

Reactivating High-Density Suburbs: From Regional to City-Wide Service

– A Case Study of Yishun and Jurong East in Singapore

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Abstract

This study explores suburban upgrading as a solution to alleviate urban stress in high-density cities, focusing on Yishun and Jurong East in Singapore. Using MRT passenger flow data from the Land Transport Authority, processed through R to create an Origin-Destination matrix, the study analyses temporal and spatial patterns of population flow. It also examines data from the Urban Redevelopment Authority, and Interviews with residents, identifying key factors behind the reactivation of suburban areas. Results show that revitalized suburbs maintain their appeal within the city, easing density in central areas. The study highlights three strategies: promoting mixed-use land development, enhancing transportation models through Transit-Oriented Development (TOD), and preserving green spaces. These findings offer valuable insights for suburban redevelopment in other high-density cities, particularly in the Global South, and demonstrate how cities can balance population growth with liveability to ensure sustainable urban development.

Keywords

Suburban reactivating, Sustainable development, High-density cities, Mixed land-use, Transit-Oriented Development, Green spaces

1. Introduction

In the 21st century, global urban development has progressed rapidly, accompanied by a significant rise in urbanization rates. The global urbanization rate reached 56.2% by 2020 (World Bank, 2024). In particular, for such fast-developing Asian countries as China, Malaysia, and Singapore, the urbanization rate has reached 61.4%, 77.2%, and 100%, respectively (World Bank, 2024). Several fast-growing Asian cities even reached full urbanization at the beginning of this century, with their built-up areas and populations expanding several-fold in a very short time (Cheng et al., 2023).

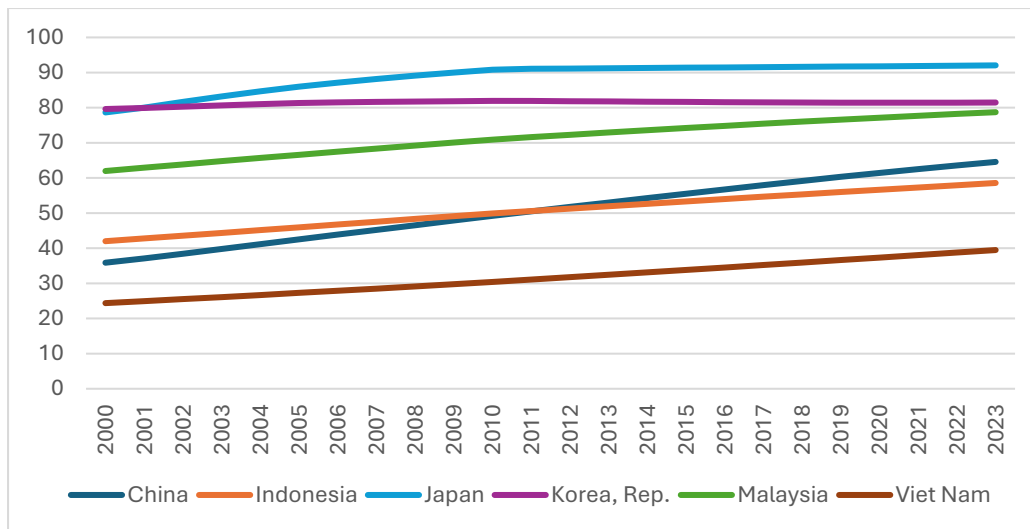


Figure 1. Changes of urbanization rate in some Asian countries in this century

Source: World Bank, 2024

This rapid urbanization often imposes significant pressure on housing, transportation, and the environment (Sumari et al., 2020; Wang et al., 2020). To alleviate these challenges, developing suburban areas and building new towns have become essential strategies for these Asian cities (Hanlon and Vicino, 2018).

The development of suburban areas exerts a positive role in terms of population redistribution and maintaining urban sustainability. Suburban growth promotes urban development while encouraging population decentralization (Ekers et al., 2012). This decentralization helps reduce traffic congestion and housing shortages in central cities. It further provides low- and middle-income groups with opportunities for affordable housing, which maintains urban vitality at the suburban area (Tong et al., 2019).

Additionally, suburban development diversifies urban economic growth, reducing reliance on the city centre and spreading economic activities outward, forming a multipolar urban economic development model that enhances economic resilience (Sadewo et al., 2023; Wood and Phelps, 2020). Moreover, suburban development contributes positively to urban ecological preservation. Natural environments and wildlife around cities can enrich suburban residents' lives (DeStefano and DeGraaf, 2003). Creating green belts and a continuous urban green space system can enhance the overall ecological attributes of cities and address environmental issues to some extent (Keil and Macdonald, 2016; Li et al., 2005).

However, with continuous suburban development, numerous new problems have emerged. Many suburban developments merely serve as geographical substitutes for urban areas, representing metropolitan construction and reconstruction at the edges (Keil, 2020). Such development lacks the demonstration of the unique ecological and geographical advantages of suburban areas, rendering them less attractive compared to city centres. Furthermore, aging suburbs from previous developments are continually losing their appeal, as noted by Keil (2020), "the suburbs have been out of style," and their attractiveness has diminished.

Currently, there are numerous issues in suburban development, which urgently need to be addressed to enhance their appeal. However, there is a noticeable lack of research on how to restore the appeal of aging suburbs and rejuvenate them. This lack of research is partly due to the late start of high-density suburban development in many cities (Brewer and Grant, 2015), where the demand for suburban renewal is not yet pressing. In early-developed cities, suburban density is relatively low (Spencer et al., 2015), and these areas still meet residents' needs, reducing the urgency for renewal. However, in high-density cities, the rapid

aging of suburban infrastructure has caused significant disruptions to residents' mobility, recreation, and daily lives (Ren, 2021). Therefore, suburban renewal in high-density cities is imperative.

