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Industrial New Towns and Livability in China: Evidence from Chenglingji New Port Area

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Abstract

Industrial new towns have become important spatial instruments for regional economic development in China, yet many continue to struggle to attract and retain a stable workforce, support long-term settlement, and provide a complete urban living environment. Taking the Chenglingji New Port Area in central China as a case study, this paper applies the Industry–People–City analytical framework to examine the relationship among industrial development, residents' everyday behaviours, and public service provision. The study combines field investigations, activity-diary interviews with 60 local residents, semi-structured interviews with 12 enterprise managers, and point-of-interest data on public service facilities. These materials are used for a primarily qualitative analysis supported by GIS-based spatial evidence. The findings show that the Chenglingji New Port Area has developed a clear basis of industrial agglomeration and four functional sectors, but public service provision remains mismatched with the everyday needs of different population groups. Managerial personnel and some technical workers continue to rely heavily on Yueyang's main urban area for residence, consumption, leisure, and higher-order services, while locally based residents face combined deficits in commerce, transport, healthcare, education, cultural and recreational services, and public open spaces. The contribution of this study is twofold. First, it provides an empirically grounded assessment of the living conditions of labour and related residential groups in a resource-constrained inland industrial new town. Second, it demonstrates how the Industry–People–City analytical framework can be used to diagnose structural imbalances among industrial growth, population behaviour, and urban service provision. The study argues that improving the livability of industrial new towns should not depend solely on industrial expansion or one-off investment in high-standard facilities. Instead, phased, sector-specific, and user-oriented public service provision is needed to help industrial new towns gradually transform from mono-functional production-oriented growth poles into more complete and sustainable urban living nodes.

Keywords: industrial new town; Industry–People–City analytical framework; livability; Chenglingji New Port Area

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Academic Editors: Isidoro Fasolino and Tingting Chen

Received: 9 April 2026
Revised: 20 May 2026
Accepted: 2 June 2026
Published: 5 June 2026

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1. Introduction

China's reform and opening-up policy, initiated in 1978, reshaped the spatial pattern of industrial development. Industrial production gradually shifted from established urban

centres toward peripheral areas as part of a national strategy to stimulate private sector growth and attract foreign investment. This policy direction led to the establishment of several development platforms, including special economic zones, economic and technological development zones, and high-tech industrial development zones [1,2]. The rapid expansion of these zones contributed to the emergence of numerous new urban districts organised around industrial production [3]. Many of these districts were developed at considerable distances from existing city centres, where administrative, commercial, and social services were concentrated. Early development therefore emphasised industrial infrastructure, while the provision of public services often remained limited [4].

To address these imbalances, the concept of industry–city integration was introduced to encourage closer coordination between industrial development and urban functions [5]. The concept highlights the importance of aligning employment opportunities with residential environments and public service provision so that industrial districts can support everyday urban life and long-term settlement [6–8]. Industrial new towns gradually emerged from this policy orientation as a development model that seeks to combine production, housing, and service functions in a single urban area. Representative examples include Suzhou Industrial Park [9], Shanghai Zhangjiang High-Tech Park [10], and Shenzhen High-Tech Industrial Park [11]. Similar development strategies can also be observed internationally in projects such as Tsukuba Science City in Japan [12] and Silicon Valley in the United States [13].

Despite these policy efforts, many industrial new towns continue to face structural challenges. Early stages of development frequently concentrated on industrial investment, while public service provision progressed more slowly. Limited access to everyday services often encourages employees to reside in nearby central urban areas, increasing commuting distances between residential locations and workplaces [14]. Inadequate education, healthcare, and cultural facilities further reduce the attractiveness of these towns for long-term settlement. These challenges are particularly evident in central China, where economic foundations tend to be weaker, industrial structures less diversified [15], and fiscal capacity for sustained public service investment more constrained. Under such conditions, difficulties in retaining skilled labour and population out-migration are frequently reported [16]. Improving the accessibility and spatial distribution of public service facilities has therefore become an important concern for the development of industrial new towns in these regions.

Previous studies have examined related questions from several perspectives, including equitable access to public services [17], spatial optimisation of service facilities [18], theoretical model development [19], and land-use transformation in industrial districts [20]. Earlier research on Chenglingji New Port Area identified significant gaps in public service provision and demonstrated that these deficiencies shape residents' perceptions of urban livability [21]. However, existing research rarely examines the relationship between industrial spatial organisation, residents' daily activity patterns, and the distribution of public service facilities in a single analytical framework. Without such examination, it remains difficult to understand how industrial new towns operate as living environments for their workforce.

This study examines the livability of industrial new towns by asking how existing spatial and service arrangements respond to residents' everyday needs. Using the Chenglingji New Port Area as a case study, it explores the relationship among industrial development, residential life, and public service provision, with particular attention to the spatial organisation of industrial activities, residents' daily activity patterns, and the distribution of service facilities. By clarifying these relationships, the study provides empirical evidence for planning strategies aimed at improving livability in industrial new towns.

The paper proceeds as follows. Section 2 reviews relevant literature and outlines the analytical perspective used in this study. Section 3 describes the study area and the data collection process. Section 4 presents the empirical analysis. Section 5 interprets the results and discusses their implications for planning and policy. The final section summarises the main findings and identifies directions for future research.

2. Literature Review

Research on industrial new towns has increasingly focused on how industrial expansion, spatial development, and urban functions interact in emerging economic districts. Growth pole theory is useful for explaining the spatial concentration of economic activity and its potential to stimulate regional development. However, industrial or technological agglomeration alone does not necessarily create a complete urban living environment. Studies of science cities and new towns show that innovation functions may remain weakly connected to everyday urban life, while social infrastructure, mixed-use functions, and links with existing urban centres often develop more slowly than expected [22–25]. Industry–city integration theory therefore offers a complementary perspective by focusing on the coordination of employment, residential environments, and public service provision. The following sections review these two theoretical perspectives and explain their relevance to this study.

2.1. Growth Pole Theory

Growth pole theory remains important for explaining the early development of industrial new towns. Perroux first proposed the concept of the growth pole in 1955, arguing that economic expansion is driven by leading industries capable of generating development impulses beyond their immediate sectors [26]. Subsequent regional studies further suggest that the effectiveness of growth-pole strategies depends on the capacity of selected locations to concentrate infrastructure, institutions, investment, and specialised economic activities [27,28].

In recent years, however, scholars have revisited spatially targeted development policies and cautioned against treating industrial concentration as a sufficient condition for balanced urban development. Research on special economic zones shows that infrastructure quality, strategic location, policy incentives, and service provision affect their capacity to attract investment, but the links between these zones, local economies, and surrounding settlements are often uneven [29]. Studies of industrial districts also indicate that whether a place becomes a "sticky" industrial space depends on governance structures, labour markets, and institutional embeddedness, rather than firm agglomeration alone [30]. These insights imply that a growth pole may succeed as a production platform while remaining weak as a living environment. This tension is central to the present study.

2.2. Industry–City Integration Theory

Industry–city integration theory responds to the above limitation by emphasising the coordination between production and urban life. In the Chinese context, the concept emerged from the transformation of development zones, where mono-functional industrial parks were expected to evolve into more complete urban districts [31,32]. Its core premise is that industrial development should provide an economic basis for public services, housing, and urban facilities, while a high-quality living environment helps attract and retain labour, support innovation, and stabilise local development [7,33]. Industry–city integration therefore shifts the evaluation of industrial new towns from output-oriented indicators alone toward the relationship between productive capacity and everyday urban functions.

International debates on urban livability and amenities reinforce this argument. Studies of consumer cities and amenity-led urban growth show that residents and skilled labour are increasingly attracted not only by employment opportunities but also by education, healthcare, culture, leisure, and opportunities for social interaction [25,34]. Research on urban social sustainability similarly emphasises equitable access to services and the ability of communities to support everyday life [24,35]. For industrial new towns, this means that competitiveness depends on the coupling between productive capacity and everyday life infrastructure. If this coupling remains weak, new towns may continue to depend on nearby central cities for higher-order services and long-term settlement needs [36].

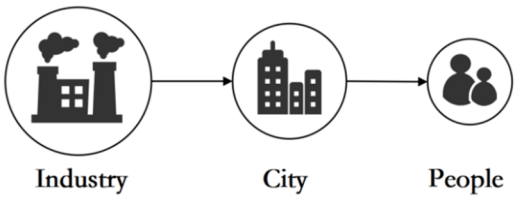
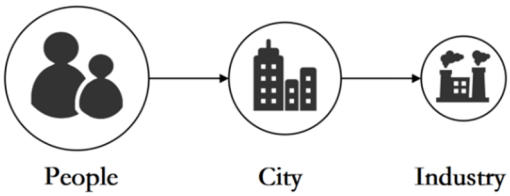
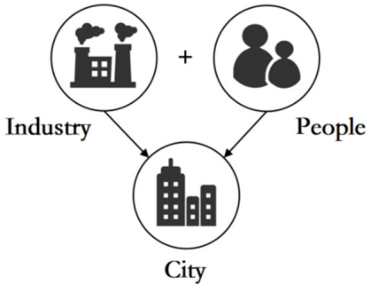
2.3. The Industry–People–City Analytical Framework for Industrial New Town Development

Previous studies identify several key drivers of industrial new town development. Industrial agglomeration and expansion are often regarded as the initial engine of growth [37]. From the perspective of growth pole theory, industrial concentration can stimulate infrastructure investment and attract related firms through clustering effects. At the same time, "city" functions, provided through facilities such as parks, schools, clinics, cultural venues, and commercial centres, form the material and social infrastructure that supports both economic activity and everyday life [38]. As people-centred planning has gained attention, residents' daily practices and needs have also become an important basis for shaping public services and urban design in industrial new towns [39,40]. Chinese scholarship often discusses these elements through three dimensions: industry, people, and city, which together affect the long-term sustainability of industrial new towns.

How these dimensions interact, however, remains insufficiently explained. Early industrial new-town development in China often followed a linear sequence of "industry" → "city" → "people": industrial growth came first, basic services were then introduced, and higher-quality amenities were added later as residents' demands increased [41,42]. This sequence often delayed public service provision and weakened residents' willingness to settle. In response, some governments and scholars have proposed a more people-oriented pathway that gives priority to residents' needs and service quality in order to attract labour and support later industrial development [43–45]. Yet this approach is more feasible in places with stronger fiscal capacity, mature industrial foundations, and richer human capital resources (see Table 1).

