



The Transformation of Women's Residential Space in the Gentrification Process of Wuhan's Old City: A Case Study of Hankou Historic District

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Abstract. Drawing on feminist urban theory and social reproduction frameworks, this study examined gendered spatial transformation in Hankou Historic District, Wuhan (2015-2024), analyzing residential, activity, and social spaces across four subgroups of women residents through spatial analysis, longitudinal comparison, and multi-dimensional objective assessment. The results revealed profound contradictions in material transformation: while the average housing area expanded 47% (51 m² to 75 m²), housing affordability declined sharply for vulnerable groups, with elderly women's price-to-income ratio rising from 4.2:1 to 9.8:1. Spatial reorganization systematically disrupted daily provisioning—service facility coverage declined from 87.8% to 84.0%, with walking distances increasing 10.6% overall but 50% for elderly residents whose facility density declined 57% (42 to 18 facilities/km²). Social network erosion proved most pronounced: neighborhood interaction frequency declined 59% (8.5 to 3.5 times/week), while elderly women's average residence duration declined 52% (25.5 to 12.3 years) and population turnover rose 478% (3.2% to 18.5%), contrasting with new middle-class women's residential stabilization (turnover declining from 12.5% to 8.2%). These findings show that gentrification operates through infrastructural dispossession—systematic removal of proximity-based survival resources essential for women's social reproduction. The study underscores the urgent need for gender-sensitive urban regeneration policies, integrating accessibility preservation, affordable housing protection, and community stability maintenance in China's heritage district transformations.

Keywords. State-led gentrification; Gendered spatial justice; Historic district renewal; Social reproduction; Urban displacement

Introduction

The past four decades in China witnessed accelerated urbanization, resulting in large-scale urban regeneration projects that significantly transformed the spatial configuration of historic urban areas. Unlike the market-driven gentrification that is predominant in Western contexts, China's urban renewal is characterized by state-led processes in which local governments actively design redevelopment policies through land financing mechanisms and heritage conservation imperatives (Li et al., 2023; Zhu et al., 2022). These transformations have attracted considerable scholarly attention regarding residential displacement, housing affordability, and neighborhood change. Yet the gendered dimensions of such spatial restructuring processes remain underexplored in the existing literature.

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Feminist urban scholars have argued that gentrification disproportionately affects women due to their heightened dependence on proximity-based resources that are essential for social reproduction, including affordable markets, healthcare facilities, childcare services, and informal support networks (Kern, 2021; Sakızlıoğlu, 2024). Women's daily activity patterns, characterized by multi-purpose journeys, combining work, caregiving, and household provisioning, render them particularly vulnerable to spatial reorganization that disrupts neighborhood-based service accessibility. Gentrification research in China, however, has largely adopted gender-neutral analytical frameworks, thereby obscuring how state-led urban renewal differentially restructures spaces critical for women's everyday survival strategies across different socio-economic positions.

Women's residential space, as used here, refers to the composite spatial infrastructure through which women's daily residential lives are conducted: the physical housing they occupy, the daily-necessity facilities within accessible walking distance, and the neighborhood-scale social networks that sustain reproductive labor and mutual support. This composite conception, broader than housing narrowly defined, allows the analysis to trace how gentrification transforms not only where women live but the spatial conditions under which their daily routines and community ties are sustained.

Hankou Historic District warrants analysis not as a representative or extreme instance but as a critical case for testing whether heritage conservation imperatives amplify gendered spatial exclusion under state-led gentrification. The district combines colonial concession fabric, lilong vernacular housing, and post-2010 large-scale infrastructure investment; this co-presence isolates the analytical question of whether heritage-driven regeneration produces qualitatively distinct gendered outcomes compared with market-driven or purely commercial redevelopment. Three research questions organized our analysis: how state-led gentrification transforms the material conditions of women's housing across socioeconomic strata; how spatial reorganization of daily-necessity facilities reshapes the accessibility infrastructure on which women's reproductive labor depends; and how these transformations restructure the social networks that sustain women's community life. The study extends the displacement-in-place thesis (Carlson, 2020) and the activity-space gentrification framework (Xiao and Zhang, 2025) by proposing infrastructural dispossession as a gendered mechanism operating without residential relocation.

Employing spatial analysis, longitudinal comparison, and cross-group assessment, this research analyzed transformation patterns in residential conditions, daily activity spaces, and social networks across four subgroups of women residents: elderly original residents, middle-aged original residents, new middle-class migrants, and female migrant workers. The findings contribute to gentrification theory by revealing mechanisms of infrastructural dispossession, the systematic removal of proximity-based resources essential for women's social reproduction and underscore the need for gender-sensitive urban regeneration policies in China's heritage district transformations.

Literature Review

State-led Gentrification in the Chinese Context

Gentrification in China exhibits distinctive institutional characteristics that differentiate it from market-driven processes in Western contexts. Rather than emerging primarily from private capital investment and individual consumption preferences, Chinese urban gentrification is fundamentally shaped by local government interventions through land commodification, fiscal

incentives, and heritage-based redevelopment strategies (Zhu & Ye, 2024). This state-embedded process operates through complex institutional mechanisms whereby local authorities leverage land financing policies to fund infrastructure improvements while simultaneously promoting property value appreciation in targeted neighborhoods (Kuang Deng et al., 2025).

The spatial consequences of such interventions manifest through coordinated transformations across multiple urban domains. Public investments in transportation infrastructure, particularly metro expansion, have demonstrated significant capacity to accelerate residential gentrification by enhancing location premiums and attracting middle-class in-migration (He et al., 2024). Commercial gentrification transforms neighborhood retail landscapes concurrently, replacing affordable daily-necessity services with consumption-oriented establishments catering to higher-income demographics and tourism demands (Zhang & Li, 2025). The cumulative effect of these regeneration projects has resulted in changing the spatial ordering of neighborhoods to suit economic motivations rather than ensuring sustainability for existing communities (Wu & Wang, 2017).

Historic districts present particularly complex cases due to inherent tensions between preservation imperatives and development objectives. Heritage conservation requirements introduce additional regulatory constraints while simultaneously creating opportunities for cultural commodification, which intensifies gentrification dynamics (Pfau et al., 2024; Zhao et al., 2025). The evolution of neighborhood transformation in these areas has taken different forms in accordance with socio-economic factors and management strategies (Choi, 2025; Choi et al., 2025), yet regeneration schemes need to integrate functionality with authenticity in terms of design (Zhou et al., 2025). The distributional consequences of these interventions across different resident populations, particularly women and elderly groups, remain inadequately understood in current scholarship.

Displacement and Spatial Dispossession

Traditional gentrification scholarship conceptualized displacement primarily as involuntary residential relocation—the physical movement of lower-income residents from gentrifying neighborhoods due to rising housing costs or direct eviction. Contemporary displacement research has substantially expanded this understanding to encompass multiple forms of spatial dispossession that affect residents without necessarily requiring physical relocation (Hepburn et al., 2024; van Leeuwen, 2025).

The concept of displacement in place captures how longtime residents may experience profound dispossession while remaining in gentrifying neighborhoods as familiar services disappear, social networks fragment, and the neighborhood's character transforms beyond recognition (Carlson, 2020). Huang and Liu (2022) documented this phenomenon among displaced residents in Beijing, revealing that improved housing conditions were frequently accompanied by deteriorating quality of life due to disrupted social connections and reduced service accessibility. Such findings challenge simplistic assessments equating physical housing improvements with enhanced residential welfare, and raise questions about where displaced populations will ultimately relocate (Freeman et al., 2024).

Methodological innovations have further extended displacement analysis to activity spaces beyond residential locations. Xiao and Zhang (2025) employed mobile phone data to identify activity-space gentrification, demonstrating that low-income communities experience exclusion not only from residential neighborhoods but also from habitual activity spaces where daily provisioning, socialization, and livelihood activities occur. This spatial-behavioral approach reveals how gentrification restructures urban accessibility patterns in ways that compound

residential displacement effects, particularly for populations whose survival strategies depend on proximity-based resource networks.

Gendered Displacement and Social Reproduction

Feminist urban geography has established that urban spatial organization is fundamentally gendered, with profound implications for how different populations experience and navigate city environments (Bondi & Rose, 2003; Jarvis et al., 2009). Women's urban spatial practices differ systematically from men's due to gendered divisions of reproductive labor that assign primary responsibility for childcare, eldercare, household provisioning, and community maintenance to women across most societal contexts (Peake, 2016).