Given the significant differences in economic, social, and spatial structures between suburbs and city centres (van der Veer, 1994), traditional urban renewal theories may not directly guide suburban renewal. Therefore, this paper will explore issues related to suburban renewal and propose valuable and feasible strategies for suburban revitalization.

2. Literature Review: The Decline of Suburbs

Historically, since the 1970s, many scholars have focused on the decline of inner cities and subsequent urban renewal and redevelopment (Badcock, 2001). However, it wasn't until this century that researchers gradually began to turn their attention to the decline and diminishing attractiveness of urban suburbs. In many cases, the decline in suburban appeal has been more severe and rapid than that of inner cities (Lucy and Phillips, 2000). Scholars attribute the decline in suburban attractiveness to several factors, including the aging and inadequacy of suburban infrastructure, social inequities, and the environmental degradation caused by suburban development.

2.1. Aging Infrastructure and Declining Attractiveness in Suburbs

The aging of suburban infrastructure has significantly contributed to the decline in suburban appeal. Due to lower levels of urban construction and investment in suburban areas compared to inner cities, the public resources available in suburbs—particularly infrastructure—often lag behind those in central urban areas, both in quantity and quality. As a result, suburban facilities for services, recreation, and other public amenities are often inferior (Randolph and Tice, 2014). As this already insufficient infrastructure continues to age and lacks the necessary funding for timely upgrades, the quality of life in suburban areas deteriorates, making daily life more challenging for residents (Lucy and Phillips, 2000).

In addition, a large number of suburbs were designed with a more middle-class, car-based lifestyle in mind, resulting in a lack of good public transport and pedestrian experience in these areas. The spatial separation and distance between residential and commercial areas in some suburban areas, where shopping centres are only accessible by car and parking facilities around these malls and institutions reinforce the separation between the different functions (Samarütel et al., 2010), make the daily life of car-less residents in these areas even more difficult. The negligent design of walking and cycling systems has also led to difficulties in accessing the urban landscape of the neighbourhood in everyday life, resulting in a lack of sense of belonging to the community (Larco et al., 2013).

At the same time, the neglect of the elderly in suburban design has led to a general lack of age-friendly facilities, which has also caused many inconveniences for older people living in the suburbs, directly undermining the psychological and physical health and well-being of those living in the suburbs (Campbell, 2015), and the simultaneous ageing of both the elderly and the infrastructure in the suburbs has brought to light this otherwise latent vulnerability (Hartt et al., 2023).

In addition to social infrastructure, the ageing of engineered infrastructure also makes routine maintenance in the suburbs more difficult. Spacious, large houses, which are an otherwise important source of attractiveness in suburbs, tend to have more stringent requirements for engineered infrastructure such as electricity and water supply and drainage (Wiesel et al., 2013). But as houses as well as engineered infrastructure age, these facilities tend to require more routine inspection and maintenance

(Arumsari and Rarasati, 2017), which inevitably puts more financial pressure on suburban residents, making suburbs even less attractive (Wiesel et al., 2013).

2.2. Deepening Spatial Inequality and Declining Attractiveness in Suburbs

The segregation and inequality evident in suburban areas have also contributed to their growing notoriety. As King (2004, p. 99) pointed out, “The essence of modern suburbs is physical, social, and spatial separation.” This distinction between suburbs and cities has led to clear geographic divides in income and social class (Swanstrom et al., 2002). Such segregation has resulted in suburban areas being at a disadvantage in terms of social composition, service capacity, and fiscal revenue, leading to the continuous loss of well-educated, skilled workers and further weakening the professional prospects of these areas (Pham, 2024). The ongoing exodus of skilled workers and the middle class further destabilizes the social structure of suburban areas, so much so that “images of failure, insecurity, and threat have come defining features of modern suburbs” (Mack, 2023, p.659).

In immigrant nations, this segregation often manifests as racial divides, where suburbs become associated with crime and failure, which in turn becomes linked to specific racial groups, resulting in a dual stigmatization of both the suburbs and certain races. This, in turn, exacerbates racial inequality (Hess, 2021). Moreover, as previously mentioned, the inadequacy and poor quality of public facilities in suburban areas intertwine with social class and racial segregation, further intensifying suburban inequalities. In some suburban areas, the low density of public transportation infrastructure leads to poor accessibility, worsening the employment inequities faced by suburban workers (Filion and Keil, 2017). The weak educational resources in suburban areas further reduce the opportunities for residents’ children to receive quality education, perpetuating these inequalities across generations (Lleras, 2008).

2.3. Deterioration of the Environment and Declining Attractiveness in Suburbs

The overdevelopment of suburban areas has, to some extent, damaged the environment and local ecosystems, diminishing the natural beauty that once defined their appeal. Studies show that while the natural environment of suburbs may still be better than that of city centres, suburban development has nonetheless negatively impacted the environment, particularly through overdevelopment, which often leads to rapid environmental deterioration (Keil, 2020). The sudden surge in traffic, industrial activity, and waste emissions in rapidly built high-density suburban areas has severely polluted suburban land (Shi et al., 2010). The air and groundwater in suburban areas have also been adversely affected (Camagni et al., 2002; Hu et al., 2024), creating what Mack (2023, p.660) describes as an “inhumane and unattractive environment.”

Environmental degradation has also led to rapid ecological deterioration. High-density suburban development has quickly converted green spaces into high-intensity urban land, and the constantly changing development scope has posed serious challenges to the local ecology (Tian and Qian, 2021). Unchecked suburban construction has disrupted the ecological corridors that had naturally evolved over decades around urban areas (Peng et al., 2017), disturbing habitats for various species, including birds (Blair, 2004), thereby shattering the idyllic, pastoral vision once associated with suburban living. Furthermore, the deterioration of suburban ecology and environment has ultimately affected the physical health of suburban residents (Loh and Brieger, 2014), making suburbs even less attractive to potential inhabitants.