For industrial new towns in central China, such as the Chenglingji New Port Area, directly following a "people" → "city" → "industry" pathway is difficult. A limited industrial base, a smaller pool of human capital, and restricted fiscal resources reduce the capacity to provide high-quality services and amenities in advance of population growth. Existing sequencing models therefore offer only partial guidance for such contexts. This study proposes the Industry–People–City analytical framework to interpret existing conditions and identify how they may be improved. The framework treats industrial development and improvements in living conditions as interdependent from the outset, linking them through a coherent public service system. It draws on the macro-spatial logic of growth pole theory, incorporates the coordination perspective of industry–city integration, and adapts these insights to inland development contexts. The following sections are structured around this framework, focusing on industrial development, population characteristics, and urban service provision in the Chenglingji New Port Area.

Table 1. Comparative analysis of three development concepts for industrial new towns.

Development Paradigm	Schematic Diagram	Applicable Urban Context
"Industry–City –People"	 Prioritise industrial development in the new town, then provision of basic public service facilities, and finally optimisation of those facilities.	The early model of industrial new-town construction in China, which is no longer suitable for contemporary industrial new-town development.
"People–Industry–City"	 Give priority to residents' needs by constructing high-quality public service facilities to attract skilled labour and talent, thereby driving local industrial development and transformation.	Applicable to industrial new-town development in economically advanced regions, as well as the transformation of certain traditional industrial new towns.
"Industry–People–City"	 Treat industrial development and population needs as equally important in new-town planning, emphasising their dynamic coordination and alignment in the construction of urban public service facilities.	Suitable for industrial new-town development in regions with relatively weak economic and industrial foundations (e.g., central China).
 Represents the status of industrial development in industrial new towns.	 Represents the behavioural characteristics and daily needs of resident populations in industrial new towns.	 Represents the urban functions of industrial new towns, primarily reflected in the construction and provision of public service facilities.

Sources: Authors' analysis, 2026.

3. Study Area and Data Collection

3.1. Overview and Case Representativeness of the Study Area

The Chenglingji New Port Area, established in December 2009, is located in the northeastern part of Yueyang, Hunan Province, China, with a built-up area of approximately 69 km^2 (see Figure 1) [46]. Positioned along the Yangtze River Economic Belt, it benefits from strong water–land transport connectivity and has developed around large-scale industrial parks and logistics hubs. These characteristics make it a useful case for examining industrial new-town development in central China. According to China's Seventh National Population Census, residents aged 0–14 accounted for 13.28%, those aged 15–59 for 61.53%, and those aged 60 and above for 25.18% [47]. This population structure is workforce-oriented, but it also includes a considerable number of children and older residents whose service needs should be considered.

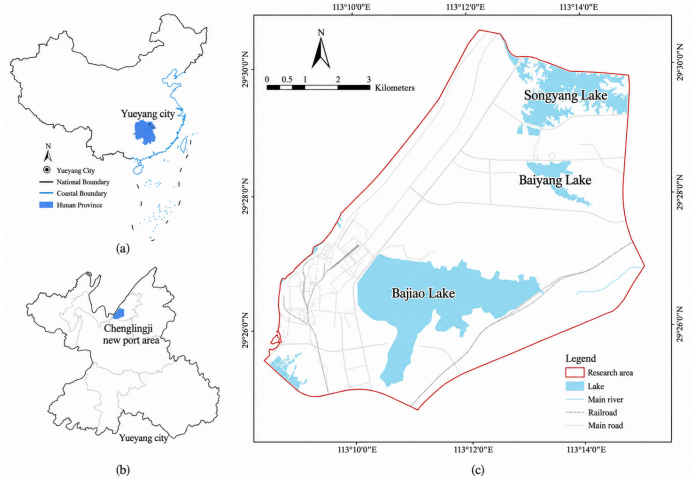


Figure 1. Location Map of Chenglingji New Port Area. (**a**) Location of Yueyang City within China; (**b**) Location of Chenglingji New Port Area within Yueyang City; (**c**) Map of Chenglingji New Port Area.

The Chenglingji New Port Area was selected because it differs from more mature industrial parks, science cities, and innovation regions, such as Suzhou Industrial Park in China [9,48], Zhangjiang High-Tech Park in Shanghai [49], Tsukuba Science City in Japan [12,22], Jurong Industrial Estate in Singapore [50], and Silicon Valley in the United States [13]. These cases generally emerged in settings with stronger economic foundations, richer human resources, more favourable policy conditions, and more developed urban service systems. By contrast, Chenglingji represents a common but less-examined type of industrial new town in central China, where economic foundations, human capital reserves, public fiscal capacity, and higher-order public services are relatively limited. Such areas often have specific advantages in ports, transport, resources, or industrial location, but they cannot rapidly become independent urban nodes with complete functions, stable populations, and sufficient services in the same way as mature parks in more developed regions. Similar conditions can be observed in the Zhengzhou Airport Economy Zone [51], the Ganjiang New Area, and the Xiangjiang New Area [52,53]. Comparable challenges are also found in some developing-country industrial new towns, industrial parks, and special economic zones, including India's southern SEZ-based industrial city [54], Ethiopia's industrial parks [55], and Batam in Indonesia [56].

These industrial new towns cannot simply replicate the theoretical models or successful experiences of mature industrial districts in developed regions, and they remain relatively underexplored in existing research. By reinterpreting the Industry–People–City analytical framework and selecting the Chenglingji New Port Area as a case, this study seeks to explain why industrial development, residents' everyday behaviours and needs, and urban service provision remain mismatched in such contexts. It further explores how, under conditions of limited resources, weak labour attractiveness, and the syphoning effects of the main urban area, industrial new towns can move from production-oriented growth poles toward more independent and integrated urban nodes through phased, sector-specific, and user-oriented public service provision and spatial governance.

3.2. Research Design and Data Collection

This study is a follow-up to our 2023 research on the Chenglingji New Port Area. The earlier study mainly adopted a quantitative approach, using geographic information system (GIS) software (version 10.8) and statistical methods to analyse the spatial characteristics of public service facilities and residents' service needs [21]. The present study adopts a qualitatively oriented exploratory case study design. Building on a theoretical discussion of

the interactions among the three key factors in China's industrial new-town development, it proposes the Industry–People–City analytical framework and uses the Chenglingji New Port Area as an empirical case. Data were collected around three dimensions: industrial development, residents' behaviours and needs, and urban functions. The purpose is not to make strict demographic inferences, but to explain the practical difficulties faced by industrial new towns in central China through multiple forms of field-based evidence.

For the "industry" dimension, this study conducted semi-structured interviews with managers from twelve major local enterprises and combined these interviews with field investigations. This enabled us to identify the spatial agglomeration characteristics of local industries and understand the practical problems and development needs faced by enterprises.

For the "people" dimension, the study used activity-diary interviews to record and interpret the everyday spatiotemporal behaviours of different population groups in the industrial new town. This approach is rooted in the time-geographic tradition of human activity research. Hägerstrand argued that "people" should be brought back into regional and spatial analysis by focusing on continuous action paths shaped by time, space, and institutional constraints [57]. Latham showed that diary-interview methods can combine participants' records of everyday experience with follow-up questioning, thereby helping to explain the meanings, spatial perceptions, and contextual constraints behind behaviour [58]. Kwan further demonstrated that individual geocoded data and GIS-based computation can transform activity trajectories, space–time paths, and behavioural patterns into analysable spatial evidence through geocoding, trajectory reconstruction, and visualisation [59]. Building on this methodological tradition, the present study combines activity diaries with semi-structured interviews: the former record activity time, location, content, and travel mode on workdays and rest days, while the latter explain residential choice, commuting arrangements, and public service use. Respondents' daily activities were then visualised in GIS.

Fieldwork was conducted in the Chenglingji New Port Area between 14 and 20 August 2024. To cover people of different occupations and age groups, 63 respondents were selected for face-to-face activity-diary interviews (see Figure 2). With the assistance of trained researchers, each respondent recalled and recorded their main activities on one workday and one rest day, including the start and end time of each activity, activity content, location, travel mode, and actual use of public service facilities. The research team then used semi-structured interviews to ask follow-up questions about residential choice, commuting mode, experience and needs regarding public service facilities, and perceptions of livability in the Chenglingji New Port Area. In the data-processing stage, reported activity locations were geocoded and checked in GIS. Individual activity trajectories were reconstructed and kernel density analysis was conducted. Three respondents were excluded from the spatial behaviour analysis because their activity locations were too vague to be reliably geocoded. Finally, 60 valid activity-diary interviews were retained, yielding an effective rate of 95.2%.

For the "city" dimension, our previous study had already conducted a detailed GIS-based analysis of public service facility provision in the Chenglingji New Port Area [21]. In the present study, GIS visualisation was used to further understand the development process and spatial distribution of public service facilities in the industrial new town. Interview records were also used to identify the differentiated service needs of different population groups. Together with the findings of the previous study, these data help reveal the main problems in local public service facility provision.

Finally, by integrating field investigation, activity-diary interviews, semi-structured interviews, and GIS spatial data, this study discusses the interactions among industry, people, and city as three key factors in industrial new-town development. It explores

the development difficulties of the Chenglingji New Port Area and proposes planning responses from an urban planning perspective, with the aim of offering reference value for similar industrial new towns in central China and other developing-country contexts.

Activity-Diary Interview Sheet for Different Population Groups in Chenglingji New Port Area

I. Your Basic Information:

① Gender:
② Age:
③ Education Level:
④ Occupation: Monthly Income:
⑤ Place of Residence: Workplace: Commuting Time:
⑥ Demands for Local Public Service Facilities:

II. Activity Log

Q1	Q2	Q3		Q4	Q5	Q6
Date	Activity Order	Activity Start and End Time (Fill in all activities of the day in chronological order starting from midnight)		Activity Content	Specific Address Where Activity Occurred	Transportation Mode
Workday	1	Start				
		End				
	2	Start				
		End				
	.....					
Rest Day	1	Start				
		End				
	2	Start				
		End				
	.....					

Q4 Activity Content: 1. Sleep 2. Household chores 3. Dining/Eating 4. Shopping 5. Work 6. Study 7. Taking care of the elderly 8. Physical exercise 9. Entertainment and leisure 10. Running errands 11. Social activities 12. Others

Q6 Transportation Mode: 1. Walking 2. Bicycle 3. Electric bicycle 4. Company shuttle/bus 5. Private car 6. Public bus 7. Taxi 8. Others

Figure 2. Activity-diary interview sheet. Source: Authors' documentation (2026).

4. Findings

4.1. Spatial Characteristics of Industrial Agglomeration and Development Needs

Based on the semi-structured interviews, four major sectors that structure industrial activities in the Chenglingji New Port Area were identified. Each sector is characterised by distinct industrial profiles and varying levels of public service provision supporting both enterprise operations and residents' daily life (see Figure 3).

