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A Preliminary Strategic Study of Resilient Plot Utilization in Rail Transit Stations in the Realm of the City Center, Guided by the Density of Three-Dimensional-Path Public Space

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Abstract With the requirement of high quality and three-dimensional urban development, the public space areas city-center rail transit stations is expanded from the plots defined by the road network density to the plots defined by the three-dimensional public space density, covering the internal and external paths of the plots, which brings about the resilient pattern of plot utilization. This paper uses the isochronous three-dimensional influence realm model around the station areas to quantitatively analyze and compare the surrounding three-dimensional path density of public space, and initially proposes flexible use patterns of differently scaled plots under the multi-scale plots linkage, to effectively promote the overall accessibility of the station realm space.

Keywords City center, Path density (three-dimensional), Plot resilience, Rail transit stations

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1. Introduction

With the rapid urbanization of China and consequent development of rail transit, the coexistence of increment and inventory, the overlapping of complexity and periodicity, and the compounding of multiple and dynamic demands presents the plot utilization of urban-center rail transit stations with many challenges. First, in the city center, since the construction of rail transit often occurs later than the construction of the surrounding urban land, the sizes of urban plots are always basically formed, and the current conditions of plot development are varied. In addition, the huge pedestrian flow in the underground level by the stations stimulates the potential of three-dimensional development of the rail station area, which demands higher requirements for the compound and efficient use of the plot space. Therefore, the flexible use of plots under the guidance of a three-dimensional "slow path" becomes a direction that needs to be further refined and explored under the requirements of high-quality urban development.

2. Path Density: Pointing to Resilient Plot Utilization in Rail Transit Station Vicinities in the City Center

As a highly intensive development mode, the transit-oriented development (TOD) model-based rail transit station spatial development of the city center is related to many plots around the station. On the basis of the high-intensity development of the core area around the stations, and the efficient connection within the station's area of influence, the development of urban space needs to more be focused on the three-dimensional integration of the core plots, so as to realize the overall systemic connection between multiple plots. Therefore, combined with the three-dimensional path expansion of the station space, further refinement research on the resilient plot utilization mode, with a dynamic perspective of the uncertainty of urban development, becomes one of the important dimensions for refinement design in the rail station space. It is embodied in the existing "rigid" plot boundary control, giving "flexible" public space guidance, strengthening the urban attributes of local "secondary slow walking" within the plot, and participating in the construction of a highly selectable and accessible urban slow walking network, while providing a variety of architectural arrangements within the plot.

3. Three-Dimensional Density: The Trend of Plot Connection Guided by Public Space Accessibility

3.1 Three-Dimensional Path Density Properties

The accessibility of a station's public space, defined by the ease of getting from one target point to another, determines the vitality of the public space. The station area public space carries the role of guiding and dispersing the pedestrian flow. It is essential to rationally reorganize

the pedestrian flow from the subway stations, and also to increase the walkable radius by improving the slow walking system in public space to make use of its centripetal force.

In general, there is a direct link between plot scale and walking paths. For example, the concept of "small block & dense road" represents the station space / plot size division, bringing more accessibility to the plots, and also represents a plot division pattern of station areas, which increases the accessibility of plots. This concept, of course, generally uses the ground level as the pedestrian base, and the plot boundaries normally become the only public pedestrian path. The development of the subway emphasizes the equal importance of underground and ground-based pedestrian systems in the station area space. The high-intensity development guided by the three-dimensional spatial path further emphasizes the integration of the underground and ground-based pedestrian bases. Plot boundaries are no longer the only public pedestrian paths, and three-dimensional paths of public space through and across plots become the main characteristic of the rail-station realm space. The perception of the density of public space also extends from the density of the road network based on the size of the plot, to the density of public paths inside and outside the plot. From the perspective of functional distribution, public space density can be divided into carriageway density (corresponding to the plot division) and footway density (including the road along the plot contour, through the plot, and along roads or green paths). From the spatial distribution aspect, it is divided into ground-level road network density, space corridor density, and underground corridor density. By comparing the distribution characteristics of multiple types of public spaces around the station area, the specific division and use of plots can be further explored.

3.2 Accessibility Guided by the Three-dimensional Density of Public Paths

Multiple studies have shown that the increase in the three-dimensional density of public paths can expand the influential range of metro stations, thus enhancing the efficiency of metro usage. According to Shanghai and Tokyo surveys and research statistics, 40% to 70% of subway arrivals connect to a pedestrian system (Liu, 2021). Compared to a subway station of the same size with an inadequate pedestrian system, the Tsim Sha Tsui Station subway station in Hong Kong, accompanied by a well-developed pedestrian system, can expand the distance of travel for residents up to 1.5 times (Niu, 2016). When the three-dimensional path density of the regional public space is low, the amount of isochronous area shows different degrees of reduction due to the enclosed character of the plot, and the detour cost to residents increases, which is not conducive to the coverage of public transportation (see Figure 1). Only by improving the path density of public space and shaping an open and integrated pedestrian network can we achieve a wide coverage of metro services in appropriate proximity, improve the accessibility of the overall space, and yield a diversity of path choices, that is, an increase in redundant paths. It helps to increase the number of open street interfaces per unit area, thus shaping the overall vitality of the district (see Figure 2).

