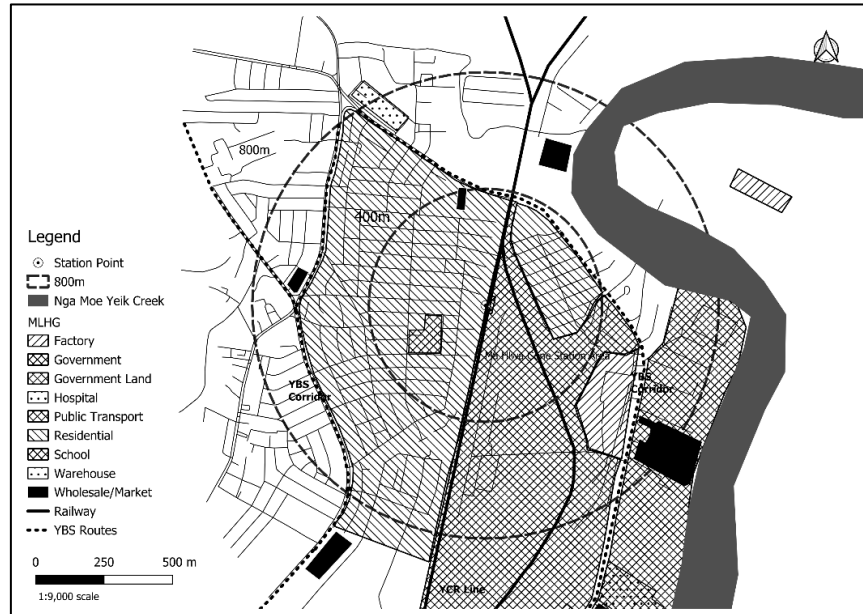


Figure 3. Land Use Distribution around the Station (Developed with QGIS by the Authors).

Figure 3 shows the distribution of railway, residential, commercial, institutional and other land uses within the study area. Beyond the railway corridor, land use is characterized by a mixture of residential areas, government-owned land, small-scale commercial activities and community services. Although this reflects a certain degree of land-use diversity, the overall spatial arrangement remains fragmented. Approximately 100 properties were identified within this zone, including 79 residential properties, 6 commercial or retail properties, 5 institutional properties that includes 2 primary schools and 2 institutes, 3 monasteries and A Thaw Ka market. Important landmarks include Ma Hlwa Gone railway workshop and nearby informal feeder or trishaw points. Consequently, the station area currently functions more as a collection of individual land uses rather than as a coherent urban node.

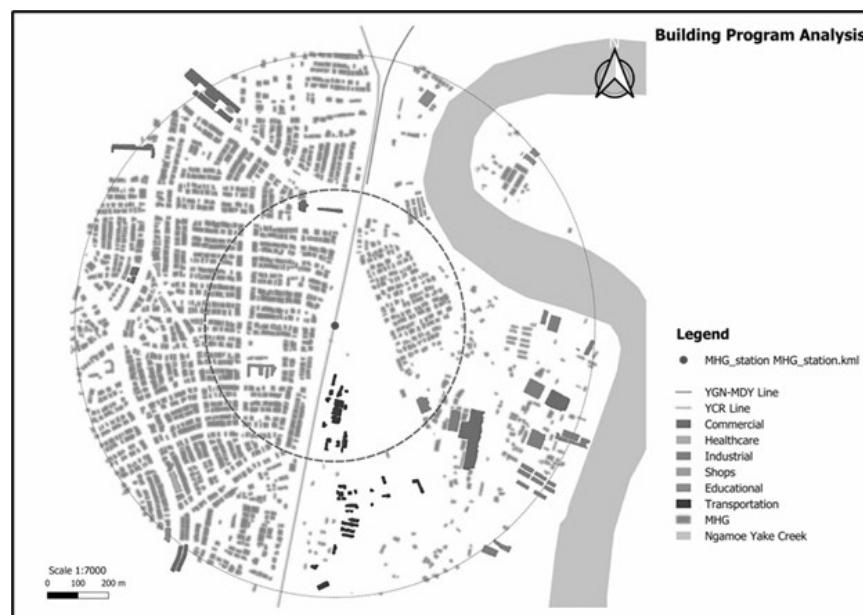


Figure 4. Buildings around the Station (Developed with QGIS by the Authors).