The first is the Songyang Lake sector, a port-oriented area centred on shipping and logistics, grain and edible oil processing, and foreign trade. Its location within the core port zone and the comprehensive bonded area provides clear advantages in logistics access and administrative support. Public services here are closely tied to port operations, with facilities focused on customs clearance, taxation, and financial transactions. Interviews, however, point to a lack of business-promotion spaces such as exhibition halls and conference venues, which limits opportunities for industry interaction and product showcasing.

Interview excerpt (Enterprise manager, E01): "*Basic services such as customs clearance, taxation, and financial services are available, so routine procedures are relatively convenient. However, when we need product display, client reception, or industry exchange, there are few suitable exhibition or meeting spaces nearby. In many cases, we have to find a hotel temporarily or take clients to Yueyang's main urban area, which affects both business communication and the company's image.*"

In contrast, the Baiyang Lake sector reflects a different development trajectory. As a high-tech industrial area, it brings together activities such as research and development, finance, biotechnology, and new materials, while also showing a closer connection between industrial development and human resource support. The presence of a vocational institution aligned with local industry needs, along with talent apartments, supports workforce training and retention. At the same time, everyday amenities such as large supermarkets,

sports facilities, and entertainment spaces remain limited or underused, indicating that improvements in daily-life services have not kept pace with industrial growth.

Interview excerpt (Respondent No. 19, enterprise laboratory technician): "*Living in the talent apartment is convenient because it is close to the company, and commuting and meals are easy on workdays. But after work, there are not many places to choose from; the surrounding area mainly has small restaurants and shops. If I want to shop, exercise, or meet friends, I usually still go to Bubugao Plaza or the Nanhu area. This place is suitable for work, but everyday life here is not yet very diverse.*"

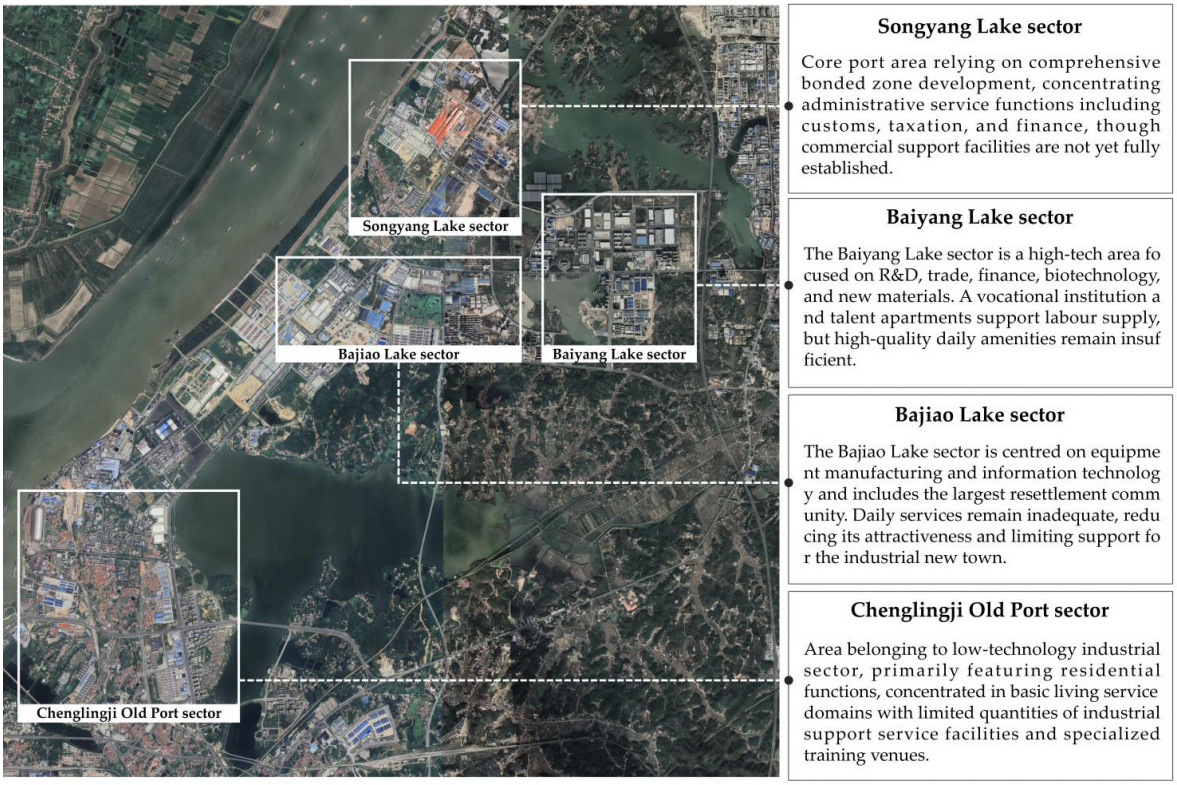


Figure 3. Industrial Spatial Distribution Characteristics of Chenglingji New Port Area. Source: Authors' analysis, 2026.

A different set of conditions can be observed in the Bajiao Lake sector. Characterised by equipment manufacturing, software and information technology industries, it also contains the largest resettlement residential community in the new town. Residents report shortages in basic services, including retail, healthcare, education, and leisure facilities. These limitations affect daily routines and reduce the area's capacity to attract new residents or support the wider functioning of the industrial new town. The imbalance between industrial activity and living conditions is particularly evident in this sector.

Interview excerpt (Enterprise manager, E04): "*The resettlement community has a large population, but supporting facilities have not kept pace. The temporary market occupies outdoor community space, and there are problems with hygiene and management; parking spaces are also insufficient, so cars often occupy roads and public spaces. Activity rooms for older residents, children's play spaces, and basic medical facilities are still incomplete, making everyday life inconvenient for residents.*"

A similar mismatch, though in a different form, appears in the Chenglingji Old Port sector. Located closer to Yueyang's main urban area, it retains a more traditional industrial structure, with lower-technology activities. Public services in this area mainly support residents' everyday needs, while facilities that could support industrial upgrading, such as

training centres or innovation platforms, remain limited. This constrains the sector's ability to respond to changing economic demands and limits opportunities for transition toward higher-value activities.

Interview excerpt (Enterprise manager, E09): "*The Old Port sector has some traditional daily services, so basic needs such as buying food and eating can be met. However, if enterprises need training, technical exchange, or product innovation, there are few suitable platforms or spaces nearby. This area should not remain only at the level of basic daily services; it needs more functions that can support industrial upgrading.*"

These sectoral differences reveal an uneven alignment between industrial development and public service provision. The Baiyang Lake sector shows a relatively closer connection between production and supporting services, whereas the Songyang Lake and Chenglingji Old Port sectors continue to face gaps in industry-oriented facilities. Residential areas such as the Bajiao Lake sector require more substantial improvements in basic services. This uneven configuration indicates that public service provision has not yet been sufficiently adjusted to the functional differences and population needs of each sector, highlighting the need for more coordinated planning across the new port area.

4.2. Temporal–Spatial Behavioural Characteristics of Surveyed Residents

4.2.1. General Daily Behavioural Characteristics of Residents

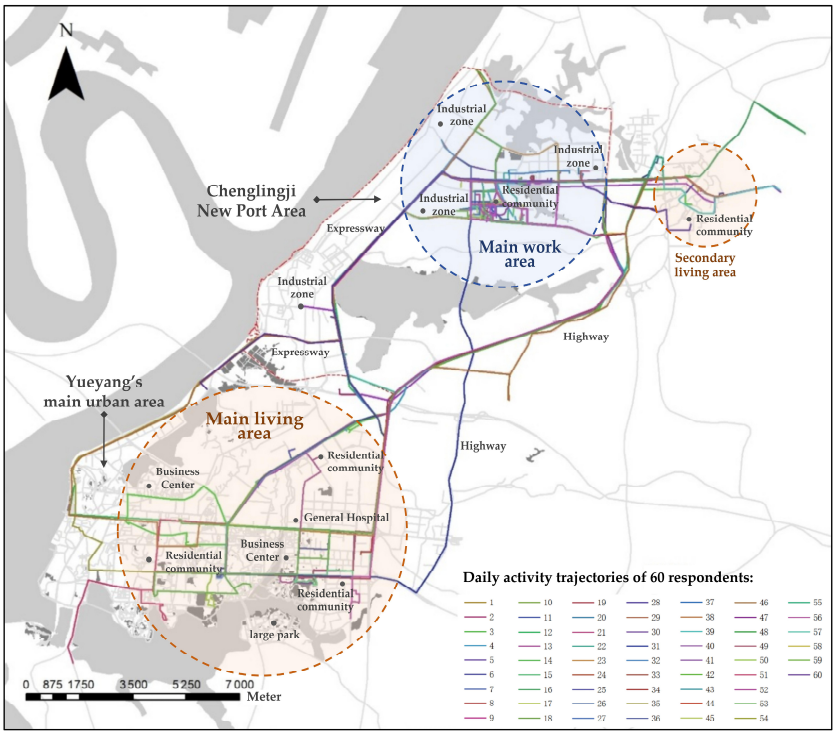
To examine the everyday behavioural patterns of people working in the Chenglingji New Port Area, we used GIS to map the daily activity trajectories of 60 respondents and applied kernel density estimation to their activity points in order to identify travel patterns and areas of activity concentration (see Figure 4). The results show that residents' daily lives are not confined to the Chenglingji New Port Area. Many trips extend to Yueyang's main urban area, indicating a stable and sustained connection between the two. A considerable proportion of respondents live in the main urban area and commute to the Chenglingji New Port Area for work over relatively long distances, reflecting a clear separation between places of residence and employment.

Within the Chenglingji New Port Area, activity and residential concentrations are more evident in the Bajiao Lake and Baiyang Lake sectors. These areas contain resettlement communities and talent apartments and have comparatively better access to basic public service facilities. Short-distance trips, shopping, errands, and nearby activities therefore tend to cluster in these locations. Nevertheless, the range and quality of local facilities remain limited, especially in terms of diversified commercial, recreational, and social spaces. This weakens the capacity of these sectors to function as self-sufficient living environments. Many residents therefore continue to travel to Yueyang's main urban area on rest days to access services and leisure opportunities that are not yet available locally.