These reproductive responsibilities generate distinctive spatial requirements and mobility patterns. Women's daily travel typically involves complex trip-chaining—multi-stop journeys combining employment, childcare, shopping, healthcare visits, and other caregiving errands within constrained time budgets (Hanson, 2010; Nanayakkara et al., 2023). Such mobility patterns create heightened dependence on proximate service availability and pedestrian-accessible neighborhood infrastructure, rendering women particularly vulnerable to spatial reorganization that prioritizes automobile-oriented development or relocates essential services beyond convenient walking distances. Research has documented significant gender differences in space utilization patterns shaped by both practical accessibility constraints and safety considerations (Cag & Ozkazanc, 2025; Fezzai et al., 2025).

Social reproduction assumes concrete spatial form through a stratified network of neighborhood infrastructures. Wet markets and small-format grocers within walking distance sustain daily provisioning cycles. Community-level clinics and pharmacies underwrite basic health monitoring for children and elderly dependents. Informal childcare arrangements, whether formal kindergartens or grandparent-neighbor relays, depend on spatial proximity and continuous familiarity. Walkable street networks and semi-public courtyards enable the incidental encounters through which mutual-aid ties are formed and maintained. When gentrification substitutes these proximity-embedded infrastructures with consumption-oriented venues located to serve middle-class demand, the spatial substrate of reproductive labor is not merely altered but selectively dismantled for residents whose survival strategies presuppose short walking distances and low monetary thresholds.

The intersection of gender, class, and urban transformation has received growing attention in gentrification scholarship. Bondi (1999) argued that gentrification research must incorporate gender analysis to understand how neighborhood change differentially affects women across class positions. Kern (2010) provided empirical evidence demonstrating that new-build gentrification in Toronto produced distinctly gendered experiences, with middle-class women benefiting from certain amenities while working-class women faced displacement pressures. The concept of social reproduction offers a theoretical lens for understanding these dynamics, highlighting how capitalism depends upon unwaged domestic labor predominantly performed by women (Katz, 2001). Gentrification-induced transformation of neighborhood service landscapes—closure of affordable markets, displacement of healthcare facilities, elimination of informal childcare networks—directly undermines the spatial infrastructure upon which women's reproductive labor depends (Sakızlıoğlu, 2024).

Research Gaps and Analytical Framework

Despite growing recognition of gentrification's gendered dimensions in Western scholarship, empirical investigation of these dynamics in Chinese contexts remains limited. China's distinctive institutional arrangements—including state land ownership, hukou-based social stratification, and heritage-driven urban policies—generate gentrification processes whose gendered consequences cannot be straightforwardly extrapolated from Western findings. The intersection of rapid urban transformation, evolving gender relations, and emerging middle-class consumption cultures creates unique conditions requiring context-specific empirical investigation.

The present study extends this literature along two axes. Analytically, it introduces infrastructural dispossession as a concept distinct from both residential displacement and exclusionary displacement, referring specifically to the systematic replacement of proximity-based, low-threshold service infrastructure with consumption-mediated venues that raise the economic prerequisite for spatial participation. Conceptually, it demonstrates that this mechanism produces socially differentiated outcomes even in the absence of relocation, refining the displacement in place literature by identifying the infrastructural substrate through which non-relocational dispossession is transmitted.

Existing Chinese gentrification research has predominantly employed gender-neutral analytical frameworks, treating affected populations as undifferentiated residents rather than examining how displacement mechanisms operate differentially across gender and other social positions. This analytical gap obscures potentially significant variations in how different subgroups of women residents distinguished by age and socio-economic status experience gentrification-induced spatial transformations. Understanding these differentiated experiences is essential for developing equitable urban regeneration policies capable of addressing diverse resident needs.

This study addresses these gaps by developing an integrated analytical framework examining gendered spatial transformation across three interconnected dimensions: material residential conditions, daily activity space accessibility, and social network configurations. By comparing transformation trajectories across four subgroups of women residents—elderly original residents, middle-aged original residents, new middle-class migrants, and female migrant workers—the analysis reveals how state-led gentrification produces stratified spatial outcomes reflecting intersections of gender, age, and class positioning within China's distinctive institutional context.

Study Area

Study Area Overview

The Hankou Historic District is situated in Jiangnan District, Wuhan City, in the Hubei Province of Central China (Figure 1). Hankou is one of the three towns constituting metropolitan Wuhan and developed as a commercial center following the establishment of foreign concessions in the late nineteenth century. The investigated area involves around 4.8 square kilometers of the historic district, defined by densely compacted urban space that has resulted from over one century of spatial development. The area is characterized by architectural features from the concession period of former British, French, Russian, German, and even Japanese settlements in addition to the lilong-style residential areas, unique to China and representative of early 20th-century urban space.

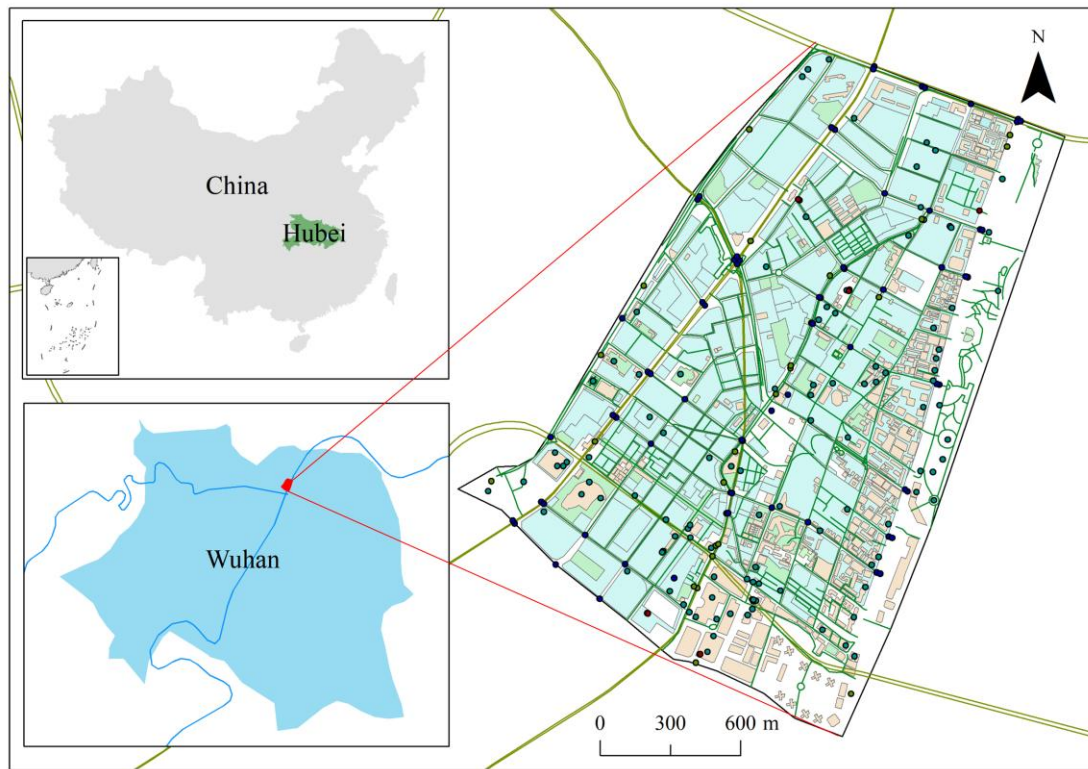


Figure 1. Location and boundary of the study area.

The spatial morphology has distinct characteristics of colonial planning, with the grid street network intersected by major roads such as Zhongshan Avenue and Jiangnan Street. The architectural morphology has undergone substantial change, from the former low-to-medium-rise architecture with narrow alleys to large modern shopping complexes, with large spatial heterogeneity in between. The new urban regeneration schemes have significantly altered the spatial and societal context in which the area is set (Wang et al., 2024). The city has employed comprehensive regeneration schemes to enhance public facilities and advance new modernized infrastructure, while attempting to keep architectural identity in the process (Liu et al., 2025). These dynamic processes of change have influenced the area in multiple ways, with the restored and reused architectural features being applied to cultural and commercial functions, while the former residential areas have undergone substantial displacement and reorganization of prior residential settlements.

The district's location along the Yangtze River, its layered architectural heritage, and its ongoing exposure to state-led regeneration make it an analytically appropriate setting for examining the spatial transformation of women's residential space under state-led urban renewal in China.