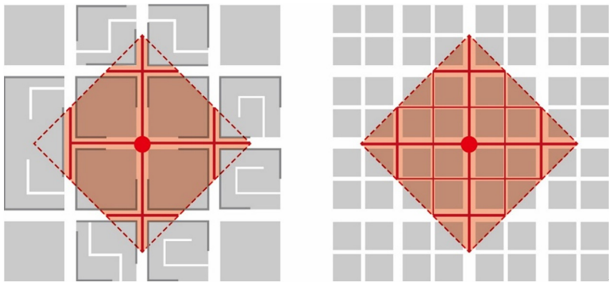


Figure 1. Comparison of low path density (left) and high path density (right) in the isochronous range. Source: the authors.

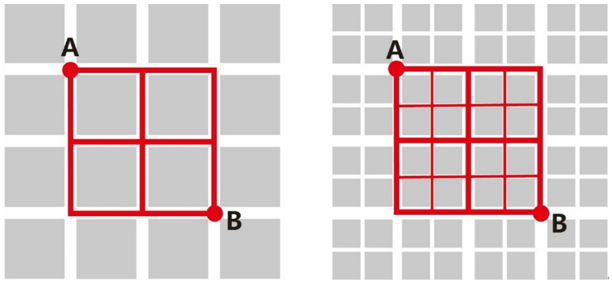


Figure 2. Comparison of redundant paths for low path density (left) and high path density (right). Source: the authors.

To a certain extent, the increase in the density of three-dimensional public space strengthens the distribution of paths in the vertical spatial layers, while avoiding fragmented and intermittent spatial cascades, which is determined by the "flatness" of pedestrian activities and the need to form a large and coherent pedestrian base at a single level (Ming & Yu, 2015). Based on this, the discussion of the three-dimensional density of public space still needs to be based on a certain plan, and the three-dimensional superposition of the density of the planar public space needs to support the high accessibility of the station realm space.

3.3 Trends in Spatial Accessibility and Plot Resilience Utilization Guided by 3D Path Density

The association between the three-dimensional paths of the station area and the plot emphasizes the formation of public paths through the plot by defining the public space area within the plot to shorten the walking distance from point to point, which will guide the development pattern within the plot, based on public space reservation and balanced distribution at different elevations of the horizontal plane. In particular for the mode of "small block & dense

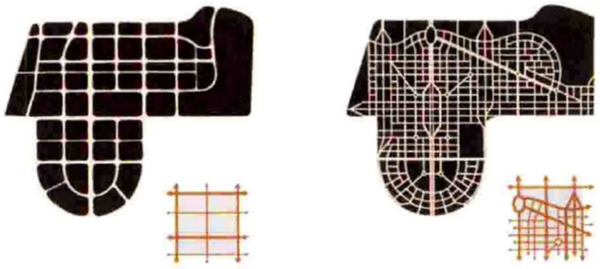


Figure 3. Comparison of road network planning in Chenggong Area of Kunming, China, before (left) and after third-party analysis (right). Source: Calthorpe, P. (2015). Transit Oriented Development in China: A manual of land-use and transportation for low carbon cities. China Architecture and Building Press.

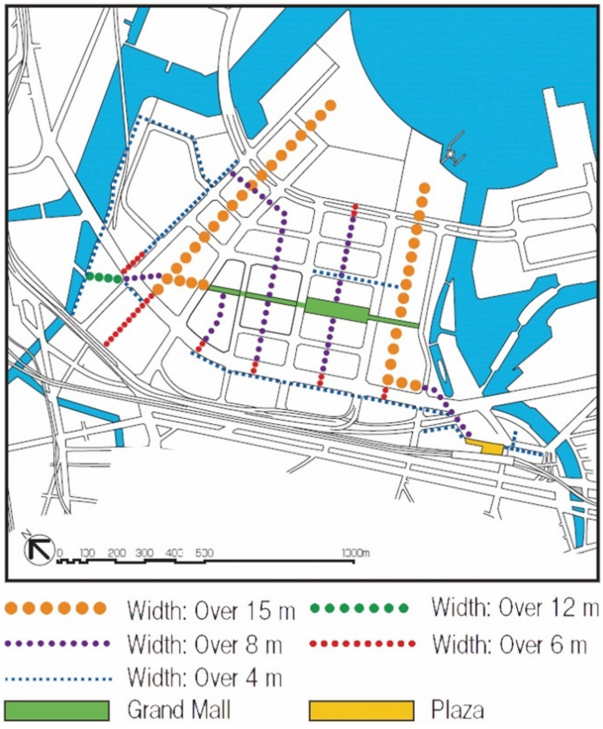


Figure 4. Pedestrian network in the Minatomirai Station, Yokohama. Source: Minatomarai 21 Plans and Projects, https://www.ymm21.jp/upload/Info85.pdf.

road", the dense road network and the narrowing of the carriageway together effectively improve the efficiency of the pedestrian crossing. This has been widely used in newly developed urban areas with relatively liberal plot divisions. For example, the Chenggong New District in Kunming has subdivided plots to create a pedestrian-friendly plot distribution (see Figure 3). For large plots mode of "open streets", the establishment of open paths and increasing the density of pedestrian paths within the plots directly affects the division and use of the plots, such as at Tokyo's Minatomirai Station, where a footway is reserved between the plots (see Figure 4), leading to more

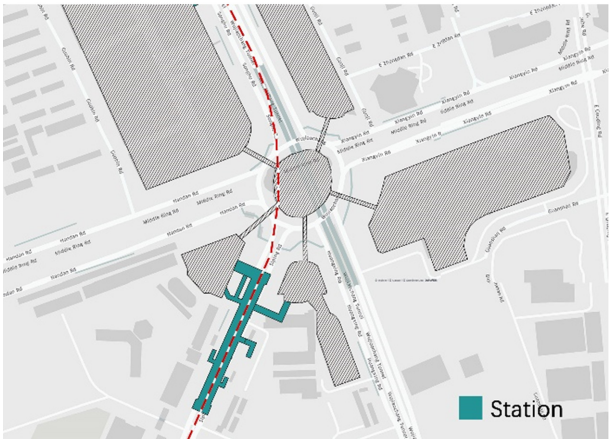


Figure 5. Underground Tandem Space of Wujiaochang Station, Shanghai. Source: Drawn by Jie Xu.