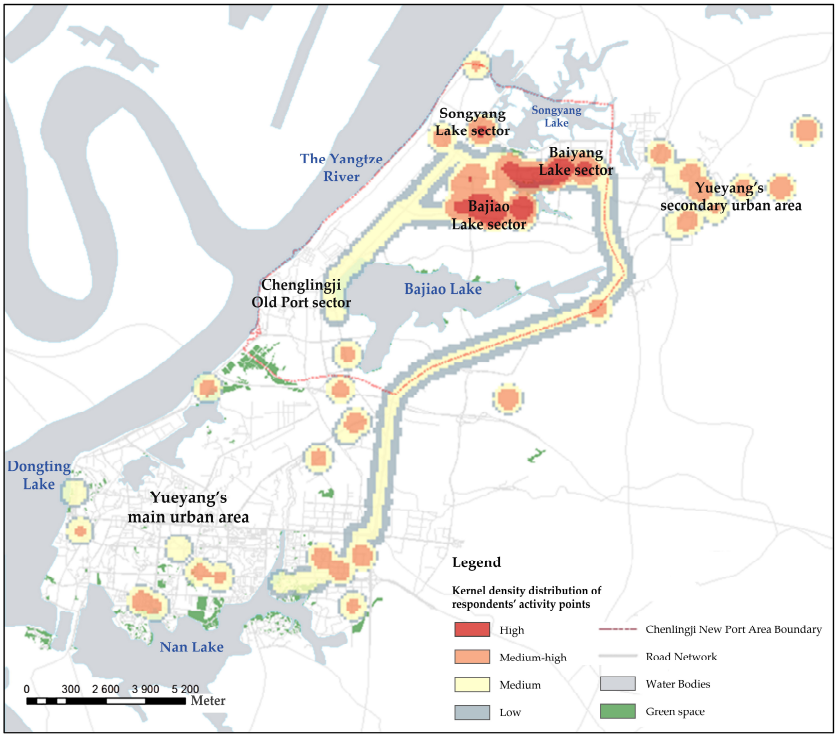
4.2.2. Profile of Surveyed Residents

Based on the activity-diary interviews and semi-structured interviews, respondents in the Chenglingji New Port Area can be broadly divided into two categories: the labour population and the non-labour population (see Table 2). The labour population constitutes the majority of the sample and mainly includes managerial personnel, technical professionals, and service-sector workers. Managerial personnel, such as government officials and corporate executives, are primarily involved in governance, administration, and strategic decision-making. Technical professionals, including research and development personnel, technical workers, and frontline industrial workers, support industrial production and technological operations in the area. Service-sector workers provide both specialised and everyday operational services, thereby sustaining the daily functioning of the industrial new town. By contrast, the non-labour population mainly includes homemakers, older

adults, and children. Although these groups are not directly engaged in industrial production, they are important for understanding the social composition, care needs, and everyday service demands of the settlement.



(**a**)



(**b**)

Figure 4. Analysis of respondents' daily activity trajectories and kernel density. (**a**) Daily activity trajectory chart of 60 respondents; (**b**) Kernel density analysis. Source: Authors' analysis, 2026.

Table 2. Classification of respondents and sample size statistics.

Category		Specific Group	Number of Participants
Labour population	Managerial Personnel	Government Officials	4
		Corporate Executives	2
	Technical Professionals	Research and Development Personnel	11
		Medium and Senior Technical Workers	5
		Frontline Workers	7
	Service Sector Workers	Professional Service Providers	6
		General Service Staff	10
Non-labour population		Homemakers	7
		Elderly	2
		Children	4

Source: Authors' analysis, 2026.

At the same time, the respondent profile shows clear socio-economic and household characteristics (see Figure 5). In terms of gender, men account for 64% of the respondents and women for 36%. In terms of age, respondents aged 26–49 account for 48%, those aged 25 and below for 28%, and those aged 50 and above for 24%, indicating that the sample is mainly composed of working-age residents while also including younger and older groups. Regarding educational attainment, 58% of respondents have a college degree or above, while 13% have completed high school education. In terms of monthly income, 42% report an income of 5000 yuan or above, and 23% report an income between 3000 and 5000 yuan. With regard to commuting, 29% of respondents report a commuting time of less than 10 min, while 52% report a commuting time of 10–30 min. In addition, 58% of respondents are married, 61% have school-age children, and 72% live within the Chenglingji New Port Area.

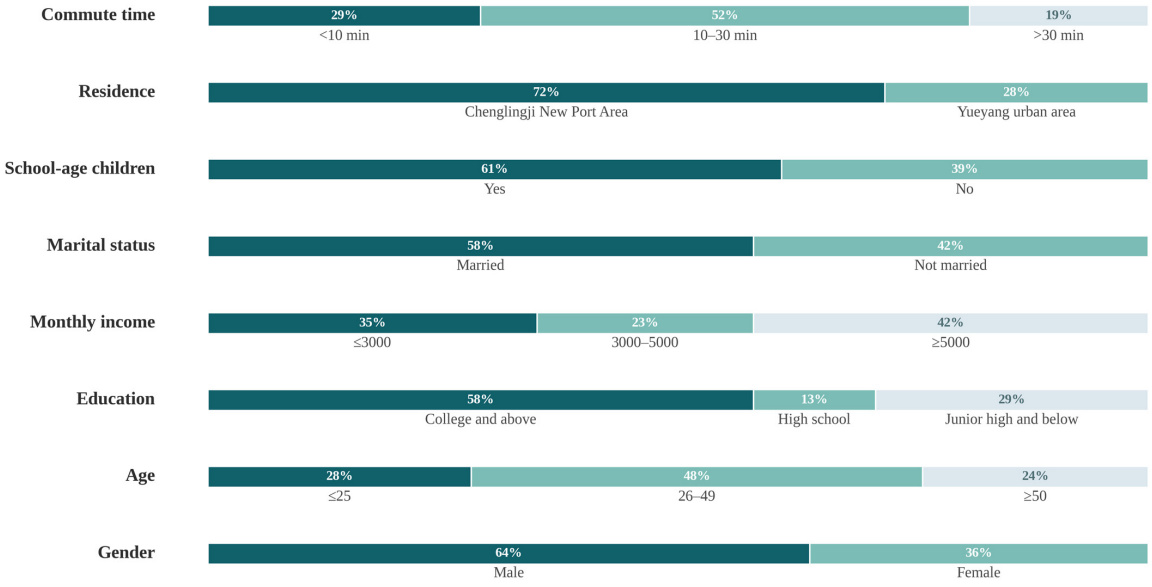


Figure 5. Profile of surveyed respondents. Source: Authors' analysis, 2026.

This profile indicates that the respondents are not a homogeneous group of industrial workers. Instead, they include residents of different ages, education, income, marital status, child-rearing, and residential backgrounds. While the sample is not intended to support demographic generalisation, it covers a broad range of population groups within

the industrial new town and helps reveal its basic social structure. It also provides an important basis for analysing how different occupational and household groups organise their daily activities and how their demands for public services vary within the Chenglingji New Port Area.

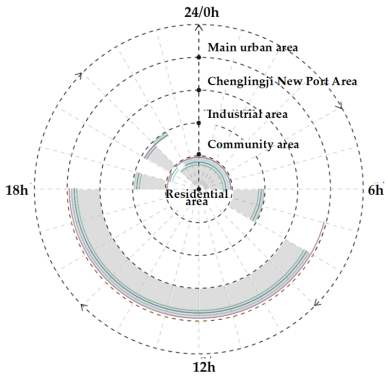
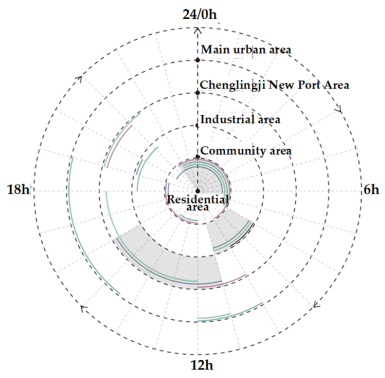
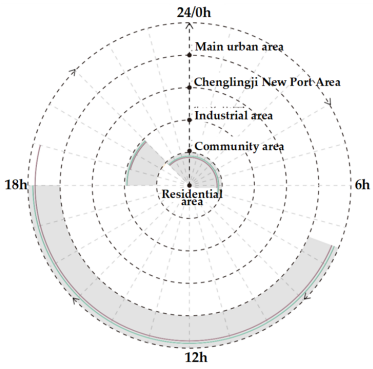
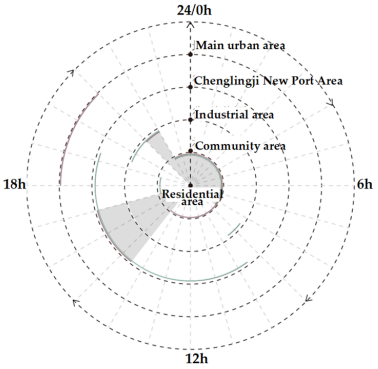
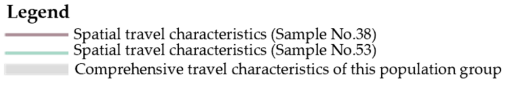
4.2.3. Daily Behavioural Characteristics of Different Resident Groups

Building on this classification of surveyed residents, we further analysed the daily behavioural patterns of different groups on the basis of each respondent's activity trajectory.

1. Managerial Personnel Group: Workplace–Residence Separation

The first set of findings relates to managerial personnel, where a clear pattern of workplace–residence separation is observed (see Table 3). Government officials and corporate executives working in the industrial new town are mostly based in Yueyang's main urban area and do not typically reside within the Chenglingji New Port Area. This arrangement produces a daily rhythm centred on movement between two locations. Weekdays are structured around commuting between home in the urban core and workplaces in the new port area, often involving long travel times along the main transport corridors that connect the two. Over time, commuting becomes a routine element of daily life, with activities organised around fixed points of residence and work.

Table 3. Spatiotemporal characteristics of daily life among surveyed managerial personnel.

Types	Workday Behaviour	Rest-Bay Behaviour
Government Officials		
		
Corporate Executives		
		

Source: Authors' analysis, 2026.

After working hours, activities remain limited in both time and location. On weekdays, non-work activities are usually short and occur either near the workplace or after returning to the urban core. These tend to include quick meals, small errands, or brief periods of leisure. Weekends show a different pattern. With fewer time constraints, activities are more varied and take place mainly in Yueyang's main urban area. Common activities include shopping in commercial districts, dining out, visiting parks, participating in parent–child learning programmes, using sports and fitness facilities, and meeting friends or relatives. This pattern indicates that everyday life for this group is centred in the main urban area, while the Chenglingji New Port Area is used primarily as a place of work.