Gentrification Process and Phased Characteristics

State-led regeneration in Hankou Historic District unfolded across three analytically distinct phases, demarcated by the timing of municipal planning releases, metro infrastructure completions, and regeneration pilot programs. Table 1 documents the sourced policy and infrastructure milestones underpinning this phasing. The initial conservation phase (2000–2010) was characterized by selective commercial redevelopment and the drafting of conservation planning frameworks, together with the pedestrianization of Jiangnan Road. Property value

appreciation remained moderate, tourism-related establishments expanded incrementally, and residential communities remained relatively stable. The acceleration phase (2011–2017) was defined by large-scale infrastructural investment, including the opening of Metro Line 2 through Jiangnan Road Station and the comprehensive regeneration of Zhongshan Avenue, which marked the onset of pronounced commercial gentrification and residential turnover. Property values rose substantially, established residential communities relocated toward peripheral districts, and middle-class households progressively occupying renovated historic housing and newly built commercial apartments. The post-COVID restructuring phase (2018–2024) combined post-pandemic commercial revitalization initiatives on Jiangnan Road and Zhongshan Avenue with the release of updated heritage conservation regulations and the launch of lilong adaptive reuse pilots, producing further reorganization of the district’s commercial and residential landscape (Rao et al., 2024; Liu et al., 2022).

Table 1 summarizes the principal policy releases, infrastructure completions, and regeneration pilot programs underpinning this three-phase delineation, with each entry sourced from municipal planning documents, district-level archives, and transport authority records.

Table 1. Policy, Infrastructure, and Regeneration Milestones in Hankou Historic District (2000–2024)

Phase	Year	Milestone	Source
Initial Conservation (2000–2010)	2000	Completion of Jiangnan Road pedestrianization	Jiangnan District Chronicles
	2005	Initial Wuhan Historic and Cultural Famous City Protection Plan	Wuhan Planning Bureau
	2009	Hankou Historic District designated as municipal-level heritage protection zone	Wuhan Municipal Government Notice
Acceleration (2011–2017)	December 2012	Opening of Wuhan Metro Line 2 (Jiangnan Road Station)	Wuhan Metro Group annual report
	2014	Launch of Zhongshan Avenue Comprehensive Regeneration Project	Wuhan Municipal Government Notice
	December 2016	Opening of Wuhan Metro Line 6 (Jiangnan segment)	Wuhan Metro Group annual report
	2017	Initiation of Lifan pilot renovation program	Jiangnan District Housing Bureau
Post-COVID Restructuring (2018–2024)	2019	Release of Wuhan Historic and Cultural Famous City Protection Plan (2019–2035)	Wuhan Planning Bureau (2019)
	2021	Post-COVID commercial revitalization of Jiangnan Road	Rao et al. (2024); Municipal announcement
	2023	Launch of Lilong Adaptive Reuse Pilot Project	Wuhan Housing Security Bureau

Note: Entries compiled from Wuhan Municipal Planning Bureau documents, Jiangnan District archives, and Wuhan Metro Group operational records.

Data and Methods

Research Framework

The current study used an extensive analytical approach to understand the process of the transformation of women's residential space in the gentrification of the Hankou Historic District (Figure 2). This analytical approach combines three interactive analytical dimensions to understand the comprehensive process of transformation: physical space, social network, and residential stability. The physical space analytical dimension involves dwelling types, household facilities, regular activities, and access to basic services. The analytical dimension of the social network involves neighborhood relations, participation in community structures, and women's space-use patterns. The residential stability dimension employs objective indicators, namely, average residence duration, population turnover rates, housing price-to-income ratios, and spatial accessibility measurements to quantify neighborhood transformation impacts across subgroups of women residents.

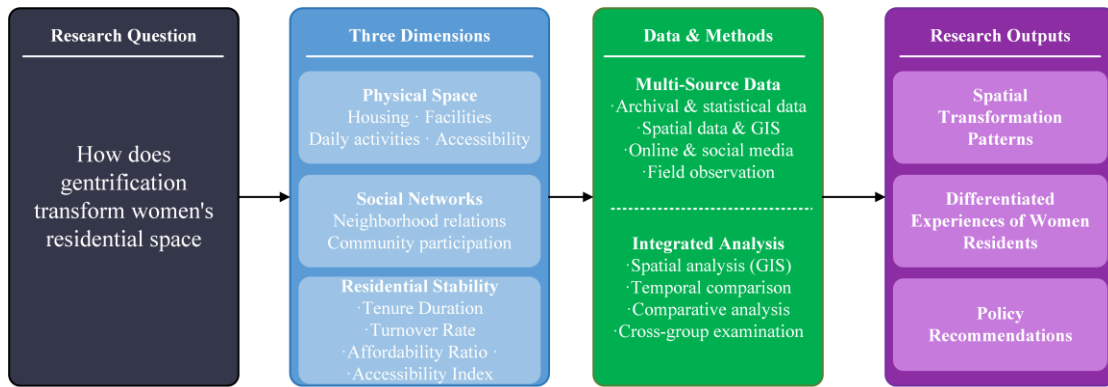


Figure 2. Analytical framework for examining gendered spatial transformation.

Following an updated methodology of spatial analysis in cities (Ni et al., 2023; Xu et al., 2025), the current study integrated data gathered from various sources. The archival and statistical data provides information on the historical and demographic aspects of a city, while the geographic information system provides data that can be used for measuring the delivery of attributes and accessibility of services in the built environment (Ni et al., 2023). Data gathered from various online platforms and SNS provides information on the modern provision of residential space and usage practices. The researcher conducted fieldwork to provide information on actual space usage practices and realities on the ground.

The analytical process adopted integrated methods that include spatial analysis techniques to examine transformation patterns, comparative analysis to examine pre- and post-changes, and further comparative analysis to examine the different impacts on different women communities, namely, original residents, middle class migrants, women workers, and older women respectively (Xu et al., 2025). This process helped in gaining in-depth knowledge about the different spatial impacts on women associated with state-led gentrification while maintaining clarity of method, which is crucial for replication studies in comparative contexts.

Data Sources and Collection

This study integrated two categories of data covering the period 2015–2024, complemented by a fieldwork phase conducted in 2026 under formal ethics approval. The first category comprised publicly accessible secondary sources documenting spatial, demographic, and market transformations, drawing on established procedures for integrating multi-source urban data (Chen et al., 2024; Roy et al., 2024). The second category comprised structured field observation and key-informant consultation conducted between March and June 2026, which supplied the qualitative and semi-structured data used to characterize subgroup-level residential trajectories.

Secondary sources included the Wuhan Statistical Yearbook (2000–2024) and Jiangnan District demographic records for population composition and income distribution; the Wuhan Municipal Planning Bureau archives and Jiangnan District Housing Bureau notices for policy timelines and regeneration events; satellite imagery from Google Earth Engine at five-year intervals (2005, 2010, 2015, 2020, 2024) for land-use classification; OpenStreetMap and AutoNavi Map API historical POI snapshots for facility distribution, following procedures for large-scale urban facility mapping (Chen et al., 2024), with the 2015 baseline derived from the December 2015 API archive and the 2024 layer from the June 2024 query; Lianjia and Beike housing platform listings (n = 1,847 across 2015–2024) for housing characteristics and prices; and Dianping, Weibo, and Xiaohongshu geotagged content for the 2018–2024 period, used to corroborate post-2018 facility usage patterns rather than to reconstruct pre-2018 baselines.

The 2026 fieldwork phase comprised structured spatial observation of twelve residential clusters representing the four housing typologies present in the district, together with semi-structured consultations with ten key informants drawn from neighborhood residents’ committees, lilong property management personnel, and long-term women residents. Observation protocols documenting facility usage patterns and spatial routines drew on established approaches to field-based urban documentation (Roy et al., 2024). Consultation transcripts were coded against a typology of interaction categories (daily conversational exchange, mutual assistance, joint activities) to generate the frequency characterizations reported in Section 5.3. These figures represent typology-coded characterizations of prevailing interaction patterns for each subgroup rather than population-level survey estimates and are presented as such in the Results section. All spatial data were georeferenced in the ArcGIS 10.8 environment (WGS 1984 UTM Zone 49N). Table 2 summarizes the data sources by category, time coverage, and analytical use.

Table 2. Summary of Data Sources

Data Category	Sources	Time Period	Main Applications
Government Statistics	Wuhan Statistical Yearbook; Real Estate Information Network; Planning Bureau archives	2000–2024	Demographics, housing prices, policy timeline
Satellite Imagery	Google Earth Engine	2005, 2010, 2015, 2020, 2024	Land-use change detection
Vector Spatial Data	OpenStreetMap; AutoNavi Map API	2024	Building footprints, street networks, POI mapping (15,000+ facilities)
Property Platforms	Lianjia, Beike	2015–2024	Housing characteristics, rental/sale prices
Social Platforms	Dianping, Weibo, Xiaohongshu	2018–2024	Consumer reviews, neighborhood perceptions
Field Survey	Photographic documentation, spatial observations	March–September 2024	Material conditions, space usage patterns

Note: All secondary sources are publicly accessible. The 2026 fieldwork component was conducted under Universiti Malaya Research Ethics Committee approval. Spatial analysis was conducted using ArcGIS 10.8 (WGS 1984 UTM Zone 49N).