The combination of fragmented land use, low development intensity and extensive MR-owned land creates contrasting spatial conditions. The current pattern limits compact station-area activity, while publicly controlled railway land provides a possible resource for future redevelopment and mixed-use

intensification. At present, however, this land is not integrated with surrounding transport and urban functions. Overall, Ma Hlwa Gone Station has substantial railway land and an established surrounding urban area, but its spatial structure remains fragmented and weakly integrated.

3.3 Rail + Property and Local Economic Potential

The findings indicate that the station area has economic assets relevant to an R+P approach, particularly its relatively centralised land-ownership structure. A large area surrounding the station is controlled by MR, reducing some of the complexity associated with fragmented private ownership. Stakeholder interviews identified railway-owned land as a possible basis for future development, but they also emphasised that accessibility, land management and institutional coordination must improve before value-capture mechanisms can be considered feasible. The study found no evidence that land-value uplift has already occurred.

Small-scale economic activities around the station support everyday urban life and contribute to local street activity. They also demonstrate the dependence of nearby communities on proximity-based services that meet daily needs within walking distance. Figure 5 presents the observed pattern of land unit prices within and around the station area.

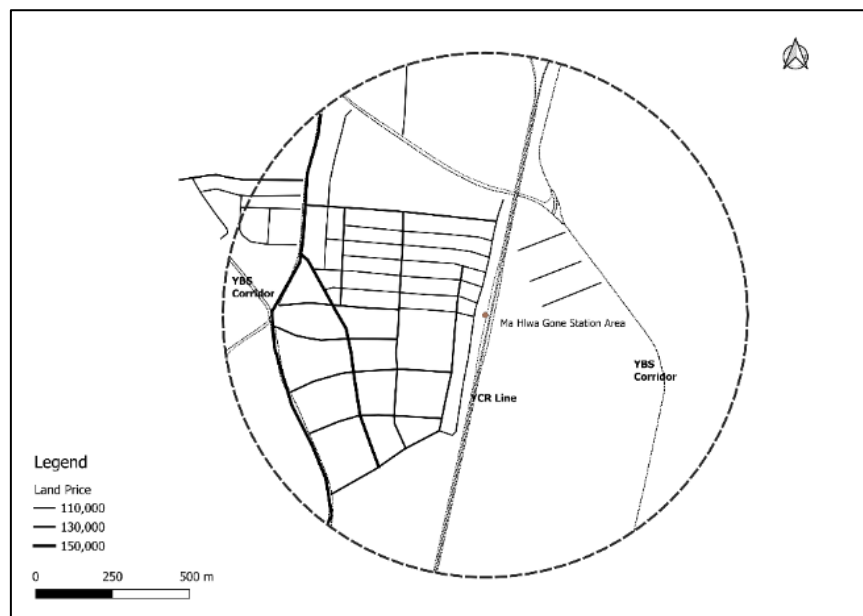


Figure 5. Land Unit Prices around the station area (MMK per ft²).

Table 4: Land-use and development potentials around the station.

Land-use element	Existing condition	Potential contribution	Constraint
Railway-related land	Present around station and rail corridor.	Possible station-area improvement, public space, mixed-use or service facilities	Requires MR coordination and clear development framework
Residential areas	Dense neighbourhoods around station	Supports walking demand and local ridership	Poor pedestrian access reduces station use
Local commercial activities	Shops, vendors, and small services nearby	Supports socio-economic activity and station-area vitality	Some activities obstruct sidewalks and access routes
Public/institutional uses	Present within wider catchment	Can support daily trip generation	Weak integration with station access
Underused spaces	Found near railway edges and service areas	Potential for phased redevelopment or public realm improvement	Land control, feasibility, and governance issues
Roadside activities	Active but informal	Can support local economy if organised	Creates pedestrian conflict if unmanaged

The surrounding wards contain an estimated 78,286 residents, creating demand for public transport, commercial activity and everyday services. Field surveys identified convenience stores, restaurants, cafés, markets, educational facilities and other neighbourhood services within the station catchment. These functions provide a socio-economic base for station-area activities. However, development intensity remains relatively low, and the present land-use pattern does not yet support a compact, mixed-use and transit-oriented urban form.