Figure 6. Xujiahui Sky Corridor, Shanghai. Source: Xujiahui Commercial District Platform General Layout Demonstration.

openness and activities.

The high-density connection of public space paths above and below ground reduces the restrictions of plot size and road division, especially in areas where urban plot size has been settled, the remaining space above and below ground of roads can be used to connect the plots, and enhance the effectiveness of the subway's commercial association and the pedestrian efficiency for rail-station realm redevelopment. This solves the problem of pedestrian flow being fragmented by the carriageway on the one hand, and compensates for the difficult separation of pedestrian and vehicle traffic at the ground level on the other, thus greatly enhancing the accessibility of multiple paths between plots. For example, Wujiaochang Station in Shanghai integrated five plots divided by carriageways through underground plazas, transforming the internal paths of the plots into public paths (see Figure 5); The Xujiahui site in Shanghai is connected to various commercial

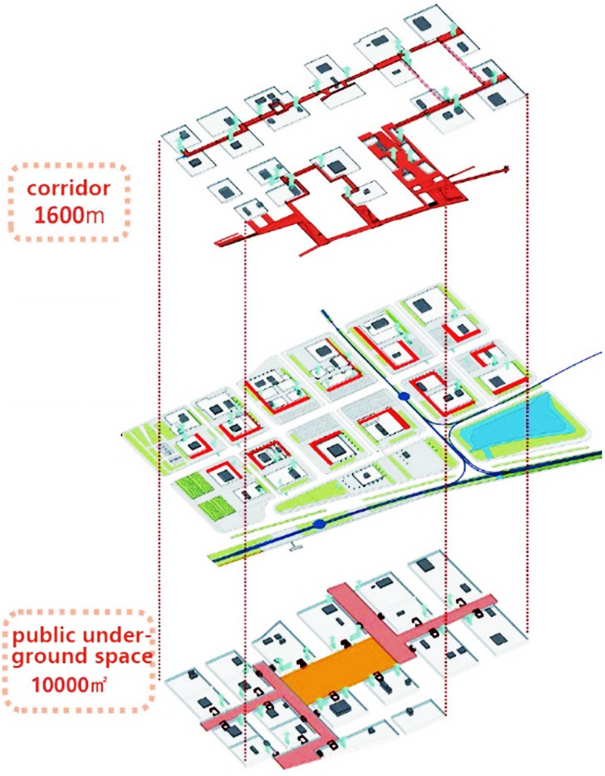


Figure 7. Analysis of the 3D pedestrian system in Pazhou West District, Guangzhou. Source: Pazhou West District Urban Design and Control Plan Optimization Project Team.

plots and city parks by a skybridge system (see Figure 6); The Marunouchi area of Tokyo Station has been gradually improving its underground network since 1937, spreading to small-scale streets and opening up the underground commercial space of each private plot.

With the high-intensity and three-dimensional development of urban rail stations, the 3D stratification and differentiated network development of public space paths within the plot leads to further refinement of the urban spatial development and control mode. For example, Guangzhou's Pazhou West City Center uses a plot size of 80 by 120 meters at ground level, while building a shared unit of the plot through underground connections, and also sets up a 24-hour public open corridor system in the upper building space (Su & Sheng, 2021) (see Figure 7). The Central Business District of Suzhou's Industrial Zone controls the distance between roads within the range of 50 to 150 meters, and uses the space under the roads and the corridor system to connect the plots (Calthorpe, 2015) (see Figure 8). Evidently, the improvement of station area space accessibility guided by 3D paths brings a variety of possibilities for flexible utilization of station area plots in the city center.

4. Spatial Redundancy: Analysis of 3D Path Density of Public Space in the Station's Isochronous 3D-Influenced Realm

This research paper takes the land divided by urban public carriageways as the smallest unit of the plot and takes the range of public space within the 10-minute (500-meter) isochronal three-dimensional area (Yuan & Hang, 2022) of the subway out of the gate as the research scope, and uses the ratio of the total length of the path to the area of the region as the index value of the three-dimensional path density, so as to further explore the connection between the three-dimensional public space paths and the plots. The study is based on OSM (an open-source map) information, using QGIS software to calculate the accessibility range within 500 meters along the path, while further completing, classifying, counting and graphically representing different types of road networks. For the evaluation of paths, the "Betweenness" indicator in the Urban Network Analysis (UNA) software is used, which ultimately points to the enhancement of urban spatial vitality guided by the selectability and density of public paths. In the actual calculation, the value is assigned a detour ratio of 1.2, which is appropriately widened to simulate the real state of people's multiple path choices (see Table 1).

4.1. Correlation Between the Plot Size and the Pedestrian Path Density

From the comparison between the carriageway density and effective pedestrian path[5] density in Table 2, the pedestrian paths reflect different multiplicative growth factors, from 1.35 (Wujiaochang & Jiangwan Stadium



Figure 8. Urban Design of Suzhou CBD and East New Town Central District. Source: Calthorpe, P. (2015). Transit Oriented Development in China: A manual of land-use and transportation for low carbon cities. China Architecture and Building Press.