Ethical Considerations

The secondary data component drew exclusively on publicly accessible sources and involved no interaction with human subjects. The 2026 fieldwork component, comprising key-informant consultation and structured observation, was reviewed and approved by the Universiti Malaya Research Ethics Committee (reference UM.TNC(P&I)/UMREC/3/5698; approval date 16 March 2026; validity March 2026 to March 2029). All key informants provided informed consent prior to participation. Personal identifiers were removed at the point of transcription and all reported findings were aggregated at the subgroup or neighborhood level. Photographic documentation of residential spaces excluded identifiable individuals.

Operationalization of Women's Subgroups

Four subgroups of women residents were defined for comparative analysis. The group of elderly original residents was defined as women aged sixty or above who have resided continuously in lilong housing, work-unit compounds, or municipal social housing within the district for twenty years or longer. The group of middle-aged original residents was defined as women aged forty to fifty-nine with continuous residence of ten years or longer. The group of new middle-class residents was defined as women who acquired ownership or long-term tenancy of renovated historic housing or commercial apartments after 2015 and whose household income exceeds one-and-a-half times the Wuhan urban median disposable income reported by the Statistical Yearbook. The group of female migrant workers was defined as non-local hukou-registered women residing in shared rental units or informal accommodation and employed in the district's service, retail, or hospitality sectors. Subgroup identification for the secondary data component relied on housing typology, transaction records, and district-level demographic aggregates; the 2026 fieldwork component enabled direct identification through consultation and observation. Subgroup boundaries were analytically defined rather than administratively fixed, and marginal cases were assigned on the basis of dominant residential and economic characteristics.

Analysis Methods

The current study used integrated analytical methods to study the transformation of women's residential space. The analytical process had three connected parts to address the study questions. Spatial analysis provided the methodological base, relying on GIS technology to quantify and visualize transformation dynamics. Following standard protocols for spatial accessibility evaluation in urban settings (Cheng et al., 2023), network analysis was employed to quantify women's accessibility to vital services such as markets, healthcare centers, schools, and public transportation networks. Then, fifteen-minute walking accessibility areas or isochrones were calculated for different years (2005, 2015, 2024) to visualize transformation in the proximity of vital services. Kernel density analysis was employed to visualize the spatial pattern of points of interest relevant to women's daily provisioning and care, including child-care institutions, community healthcare centers, and shopping centers. The hot spot analysis tool in ArcGIS software was used to identify statistically significant locations of gentrification-related transformation (Hepburn et al., 2024). Building-wise analysis was done to quantify housing types, floor space, and equipment layout for different periods of transformation after integrating field survey documentation with cadastral data.

The transformation analysis with respect to time was done through the overlay of multiple time datasets. Satellite images were used to identify the change in the usage of the land and any renovations done on the buildings through supervised classification techniques. The change in the housing market prices was measured through hedonic pricing models, which were derived from data coming from property sales platforms, with the growth rate being calculated on an annual basis, divided according to the neighborhood zones. The demographic change in the population was done through cohort comparison in the periods between successive censuses (Hepburn et al., 2024).

The cross-group comparative analysis was conducted to evaluate the differentiating effects across subgroups of women residents through stratification of spatial data on the basis of neighborhood characteristics and housing types. Representative areas were selected for each subgroup of women residents (original residents in lilongs, new middle-class residents in renovated historic housing, and elderly women in municipal social housing) to conduct synchronized spatial analyses of subgroup-specific transformation trajectories (Beck & Martin, 2025). The analytical processes were done in standardized spatial and temporal coordinates to ensure consistent comparative analysis of different data sources.

Results

Material Transformation of Women's Residential Space

The living space of women in Hankou Historic District that was the subject of this study has experienced dramatic changes in terms of material conditions throughout the study period, in accordance with the spatial rationality of state-led gentrification and space-specific variations in socio-economic stratification (Figure 3). The expansion of housing area shows great but uneven improvement. Figure 3a shows that the average apartment area increased from 51 m² in 2015 to 75 m² in 2024, accounting for 47% growth. These goals were achieved in all apartment forms, with the largest growth in units with three bedrooms of 68 m² to 95 m², or +40%. The others were units with two bedrooms, growing from 56 m² to 78 m², or +39%; and one-bedroom units rising from 42 m² to 58 m², or +38%. Nevertheless, there existed great inequality in improvement: traditional lilong residential houses generally had a small area (40-60 m²), while new-style commercial apartments were larger (above 80 m²), where spatial improvement was concentrated among middle-class women who can only afford market-regulated housing prices.

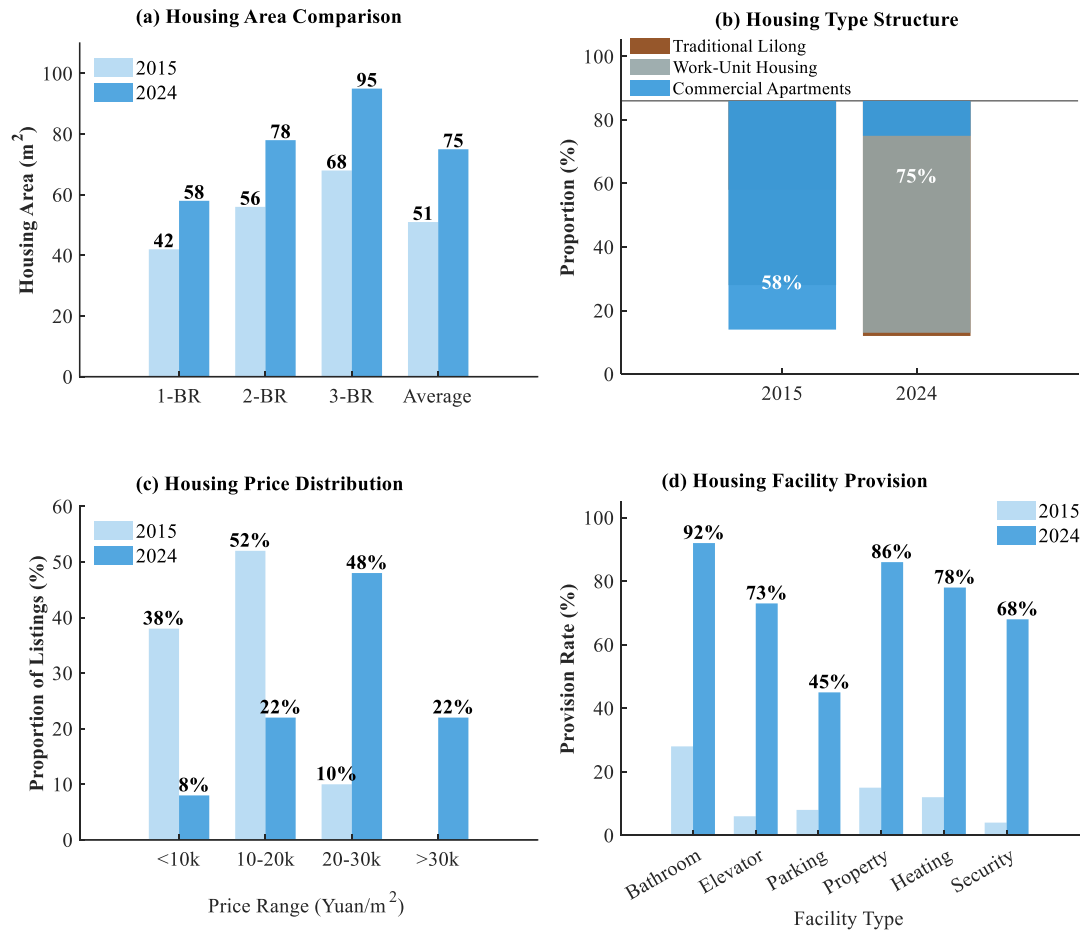


Figure 3. Material transformation of women's residential space in Hankou Historic District (2015-2024).

The housing stock composition changed substantially, completely transforming the housing landscapes offered to women. As indicated in Figure 3b, the number of houses of the traditional lilong housing type dramatically decreased from 58% to 12%, while that of commercial apartments increased from 14% to 75%. As indicated in Table 3, housing quality and accessibility differentials emerged across the new housing composition. The final 12% of lilong houses was made up of housing units preserved in lilongs for special commercial functions rather than low-cost housing units affordable to women in low-paying jobs and senior women in China.