3.4 Multimodal Connectivity

Findings showed that multimodal connectivity at the station is still limited and poorly organized. Although several transport modes were available, they did not operate as an integrated system. First- and last-mile travel relied largely on informal modes such as trishaws and shared taxis. These services supported daily mobility, particularly short trips between the station and passengers' final destinations.

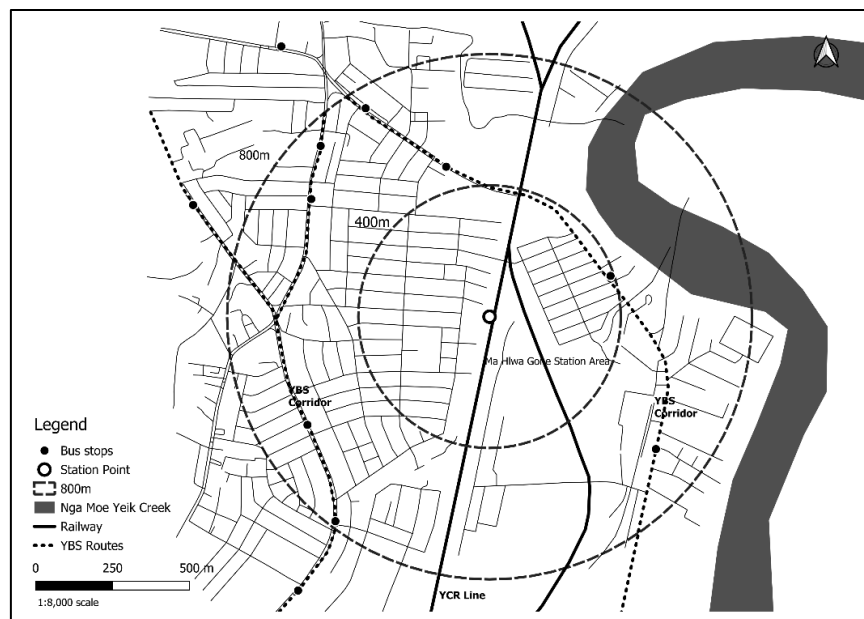


Figure 6. Connectivity Map of the Station (Developed with QGIS by the Authors).

These feeder services remained informal and lacked supporting infrastructure. The station had no clearly designated pick-up or drop-off areas, organized interchange points or formal transfer facilities.

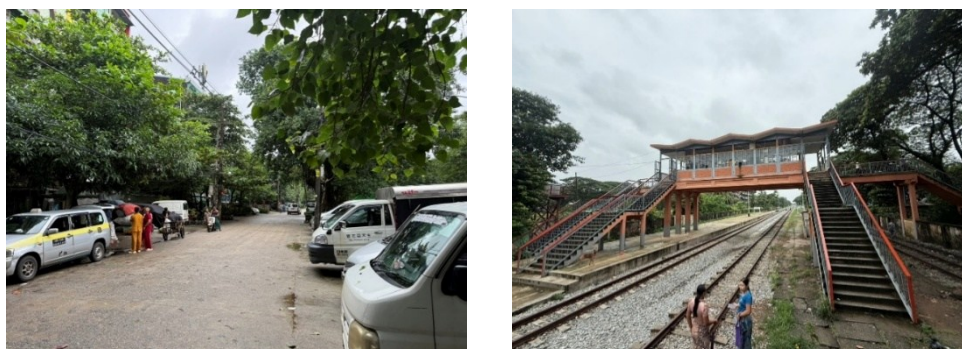


Figure 7. Station Area Conditions.

Connections to YBS were also weak. Although YBS routes operated along nearby main roads, no clear or direct pedestrian links connected bus stops with the station. Passengers used indirect routes and informal paths, making transfers less convenient and reducing the attractiveness of rail travel. Overall, different transport modes were present but poorly connected. The observed system remained

fragmented and lacked organized transfer spaces, direct walking routes and coordinated passenger facilities.

3.5 Governance Barriers

The governance review, legal issues and stakeholder interviews indicate that the main implementation barriers can be regarded as institutional rather than only physical. Currently, railway-owned land, pedestrian infrastructure, road space, public transport coordination and land-use control are managed by different agencies. This creates difficulty in implementing station-area improvements as a single coordinated project. At present, there is no specific TOD or station-area planning mechanism that clearly links YCR improvement with compact urban development, R+P opportunities, and land value capture.

