

# Research on spatial factors and mechanisms of community social capital in the high-density areas of China using grounded theory

Yixin HUANG, School of Architecture, Harbin Institute of Technology; Key Laboratory of National Territory Spatial Planning and Ecological Restoration in Cold Regions, China

Wei DONG, School of Architecture, Harbin Institute of Technology; Key Laboratory of National Territory Spatial Planning and Ecological Restoration in Cold Regions, China

Yu DONG, School of Architecture, Harbin Institute of Technology; Key Laboratory of National Territory Spatial Planning and Ecological Restoration in Cold Regions, China

Jiankun LOU, School of Architecture, Harbin Institute of Technology; Key Laboratory of National Territory Spatial Planning and Ecological Restoration in Cold Regions, China

## Abstract

*Community social capital is the collective social capital, which is formed by the community and has various characteristics such as geography, sociality, and space. A high level of community social capital can effectively promote the development of a community, which forms a bottom-up driving force of "sharing, co-policing, and co-governance". High-density areas in China are facing problems such as land shortage, limited development, an aging population, as well as deteriorating spatial quality. In the community. It is manifested in the intensification of population mobility and the weakening of community sense, which results in a decline in the level of community social capital. This study conducts a qualitative analysis of community social capital from the background of high density in China, using the Grounded Theory to construct a theoretical model of spatial influencing factors, which affect community social capital. Then we analyse the causal impact path between spatial elements and community social capital. The research conducted semi-structured interviews with 32 residents in typical communities in Yuexiu District, Guangzhou. Through three-level coding analysis of the collected data, we constructed a structure including individual differences, health status, acceptance of local culture, types of daily activities, and daily activities, location, shopping tendency, residential area type, community social capital, which is in a total of 8 main categories or 43 specific sub-items of the built environment and community social capital subjective evaluation factor model. Eventually, the paper explores the theoretical framework for further empirical research.*

## Keywords

*Community social capital, high-density areas of China, Built environment, Social interaction behaviour, the Grounded Theory*

## 1. Introduction

### 1.1. Background

This study aims to investigate the relations between the built environment and social capital at the community level under the rapid urbanization process in high-density areas of China, using the grounded theory. "Social capital" was put forward by Putnam and other scholars based on social network theory, which refers to "the characteristics of social organizations that promote collective behavior, such as trust among citizens, reciprocity norms, and community relations, etc." Its level reflects the degrees of informal social dynamic development and internal collaboration ability of the group where the research object is located. The core of social capital is the degree of connection between individuals based on mutual trust, which has a positive impact on reducing the cost of achieving goals and improving the efficiency of resource utilization and transformation. Current researches have illustrated that social capital has spatial, cultural, group differences, and group nesting. It is an important indicator for identifying social structure functions, explaining the phenomenon of spatial differences, which is of great significance to reduce social isolation and boost development.

### 1.2. Built environment and Social capital

As for the relationships between built environment and social capital, current studies show that the sociodemographic variables of individuals, such as age, income, education level, whether they have local household registration, personality preferences, health level, etc., largely determine the level of individual social capital. Putnam found that the general improvement of citizens' education level has brought about changes in the level of social capital at the community level, and the cyclical fluctuations of economic development have also prompted the cyclical changes in the level of social capital (Mazumdar *et al.*, 2018).