3. Methodology

3.1. Site Selection

This study focuses on Singapore, a mature and highly urbanized Asian city-state. By 2018, Singapore had achieved complete urbanization. Characterized by its high population density, Singapore is home to 5.92 million people living on just 735.6 square kilometres of land, making it a quintessential high-density city (Singapore Department of Statistics, 2024). To alleviate urban pressures, particularly those related to housing, the Singapore government established the Housing Development Board (HDB) in 1960 and initiated the construction of new towns (Eng, 1996), becoming one of the earliest adopters of suburban development in Asia.

However, this also means that Singapore's earliest new towns, now over 50 years old, have become outdated. The infrastructure is aging, the service capacity fails to meet current community needs, and they lack attractiveness, thus providing limited assistance to ongoing population growth. In recent years, the Urban Redevelopment Authority (URA) has proposed the rejuvenation of old towns through suburban revitalization plans, aiming to restore the attractiveness of these suburban "new towns" by updating their infrastructure. Given this context, Singapore, as an early-developed nation, offers valuable insights and reference points for other countries.

Specifically, the study will focus on Yishun and Jurong East, two new towns located in the northeastern and southwestern parts of Singapore, respectively. These areas are significant high-density residential zones and are key regions in the suburban revitalization plans for rejuvenating old towns, which is a typical case of suburban renewal in Singapore. Therefore, selecting these two areas will effectively demonstrate how suburbs can be reactivated and how they can maintain their attractiveness to both local and external populations.

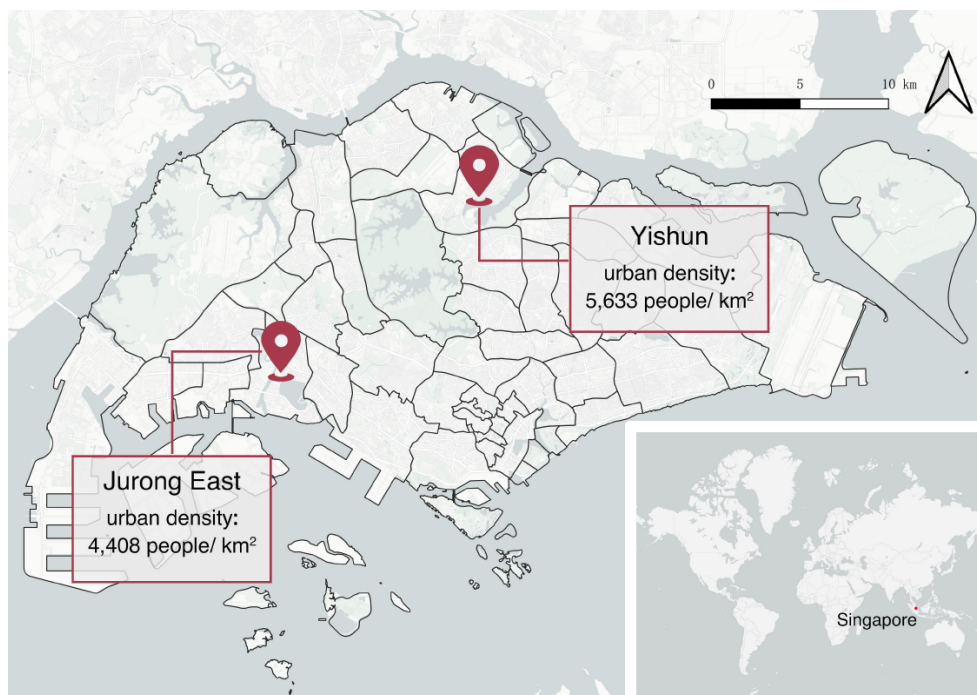


Figure 2. The site of Yishun and Jurong East and Singapore's location

Source: By Author

3.2. Research Method

This study employs a mixed-methods approach to collect and analyse data. The research is divided into two distinct phases. The first phase involves a quantitative analysis of the attractiveness of Singapore's suburban new towns using relevant traffic and population movement data. The second phase focuses on qualitative data collection and analysis through the gathering of materials and reports related to the redevelopment of specific suburban new towns and conducting interviews with local residents. Choosing this explanatory sequential research design is due to the fact that subsequent qualitative data will help explain the initial quantitative results, providing deeper insights into the research questions.