Housing price distributions reveal intensified stratification (Figure 3c). The modal price range shifted from 10,000–20,000 yuan/m² (52% of listings in 2015) to 20,000–30,000 yuan/m² (48% in 2024), while properties below 10,000 yuan/m² declined to merely 8%, consisting predominantly of deteriorated lilong units lacking modern amenities. This pricing transformation systematically excluded low-income women from renovated housing, compelling peripheral relocation or acceptance of substandard conditions.

The provision of facility rates reveals considerable inequality (Figure 3d). Availability of independent restroom access increased from 28% to 92%, while property management coverage enhanced from 15% to 86%. Nevertheless, the provision of parking facilities was only 45% due to spatial constraints in the older district areas, despite the proliferation of car ownership in China.

The provision of upgraded facilities is concentrated in commercial apartments (92–98 per cent), while lilong residential areas retained markedly lower rates (15–35 per cent), producing stratified residential experiences across housing types.

Table 3. Housing Characteristics by Type in Hankou Historic District (2015 vs 2024)

Housing Type	Time	Average Area (m ²)	Average Price (yuan/m ²)	Independent Bathroom (%)	Elevator (%)	Parking (%)	Sample Size
Traditional Lilong	2015	45	9,500	15	0	0	<i>n</i> = 188
Traditional Lilong	2024	48	12,800	35	5	2	<i>n</i> = 50
Work-Unit Housing	2015	58	11,200	42	8	5	<i>n</i> = 91
Work-Unit Housing	2024	62	16,500	68	25	12	<i>n</i> = 54
Commercial Apartments	2015	82	18,500	95	85	45	<i>n</i> = 45
Commercial Apartments	2024	88	28,200	98	95	68	<i>n</i> = 314

Note: Data drawn from Lianjia and Beike housing platform listings (total *n* = 1,847). Comparisons across time points are reported as descriptive changes; given the heterogeneity of sample composition across years, the analysis emphasizes the direction and magnitude of transformation rather than inferential testing. Parking rates reflect available designated spaces per unit. The figure of 1,847 refers to all listings retrieved during 2015–2024; the entries reported in the table represent the sub-sample matched to the three housing typologies at the two reference time points, with the remaining listings distributed across intermediate years or unclassifiable transitional units.

The changes described above capture transformation in the district's housing stock and market landscape. Whether and how each subgroup of women residents experienced these changes as improvement or displacement is examined in Section 5.4 in light of subgroup-specific residential trajectories.

Reconstruction of Women's Daily Activity Space

Facilities recorded through POI data were classified into two functional categories for the purpose of interpreting accessibility change. Daily-necessity facilities include wet markets, small-format grocers, community clinics, pharmacies, kindergartens, and public transit stops, each carrying a low monetary threshold for use and directly supporting the routines of household provisioning and care. Consumption-oriented facilities include cafés, boutiques, specialty retail, and cultural-tourism venues, whose use presupposes discretionary income and whose spatial distribution follows middle-class and tourist demand. The aggregate growth of 163 per cent in facility count comprises heterogeneous shifts across these categories: consumption-oriented density expanded substantially within the historic core, while daily-necessity density declined in the residential interior. The aggregate figure therefore reflects functional substitution rather than a net expansion of accessibility for daily provisioning.

The transformation in Hankou Historic District has resulted in a paradigm shift in women's daily activity space, with an interesting situation of expansion coupled with inaccessibility. The data on facility distribution portrays massive expansion in core facilities including markets, shops, and bus stops, with key facilities increasing from 79 to 208 facilities, exhibiting an increase of 163%, while markets/shops were on the verge of doubling to 115 units from 55 units in 2015 (Figure 4a-b). Notably, massive expansion has contributed to large spatial expansions in women's daily

activity space, with extensive growth ranging from 1.05 km in 2015 to 1.65 km in 2024, exhibiting an expansion of 57% (Figure 4c). The overlap in the density of facilities shows that while 2015 was dominantly marked by massive clustering in the primary residential areas, in 2024, there were major spatial shifts in the peripheral areas, indicating a completely new spatial arrangement in terms of spatial mobility in women's daily activity space.

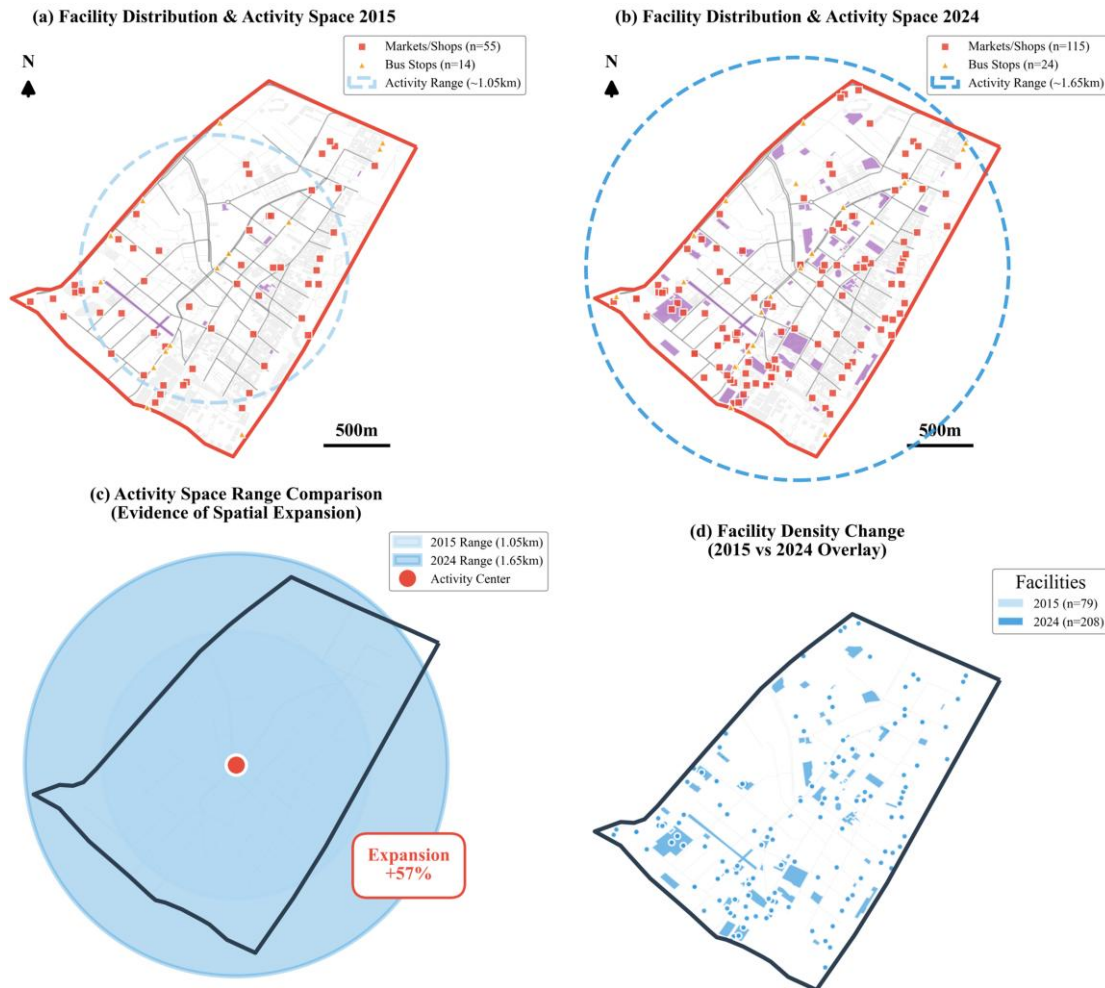


Figure 4. Facility distribution and activity space transformation (2015-2024).

However, the walking accessibility analysis highlights the most essential contradictions in the numerical growth numbers in Figure 5. Contrary to the 163% growth in new facilities, the coverage areas of 500 meter service accessibility declined from 87.8% to 84.0% (-3.8%) in Figure 5a-c, thus clearly indicating an heightened level of service accessibility deficits in the study area. More alarmingly, average walking distances to these nearest facilities increased from 348 meters to 385 meters (+37m, +10.6%), thereby forcing women to walk longer distances to perform regular provisioning tasks (Figure 5d). This trend symbolically illustrates the effects of gentrification in relocating these facilities to enhance accessibility to middle-class consumption patterns and tourism-related activities, hence relocating new facilities in restored historic areas while leaving accessibility deficits in residential areas.