Compared with individual attribute factors, objective environment factors directly affect social capital to limited lesser extent, in which process need to through other intermediary factors (Figure 1). Among them, in community-scale research, scholars in the field of built environment mainly focus on the influence relationship and mechanism of the residential space environment within the community on social capital and consider residents' behaviours or perception as important mediating factors between the two. Putnam and Mohan found that, given that the establishment of relational networks is shaped by the region where individuals live, social capital participation groups in different geographic regions have different characteristics due to the environment (D, 1993; Mohan and Mohan, 2002). Kim found that community. There are obvious differences in social capital due to geographical environment (Kim *et al.*, 2006). Hanibuchi found that the long history and geographical environment of the region affect the social capital of the community (Hanibuchi *et al.*, 2012). But there are various differences in the influences of different built environment elements on social capital. In most studies, the impacts of population density, building density, and takeaway alcohol sales points on community social capital are negative (Gonzalez *et al.*, 2019), while the effects of residential density, park density, residential population density, public transportation accessibility, accessibility of convenient living facilities, the number of third spaces, land mix, objective walkability score, the number of street intersections and other elements on the social capital of the community are positive (Zahnow *et al.*, 2022; Won and Lee, 2020; Jun and Park, 2019; Rugel *et al.*, 2019). However, what deserves more attention is that the influences of road coverage, land development intensity and other factors with SC are uncertain (Bottini, 2018).

With the respects of the influenced mechanism, existing empirical studies have found that the objective built environment increases or decreases the opportunities to meet, contact, and communicate with others through its influence on individual behaviours or behavioural preferences, including social participation, social interaction and others(Nicholas *et al.*, 2018), which in turn affects the quality of interpersonal relationships(Alrasheed, 2019; Kuchler, 2019), specifically structural social capital such as the scale and the quality of social networks, the level of social support, and the level of mutual trust, improving the total level of community social capital. Mouratidis proved that neighbourhood activities are an important representation of urban vitality(Mouratidis, 2018; Mouratidis and Poortinga, 2020), including living activities, spontaneous activities, and social interaction activities(Gehl, 2002). Ross found that high-frequency neighbourhood activities reflect high-quality neighbourhood life(Ross and Searle, 2019).

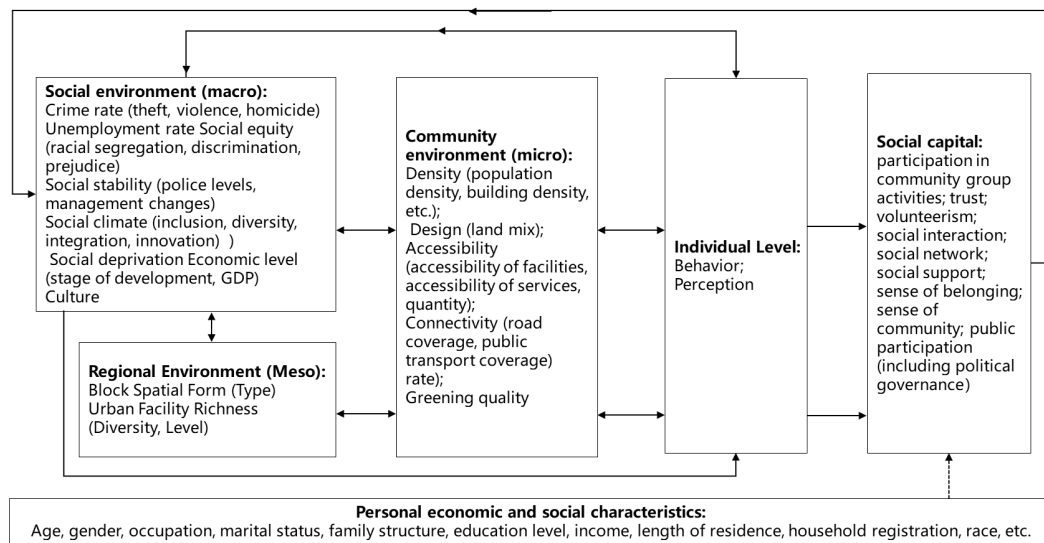


Figure 1. Social capital Theory used in community investigation. Source: Author.

Overall, current researches lack direct evidence on the mechanism of the impact of neighbourhood activities on community social capital, rarely studies focus on the case of low-income developing countries. In order to better understand the impact mechanism between the built environment and community social capital in low-income places like China's high-density areas, under the framework of Putnam's social capital theory, it is necessary to conduct on-site researches on the formation processes, so as to provide a theoretical framework for empirical researches.