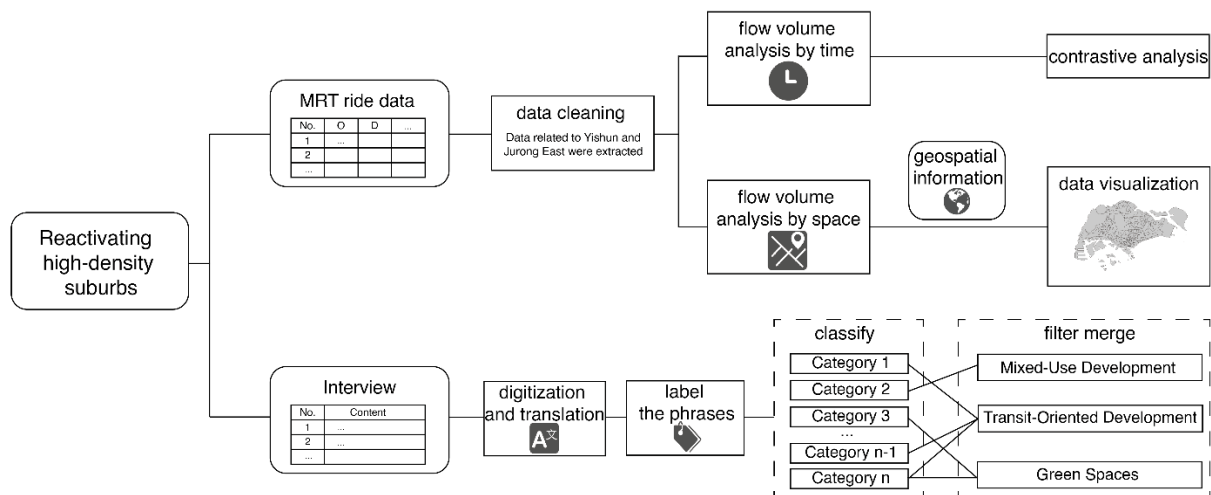


Figure 3. Research Flow

Source: By Author

3.2.1. Traffic Data Comparative Analysis

In the first phase, the study obtained Singapore-wide MRT passenger flow OD data from LTA from 2020 to 2024. This dataset mainly consists of variables such as the origin and destination station numbers of MRT rides, the specific year and month of the ride, the type of time (weekday or rest day), and the passenger flow statistics under the specific variables. Factors such as the intensity of passenger traffic in this dataset help to reflect the strength of the attractiveness of the new suburban city. Since only the first half of the year 2024 was available, data for that year was excluded. In the end, a total of 2.12 million MRT rides with different times and starting and ending points were obtained for the period from 2020 to 2023, with 134 million passenger trips.

Meanwhile, the study utilises the spatial dataset from OpenStreetMap to spatially correspond MRT stations by serial numbers for easy visualisation.

In addition, the study utilised the Master Plan 2019 land properties as well as zoning boundaries dataset from URA to define the boundaries and land use of the new city.

After collecting the above receipts, the study used R to count and integrate the relevant OD data to calculate the hourly outbound passenger flow at a given station using the following formula:

$$F_{d,h} = \sum_{\substack{d=1 \\ d \neq o}}^{n-1} x_{o-d,h} \quad (1)$$

Where:

o - the origin station,

d - the destination station,

n - the total number of MRT stations,

h - the hour (measured in hours),

$x_{o-d,h}$ - the number of trips from origin o to destination d during a specific hour

$F_{d,h}$ - the passenger flow alighting at station d during hour h .

Next, the study used the following formula to calculate the average hourly outbound passenger flow across multiple stations:

$$\bar{F}_h = \frac{1}{n} \sum_{o=1}^n \sum_{\substack{d=1 \\ d \neq o}}^{n-1} x_{o-d,h} \quad (2)$$

The specific station information in the OD dataset was then integrated with spatial data from OpenStreetMap. This provided spatial information for each station. Notably, the study found that some stations had changed locations or were closed. To accurately reflect changes in passenger flow within the OD dataset, these stations were retained based on their status during the relevant year. Using the following formula, the study generated a daily average passenger flow OD matrix:

$$F_{o-d} = \sum_{h=5}^{24} x_{o-d,h} \quad (3)$$

Finally, the OD matrix was visualized in QGIS by integrating it with spatial information (Tu et al., 2021). The analysis is also further enriched by combining it with land boundaries and other contextual information.

3.2.2. Semi-structure Interview

In the second phase, the study conducted interviews with residents of two key suburban new towns: Jurong East and Yishun. The research used semi-structured interviews. To explore the topic in depth, a set of open-ended questions was employed. Respondents were also encouraged to share additional relevant information. This approach provided a more comprehensive understanding of residents' perceptions of local urban renewal and attractiveness.

A total of 28 participants, including residents and visitors, were interviewed in Jurong East and Yishun. Some interviews were cut short due to language barriers or scheduling conflicts. However, 23 interviews were successfully completed. Each completed interview lasted over 20 minutes, ensuring data saturation (Marshall et al., 2013). The median age of participants was 51.6 years. Most respondents (66.7%) were local residents.

During this stage of data analysis, the study used coding analysis to identify the themes in it and processed the text using the analytical approach proposed by Braun & Clarke (2006). After completing the digitisation

of the relevant interview transcripts, the study categorised and labelled the phrases in the manuscripts and represented them with different codes, and further reviewed the codes to categorise them under different subjects and validated the subjects using deductive methods. Eventually, the study screened and merged the subjects to form three main themes, which were categorised and named.

4. Results and discussion

4.1. Attractiveness Analysis Results

Analysing the dataset by extracting data specific to weekends and holidays provides a better reflection of people's travel intentions and, consequently, a more accurate representation of the attractiveness of the respective areas. Using Formula 1, the hourly passenger outflow for Yishun and Jurong East was calculated. Formula 2 was then applied to compute the average hourly passenger flow for suburban MRT stations outside the Central Region.

The analysis revealed that the average hourly passenger flows for Yishun and Jurong East were 16,770.75 and 33,890.1, respectively, representing 2.7 to 5.4 times the average for suburban MRT stations. Figure 4 visualizes the relationship between passenger flow and time, showing that Jurong East MRT station exhibited two distinct peaks at 12:00 and 17:00. These patterns differ significantly from the average suburban MRT station and align with common dining and entertainment times (Jones and Clarke, 1988), indicating the high recreational appeal of the Jurong East area. Similarly, Yishun consistently recorded higher hourly passenger flows compared to the average, with a pronounced peak at 17:00.

Additionally, over 75% of Yishun's passenger flow occurred between 9:00 and 20:00, contrasting with the typical non-working day return travel pattern concentrated between 20:00 and 8:00 the next day (Jiang et al., 2012). This suggests that Yishun attracts a significant number of non-local residents for various activities during the day.