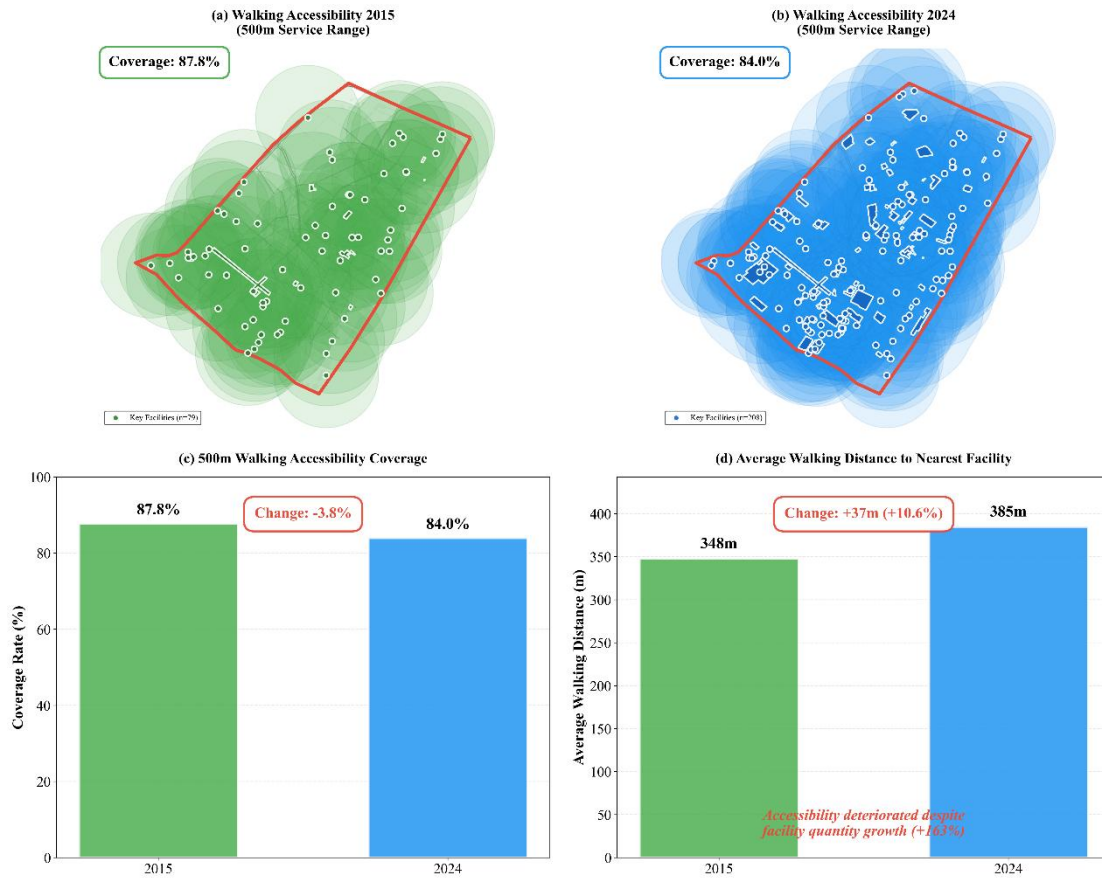


Figure 5. Walking accessibility analysis (500-m service range).

The spatial restructuring imposes differentially burdensome challenges on subgroups of women residents. For older women in the *lilong* communities in peripheral areas who work in the informal sector, there are compounding difficulties due to reduced accessibility for proximal needs, which increase the time and physical effort premised on regular activities. For working mothers with responsibility for child-rearing who must take child-care duties in addition to work, increased distances to work limit flexibility in their time budget necessary to coordinate complex work and child-rearing schedules. These accessibility problems demonstrate the gendered processes in which state policies for urban revival spatially fractionate accessibility networks formerly implicit in the neighborhood spatial arrangement, to the detriment of women whose accessibility networks privilege neighborhood accessibility over car-centric network arrangements.

Transformation of Women's Social Networks

Gentrification has restructured women's social networks through the coordinated transformation of social space configuration, interaction patterns, and residential stability, as displayed in Figure 6. The spatial reorganization reveals systematic patterns of network disruption differentially impacting women across socio-economic positions. The transformation of social infrastructure exhibits pronounced shifts from neighborhood-based to consumption-oriented interaction sites. Traditional social spaces—markets, community centers, and *lilong* courtyards, which facilitate proximity-based daily provisioning exchanges and informal socializing—declined from 109 locations in 2015 to being replaced by 184 commercialized venues (cafes, boutiques, galleries) in 2024, representing 69% spatial expansion (Figure 6a-b). This numerical growth masks qualitative

transformation: the new commercial spaces require monetary consumption for spatial access, fundamentally altering economic prerequisites for social participation and transforming networks from proximity-based to consumption-mediated formations.

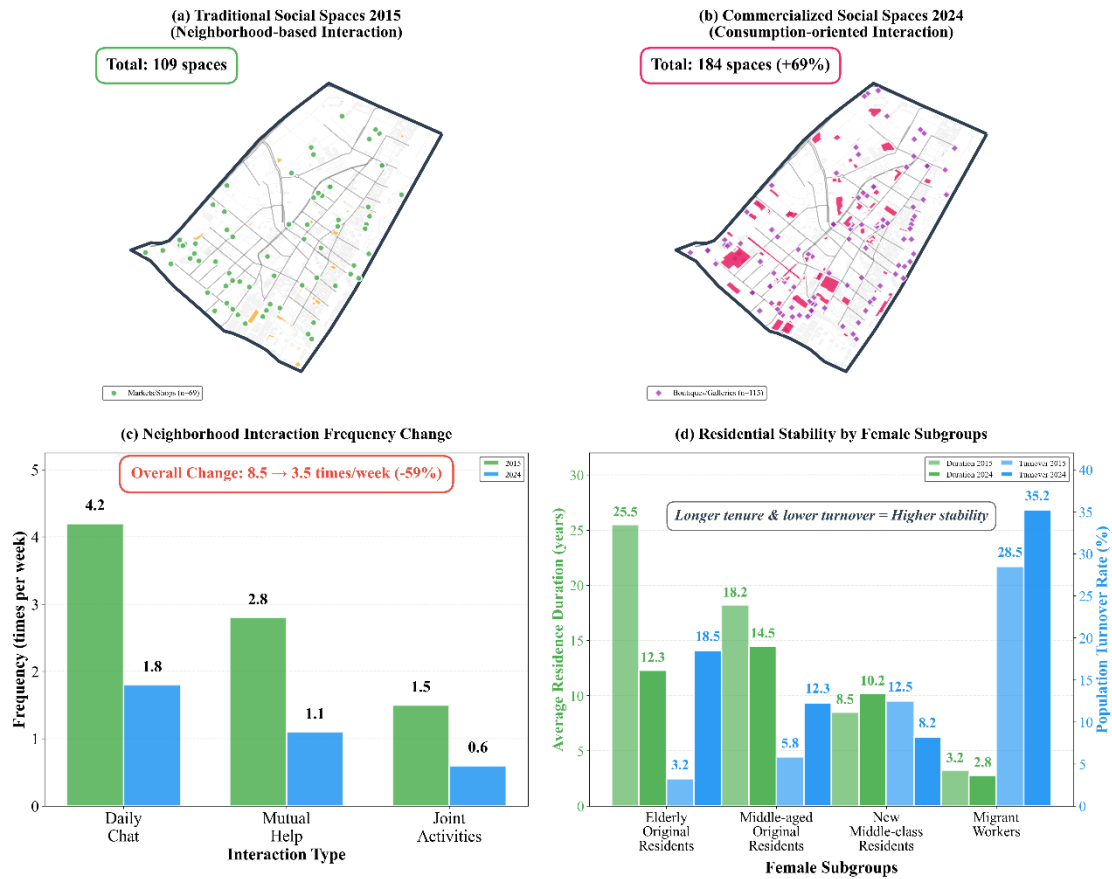


Figure 6. Transformation of women's social network spaces.

The restructuring of social space corresponded to substantial declines in neighborhood interaction intensity. Drawing on the typology-coded characterizations derived from the 2026 fieldwork protocols described in Section 4.2, daily conversational exchanges among women residents decreased from approximately 4.2 to 1.8 occurrences per week; mutual-assistance exchanges, central to the routines of elderly women, declined from 2.8 to 1.1 occurrences; and joint neighborhood activities decreased from 1.5 to 0.6 occurrences. The composite characterization of neighborhood interaction intensity fell from 8.5 to 3.5 occurrences per week (Figure 6c). These figures are read as typology-coded descriptions of prevailing interaction patterns for the subgroups concerned rather than as population-level estimates. The direction and magnitude of change indicate a marked erosion of place-based social capital, with the sharpest attenuation observed among elderly women dependent on proximate infrastructure for daily interaction.