### 1.3 Research Process

This study would investigate by three parts (Figure 2). Firstly, most of the existing studies are carried out in developed western regions, and few studies have explored the relationship between the built environment and social capital in different geographical backgrounds. As one of the most important developing countries, China has formed urban spatial morphological characteristics (such as high-density areas) that are completely different from developed areas in the process of rapid urbanization in the past half-century. This process is accompanied by social capital. The decline of the level is the emergence of problems such as the alienation of the human-land relationship of representation. Secondly, the unique social and cultural backgrounds of China enhance the complexities of the connotation between social capital and the built environment. The existing research results on the built environment and community social capital in western developed countries are not suitable for China's environment, especially in the behaviour and perception characteristics of residents. There are many differences (behaviour and perception are important mediating factors between the built environment and social capital), which

requires localized research on the connotation of social capital. Thirdly, combining the existing theoretical framework of social capital and abundant first-hand interview materials, this study attempts to propose a theoretical research framework of social capital suitable for the characteristics of high-density areas in China, and revise the existing framework to provide strong evidence for future empirical research. strong theoretical basis. Overall, these factors bring new opportunities for the theoretical study of social capital.

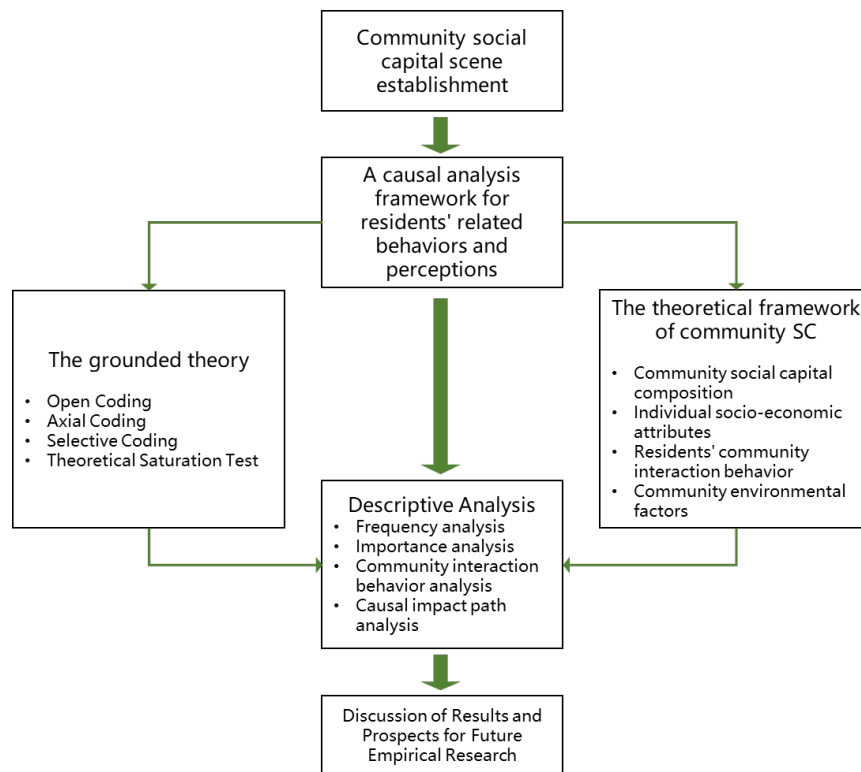


Figure 2. The overview of methodology used in the study. Source: Author.

## 2. Methodology and Analysis

### 2.1. Research area

This study selects Guangzhou Yuexiu District as the research object. Guangzhou is a coastal provincial capital city in southern China with a history of more than 2,000 years of urban development. Yuexiu District is one of the central urban areas of Guangzhou, with a jurisdiction area of about 33 square kilometres and a population density of 31,212 people per square kilometre, ranking among the top in the country. Besides, the elderly population over the age of 65 accounted for 15.88%, which contributes to aging level was higher than the national average. In terms of the built environment of the urban area, the development intensity of Yuexiu District is as high as 92.2%, and the new and old residential areas are staggered, all kinds of basic and commercial service facilities are sufficient, the accessibility is high, and the public transportation is extremely convenient. There are more unit-system residential communities, and there are lots of elderly people living in the community, which is a typical high-density urban area in China(Zhang *et al.*, 2013).