Interview excerpt (Respondent No. 16, government staff member): "*On workdays, I basically work in the New Port Area and have meals in the workplace canteen, but my home is still in Yueyang's main urban area. After work, if there is no special arrangement, I usually go home; shopping, family time, and leisure on weekends also take place in the main urban area. For me, the New Port Area is mainly a workplace, while my life is still in the city.*"

2. Technical Professionals Group: Workplace–Residence Balance

Meanwhile, technical professionals, including research and development personnel, mid- to senior-level technical workers, and frontline workers, tend to reside within the Chenglingji New Port Area (see Table 4). Research and development staff and mid- to senior-level workers are often accommodated in talent apartments located near enterprise sites, which provide convenient access to workplaces and reduce daily travel time. Frontline workers, in contrast, typically live in dormitories situated within or adjacent to factory compounds. This close proximity between residence and workplace results in short commuting distances, often completed on foot or by factory shuttle buses, allowing daily activities to remain largely within the same spatial area.

On weekdays, activities outside working hours are concentrated within the nearby surroundings. Common destinations include dining facilities, small retail outlets, and basic leisure spaces located within walking distance or along shuttle routes. Daily routines are relatively compact, with limited need to travel beyond the industrial area. The close alignment between work and living spaces shapes a pattern of localised and time-efficient activity.

On rest days, activity patterns become more varied. Some technical professionals continue to remain within the industrial area or nearby residential zones, relying on local facilities for dining and leisure. Others travel to Yueyang's main urban area, where a wider range of amenities is available, including shopping malls, food streets, and entertainment venues. These trips involve different transport modes, such as motorcycles, public buses, factory shuttles, and taxis. Compared to the highly localised weekday routine, weekend activities extend across a broader spatial range and include a wider mix of leisure, consumption, and social interactions.

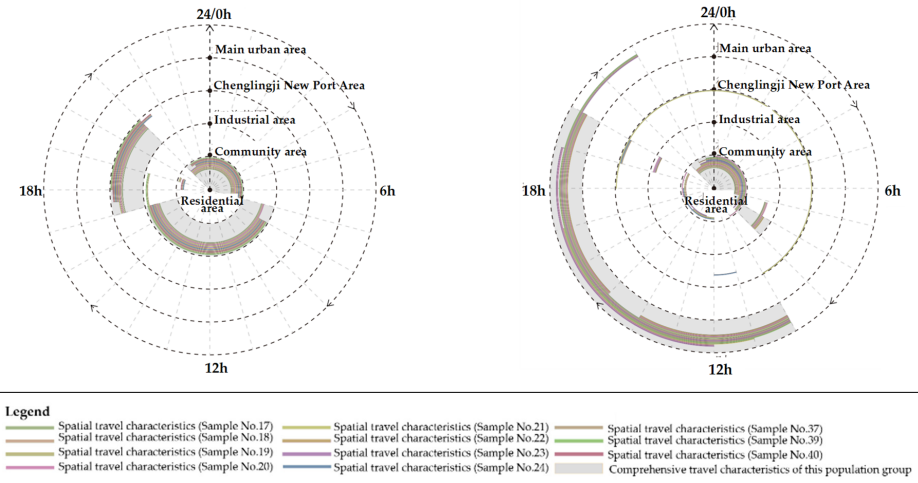
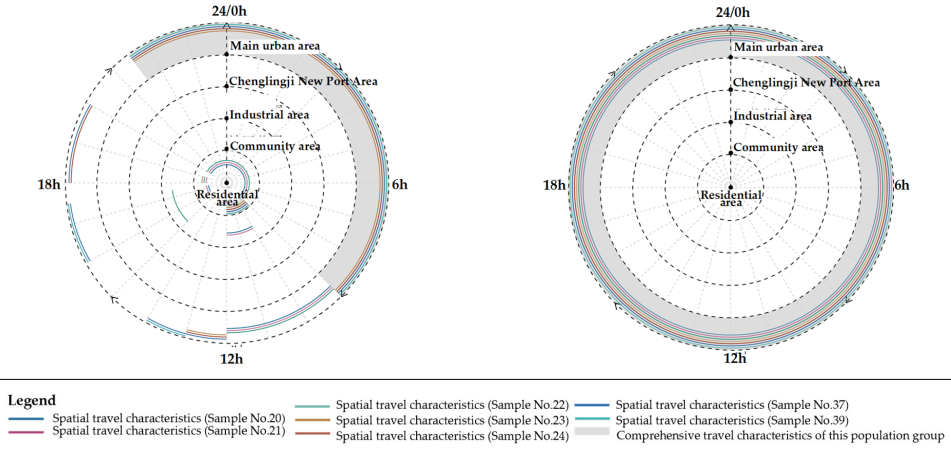
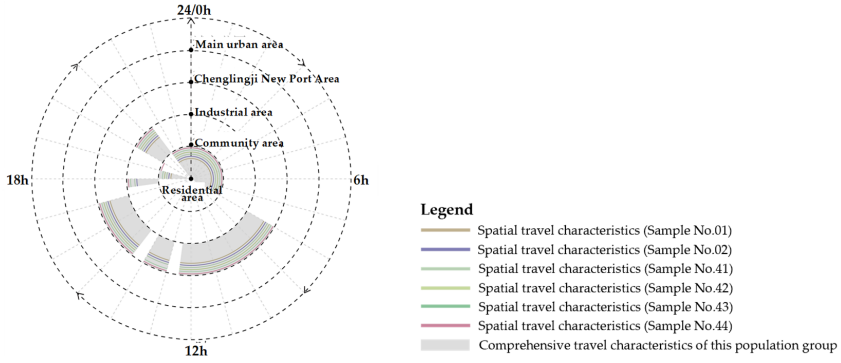
Interview excerpt (Respondent No. 23, enterprise technician): "*Living in the talent apartment or dormitory means I am very close to the workplace, so commuting and meals take little time. On workdays, my activities are basically limited to the company, the canteen, and the dormitory. But on rest days, if I want to go shopping, eat out, or meet friends, there are not many options nearby, so I still go to Bubugao Plaza or the Nanhu commercial area. Commuting is convenient here, but everyday life is quite monotonous.*"

3. Service-Sector Workers Group: Differentiated Work–Residence Arrangements

Service-sector workers can be divided into two subgroups: professional service providers and general service staff, each with distinct living arrangements and activity patterns (see Table 5). Professional service providers mainly include primary school and kindergarten teachers, as well as doctors working in community hospitals. Many of them maintain permanent housing in Yueyang's main urban area, but their work requires an

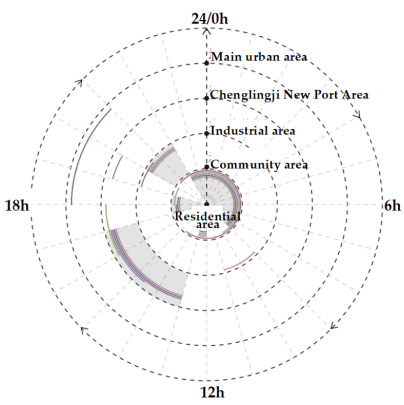
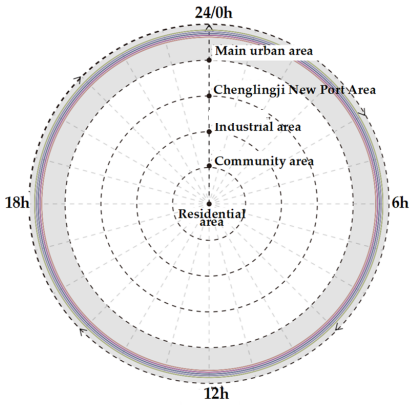
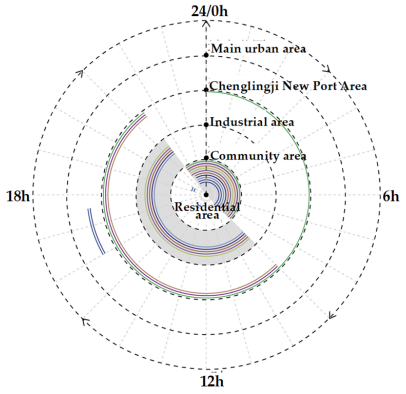
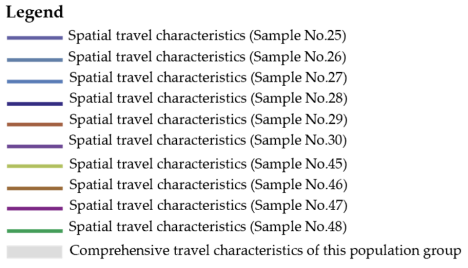
extended on-site presence. During the workweek, they often stay in dormitories provided by their work units. This arrangement restricts their non-work activities on weekdays, which are usually limited to nearby parks, supermarkets, or other basic facilities. On non-working days, their routines shift back to Yueyang's main urban area, where they have access to a wider range of dining, shopping, sports, and social activities.

Table 4. Spatiotemporal characteristics of daily life among surveyed technical professionals.

Types	Workday Behaviour	Rest-Day Behaviour
Research and Development Personnel		
Medium and Senior Technical Workers		
Frontline Workers		

Source: Authors' analysis, 2026.

Table 5. Spatiotemporal characteristics of daily life among surveyed service-sector workers.

Types	Workday Behaviour	Rest-Day Behaviour
Professional Service Providers		
		
General Service Staff		

Source: Authors' analysis, 2026.

General service staff show a different pattern shaped by the close alignment between work and residence. This subgroup, which includes waitstaff and self-employed workers, often lives at or adjacent to their workplaces, such as restaurants or small shops. Many are long-term local residents of the Chenglingji New Port Area, with occupational trajectories linked to the area's transformation. Prior to the development of the industrial new town, a significant number were engaged in agriculture. With the loss of farmland, they moved into service-sector employment or established small businesses within the area. Their work schedules are often irregular and do not follow fixed rest days, so daily routines show little distinction between weekdays and weekends. Activities remain centred on the workplace, and most movements take place within the local community. Stronger local social ties also shape this pattern, as everyday needs and social interactions can be met within nearby networks, reducing the need to travel to Yueyang's main urban area.