Residential stability patterns show pronounced differentiation across subgroups. Elderly original residents experienced substantial instability, with average residence tenure declining from 25.5 to 12.3 years and annual population turnover rising from 3.2 to 18.5 per cent, indicating fragmentation of social networks accumulated over decades (Figure 6d). Middle-aged original residents exhibited more moderate instability, with tenure declining from 18.2 to 14.5 years and

turnover rising from 5.8 to 12.3 per cent, reflecting partial disruption alongside partially maintained networks. New middle-class residents attained residential stabilization, with tenure lengthening from 8.5 to 10.2 years and turnover declining from 12.5 to 8.2 per cent, demonstrating the establishment of consumption-mediated networks aligned with commercialized social spaces. Female migrant workers exhibited persistent precarity, with average tenure of 2.8 years and annual turnover of 35.2 per cent, reflecting structural exclusion from both proximity-based and consumption-oriented formations. These patterns illustrate two coincident mechanisms in state-led gentrification: the erosion of proximity-dependent networks and the selective enabling of consumption-mediated formations, producing cumulative deprivation of social capital for economically constrained subgroups of women.

Differentiated Living Conditions Across Subgroups of Women Residents

The subgroup-specific indicators reported below combine housing platform data, district-level aggregates from the Wuhan Statistical Yearbook, and typology-coded characterizations from the 2026 fieldwork phase, following the operationalization set out in Sections 4.2 and 4.4.

The gentrification process has produced substantially differentiated living conditions across subgroups of women residents, as quantified through objective spatial and housing indicators (Figure 7). Our analysis revealed systematic patterns of spatial inequality stratified by socio-economic positioning and age, with divergent trajectories across six key dimensions.

The group of elderly original residents experienced the most pronounced deterioration across nearly all indicators. Housing affordability declined markedly, with price-to-income ratios rising from 4.2:1 to 9.8:1 (Figure 7b), rendering housing severely unaffordable relative to fixed pension incomes despite minimal housing price increases in their neighborhoods (9,500 to 12,800 yuan/m², Figure 7a). Spatial accessibility deteriorated substantially as average walking distances to essential services increased 50% from 280 m to 420 m (Figure 7c), pushing daily necessities beyond a comfortable walking range for this mobility-limited group. Facility density in their neighborhoods declined 57% from 42 to 18 facilities/km² (Figure 7d) as traditional markets closed. Residential instability indicators revealed community fragmentation: average tenure declined from 25.5 to 12.3 years while population turnover rose from 3.2% to 18.5% annually (Figure 7e-f), indicating intense displacement pressure.

The group of middle-aged original residents demonstrated greater resilience, with moderate declines. Price-to-income ratios increased from 5.5:1 to 8.2:1, creating affordability strain despite higher earning capacity. Average service distances increased 30% from 295 m to 385 m, while facility density declined 34% from 38 to 25 facilities/km². Residential stability weakened as average tenure dropped from 18.2 to 14.5 years and turnover doubled from 5.8% to 12.3%, reflecting partial displacement pressures.

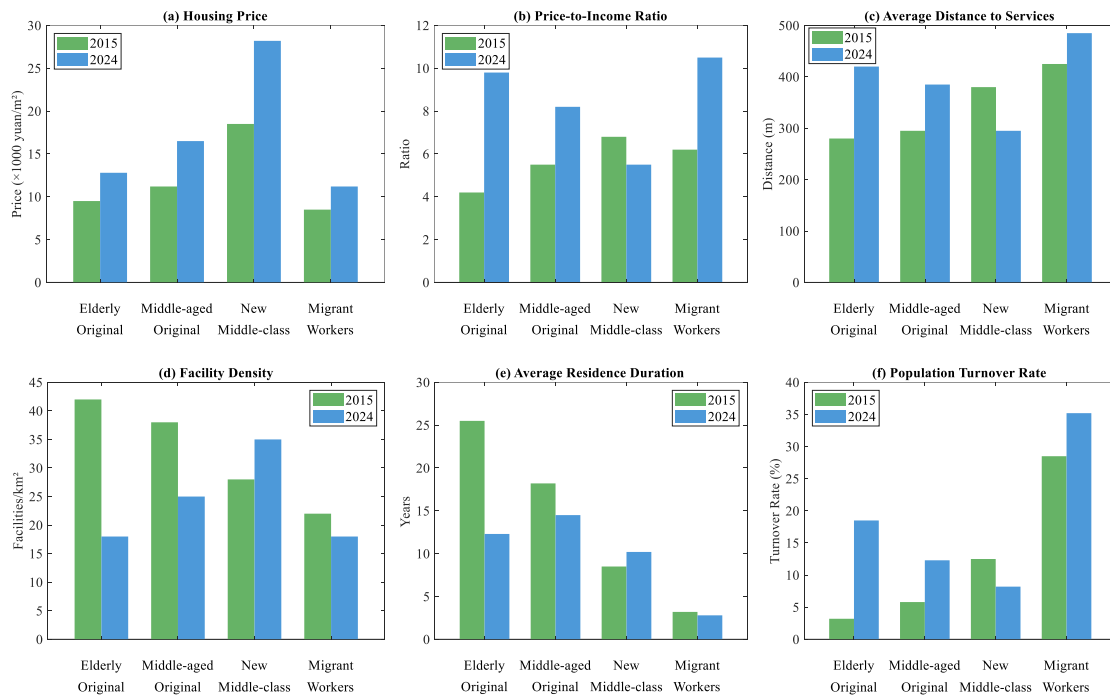


Figure 7. Objective living conditions across subgroups of women residents.

The group of new middle-class residents emerged as primary beneficiaries, achieving comprehensive improvements. Price-to-income ratios improved from 6.8:1 to 5.5:1 despite 52% housing price increases (18,500 to 28,200 yuan/m²), indicating superior purchasing power. Spatial accessibility improved dramatically with average service distances decreasing 22% from 380 m to 295 m as curated facilities relocated to serve middle-class consumption. Facility density increased 25% from 28 to 35 facilities/km², uniquely benefiting from gentrification-induced commercial development. Residential stability strengthened with declining turnover rates (12.5% to 8.2%).

The group of migrant workers maintained severe marginalization with deteriorating conditions. Price-to-income ratios rose from 6.2:1 to 10.5:1, rendering even deteriorated housing increasingly unaffordable. Service distances worsened from 425 m to 485 m—the longest among all groups—while facility density declined from 22 to 18 facilities/km². Extreme residential instability persisted with 35.2% annual turnover and only 2.8 years average tenure, reflecting precarious housing situations (Table 4).

Table 4. Key living conditions indicators by subgroup of women residents (2015→2024)

Indicator	Elderly Original	Middle-aged Original	New Middle-class	Migrant Workers
Price-to-Income Ratio	4.2 → 9.8 (+133%)	5.5 → 8.2 (+49%)	6.8 → 5.5 (−19%)	6.2 → 10.5 (+69%)
Service Distance (m)	280 → 420 (+50%)	295 → 385 (+30%)	380 → 295 (−22%)	425 → 485 (+14%)
Facility Density (/km ²)	42 → 18 (−57%)	38 → 25 (−34%)	28 → 35 (+25%)	22 → 18 (−18%)
Residence Duration (years)	25.5 → 12.3 (−52%)	18.2 → 14.5 (−20%)	8.5 → 10.2 (+20%)	3.2 → 2.8 (−13%)

Indicator	Elderly Original	Middle-aged Original	New Middle-class	Migrant Workers
Population Turnover (%)	3.2 → 18.5 (+478%)	5.8 → 12.3 (+112%)	12.5 → 8.2 (−34%)	28.5 → 35.2 (+24%)

These differentiated trajectories illuminate gentrification-induced spatial sorting mechanisms: commercial reorganization and housing commodification systematically enhance conditions for economically advantaged groups while generating compounding deprivations for less mobile populations, particularly elderly women whose survival depends on proximate service access and stable community networks.