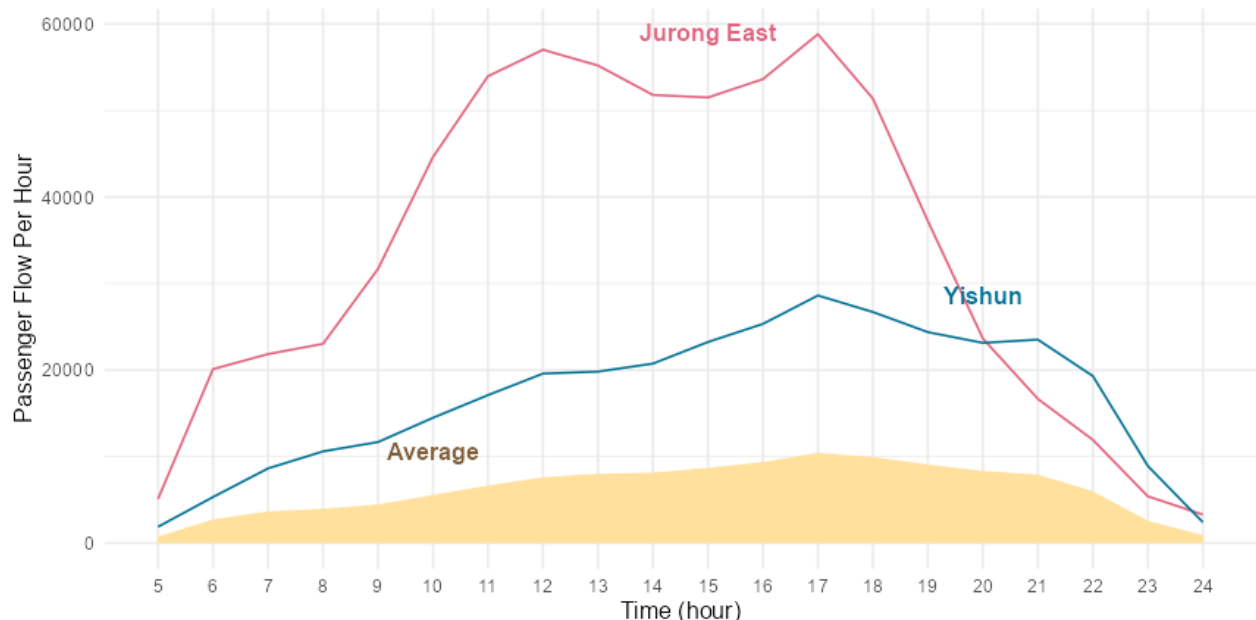


Figure 4. Hourly passengers flow of suburban MRT stations

Source: By Author

The daily average passenger flow analysis further supports that Jurong East and Yishun are the two most populated suburban areas outside the Central Region (Figure 5). Jurong East stands out as one of the busiest non-working day transit areas in western Singapore, with passenger volumes comparable to some central areas. Yishun, on the other hand, is a major hub for MRT traffic in northeastern Singapore, second only to Punggol, a developing new town in eastern Singapore (HDB, 2024). Studies indicate that daily MRT passenger flow effectively reflects the overall population activity intensity in an area (Kim et al., 2022). Therefore, it can be inferred that Jurong East and Yishun experience significantly higher population activity intensity on non-working days compared to other suburban areas, demonstrating vibrant urban vitality. Furthermore, MRT passenger flow is correlated with economic, particularly commercial, activity levels (Yu et al., 2022), suggesting that Jurong East and Yishun serve as crucial commercial activity centres in the western and eastern suburbs, respectively.