Interview excerpt (Respondent No. 36, primary school teacher): "*My permanent home is in Yueyang's main urban area, but during the school week I usually stay in the dormitory provided by the school because classes start early and I often need to remain on campus after school. On workdays, my activities are basically limited to the school, the dormitory, a nearby supermarket, and occasionally a short walk in the surrounding park. There are not many places nearby for sports, cultural activities, or socialising, so weekday life here is quite simple. On weekends, I usually return to Yueyang's main urban area, where shopping, dining, exercise, and meeting friends are much more convenient.*"

Interview excerpt (Respondent No. 25, service-sector worker): "*My shop and my home are both in the Lingbo Lake community, so I usually do not need to travel far. Buying food, eating, and taking care of my family can all be handled nearby. For people like us who run small businesses, there is no fixed rest day, and work and life are basically mixed together. Most acquaintances are also in the community, so unless there is something specific to do, I rarely go to the main urban area.*"

4. Non-labour Population Group: Community-Centred Activity Patterns

The findings indicate that the surveyed non-labour population mainly consists of homemakers, older residents, and children. These groups are primarily based in residential communities within the Chenglingji New Port Area, and their daily activities are largely organised at the community scale, with limited need for long-distance travel (see Table 6). Homemakers often reside in the Chenglingji New Port Area to accompany spouses employed locally and to support childcare for children attending nearby schools. Their daily routines are structured around household responsibilities, including grocery shopping and caregiving. Activity locations are typically concentrated around the home, farmers' markets, and nearby shopping centres, which are usually accessed on foot or by electric bicycle.

Interview excerpt (Respondent No. 12, homemaker): "*Most of my daily activities take place around the Lingbo Lake community. Buying food, taking care of the child, and doing housework usually mean moving between home and the market. Some daily needs can be met in the community, but there are too few places for children to play and too few childcare services. On weekends, if I want the child to have more activities, I still take him to a children's park or shopping mall in Yueyang's main urban area.*"

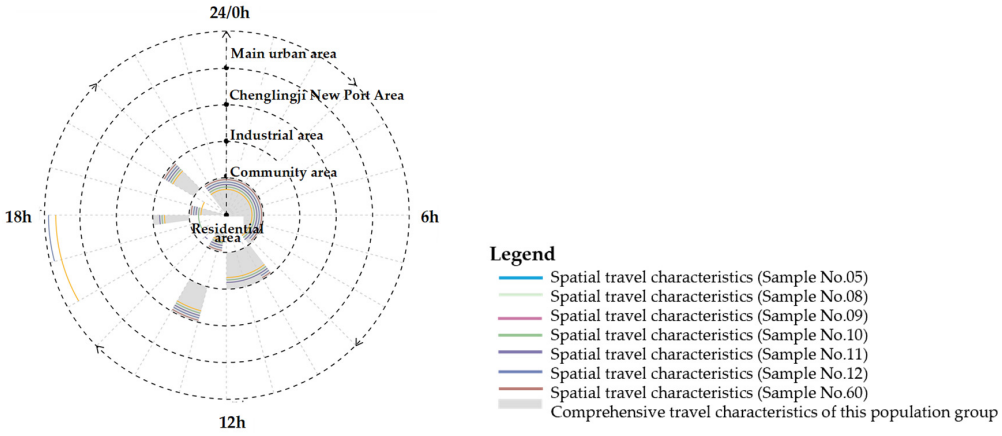
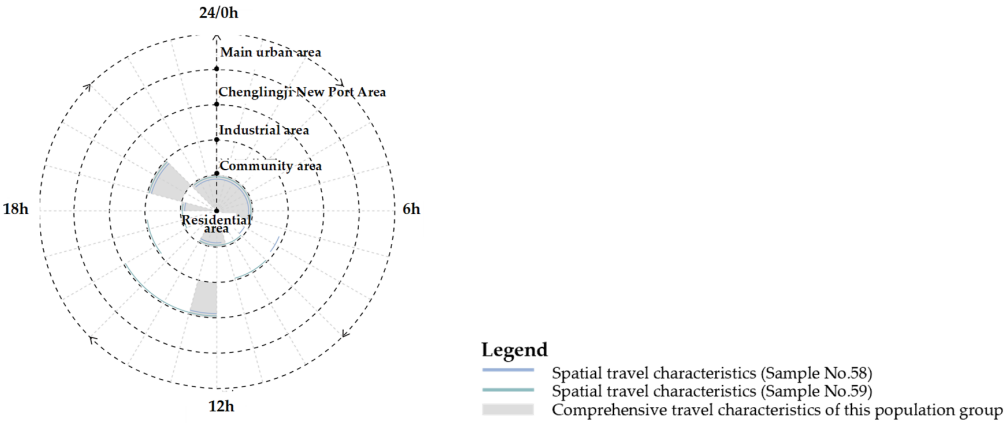
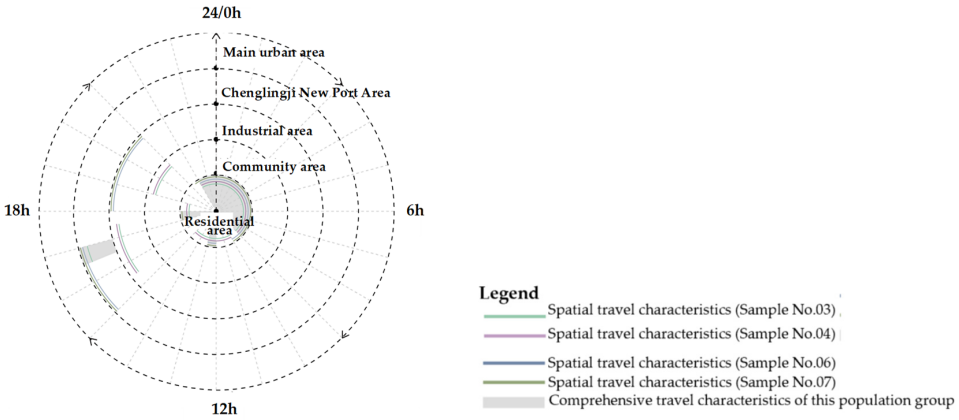
Older residents, many of whom are long-term local inhabitants, also conduct most of their activities within close proximity to their residences. Their daily routines include walking, informal social activities such as card or board games, participation in square dancing, and shopping in local markets. These activities are largely embedded within neighbourhood spaces and rely on familiar social networks. Meanwhile, children's activity spaces are centred on schools and nearby community open spaces. After school, they commonly spend time in parks and public squares within the community. On some occasions, children travel with family members to Yueyang's main urban area to visit larger shopping centres or recreational parks, where a wider range of leisure and entertainment options is available.

Interview excerpt (Respondent No. 59, older resident): "*I have lived in Linbohu community for many years. Usually I walk around the community, buy food, and play cards with neighbours. There are not many places for older people to spend time, and public spaces are often occupied by parked cars; if there is a health problem, there is no large hospital nearby. At my age, what I hope for most is more convenient medical services and activity spaces in the community.*"

Interview excerpt (Respondent No. 06, child/student): "*Most of my activities are around school and home. After school, I sometimes play with classmates near the community or buy snacks on Limu Street. There are not many places in the community that are really suitable for us to play. On weekends, if I want to go to a larger playground or shopping mall, I still have to go to Yueyang's main urban area with my family. It is close to school here, but there are not many interesting places.*"

The above findings point to a broader pattern in how daily life is organised within the Chenglingji New Port Area. Residents' behavioural patterns reflect more than individual preferences. They provide a useful entry point for examining how industry, population, and urban functions are organised in practice. In the Chenglingji New Port Area, the observed patterns suggest that many groups have achieved a relatively efficient jobs–housing arrangement at the local level, which supports routine weekday activities such as commuting, basic consumption, and nearby service use. This arrangement, however, remains limited in scope and does not fully support a broader range of everyday needs.

Table 6. Spatiotemporal characteristics of daily life among the surveyed non-labour population.

Types	Daily Behaviour
Homemakers	
Older Adults	
Children	

Source: Authors' analysis, 2026.

For higher-order consumption, leisure and entertainment, and access to more specialised public services, residents continue to depend on Yueyang's main urban area. This is evident in regular weekend travel and in the use of facilities that are not available locally. The pattern indicates that public service provision within the Chenglingji New Port Area remains constrained in both depth and diversity. Facilities that support daily living are present, but those that enable more varied social, cultural, and recreational activities are still limited. As a result, the area has yet to develop a more comprehensive and self-sustaining urban living system, and continues to function in close relation to the main urban area.

4.3. Current Status of Public Service Provision

To examine public service facility provision in the Chenglingji New Port Area, GIS-based spatial analysis was used to trace changes in facility distribution over the past decade (see Figure 6). From 2015 to 2017, public service facilities were mainly concentrated in the Chenglingji Old Port sector, which is adjacent to Yueyang's main urban area and has a relatively established development base. From 2018 to 2022, industrial expansion converted large areas of farmland into industrial land, while land-expropriated farmers were resettled in large communities in the Bajiao Lake sector. Public service facilities therefore gradually began to cluster in this area. At the same time, the growth of port-related industries in the Songyang Lake sector attracted migrant workers and generated additional demand for supporting facilities. By 2024, government administrative facilities, talent apartments, and vocational institutions had also been established in the Baiyang Lake sector, forming another secondary cluster of public service facilities.

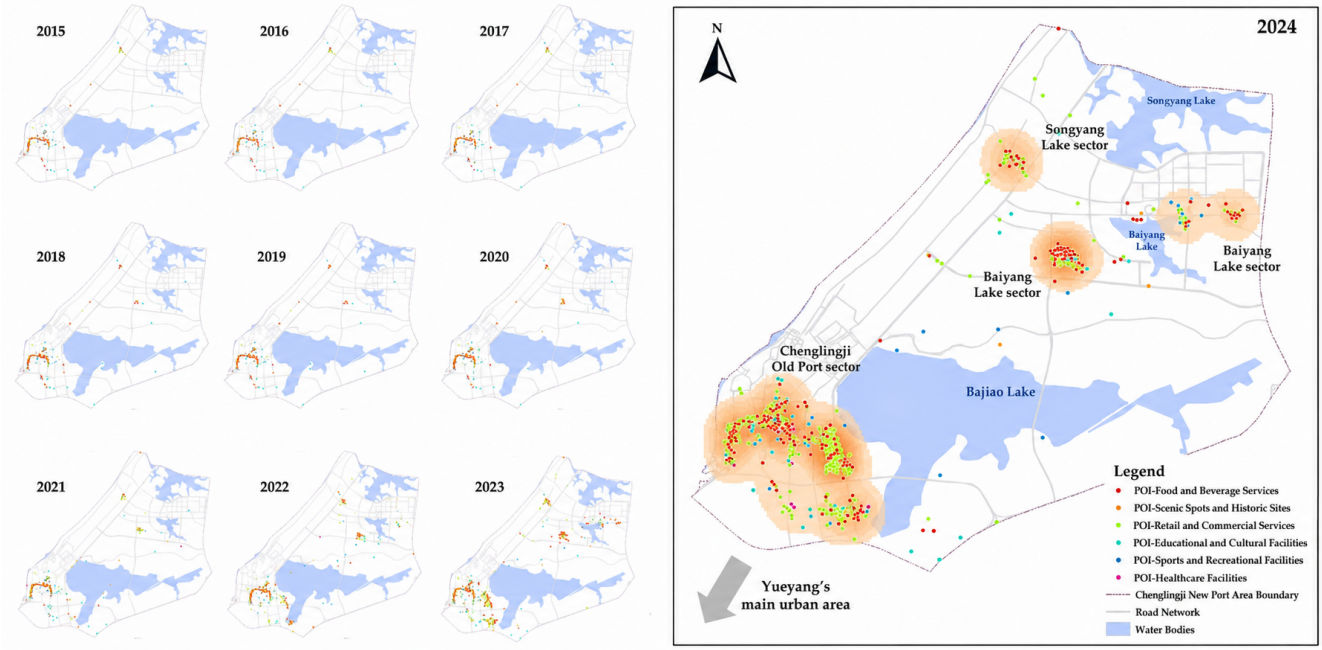


Figure 6. Annual changes in the distribution of public service facilities and kernel density analysis in the Chenglingji New Port Area. Source: Authors' analysis, 2026.