Table 1. Summary of itemized data collected from five metro stations

City	Station	Spatial Layer	Road Density (Unit: km/km^2)				
			Carriageway	Boundary Path	Square Path	Path through Plot	End Path
Tokyo	Tokyo Station	Ground floor	17.70	18.67	0.86	3.87	0.46
		Underground		6.72	0.00	6.65	0.34
Yokohama	Minatomirai Station	Ground	17.94	21.06	4.19	4.62	1.25
		Upper Ground		0.20	0.66	5.72	0.00
		Underground		0.20	0.00	0.69	0.00
Hong Kong	Central Station	Ground	30.01	29.83	4.15	3.39	0.81
		Upper Ground		5.15	0.00	5.76	0.00
		Underground		1.61	0.00	2.21	0.00
Shanghai	Xujiahui Station	Ground	13.62	14.86	0.79	0.54	6.69
		Upper Ground		0.73	0.00	1.06	3.60
		Underground		3.11	0.00	0.59	0.00
Shanghai	Wujiaochang & Jiangwan Stadium Station	Ground	17.22	13.68	0.93	2.50	1.44
		Underground		3.29	0.00	2.88	0.00

Table 2. Comparison of overall road network density

No.	Station	Average plot area(ha)	Carriageway density (km/km^2)	Effective pedestrian path density (km/km^2)	Ratio*
1	Tokyo Station	1.2	17.7	36.77	2.077
2	Minatomirai Station	3.31	17.94	36.04	2.009
3	Central Station	0.93	30.01	52.09	1.736
4	Xujiahui Station	6.32	13.62	21.69	1.593
5	Wujiaochang& Jiangwan Stadium Station	5.02	17.22	23.28	1.352

* The ratio of Effective pedestrian path density to Carriageway density.

Station) to 2.01 (Minatomirai Station), indicating that the effective pedestrian path achieves the superposition of different spatial levels on the basis of setting along the vehicular road. By analyzing the relationship between the data of the average plot area and the density of the effective pedestrian path, we could find that the plot size did not show a significant correlation with the overall pedestrian path density, which shows that the path access

Table 3. Effective pedestrian path density spatial distribution

Station	Effective pedestrian path density (km/km^2)	Spatial Layer	Road Density (km/km^2)	Percentage
Tokyo Station	36.77	Ground floor	23.40	63.6%
		Underground	13.37	36.4%
Minatomirai Station	36.04	Ground	29.18	81.0%
		Upper Ground	5.60	15.5%
		Underground	1.25	3.5%
Central Station	52.09	Ground	37.36	71.7%
		Upper Ground	10.91	21.0%
		Underground	3.82	7.3%
Xujiahui Station	21.69	Ground	16.19	74.6%
		Upper Ground	1.80	8.3%
		Underground	3.70	17.0%
Wujiaochang& Jiangwan Stadium Station	23.28	Ground	17.11	73.5%
		Underground	6.17	26.5%

efficiency plays a certain influential role in the process of the redefinition of public space based on the plot delineation.

By calculating the percentage of effective pedestrian path density in different spatial layers of each site (see Table 3 and Figure 11), it can be seen that each site has its own emphasis in different spatial layers due to the difference of construction environment. For example, Tokyo Station, which brings together several subway lines, opened in 1937 for the construction of underground space, and through decades of development has continued to expand, extending into a vascular underground network. Minatomirai Station has established a comprehensive two-level walkway system based on Queen Street Mall and a large stadium. Central Station is adjacent to Hong Kong Station, the railroad hub, and the pedestrian system is well distributed at all spatial levels, with the above-ground corridor system leading directly to Hong Kong Station being particularly prominent. Xujiahui Station has recently improved its above-ground footbridge system, linking five plots between large urban intersections. The Wujiaochang & Jiangwan Stadium Station effectively solves the problem of urban plots being divided by vehicular roads through underground plazas and underground commercial streets.

On the whole, the division of plots guided by the same carriageway density can present a diversity of plot sizes; the effective pedestrian path density maintains a strong trend of correlation with the average plot size. Further refinement of the comparison between Tokyo Station and Minatomirai Station shows that the difference in average