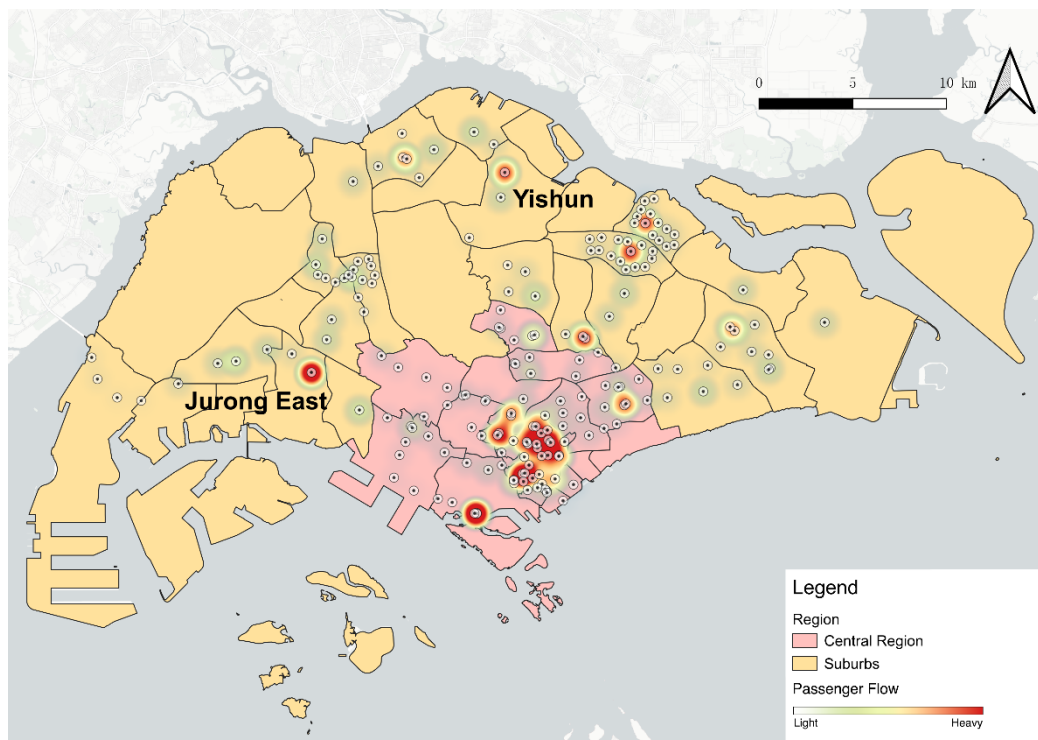


Figure 5. Average daily passengers flow by MRT station

Source: By Author

Using Equation 3, an OD matrix was calculated with Jurong East and Yishun as destination points (Figure 6 and Figure 7). The results show that Jurong East attracts a large number of visitors from the eastern region on non-working days, with a daily average of over 70,000 visitors from several neighbouring stations. Additionally, Jurong East maintains considerable attraction across much of the northern region, with 72.7% of MRT stations in the north sending more than 6,000 passengers daily to Jurong East. The furthest station with significant passenger flow to Jurong East is Tampines MRT station, located approximately 22.88 km away in the western region, from which Jurong East attracts 7,946 passengers daily on non-working days, demonstrating its strong comprehensive appeal across considerable distances (Ni et al., 2018). Similarly, Yishun exerts a strong pull on surrounding areas, with 42.98% of non-working day passenger flow to Yishun originating from the city centre, indicating Yishun's substantial impact on the central area and its effective role in bridging the urban-suburban living service zones (Zhang et al., 2016).