In terms of facility types, our previous research on facility accessibility, population load, and residents' demand for public service facilities in the Chenglingji New Port Area is broadly consistent with the findings of this study. Catering and shopping facilities are the most widely distributed categories, generally with relatively good accessibility and manageable population loads. However, the overall quality of these services remains limited, as the area still lacks large shopping malls and higher-end commercial complexes. A similar pattern can be observed in medical services. Although accessibility is relatively good and population pressure is low, existing facilities are largely confined to community clinics and small pharmacies, and there is still a lack of general or specialist hospitals capable of providing higher-capacity care. Facilities related to children and education show moderate levels of accessibility and population load, yet childcare services for children aged 0–3 remain absent. In addition, the provision of science, education, and cultural facilities, as well as parks, plazas, and sports and leisure spaces, is comparatively weak, requiring residents to bear longer travel distances as well as higher time and financial costs to access these services [21].

Local interviews further indicate that residents' demands for public service facilities are concentrated mainly in commercial consumption, public open space, transport connectivity, and healthcare services (see Figure 7). Coding of the semi-structured interview materials shows that 36 respondents called for large shopping malls or commercial streets, 33 for parks and squares, 30 for public transport facilities, 27 for sports fields or gymnasiums, and 26 for general or specialty hospitals. Schools, leisure and entertainment facilities, higher-quality dining facilities, and science, education, and cultural facilities were also raised by some respondents. These findings suggest that the Chenglingji New Port Area is not facing a shortage of a single type of facility, but a combined deficit across commerce, transport, healthcare, education, cultural and recreational services, and public open spaces.

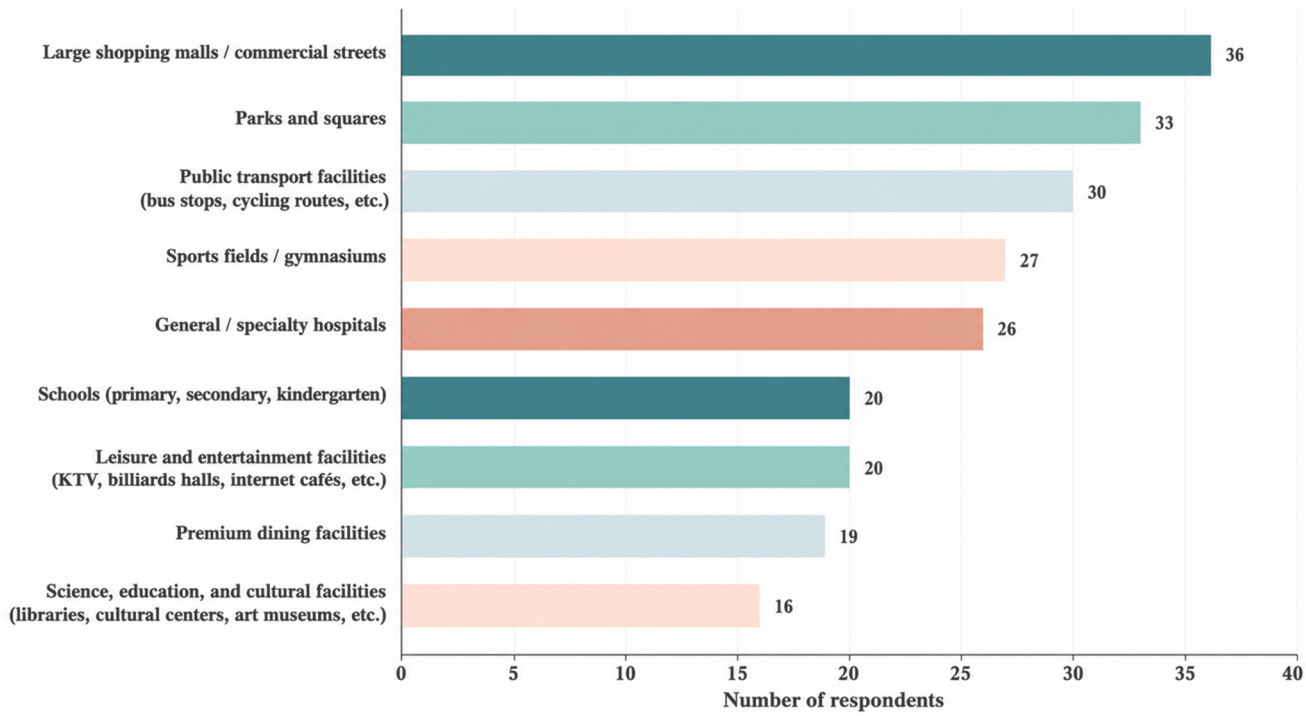


Figure 7. Demand for public service facilities among surveyed respondents based on interview materials. Source: Authors' analysis, 2026.

When considered alongside the preceding analysis of "industry" and "people", these findings show that the development of all four major industrial sectors has been accompanied by some clustering of public service facilities, which is broadly consistent with the Chinese policy idea of integrating industry and urban functions. However, the actual behaviours of people working and living in the area remain spatially misaligned with both industrial distribution and service provision. For example, although the Chenglingji Old Port sector has the highest concentration of public service facilities, most respondents do not rely on it as their main service destination; instead, many travel farther to Yueyang's main urban area. This indicates that, despite substantial progress in public service development over the past decade, provision within the Chenglingji New Port Area has not been adequately aligned with residents' actual behaviours and needs. This conclusion is consistent with our previous findings: the area can meet some basic daily needs, but services supporting more diverse forms of everyday life remain limited. As a result, residents continue to depend heavily on Yueyang's main urban area for leisure activities, higher-quality consumption, and specialised services.

5. Discussion

5.1. Why Emphasise the Industry–People–City Analytical Framework Rather than a Simply People-Oriented Logic?

A people-centred orientation has become an important normative position in contemporary urban planning. Collaborative planning emphasises participation, institutional capacity, and the inclusion of multiple actors [60], while the just city perspective highlights equity, democracy, and diversity as central planning values [61]. Urban design and public-space studies further stress human scale, everyday activity, and lived experience [62]. These perspectives indicate that planning should not serve only land development, capital accumulation, or spatial expansion, but should also respond to residents' practical needs and broader goals of social equity. In China, scholars have similarly argued that people-oriented development should be the ultimate direction of industrial new-town planning [7,45].

In practice, however, a people-oriented pathway often implies that high-quality public services, attractive residential environments, and complete urban functions should be provided at an early stage to attract talent, which then drives industrial upgrading and urban development. This pathway is more feasible in places with strong economic foundations, substantial policy resources, and mature industrial networks, such as Suzhou Industrial Park and Zhangjiang High-Tech Park.

For industrial new towns with weaker economic foundations, limited human capital, and constrained local fiscal capacity, directly adopting a "people–industry–city" development logic is less realistic. In the Chenglingji New Port Area, interviews with enterprise managers and government-related actors indicate that industry remains the main source of local fiscal revenue, employment, and infrastructure investment. If higher-order urban functions were allocated far ahead of the industrial and demographic base, facilities might be underused, fiscal pressure could increase, and service provision would be difficult to sustain.

The Industry–People–City analytical framework therefore offers a context-sensitive way to analyse resource-constrained industrial new towns. It does not abstract people-oriented planning from its industrial and fiscal conditions, nor does it reduce industrial new towns to mono-functional production spaces. Instead, it examines how industrial capacity, population needs, and urban functions can be coordinated gradually and practically. Its theoretical contribution lies in making the "people" dimension analytically visible within a development process that is still strongly shaped by industrial foundations.

The theoretical contribution of this framework lies in offering a more context-sensitive analytical path for resource-constrained industrial new towns. It avoids discussing people-oriented planning in abstraction from the industrial base, while also avoiding the reduction of industrial new towns to mono-functional production spaces. Instead, it emphasises gradual, dynamic, and implementable coordination among industrial capacity, population needs, and urban functions.

5.2. The Mismatch Between "Production" and "Living" Remains Significant in Industrial New Towns

Growth pole theory and industry–city integration theory help explain why industrial activity concentrates in strategic locations and why urban services should develop alongside such concentration. The Chenglingji case, however, shows that industrial agglomeration alone is insufficient to produce a sustainable urban node. The area has become attractive to firms and production activities, but it remains less attractive as a place of everyday life because weekend leisure, family services, higher-order consumption, and specialised services continue to depend heavily on Yueyang's main urban area [21].

From the industry dimension, the area has gradually formed four distinctive industrial sectors. Within these sectors, factories, nearby accommodation, canteens, and basic retail services have clustered in ways that improve production efficiency and shorten commuting time for some workers. Yet this configuration primarily creates a "production" environment rather than a "living" environment. It can meet basic needs but does not fully support a more diverse everyday life. Unlike Suzhou Industrial Park, where stronger local fiscal capacity and institutional arrangements enabled industrial development to be converted into residential, educational, leisure, and commercial functions [48], the Chenglingji New Port Area still lacks a strong mechanism for reinvesting industrial gains into public service facilities that respond to residents' broader needs.