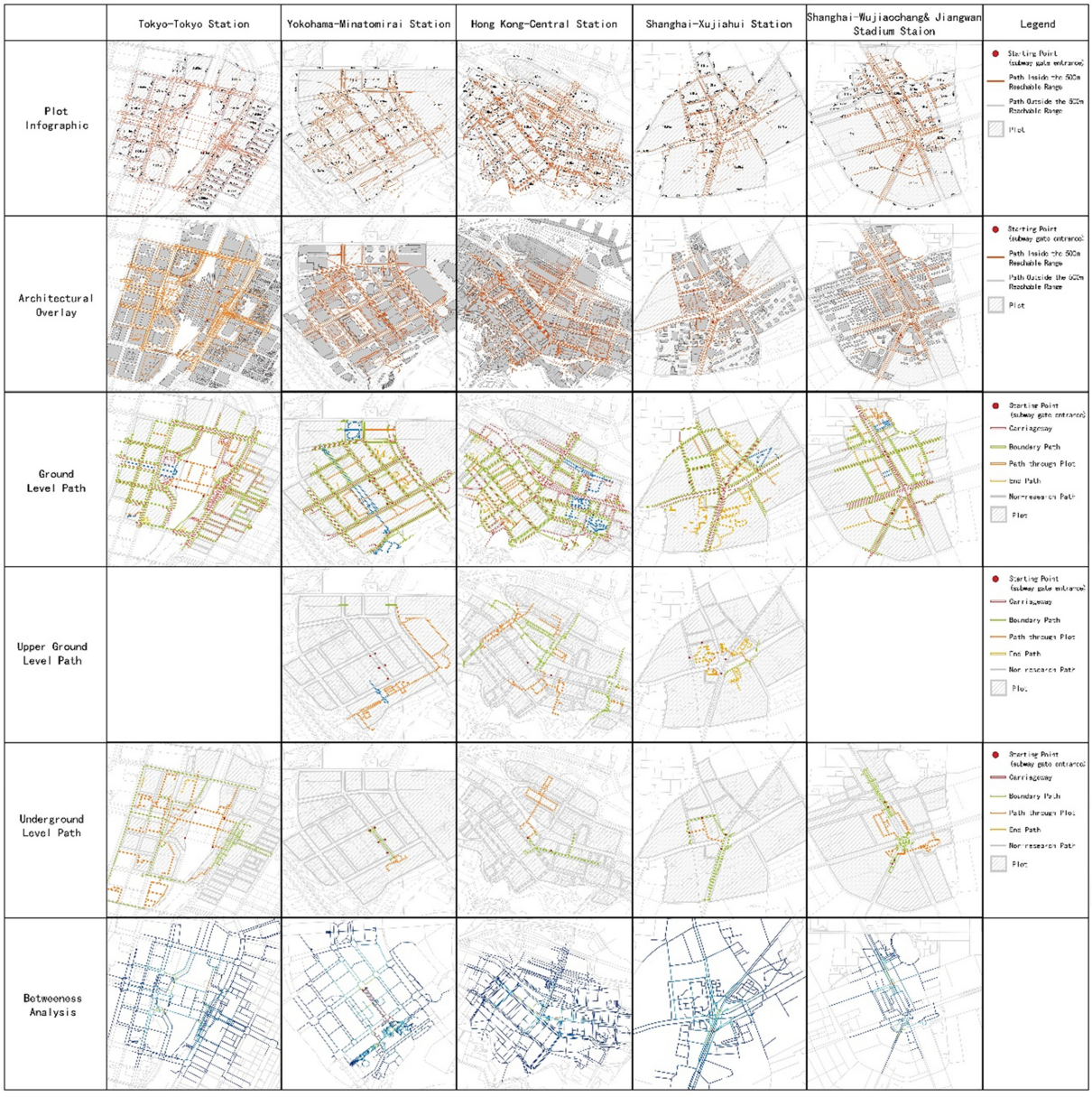


Figure 9. Path information of five researched stations. Source: the authors.

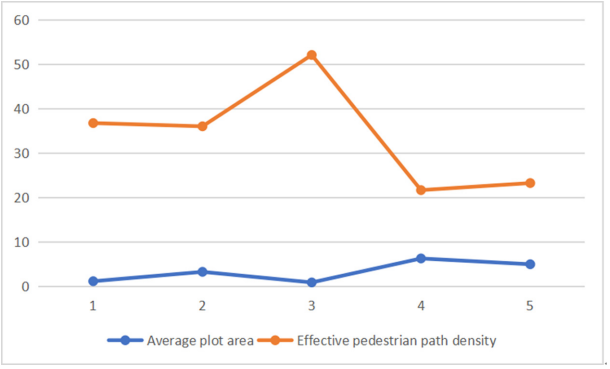


Figure 10. Plot size compared to effective pedestrian path density. Source: the authors.

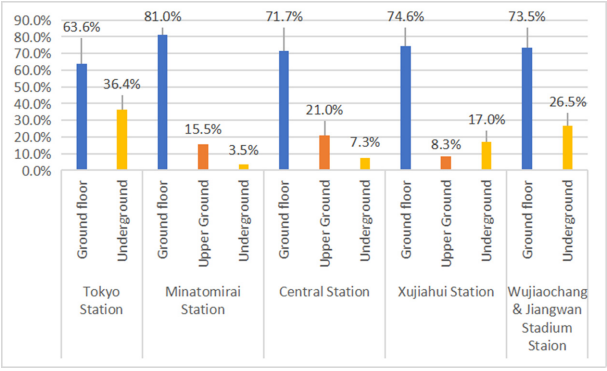


Figure 11. Percentage of effective pedestrian path density in different spatial layers at each site. Source: The authors.

plot area does not directly impact the effective pedestrian path density, while the pattern and quantity of three-dimensional paths directly affect the pedestrian path density.

4.2. Multi-Type Distribution of Pedestrian Paths

As can be seen from Table 4 and Figure 12, the pedestrian path of different sites in the city center is not limited to the distribution along the plots. Most of the sites have a larger proportion of crossing-type roads, and the pedestrian

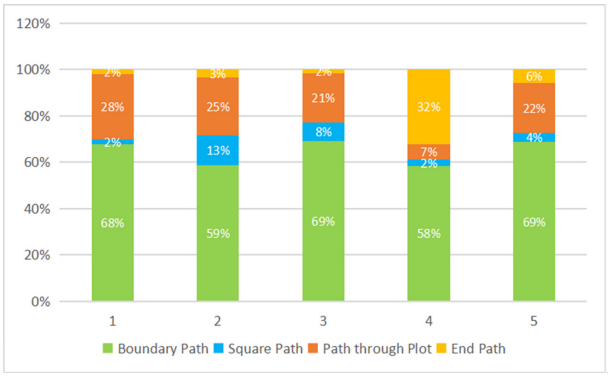


Figure 12. Proportions of different types of roads at each of the five studied station sites. Source: The authors.

path effectively subdivides the plots. However, compared to the stations in Japan and Hong Kong, the two stations in Shanghai have different degrees of problems in terms of overall road network density values and percentages. Combined with the road network distribution map (Figure 9), the plots in Xujiahui station have large scales and are dominated by end roads of the closed community, with the end roads accounting for 32 percent of the total, which is not conducive to the overall regional vitality, and the path distribution is only concentrated in the core area of the subway station. The scale of the plot in Wujiaochang station is also very large, but many lands are not fully developed, the overall path density is low, and the road has not been developed well. The situation of Wujiaochang could be further improved to enhance the pedestrian paths in future development.