3.6 Socio-economic Conditions and Land Assets

3 features of the station area are relevant to its local economy: the large population, the presence of many small businesses and the amount of land owned by MR. Field observations found shops, markets, food stalls, street vendors and informal transport services along the main pedestrian routes. These activities appeared to depend largely on passengers and daily movement through the area. Interviewees also pointed to several underused railway land parcels. At the present, there is no clear arrangement for linking this land and existing local businesses to future station-area investment or value-capture schemes.

4. Discussion

4.1 STEEP Framework

The STEEP framework was used to interpret the findings beyond the physical conditions of the station area. It shows how walkability, transport integration, land use, economic activity and governance interact to shape the feasibility of station-area transformation. The analysis shows that Ma Hlwa Gone Station has clear development potential, but this depends on improved social inclusion, multimodal integration, land-use efficiency, institutional coordination and more effective management of railway-related land. Table 5 represents the evaluation based on the STEEP framework for this station.

Table 5: Evaluation based on STEEP Framework.

Dimension	Evaluation criteria	Score	Evidence from the study	TOCC implication	Priority action
Social	Pedestrian access, safety, inclusion, universal access and access to daily services	1	Sidewalks are discontinuous or obstructed; crossings are unsafe; shade, lighting and universal access facilities are limited.	Poor pedestrian conditions reduce practical station accessibility, particularly for older people, children and persons with limited mobility. They also weaken station attractiveness and everyday transit use.	Improve continuous sidewalks, safe crossings, lighting, shade and universal access. Manage vendors and roadside parking without removing existing livelihoods.
Technological	Integration between rail, bus and feeder modes; transfer facilities; passenger information and operational coordination	1	YCR-YBS connections are weak; feeder services remain informal; no formal interchange, designated transfer area or coordinated passenger information is available.	Weak integration increases transfer inconvenience and limits the station's ability to operate as an effective transport node.	Provide direct transfer paths, organized feeder stops, waiting areas, signage and coordinated passenger information.
Economic	Local economic activity, railway-owned land,	2	MR-owned land, residential demand, local shops, vendors and services	R+P and LVC may become feasible after accessibility, land	Begin with local-business integration, organized

	development potential, market readiness and feasibility of R+P and LVC		create development potential, but land use remains low in intensity and value-capture mechanisms are absent.	management and institutional conditions are improved. The present condition represents potential rather than confirmed value uplift.	commercial spaces and phased mixed-use development. Examine railway land leasing, joint development, PPP and LVC mechanisms.
Environmental	Connected urban form, land-use efficiency, mixed use, public space, climatic comfort and reduced motorized dependence	1	Large blocks, fragmented walking routes, railway barriers, limited public space, low-intensity land use and dependence on motorized last-mile travel reduce spatial integration.	Compact development requires better connections, mixed activities and efficient use of existing land, rather than density increase alone.	Promote infill development, mixed-use frontage, shaded pedestrian routes, public spaces and stronger neighborhood-station connections.
Political	Institutional coordination, policy clarity, legal responsibility, implementation capacity and availability of TOD and LVC mechanisms	1	MR, YCDC, YRTC and MoC manage railway land, roads, public transport and planning functions separately. No specific TOD, R+P or LVC mechanism has been established.	Governance fragmentation is the principal barrier to coordinated station-area regeneration and value capture.	Establish an inter-agency station-area working body with shared responsibilities for planning, data, funding, land management and implementation.

The results show that Ma Hlwa Gone Station has an overall low level of development readiness. 4 of the 5 STEEP dimensions received a score of 1 that is indicating substantial constraints related to pedestrian access, transport integration, urban form and institutional coordination. The economic dimension received a score of 2 because local commercial activity, residential demand and railway-owned land provide a basis for future development. Nevertheless, this potential remains conditional on accessibility improvements, clearer land-management arrangements and stronger inter-agency coordination. Therefore, R+P and LVC should not be treated as immediate financing solutions. The mechanisms should be introduced gradually after the basic physical and institutional conditions for value creation have been established.

4.2 R+P, Urban Economy and Distributional Implications

The challenges around Ma Hlwa Gone Station extend beyond physical infrastructure and reflect wider spatial, institutional and economic conditions. Poor walkability, fragmented land use and weak multimodal integration reduce accessibility while divided responsibilities limit coordinated development. The findings indicate that station-area outcomes depend on the interaction between accessibility, governance and feasible development mechanisms.