Discussion

The current study uncovered mechanisms of gendered spatial exclusion in state-led gentrification processes in Hankou Historic District, thereby asserting the mechanisms of residential displacement, space of activities rearrangement, and social network division to affect women residents across different socioeconomic statuses. The current study refines displacement studies in terms of exploring not only residential displacement (Hepburn et al., 2024) but also spatial injustices experienced by women in the context of cultural heritage urban regeneration. Gentrification studies conducted in recent years highlighted the significance of involuntary mobility or displacement (Beck & Martin, 2025; van Leeuwen, 2025), while the current study verified spatial transformation reordering mechanisms affecting women in terms of gendered daily practices in nondisplacement settings in gentrified neighborhoods, thereby asserting displacement mechanisms with spatial erosion rather than residential displacement in gentrification processes.

Such displacement in place corresponds to the state-engaged gentrification processes in China in a manner that is characterized by unique dynamic features in contemporary China (Li et al., 2023; Zhu et al., 2022). Contrary to neoliberal societies, where gentrification is primarily associated with market forces in the real estate sector, state ownership of property and the commodification of cultural resources in the tourism industry provide institutional avenues that facilitate spatial exclusion in the absence of displacement in China (Zhu et al., 2024). The “heritage conservation imperative” may appear to mediate between functionality and architectural preservation in China (Wang et al., 2023), but it actually exacerbates the condition of vulnerability to gentrification for economically marginalized women in China along mutually reinforcing pathways instead. The state-sponsored infrastructural investments in Beijing, especially in railway construction to facilitate metro expansion in China (Kuang Deng et al., 2025), trigger commercialization processes (Zhang & Li, 2025), resulting in the replacement of “proximity-based service and consumption space with consumption-oriented space.” Those market sites, socializing areas, and walkable spaces central to women’s daily provisioning and interaction are progressively replaced through displacement in place, leaving residents in situ but without the infrastructural substrate on which their routines depend (Huang & Liu, 2022), signifying spatial inequality in China that conventional displacement measures fail to quantify properly (Carlson, 2020).

The existence of stratified effects presented in this study is consistent with studies on disparate displacement (Carlson, 2020), yet it further illustrates the manner in which displacement is differentially experienced in terms of the intersection of gender and socioeconomic location. The quality-of-life effects experienced by elderly women original residents were particularly pronounced, as survival strategies dependent on proximity-based associational networks and low-threshold services proved incompatible with the commercialized spatial ordering of the district.

Meanwhile, new middle-class women residents were able to utilize their significantly enhanced economic and mobility resources to rework new activity spaces (Xiao & Zhang, 2025), differentially reproducing gentrification-related spatial inequalities across intersecting locations of gender, class, and age. These results can help to further advance feminist urban theory (Sakızlıoğlu, 2024) in demonstrating that policies on city renewal that appear to be ‘gender blind’ differentially affect specific pre-existent spatial divisions of reproductive labor associated with gender (Cag & Ozkazanc, 2025; Fezzai et al., 2025). The empirical findings substantiate the theoretical proposition of Katz (2001) regarding the gendered burden of social reproduction disruptions. The observed deterioration in service accessibility and facility density for elderly women validates the way in which gentrification undermines the spatial infrastructure essential for reproductive labor. The study also extends Hanson (2010) mobility framework by demonstrating that spatial reorganization in historic districts specifically disrupts women’s trip-chaining capabilities, forcing longer and more fragmented journeys for daily provisioning tasks that were previously accomplished within walkable neighborhood distances.

Reading these findings against the displacement literature clarifies three analytically distinct mechanisms. Physical displacement refers to involuntary residential relocation driven by rising costs or direct eviction. Exclusionary displacement, following Marcuse, refers to the foreclosure of neighborhood entry to lower-income households irrespective of the movement of current residents. Infrastructural dispossession, as put forward here, refers to the systematic replacement of proximity-based, low-threshold service infrastructure with consumption-mediated venues, extracting the spatial substrate of social reproduction from residents who remain in place. The three mechanisms are neither mutually exclusive nor sequentially ordered; the Hankou case demonstrates that infrastructural dispossession can proceed in parallel with, and in some subgroups in advance of, physical displacement, and that its effects concentrate on residents whose survival strategies depend on proximate, non-monetized infrastructures.

Documenting infrastructural dispossession as a structural process should not obscure the adaptive strategies through which women residents contest and negotiate its effects. The 2026 fieldwork recorded several such practices: elderly women reorganizing provisioning routines around residual wet-market nodes at the district periphery; mid-life women mobilizing cross-district social-media groups to share information on affordable healthcare and childcare; and long-term residents’ committees mediating between original residents and commercial tenants over the use of semi-public courtyard space. These practices align with the everyday resistance and spatial agency traditions in feminist urban scholarship (Kern, 2021; Sakızlıoğlu, 2024) and complicate any reading of women residents as passive recipients of gentrification. The scale of these adaptive responses, however, appears circumscribed relative to the infrastructural transformations underway and their capacity to offset the loss of proximity-based resources remains limited for the most economically constrained subgroups.

Several limitations influenced these findings. The comparison design draws on cross-sectional data at two time points and cannot establish causal identification between specific policy interventions and observed outcomes; longitudinal panel data would strengthen causal inference (Freeman et al., 2024). The 2015 baseline for facility distribution and interaction patterns relies partly on archival reconstruction and retrospective consultation, introducing recall and archival-selection biases that a longitudinal primary design would avoid. Housing platform samples shifted in composition between 2015 and 2024 as lilong listings declined and commercial apartment listings expanded, so the reported changes reflect both stock transformation and evolving market coverage. The single-case design, appropriate for the critical case logic adopted here, restricts direct generalization to other historic districts with differing heritage designations, regeneration governance arrangements, or metro accessibility profiles. The 2026 key-informant sample, while

diverse across subgroups, is modest in absolute terms and the typology-coded interaction estimates should be read as characterizations of prevailing patterns rather than population-level measurements. Future research combining ethnographic depth (Rahmati et al., 2024; Roy et al., 2024) with comparative breadth across heritage districts (Choi, 2025; Choi et al., 2025) would consolidate or qualify the mechanisms proposed here.

Conclusion

This study examined the gendered spatial transformation of Wuhan's Hankou Historic District under state-led gentrification between 2015 and 2024, drawing on a combination of publicly accessible secondary data and a fieldwork phase conducted under formal ethics approval. The analysis was organized across three interconnected dimensions of women's residential space: material housing conditions, daily-necessity accessibility infrastructure, and neighborhood-scale social networks. By comparing transformation trajectories across four subgroups of women residents, the study traced how heritage-led regeneration reorganizes the spatial conditions of everyday life for women differentially positioned by age and socioeconomic status.

The findings can be synthesized across three dimensions. Materially, housing quality improved in aggregate but distributionally regressed, with affordability declining sharply for elderly women and migrant workers while new middle-class women accessed expanded and better-serviced housing. Spatially, the aggregate expansion of facilities masked a functional substitution in which daily-necessity infrastructure serving low-threshold provisioning was displaced by consumption-oriented venues, extending walking distances for the residents least equipped to absorb them. Socially, place-based interaction networks attenuated across subgroups, most pronounced among elderly original residents whose residential stability itself deteriorated, while new middle-class women achieved consumption-mediated stabilization.

These findings advance displacement theory in three respects. Infrastructural dispossession is proposed as an analytically distinct mechanism operating through the substitution of proximity-based service infrastructures with consumption-mediated venues, generating spatial exclusion without requiring physical relocation. This mechanism produces socially stratified outcomes intersecting gender, age, and class rather than uniform effects across the resident population. Heritage conservation imperatives, ostensibly neutral toward residents' welfare, provide institutional cover for the commercial reorganization through which these effects are transmitted. Three policy implications follow from this. Regeneration approval procedures for heritage districts should incorporate an accessibility impact assessment that quantifies, prior to the issuance of permits for demolition or reuse, the projected change in daily-necessity facility density and walking distance for the affected resident population, with particular attention to elderly women and low-income households. Affordable housing retention within regenerated blocks should be treated as a compliance requirement rather than a discretionary consideration, with a minimum share of preserved units allocated to long-term original residents at income-linked rents. Community consultation frameworks should incorporate structured representation of long-term women residents, whose situated knowledge of neighborhood provisioning networks is otherwise absent from regeneration planning.

The evidence base rests on a single critical case and the findings should be read as suggestive rather than definitive for China's heritage district transformations. The infrastructural dispossession mechanism proposed here requires testing across contrasting cases, including districts with weaker heritage designation, differing metro accessibility, and alternative regeneration governance arrangements. Longitudinal ethnographic work tracing displaced

households would further clarify how the mechanism operates over longer time horizons and how women's adaptive strategies evolve in response. Comparative research along these axes would consolidate or qualify the theoretical claims advanced in this study.

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