Combined with the road network distribution map (Figure 9) and the percentage of the spatial distribution of pedestrian paths (Table 5 and Figure 13), the distribution of path types varies at different spatial layers. At the ground level, the pedestrian path is mainly along the plot, and the path through plots is often found in plots larger than 1.8 ha. The square paths have two different patterns: one is to occupy a certain plot as an urban park, and the other is linked with the walking corridor. At the underground

Table 4. Effective pedestrian path density spatial distribution

No.	Station	Property	Boundary Path	Square Path	Path through Plot	End Path
1	Tokyo Station	Density	25.39	0.86	10.52	0.79
		Percentage	68%	2%	28%	2%
2	Minatomirai Station	Density	21.90	4.76	9.38	1.25
		Percentage	59%	13%	25%	3%
3	Central Station	Density	36.59	4.15	11.36	0.81
		Percentage	69%	8%	21%	2%
4	Xujiahui Station	Density	18.71	0.79	2.19	10.29
		Percentage	58%	2%	7%	32%
5	Wujiaochang& Jiangwan Stadium Station	Density	16.97	0.93	5.38	1.44
		Percentage	69%	4%	22%	6%

Table 5. Effective pedestrian path density spatial distribution

Station	Spatial Layer	Boundary Path	Square Path	Path through Plot	End Path
Tokyo Station	Ground floor	78%	4%	16%	2%
	Underground	49%	0%	48%	2%
Minatomirai Station	Ground floor	69%	14%	13%	4%
	Upper Ground	3%	10%	87%	0%
	Underground	53%	0%	47%	0%
Central Station	Ground floor	78%	11%	9%	2%
	Upper Ground	47%	0%	53%	0%
	Underground	42%	0%	58%	0%
Xujiahui Station	Ground floor	65%	3%	2%	29%
	Upper Ground	14%	0%	20%	67%
	Underground	84%	0%	16%	0%
Wujiaochang-Jiang-wan Stadium Station	Ground floor	74%	5%	13%	8%
	Underground	53%	0%	47%	0%

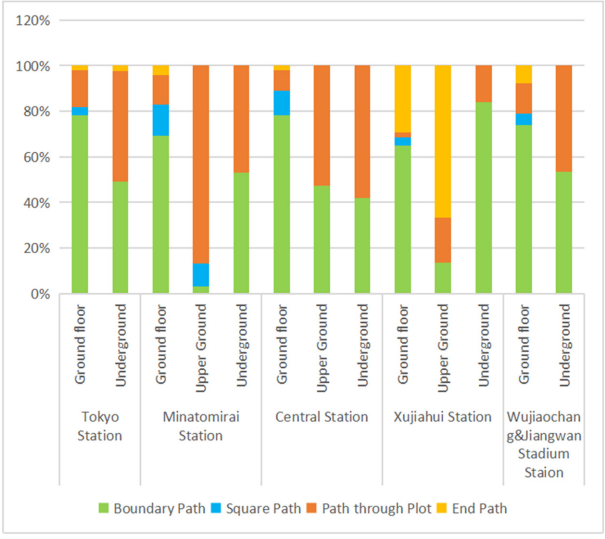


Figure 13. Spatial distribution of pedestrian paths. Source: the authors.

level, the pedestrian paths can be seen from Xujiahui Station and Wujiaochang & Jiangwan Stadium Station, mainly distributed in the space under the road. The path distribution from the stations in Japan and Hong Kong can also be seen to be more flexible in distribution, reflecting multiple types of three-dimensional paths. At the upper ground level, different stations show different patterns to connect the internal paths of different plots and enhance the accessibility of the overall area. It is worth learning that Minatomirai Station and Central Station usually adopt the mode of linking multiple plots with the public path of one building in the construction of the corridor. In contrast, the Xujiahui Station initially realizes several commercial complexes linked by a second-floor corridor, but does not effectively use the public paths within the mall to connect other plots.

5. Resilient strategy: multiple use of land plots guided by 3D path density of public space

5.1 Distribution Models of Paths in Urban Station Areas

Since Jane Jacobs (1962) in "The Death and Life of Great American Cities" pointed out that beyond the radius distance of 700 feet (about 210 meters) of road, a city's vitality is reduced. Scholars have studied the reasonable scale of plots from different perspectives, and think that the plot size should be limited to 200 m[6] (Yeqing Huang and Yimin Sun, 2012). The size of plots in urban centers is influenced by historical background and geography, and it is often difficult to change them in later stages, but we can use public space paths to make flexible use of the plots according to the existing conditions of the plots.

For small plots (Figure 14, a), the boundary paths at its ground level are abundant, and the necessity of setting up a crossing-type road network is relatively low. Consider a three-dimensional path layout at the ground and underground levels, make full use of the remaining space above and below the road, and set up continuous three-dimensional slow-moving paths along the subway entrances and exits. The 3D path arrangement can be considered above and below ground, making full use of the remaining space of the road, and setting up continuous 3D pedestrian paths to the subway entrances. Mainly, the conversion of end public paths within plots to cross-plot paths should be considered.