Improved sidewalks, safer crossings and clearer connections between YCR, YBS and feeder services could enlarge the effective station catchment. Higher passenger and pedestrian flows could strengthen access to employment, education, markets and public services while supporting local shops, food services, vendors and informal transport operators. Accessibility improvement should therefore be understood as both a mobility intervention and a local economic development strategy.

Railway-owned land provides a possible basis for phased R+P development. Suitable non-operational sites could accommodate mixed-use frontage, small commercial units, public facilities, pedestrian space or transport-supportive services. If these measures increase development intensity and market demand, surrounding land and property values may rise over time. This study does not claim that value uplift has already occurred; it identifies the physical and institutional conditions under which future value creation may become possible.

LVC mechanisms should be considered only after basic accessibility and governance conditions have improved. Possible mechanisms include railway-land leasing, joint development, negotiated developer

contributions and public-private partnerships. Revenue could be reinvested in sidewalks, crossings, station facilities, lighting, drainage, feeder stops and public space.

Value capture must also address distributional effects. Rising land values and redevelopment may increase rents or displace small businesses. LVC should therefore include social safeguards such as affordable commercial space, organised vending areas, transparent leasing, community consultation and phased redevelopment. The economic objective should extend beyond land revenue to support local livelihoods, access to urban opportunities and equitable reinvestment of station-related value. Table 6 translates these findings into a 5-phase R+P strategy that links investment, target groups, revenue sources and reinvestment priorities.

Table 6: Phased R+P Strategy for Station Area Development.

Phase	Main action	R+P approach	Target group	Revenue source	Reinvestment
1. Access improvement	Improve sidewalks, crossings, lighting and station entrances.	Prepare conditions for future value creation.	Existing shops, vendors, feeder operators and passengers.	Public or railway funding.	Pedestrian access and basic station facilities.
2. Business organization	Arrange vending areas, feeder stops and commercial frontages.	Short-term permits and low-cost licenses.	Vendors, food stalls, trishaws and small retailers.	Permit fees and modest rents.	Cleaning, lighting and maintenance.
3. Railway land leasing	Use suitable non-operational railway land for small commercial units.	Transparent land leasing.	Local shops, cafés and service businesses.	Lease and rental income.	Sidewalks, drainage and station facilities.
4. Mixed-use development	Develop selected low- to medium-intensity station frontage.	Joint development or PPP.	Local businesses, small developers and community services.	Ground rent and developer contributions.	Transfer facilities and public-space improvement.
5. Land Value Capture	Capture part of the value created by improved accessibility and development.	LVC, air rights, leasing or negotiated contributions.	Larger developers, while retaining space for local businesses.	LVC and development revenue.	Railway upgrading, affordable commercial space and neighborhood infrastructure.

4.3 Strengths and Limitations

The station area has several strengths that could support future railway-oriented development, including a large residential catchment, active local economic activities and extensive railway-owned land. These conditions provide a potential basis for phased R+P implementation, particularly if accessibility, land-use planning and redevelopment strategies are coordinated. The proposed TOCC framework is also useful because it connects accessibility, compact urban development, governance coordination and value-capture mechanisms within a single implementation-oriented approach.

However, important limitations remain. Land-use patterns are fragmented, development intensity is relatively low and transport functions are poorly integrated with surrounding urban activities. Institutional responsibilities are divided among MR, YCDC, YRTC and MoC, limiting coordinated decision-making and the application of R+P and land value capture. In addition, the study does not test financial feasibility, quantify actual land-value uplift or compare multiple YCR stations. The findings should therefore be understood as an exploratory assessment of development potential rather than confirmation of immediate R+P feasibility.

4.4 Planning and Institutional Implications

The findings indicate that Ma Hlwa Gone Station has a meaningful basis for future railway-led development. Its large residential catchment, active local economy and substantial railway-owned land create conditions that could support a more productive station area. At the present, these assets are not well connected. Development intensity remains modest, land-use patterns are fragmented and transport functions are poorly integrated with the surrounding urban fabric. The station therefore retains strategic potential but does not yet perform as a fully developed urban node. Table 7 assigns the main implementation responsibilities to the relevant public, private and community actors.

Table 7: Implementation and Business Model Framework for the Study Area.