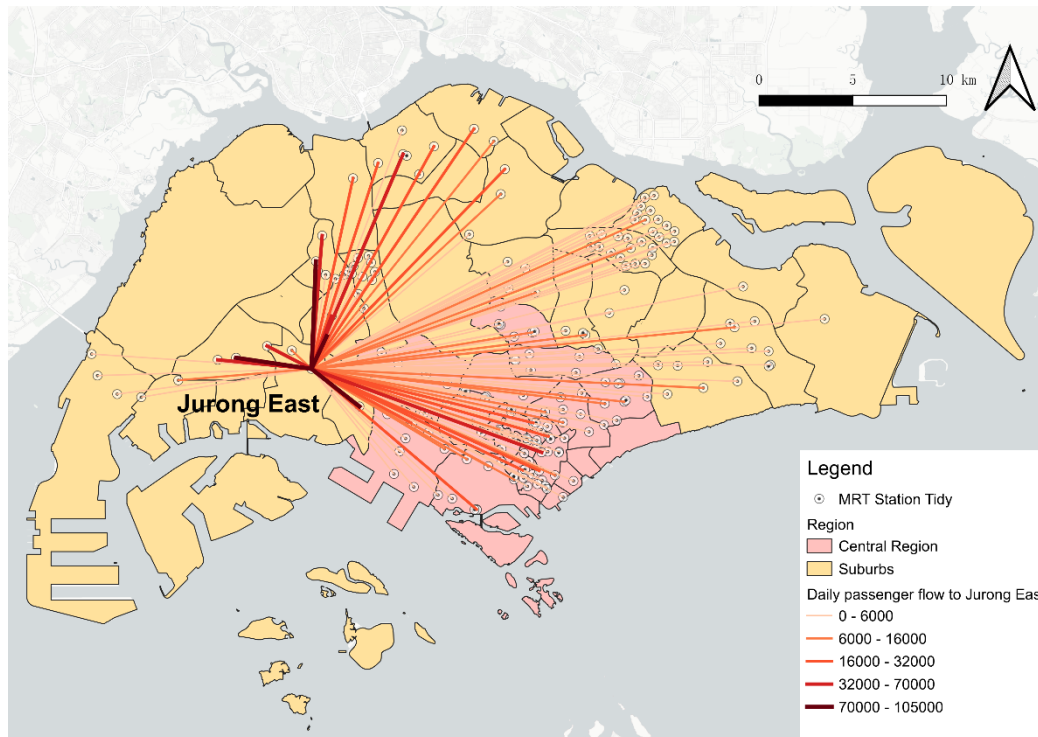


Figure 6. Passenger traffic terminating at Jurong East

Source: By Author

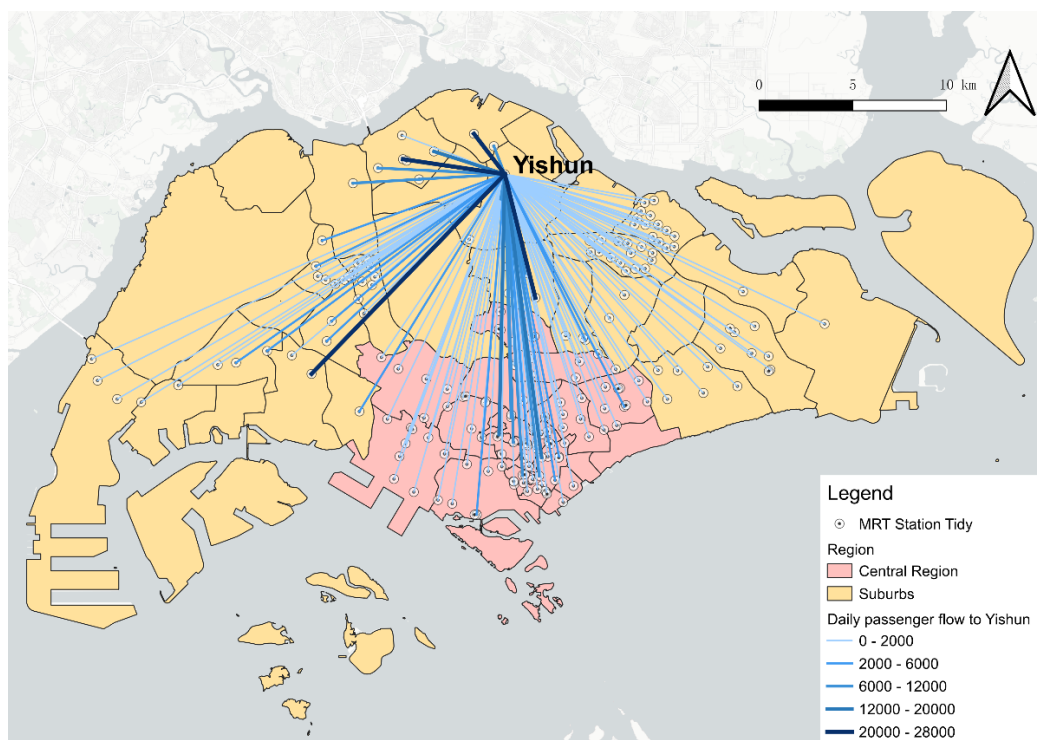


Figure 7. Passenger traffic terminating at Yishun

Source: By Author

4.2. The Role of Mixed-Use Development in Suburban Revitalization

Typically, mixed-use development is more common in urban centres, where it arises as a passive response to high-density and scarce land use (Shi and Yang, 2015). However, interviews with residents reveal that mixed-use development in suburban areas can also quickly revitalize these spaces. Specifically, the integration of commercial and residential projects effectively ensures a steady flow of people in suburban malls. By offering convenience and reducing the travel costs of nearby residents, mixed-use commercial developments help avoid the waste and pollution associated with traditional transportation, thereby promoting the overall sustainability of the community (Ewing and Cervero, 2001). Additionally, these commercial projects leverage the so-called “proximity effects” (Yang et al., 2016) to attract nearby residents, addressing the challenge of insufficient population that often leads to operational difficulties in suburban malls (Ooi and Loo-Lee, 2007). This also provides convenience for residents, as one talked:

“We live right above (the mall), so it’s very convenient... I used to not want to go to the mall, but now it’s indeed very convenient.” (54-year-old Interviewee, Local)

Moreover, mixed-use commercial complexes can effectively utilize residents’ social networks to attract more customers, further enhancing the vibrancy of the area:

“Some friends used to come over, and we’d have coffee or dine together here... They all love coming here...” (65-year-old Interviewee, Local)

“My son brings my grandson to visit me on weekends, and we often choose to dine here; there’s a great variety—Chinese food, Thai food, Malay food, all sorts... very good... It’s close and convenient...” (75-year-old Interviewee, Local)

Such commercial complexes, with a solid customer base, are more capable of sustaining their size and thriving atmosphere, thereby attracting even more foot traffic, leading to a positive feedback loop (Ooi and Loo-Lee, 2007).

Additionally, the joint arrangement of infrastructure, particularly service-oriented infrastructure, and commercial complexes can effectively enhance service levels and increase infrastructure utilization. This, in turn, brings more foot traffic to the commercial complexes, fostering a mutually beneficial situation:

“There’s a government activity centre here. I bring my son over for activities on weekends... Sometimes we just browse nearby, and since it’s indoors, we don’t have to worry about the rain... Sometimes, after the activity, we can grab a bite to eat nearby...” (37-year-old Interviewee, Visitor)

“The library moved here (into the commercial complex), and now the lighting and everything is more comfortable than before... not to mention, the air conditioning is much better than before.” (61-year-old Interviewee, Local)

However, the flourishing development of such mixed-use complexes often leads to an increase in land value (Yang et al., 2016), which, in turn, causes a rise in prices within the complex, potentially affecting the daily lives of nearby residents:

“The prices at this food court are very high, and they keep going up... If they keep increasing, I’ll have to go to Johor Bahru (a city on the border between Singapore and Malaysia) to eat.” (65-year-old Interviewee, Local)

Some scholars argue that this reasonable increase in prices, especially rising rental costs, to some extent, reflects the improved overall quality of the area (Sakashita, 1993; Song and Knaap, 2004). For suburban areas, this indirectly proves the increasing attractiveness of the region.

However, mixed-use development may also bring about noise and space occupation issues for local residents, referred to as “disamenity effects,” which can reduce the benefits that proximity effects bring to the community (Yang et al., 2016). Yet, in terms of attractiveness, this diversified and vibrant atmosphere also helps to foster stronger community ties (Song and Knaap, 2004).

4.3. The Role of Transit-Oriented Development (TOD) in Suburban Revitalization

As numerous studies have revealed, transit-oriented development (TOD) effectively integrates urban transportation, planning, and design, offering comprehensive and sustainable urban development solutions for regions (Ibraeva et al., 2020). In suburban areas, this integrated urban development model brings core urban elements while avoiding the busyness, chaos, and congestion typical of city centres, maintaining vibrancy and robust functionality (Hall and Tewdwr-Jones, 2010; Howard, 1951). In interviews conducted for this study, respondents emphasized that under Singapore’s strict regulations on private vehicle usage (Olszewski, 2007), TOD not only made their daily commutes more convenient but also made locations near transit stations popular choices for their daily activities:

“We don’t live in Yishun; I came with my child from Sembawang... Didn’t get rained on at all; in Yishun, it’s very obvious—once you exit the MRT station, you’re right at Northpoint City (mall); everyone likes coming here.” (37-year-old Interviewee, Visitor)

“After work, I just grab a bite near the MRT station; it’s very close.” (40-year-old Interviewee, Local)

The combination of robust functionality and convenient transportation not only brings convenience to nearby residents but also significantly enhances the attractiveness of the area, effectively alleviating pressure on city centres. In some cities, this pressure shift occurs as businesses relocate part of their operations or even headquarters to the suburbs due to lower land prices and better transportation conditions (Knowles, 2012). Although many businesses in Singapore remain concentrated in the city centre and Changi Business Park (Muzaini et al., 2013), the pressure on the city centre is relieved through two additional mechanisms. First, the comprehensive service offerings at TOD stations and their surrounding areas attract residents from other regions. Second, the improved facilities allow suburban residents to enjoy services similar to those in the city centre, reducing the need to travel into the city:

“It’s convenient to come to Jurong East—just takes a little over ten minutes... And you can buy everything here; it’s no different from Orchard Road... I usually come here (to Jurong East), and rarely go to Orchard Road—it’s too far.” (48-year-old Interviewee, Visitor)