Method 1 is to set up paths within plots to connect with multiple plots; method 2 is to use the public space under the road to connect the internal road of the plot to the public road (Figure 15, a, b). For big-scale plots, when the length of the street outline is more than 200 meters, the ground floor can be considered to be set through the path of the plot, and when the single side is longer, it can be set along a single side, such as the Minatomirai Station.

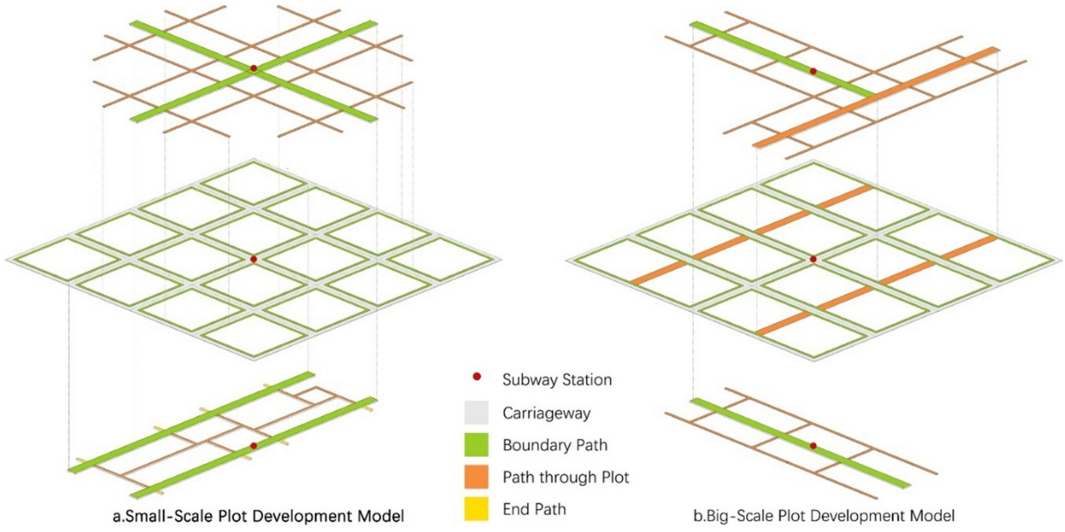


Figure 14. Plot development model. Source: The authors.

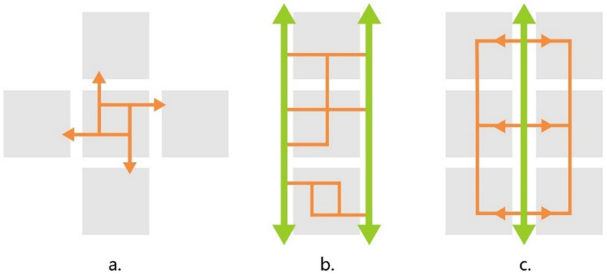


Figure 15. Connection mode of the plot underground/upper ground. Source: The authors.

When the overall street outline is large, the path distribution can be considered according to the building arrangement (Figure 16). As for the upper level, the Queen's Shopping Mall at Minatomirai Station forms an indoor corridor through the plot based on the architectural development pattern. At the underground level, it is difficult to use the public space under the city roads with parallel distances because of the large range of parcel property rights between large plots; the connection between the two sides of the plots is mainly made with the space under one of the major city roads or cross roads (Figure 15(c). It is also necessary to connect the internal paths between the plots as well. Among them, for the distribution of plaza paths, there are two main types: one is a linear plaza space combined with the main pedestrian axis (such as the Minatomirai Station), and the other is a single-plaza site, mainly for the landscape rest needs of the station area space (Figure 17).

5.2 Strategies for Resilient Use of Plots Guided by Public Space Path

Strategy 1: Plot Division - Combination Flexible Utilization

For the plot development of a large commercial complex

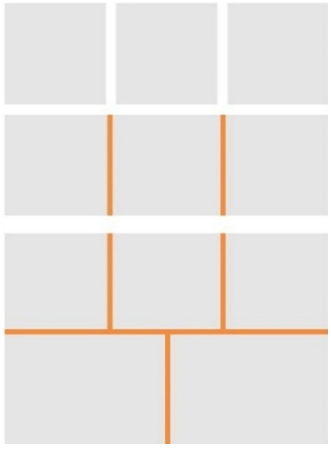


Figure 16. Pattern of ground-level division of large plots. Source: The authors.

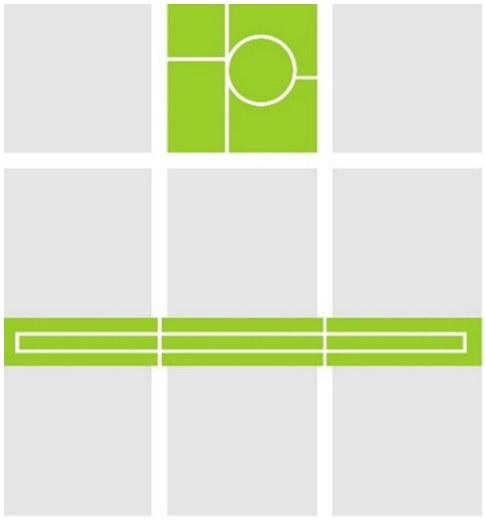


Figure 17. Pattern of plaza path distribution. Source: The authors.