Responsible Organizations	Primary Responsibility	Contribution to TOCC Implementation
MR	Railway operations, land management and infrastructure development	Lead implementing agency. Manage railway assets, coordinate station-area redevelopment and facilitate R+P initiatives through railway-owned land
YCDC/YRG	Urban planning and zoning	Support compact and mixed-use development, pedestrian improvements
MoC	National regulatory framework	Provide policy direction and institutional support to align TOCC implementation
YRTC	Integrated public transport planning	Improve multimodal connectivity, coordinate YCR-YBS integration
Private Sector	Real estate investment and commercial development	Participate in mixed-use development, PPP and value-capture projects to support long-term economic sustainability
Local Communities and Businesses	Local economic activities	Contribute to place-making, support local economic vitality and provide feedback
TOCC Coordination Mechanism	Inter-agency coordination and implementation oversight	Facilitate collaboration among MR, YCDC, MoC, YRTC and private stakeholders and data exchange

5. Conclusion

This study assessed the accessibility, land-use structure, multimodal integration, economic potential and governance conditions surrounding Ma Hlwa Gone Station through an implementation-oriented TOCC framework combined with the R+P approach. The analysis drew on GIS mapping, field observations, stakeholder interviews and STEEP assessment within the 400-800 m station catchment. The findings show that the station area has several assets that could support future railway-led urban development, including a large residential catchment, active local businesses and substantial MR-owned land. However, poor walkability, unsafe crossings, weak YCR-YBS integration, fragmented land use and limited institutional coordination reduce the station's current performance. The study also found that R+P potential is conditional rather than immediate. Railway land may support phased mixed-use development and future value capture, but only after improvements in accessibility, land management and inter-agency coordination.

The findings contribute to railway-oriented planning by showing that station proximity and publicly owned land alone are insufficient to generate urban and economic value. The proposed TOCC framework extends conventional TOD assessment by linking accessibility and compact urban form with governance coordination and R+P implementation. Practically, the results support a phased approach that begins with pedestrian improvements, multimodal connections and better organization of local businesses before advancing to land leasing, joint development and value-capture mechanisms. For policymakers, the study highlights the need for a formal coordination mechanism among MR, YCDC, YRTC and MoC to guide station-area planning and reinvestment.

The study is limited by its focus on a single station area and a relatively small group of 9 professional informants. It does not include detailed financial feasibility modelling, hedonic property analysis or detailed quantitative measurement of actual land-value uplift. The walkability and STEEP scores are based on equal weighting and triangulated planning judgment rather than statistical validation. The

findings should therefore be interpreted as an exploratory assessment of development readiness and R+P potential, rather than evidence of confirmed financial feasibility or direct transferability across the entire YCR corridor.

Future research should extend the framework to other potential TOD/TOCC YCR stations with land-use planning, accessibility and market conditions. Financial feasibility of railway-land leasing, joint development, PPP and land-value-capture mechanisms under alternative development scenarios should be a key focus of further research related to that topic. Parallel studies could also be conducted to measure changes in ridership, business activity, land values and pedestrian accessibility after station improvements. Future studies should also examine affordability, vendor displacement and community participation. These issues are important for ensuring that railway-led regeneration improves local conditions without excluding the people and businesses already dependent on the station area.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data availability statement

Data supporting the findings are available from the corresponding author on reasonable request. Interview data are not publicly available because of participant confidentiality.

Institutional Review Board Statement

Institutional review board approval was not required for this non-interventional planning study under the applicable institutional requirements. Participation was voluntary and informed consent was obtained from all interviewees.

CRedit author statement

Zaw Lin Naing: Conceptualisation, methodology, software, formal analysis, investigation, data curation, visualisation, and writing-original draft. Sukulpat Khumpaisal: Supervision, validation, project administration and writing review and editing. Federico Puggioni: Validation and writing review and editing. All authors reviewed and approved the final manuscript.