Furthermore, the mixed-use TODs, connected through atrium and elevated systems, link stations to open and dynamic urban interfaces. This networked system enhances urban mobility and further increases the attractiveness of the area (Yang et al., 2019), a structure that has been well-received by residents. In the development of Jurong East, such elevated systems integrate the entire urban area’s malls, hospitals, offices, and other functions, connecting them with the elevated MRT station, ground-level bus terminal, and taxi stands to form an integrated urban system known as J-Walk. This system is activated daily by food courts and cafes and further attracts people through special activities on holidays. Although this model has been criticized for issues such as the privatization of public urban space and the reinforcement of gentrification (Cuthbert and McKinnell, 2001), it successfully attracts both daily commuters and visiting tourists, efficiently directing them to their respective destinations through a well-developed, integrated urban system (Xue et al., 2012):

"Sometimes while walking nearby, I feel like checking out the mall since everything's connected... Especially when it rains, you're completely sheltered (between facilities), no need to worry about getting wet... If I get tired, I can quickly head home." (57-year-old Interviewee, Local)

4.4. The Role of Green Spaces in Suburban Revitalization

Green spaces are often considered one of the most crucial components of urban infrastructure (Tian and Jim, 2012). They serve physical functions such as mitigating urban heat island effects, absorbing pollutants, and reducing noise (Knowles, 2012), while also providing psychological benefits by alleviating stress among residents (Grahn and Stigsdotter, 2010). Some scholars argue that urban green space planning essentially involves introducing natural and semi-natural suburban spaces into the highly developed urban core (Ozyavuz, 2012). Consequently, suburban areas naturally hold an advantage when it comes to green spaces. With their large, intact green areas, suburbs can significantly attract residents from city centres, who often have access only to small, fragmented, and low-quality green spaces (Jim and Chen, 2006; Žlender and Ward Thompson, 2017). Research also shows that even when urban parks are well-maintained, people tend to prefer spending their leisure time in woodlands, suburban parks, and edge forests (Grahn and Stigsdotter, 2010). This preference draws many city-centre residents to suburban areas rich in semi-natural spaces:

"My grandson loves coming here, and his parents are happy too... It's great to relax and enjoy some greenery... You can't find parks this nice over in Toa Payoh." (75-year-old Interviewee, Local)

In addition, green spaces can effectively unite communities, enhancing residents' attachment to their neighbourhoods and fostering a sense of cohesion. This, in turn, makes communities more attractive and encourages residents to stay (Arnberger and Eder, 2012). While some studies suggest that green spaces in suburban areas are less appealing to urban residents compared to those in city centres (Arnberger and Eder, 2012; Kim and Kaplan, 2004), these studies generally focus on low-density suburban areas characterized by "private lawns," "family gardens," and "fields and meadows." Singapore, as a high-density city, does not feature these idyllic rural landscapes (Anwar et al., 2020). In the context of such high-density urban development, green spaces become even more valuable, and the well-maintained green spaces in suburban areas become a source of pride for local communities. Moreover, green spaces that have been preserved in strategic locations within urban planning frameworks do not result in wasted space. Due to their high accessibility and the comprehensive infrastructure surrounding them, these green spaces attract and retain a significant number of local residents on both weekdays and weekends:

"You can't find a park as nice as this one near Toa Payoh." (75-year-old Interviewee, Local)

"The park next to Northpoint City... We go there often on weekends; there are plenty of restaurants and cafes nearby, so we can easily rest when we get tired." (46-year-old Interviewee, Local)

"When I have free time, I love walking around Yishun Pond and that park (Yishun Park)... I just walk for about one or two hours... That's my way of relaxing." (71-year-old Interviewee, Local)

"This area is full of green spaces. Besides the Central Catchment Area, we probably have the most greenery around here. Whatever type of park you want, we've got it; just take a bus to the end of the line, and it's all green..." (53-year-old Interviewee, Local)

5. Summary

This study demonstrates that revitalizing suburban areas in Singapore has had a positive impact on both local and surrounding communities, as well as the whole city. By analysing the attractiveness of suburban areas and conducting interviews with residents from two districts—Yishun and Jurong East—this research highlights the significant role suburban regeneration plays in promoting sustainable urban development. Data from the Mass Rapid Transit (MRT) system indicate that successfully revitalized suburban areas in Singapore maintain both local and citywide attractiveness, reducing the density burden on the urban core and providing a solid foundation for sustainable growth in high-density urban environments.

Furthermore, the research identifies several key strategies for achieving sustainable suburban revitalization in high-density cities. First, proactive promotion of mixed-use land development in suburban areas is essential. Traditionally, mixed-use developments in city centres are reactive responses to land scarcity pressures. However, this study's cases show that actively pursuing mixed-use development in suburban areas can successfully rejuvenate these regions, attract a larger population, and alleviate pressure on urban centres.

Second, updating suburban transportation patterns through Transit-Oriented Development (TOD) systems and improving public transport accessibility can enhance the appeal of suburbs to both local residents and people from other areas. This can, in turn, reduce traffic congestion in city centres. The integration of more spaces with structures such as elevated walkways can further amplify the impact of TOD, creating sustainable urban densities.

Third, emphasizing green features is a critical factor in revitalizing suburban ecological spaces. In some instances of suburban redevelopment, neglecting the preservation of natural environments has led to environmental degradation. However, the appeal of green spaces is a major draw for residents and visitors alike. Thus, maintaining green attributes through green building initiatives and urban parks is vital for enhancing the overall attractiveness of suburban areas.

In conclusion, the example of Singapore illustrates that upgrading suburban areas can reinvigorate and expand their attractiveness, offering valuable insights for suburban renewal strategies in other high-density cities, particularly in the Global South. Additionally, this study explains how cities can balance population growth with liveable environments, guiding high-density urban areas toward sustainable development.

6. References

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