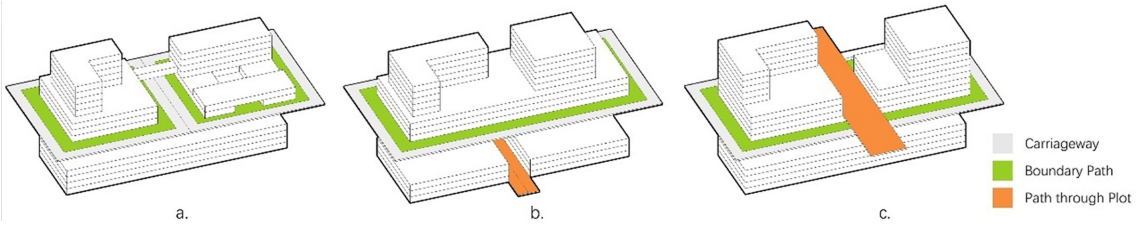


Figure 18. Pattern of plot division – combination. Source: the authors.

in the core area of rail transit stations in the city center, by reserving pedestrian paths at different heights and locations in public space, the large-scale development and path vitality of the plot will be satisfied to a certain extent, and the overall pedestrian system will be enhanced. Small plots, with a denser road network, can consider integrated development of underground space (Figure 17, a); for large plots, pedestrian corridors can be set up at the underground and upper ground to form an interaction (Figure 17(b,c)). The 3D distribution of public paths across the plots removes the limitation of plot size for walking paths, and can lead to the flexibility of division and combination between the uses of large and small plots. This is done through the above-ground and underground paths and the crossing paths at the ground level, forming a flexible use of plots in division and combination.

Strategy 2: 3D Linkage of Public Paths in Multi-Scale Plots

In the complex environment of the city center station realm, 3D paths can be used to connect plots with high density, forming a 3D linkage between multi-scale plots. For instance, in order to solve the spatial fragmentation caused by large stations and tracks, large hub stations such as Tokyo Station use station plazas and underground paths through plots to extend the paths of small blocks to the interior of large plots, effectively connecting plots on either side of the station itself. The overall plots of Hong Kong Station are small, but there are still some plots with a long length on one side, which provides easy access by way of paths through the plots at ground level. When dealing with multi-scale plot development, small plots should be used as a benchmark to make paths well developed and complementary at different spatial levels.

Strategy 3: Publicity Enhancement of Internal Paths of the Plot

In the actual construction process, the costs of underground space and upper-ground corridor space development are high, so the station often considers combining the internal path of the building to expand the public space road network. This requires plots to be developed with pre-planned underground or above-ground connections toward other plots. The Xujiahui and Wujiaochang stations, for example, use above-ground and underground spaces respectively, connecting the internal

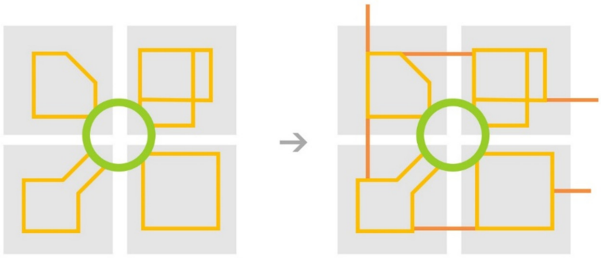


Figure 19. Transformation of internal path publicness. Source: The authors.

paths of several plots in series. However, the second-floor corridor system of Xujiahui Station only plays a connecting role and does not revitalize the internal path of the building. If we want to further expand the public property of the internal path, we need the internal path to generate corridors and interfaces for multiple plots (Figure 19). Wujiaokou Station, on the other hand, uses underground plazas to link the underground commercial flow of different plots, and the commercial spaces of different plots extend their interfaces towards other plots; this model is conducive to driving the vitality of the region.

6. Summary: Resilient Pattern of Public Path in the Station Area under Three-dimensional Density

The object of this study of the resilience development of station area plots in the view of 3D path density of public space is to rethink the plot development of TOD areas within the overall framework. This is a gentle form of guidance for the subsequent flexible utilization of building layouts and design in the plots, which can effectively promote the overall accessibility of the rail station area and enhance the efficiency of plot use.

The path analysis of the three-dimensional base surface can realize the rational development of different-sized plots under the requirement of high-density pedestrian paths in the station space through the flexible distribution of paths. On the one hand, the ground level through the plot path leaves a public path in the plot development and affects the building layout pattern of the plot division. On the other hand, the integrated and diversified model of separation and integration of above- and below-ground plots forms a flexible guide for the stratified and differentiated

development of plots. In this process, the internal paths of different layers of plots and buildings are also transformed, partly through their publicness, to achieve multiple adaptations to the three-dimensional composite development of the plots, thus shaping the resilient pattern of the development of plots in the station area space.

Notes

1. The accessibility is the definition in Gragh Theory.
2. It can be regarded as the range of urban public space (including outdoor public space and accessible and participatory indoor public space closely connected with the three-dimensional walking system) in different time zones within the isochronous range of traffic connection.
3. This property is used to define "the percentage of the shortest path between the start and end points of a group that passes through the node".
4. This property is used to define "the maximum ratio of actual path to shortest path".
5. It is the sum of the boundary path, the path through plot and the square path in different spatial layers, excluding the end path.
6. Scholars have counted and compared the central block scales of 90 large cities in China and abroad. Source: Yeqing Huang, and Yimin Sun. (2012). Judgement characteristics and quantitative index of suitable block scale. Journal of South China University of Technology (Natural Science Edition), 40(9), 131-138.

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