From the people dimension, evidence from activity-diary interviews helps explain the differentiated daily behaviours of local population groups. Managerial personnel are mainly anchored in Yueyang's main urban area; technical staff and frontline workers concentrate around factories and talent apartments; service-sector workers often rely on local social networks; and non-labour groups are more community-centred. These patterns provide an empirical basis for future planning. At the same time, they reveal that some industrial new towns in China still lack sufficient attraction for highly educated or technically skilled labour. Even though the Chenglingji New Port Area is a national-level industrial new town, many high-skilled workers still treat it primarily as a workplace and prefer to live in Yueyang's main urban area, where education, healthcare, and other services are stronger. This suggests that attracting workers' families and supporting long-term settlement require higher-quality living facilities. Existing research shows that consumer amenities and cultural facilities are increasingly important for attracting skilled labour and sustaining urban competitiveness [25,34,63]. Without such amenities, Chenglingji may remain a work-oriented space rather than a place of long-term settlement, and residents' place attachment may remain weak [64].

From the city dimension, continued dependence on Yueyang's main urban area should not be understood simply as a failure of local provision. It also indicates that the Chenglingji New Port Area remains incomplete and dependent within the regional service hierarchy. Future planning should not attempt to replicate all metropolitan functions within the new port area. Instead, it should clarify which services need to be retained locally and which can be shared at the regional scale through efficient connections with the main urban area. Basic healthcare, childcare, daily shopping, sports facilities, community parks, and family-oriented education should be strengthened within Chenglingji. Specialist hospitals, large cultural venues, and higher-order commercial functions may remain shared at the regional level, provided that frequent and affordable public transport connections are available. Experiences from Guangzhou Development District [65], Tsukuba Science City [23], and Changwon in South Korea [66] suggest that industrial new towns become more resilient when production-related functions and everyday services are planned together. These experiences also indicate, however, that strategies must be adjusted according to local fiscal capacity and industrial structure.

5.3. Phased and Sector-Specific Planning Responses

Based on the Industry–People–City analytical framework and the integration of multiple data sources, this study identifies the current mismatch between "production" and "living" in the Chenglingji New Port Area and proposes phased and sector-specific planning responses.

In the short term, the most evident deficits in everyday life should be addressed first. Priorities include public transport connections with Yueyang's main urban area, neighbourhood retail, affordable catering services, sports grounds, pocket parks, basic

clinics, childcare services, and night-time leisure facilities. In the medium term, Chenglingji should develop several compact living-service nodes around Bajiao Lake, Baiyang Lake, and Songyang Lake. Each node should integrate housing, daily commerce, community health services, childcare, sports facilities, and public open spaces. In the long term, the area should establish a public service facility system that matches industrial development and population agglomeration, with particular attention to education, healthcare, culture, sports, and community services. This would help gradually reduce dependence on Yueyang's main urban area.

More specifically, this study proposes sector-specific strategies based on the functional gaps identified above. The Songyang Lake sector should supplement its port production and comprehensive bonded-zone functions with exhibition and conference spaces, customs-related business services, workers' catering, and rest areas. The Baiyang Lake sector already contains high-tech activities and talent apartments; planning should therefore focus on a "talent living circle" by adding supermarkets, sports venues, cafés and leisure spaces, childcare, and high-quality rental housing. The Bajiao Lake sector contains resettlement communities and concentrated everyday residential demand. Its priorities should be basic public services, including community clinics, basic education, elderly-care services, parks, and affordable retail. The Chenglingji Old Port sector should use its existing local services as a basis for renewal, while supporting industrial upgrading and local identity through training centres, small innovation platforms, and adaptive reuse of old industrial or port spaces.

In addition, the local government should establish an Industry–People–City coordination mechanism that integrates industrial planning, land-use regulation, housing policy, transport planning, and public service investment. This mechanism could include an annual livability assessment based on activity-diary evidence, updated POI data, facility accessibility, and resident satisfaction; a project list linking each industrial sector with the social infrastructure it requires; and a reinvestment policy that channels part of land development gains, incremental industrial tax revenue, or enterprise contributions into public service facilities. Rather than waiting for population growth before supplementing services, the new town could use behavioural evidence to identify which service deficits already constrain settlement and which small-scale, targeted investments are most likely to generate visible improvements.

5.4. Implications of the Chenglingji Case for Other Industrial New Towns

The Chenglingji case suggests that industrial new towns in central China and other developmentally constrained contexts should not simply apply the experiences of mature industrial parks or innovation regions. These experiences are often supported by strong economic foundations, sustained fiscal investment, abundant human capital, and mature public service systems, conditions that do not necessarily exist in ordinary inland industrial new towns. Comparative urban research and policy mobility studies caution against treating urban experiences as fixed templates that can be transferred without regard to local context. Planning knowledge must be reinterpreted in relation to institutional conditions, resource capacity, population structure, and everyday lifestyles [67,68].

The contribution of the Chenglingji case therefore lies not in providing a successful model to be directly replicated but in revealing a more common dilemma of industrial new towns: industrial space has been formed, yet population stability, living services, and urban functions have not matured in parallel. Industrial growth has acquired a certain basis, but it has not been fully transformed into a living environment in which residents are willing to stay for the long term. Similar issues are reflected in the Zhengzhou Airport

Economy Zone, Ganjiang New Area, Xiangjiang New Area, India's southern SEZ-based industrial city, Ethiopia's industrial parks, and Batam in Indonesia, as discussed above.

Based on this understanding, the Chenglingji case offers three implications for similar industrial new towns. First, planning diagnosis should move beyond industrial scale and land-development intensity. It should also examine different population groups' work–residence relationships, use of public services, and dependence on Yueyang's main urban area, with particular attention to the differentiated needs of managerial personnel, technical staff, service-sector workers, and family-based residents. Second, public service facilities should be configured gradually according to industrial development stage, population concentration, and sectoral functional differences, rather than being provided in a one-off, uniform, or excessively high-standard manner. Third, spatial governance should avoid both a return to a single "industry-first" development-zone logic and an abstract people-oriented agenda detached from the industrial base. For industrial new towns with limited resources, weak talent attraction, and constrained fiscal capacity, phased, sector-specific, and behaviour-based public service provision may be more realistic than imitating the high-standard construction models of mature parks [69].

6. Conclusions

This study examined the Chenglingji New Port Area in central China through the Industry–People–City analytical framework to understand the relationship among industrial development, residents' everyday behaviours, and urban service provision. By integrating enterprise interviews, activity-diary interviews, GIS-based spatial analysis, and public service facility data, it assessed whether industrial spatial organisation, the activity patterns of different population groups, and public service provision are aligned within the industrial new town. The findings show that Chenglingji has developed a clear basis of industrial agglomeration and several functional sectors, but its urban service system and everyday living environment have not matured in parallel with industrial development. Industrial space supports production activities and basic employment, but it remains insufficient to sustain long-term settlement and stable everyday life for workers and their families.

More specifically, the Chenglingji New Port Area continues to display a clear mismatch between "production" and "living". The Songyang Lake, Baiyang Lake, Bajiao Lake, and Chenglingji Old Port sectors differ significantly in industrial profile, population composition, and service needs, yet the provision of public service facilities has not fully responded to these differentiated demands. The activity-diary interviews show that managerial personnel rely more heavily on Yueyang's main urban area for residence, consumption, leisure, and family services; technical staff and frontline workers have shorter work–residence distances but relatively limited activity ranges and lifestyle choices; and service-sector workers and non-labour groups depend more on local communities and basic facilities. These findings indicate that industrial agglomeration does not automatically lead to population stability or complete urban functions. Improving the livability of industrial new towns therefore requires closer attention to the everyday behaviours and service needs of actual users.

The theoretical contribution of this study lies in its further interpretation and application of the Industry–People–City analytical framework. Unlike the strong "industry-first" logic often found in traditional development-zone studies, and unlike an idealised pathway that begins directly with "people–industry–city", this study argues that industry remains an important foundation for local development, employment provision, and public service construction in industrial new towns with limited economic bases, human capital reserves, and fiscal capacity. The value of the Industry–People–City analytical framework

is therefore not to reinforce a production-oriented logic, but to embed residents' everyday behaviours, living needs, and spatial dependencies into the structural diagnosis of industrial new-town development. The framework helps explain why industrial growth does not necessarily produce complete urban functions and provides a context-sensitive tool for identifying structural disconnections among industry, population, and public services in resource-constrained industrial new towns.

The findings also have implications for the planning of industrial new towns in central China and other developing-country contexts. For the Chenglingji New Port Area, future planning should not remain limited to expanding industrial land, attracting enterprises, or improving basic infrastructure. It should strengthen the links among industrial development, population stability, and public service provision. In the short term, deficits in public transport, neighbourhood retail, affordable catering, basic healthcare, childcare, sports, and everyday leisure facilities should be addressed first. In the medium term, compact living-service nodes should be developed around key sectors such as Bajiao Lake, Baiyang Lake, and Songyang Lake. In the long term, a public service facility system matching industrial development and population agglomeration should be established, especially in education, healthcare, culture, sports, and community services. For other industrial new towns with similar conditions, phased, sector-specific, and behaviour-based public service provision may be more realistic than simply replicating the high-standard construction models of mature parks.

Several limitations should be acknowledged. First, this study is based on a single case. Although the Chenglingji New Port Area reflects several typical challenges faced by resource-constrained industrial new towns in central China, the conclusions should be tested in other regions and in different types of industrial new towns. Second, activity-diary interviews provide in-depth insights into individual activity trajectories, service use, and living needs, but the sample size remains limited. The purpose of the study is exploratory interpretation rather than strict demographic inference. Future research could apply the Industry–People–City analytical framework to more industrial new areas in central China, as well as to industrial parks, special economic zones, and industrial new towns in other developing countries. Multi-case comparison and longitudinal tracking would help examine how land use, public service provision, and residents' behavioural patterns change over time, and how industrial new towns may gradually evolve from mono-functional production spaces into more complete urban living environments.

Author Contributions: Conceptualization, Y.S. and R.P.D.; methodology, Y.S., X.Z. and R.P.D.; software, X.Z.; validation, Y.S., X.Z., H.Z. and Q.T.; formal analysis, Y.S. and X.Z.; investigation, Y.S., H.Z. and Q.T.; resources, R.P.D.; data curation, Y.S., X.Z. and H.Z.; writing—original draft preparation, Y.S.; writing—review and editing, R.P.D., X.Z., H.Z. and Q.T.; visualisation, X.Z. and H.Z.; supervision, R.P.D.; project administration, Y.S. and R.P.D.; funding acquisition, Y.S. and R.P.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Hunan Provincial Graduate Research and Innovation Project, grant number CX20250629, and the Hunan Provincial Science and Technology Department, grant number 2025JJ80011.

Data Availability Statement: The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author.

Acknowledgments: During the preparation of this manuscript, the authors used ChatGPT-3.5 for language editing and proofreading of the full text. The authors reviewed and edited the output and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

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