References

- Al-Kodmany, K., Xue, Q. L., & Sun, C. (2022). Reconfiguring vertical urbanism: The example of tall buildings and transit-oriented development (TB-TOD) in Hong Kong. *Buildings*, 12(2), 197. <https://doi.org/10.3390/buildings12020197>
- Berawi, M. A., Miraj, P., Saroji, G., & Sari, M. (2020). Impact of rail transit station proximity on residential property value: Case study of Jakarta, Indonesia. *Journal of Big Data*, 7(1), 71. <https://doi.org/10.1186/s40537-020-00348-z>
- Berawi, M. A., Saroji, G., Sari, M., Miraj, P., & Kim, A. A. (2020). Land value capture modeling in residential area: A big data/web scraping approach. *Engineering Journal*, 24(4), 249–259. <https://doi.org/10.4186/ej.2020.24.4.249>
- Chang, Z., & Phang, S. Y. (2017). Urban rail transit PPPs: Lessons from East Asian cities. *Transportation Research Part A: Policy and Practice*, 105, 106–122. <https://doi.org/10.1016/j.tra.2017.08.015>

- Das, A., & Roy, S. (2023). The new institutional economic approach to land development game: Integrating transaction cost and efficient institutional framework in synergic urban land use-transport development model. *Heliyon*, 9(1), e12793. <https://doi.org/10.1016/j.heliyon.2022.e12793>
- Dziauddin, M. F. (2023). Quantifying the impact of light rail transit on commercial property values: New evidence from Greater Kuala Lumpur, Malaysia. *Transportation Research Record*, 2677(6), 678–688. <https://doi.org/10.1177/03611981221149728>
- Gao, Y., Cui, X., Sun, X., Feng, H., Liang, P., & Yu, B. (2025). Exploring Transit-Oriented Development (TOD) frameworks for commercial agglomeration around rail stations: a case study of Chengdu, China. *Journal of Asian Architecture and Building Engineering*, 1-20. <https://doi.org/10.1080/13467581.2025.2519895>
- Gong, W., Li, J., & Ng, M. K. (2021). Deciphering property development around high-speed railway stations through land value capture: Case studies in Shenzhen and Hong Kong. *Sustainability*, 13(22), 12605. <https://doi.org/10.3390/su132212605>
- Gunawan, Berawi, M. A., & Sari, M. (2020). Optimizing property income in transit oriented development: A case study of Jakarta TOD. *Civil Engineering and Architecture*, 8(2), 136–143. <https://doi.org/10.13189/cea.2020.080211>
- Hasibuan, H. S., & Mulyani, M. (2022). Transit-oriented development: Towards achieving sustainable transport and urban development in Jakarta Metropolitan, Indonesia. *Sustainability*, 14(9), 5244. <https://doi.org/10.3390/su14095244>
- Iamtrakul, P., & Chayphong, S. (2024). Exploring spatial accessibility to urban activities based on the transit-oriented development concept in Pathum Thani, Thailand. *Sustainability*, 16(5), 2195. <https://doi.org/10.3390/su16052195>
- Iamtrakul, P., Chayphong, S., Seo, D., & Trinh, T. A. (2025). Geo-spatial analysis of transit planning for sustainable tourism development in Bangkok, Thailand. *Journal of Asian Architecture and Building Engineering*, 24(4), 3018–3029. <https://doi.org/10.1080/13467581.2024.2366808>
- Ibrahim, M. K., Sari, M., Zulkarnain, S. H., & Fatt, C. C. (2026). Land Value Capture Potential of Jakarta's LRT: Early Post-Operational Evidence from Residential Property Prices in TOD Zones. *International Journal of Technology*, 17(1), 219-234. <https://doi.org/10.14716/ijtech.v17i1.8024>
- Lee, J. K. (2022). New rail transit projects and land values: The difference in the impact of rail transit investment on different land types, values and locations. *Land Use Policy*, 112, 105807. <https://doi.org/10.1016/j.landusepol.2021.105807>
- Li, C., & Aveline-Dubach, N. (2025). The limits of a success story: Rethinking the Shenzhen Metro “Rail Plus Property” Model for planning sustainable urban transit in China. *Land*, 14(8), 1508. <https://doi.org/10.3390/land14081508>
- Li, J., & Huang, H. (2020). Effects of transit-oriented development (TOD) on housing prices: A case study in Wuhan, China. *Research in Transportation Economics*, 80, 100813. <https://doi.org/10.1016/j.retrec.2020.100813>
- Li, X., & Love, P. E. D. (2022). Procuring urban rail transit infrastructure by integrating land value capture and public-private partnerships: Learning from the cities of Delhi and Hong Kong. *Cities*, 122, 103545. <https://doi.org/10.1016/j.cities.2021.103545>
- Li, X., Love, P. E. D., Luo, H., & Fang, W. (2022). A systemic model for implementing land value capture to support urban rail transit infrastructure projects. *Transportation Research Part A: Policy and Practice*, 156, 90–112. <https://doi.org/10.1016/j.tra.2021.12.010>
- Panwar, M., & Fandian, S. (2025). Influence of the mass rapid transit system on plotted residential property prices: A case study of Gurugram, India. *Journal of Contemporary Urban Affairs*, 9(2), 387–401. <https://doi.org/10.25034/ijcua.2025.v9n2-4>
- Rennert, L. (2022). A meta-analysis of the impact of rail stations on property values: Applying a transit planning lens. *Transportation Research Part A: Policy and Practice*, 163, 165–180. <https://doi.org/10.1016/j.tra.2022.06.013>



- Rojas, A. (2024). Train stations' impact on housing prices: Direct and indirect effects. *Transportation Research Part A: Policy and Practice*, 181, 103979. <https://doi.org/10.1016/j.tra.2024.103979>
- Sapsangthong, A., Nitivattananon, V., Chollacoop, N., Nguyen, T. P. L., & Santoso, D. S. (2025). Assessing Transit-Oriented Development integrated practices of land use, transport, and socioeconomics toward sustainable urban development in Thailand. *Urban Rail Transit*, 11, 1–25. <https://doi.org/10.1007/s40864-025-00251-x>
- Sharma, R., & Newman, P. (2020). Land value capture tools: Integrating transit and land use through finance to enable economic value creation. *Modern Economy*, 11(4), 938–964. <https://doi.org/10.4236/me.2020.114070>
- Su, S., Zhang, J., He, S., Zhang, H., Hu, L., & Kang, M. (2021). Unraveling the impact of TOD on housing rental prices and implications on spatial planning: A comparative analysis of five Chinese megacities. *Habitat International*, 107, 102309. <https://doi.org/10.1016/j.habitatint.2020.102309>
- Trolese, M., De Fabiis, F., & Coppola, P. (2023). A walkability index including pedestrians' perception of built environment: The case study of Milano Rogoredo Station. *Sustainability*, 15(21), 15389. <https://doi.org/10.3390/su152115389>
- van Zoest, S., & Daamen, T. A. (2024). Explaining value capture implementation in New York, London, and Copenhagen: Negotiating distributional effects. *Urban Affairs Review*, 60(5), 1349–1381. <https://doi.org/10.1177/10780874231222174>
- Vichiensan, V., Wasuntarasook, V., Hayashi, Y., Kii, M., & Prakayaphun, T. (2021). Urban rail transit in Bangkok: Chronological development review and impact on residential property value. *Sustainability*, 14(1), 284. <https://doi.org/10.3390/su14010284>
- Xuto, P., Anderson, R. J., Graham, D. J., & Hörcher, D. (2023). Sustainable urban rail funding: Insights from a century-long global dataset. *Transport Policy*, 130, 100–115. <https://doi.org/10.1016/j.tranpol.2022.10.005>
- Yang, J., Zhu, L., Duan, Y., Zhou, J., & Ma, H. (2020). Developing metro-based accessibility: Three aspects of China's Rail + Property practice. *Transportation Research Part D: Transport and Environment*, 81, 102288. <https://doi.org/10.1016/j.trd.2020.102288>
- Yang, L., Chau, K. W., Szeto, W. Y., Cui, X., & Wang, X. (2020). Accessibility to transit, by transit, and property prices: Spatially varying relationships. *Transportation Research Part D: Transport and Environment*, 85, 102387. <https://doi.org/10.1016/j.trd.2020.102387>
- Yen, B. T. H., Feng, C. M., & Lee, T. C. (2023). Transit-oriented development strategy in Taiwan: An application of land value capture. *Asian Transport Studies*, 9, 100094. <https://doi.org/10.1016/j.eastsj.2022.100094>
- Zhang, D., Liu, J., Liu, K., & Zhang, Y. (2024). The non-linear impact of urban rail transit on commercial property prices: Based on a spatial heterogeneity perspective. *Applied Geography*, 171, 103385. <https://doi.org/10.1016/j.apgeog.2024.103385>
- Zhang, M., & Yen, B. T. H. (2020). The impact of Bus Rapid Transit (BRT) on land and property values: A meta-analysis. *Land Use Policy*, 96, 104684. <https://doi.org/10.1016/j.landusepol.2020.104684>



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