### 2.2. Data collection

The research objects are people who participate in social interaction in the community, including residents, regulators, assisting managers, and community service providers. Investigators went to the

community public spaces within the study area, and randomly selected those who were willing to be interviewed for a semi-structured interview of about 10 minutes. In order to understand the ranges of activities centred on the residential address, daily behaviours, community social capital behaviours and spaces related to themselves, evaluations of the quality and community atmosphere of the built environment, spatial preferences for promoting communication between neighbours, and personal preferences for the community, extent of community belonging, as well as individual socioeconomic attributes. Respondents were informed of the purposes of this research before the interview, and the interview content was recorded with the permissions of the interviewees, and their personal information was appropriately deleted in subsequent processing.

A total of 32 residents were interviewed for the study. The information about interviewees was shown in Table 1, including 18 females and 14 males. The number of interviewed persons depended on whether the content of the interview is saturated and no new information is emerging.

### 2.3. Analysis

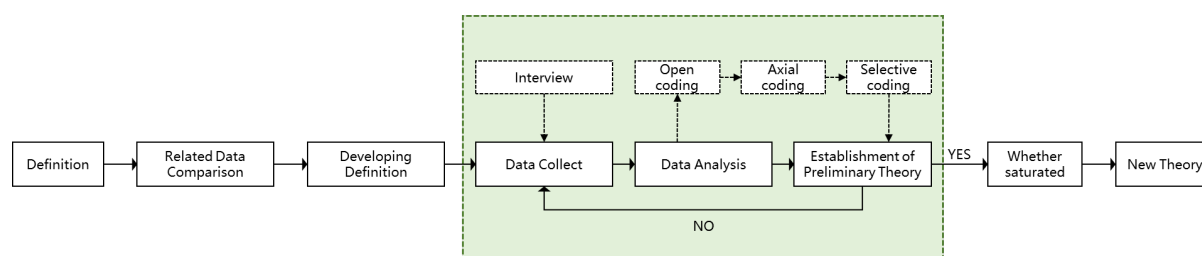


Figure 3. The flowchart of grounded theory. Source: Author.

#### 2.3.1. Open coding

Open coding is a text analysis process of preliminary conceptualization and abstract extraction based on careful analysis and research of phenomena and data after data collection is completed. By continuously reviewing the data, summarizing and comparing its levels, naming and classifying the content of the data, and exhausting the concepts and categories contained in the data to accurately reflect the content of the data. To put it simply, open coding is the process of compressing and coding massive text data according to certain logic and principles until the decoding reaches a saturation state, and the content of the data is presented with abstracted concepts. This research firstly extracts and encodes the original in-depth interview text word by word, and then adopts the method of summarization and induction to re-synthesize the concepts with the same meaning and similar nature to form a preliminary category.

#### 2.3.2. Axial coding

The research selected 80% of the text data of all interview materials for open coding, and used the remaining text data as the test set of model saturation. Firstly, the interview data was abstracted and extracted by labeling, and the data was summarized sentence by sentence and labeled with ax (a total of 1634 groups). Then the labels are classified and named for preliminary conceptual coding, and the result is expressed by aax(569 groups in total). Based on the extraction and concentration of concepts, the corresponding concepts are obtained, which are represented by Ax (108 groups in total). Finally, through clustering and categorization, the relationship between concepts is found to obtain categories, and AAx is used (51 groups in total).

Table1. The overview of methodology used in the study. Source: Author.

Number	Role	Sex	Age	Live time(year)	Interview place	Interview time	Others
F1	Resident	F	32	5	Neighborhood garden	25'54"	
F2	Resident	M	11	7	Neighborhood garden	14'11"	
F3	Resident	F	60	35	Community service center	25'56"	
F4	Resident Volunteer	F	24	30	Community service center	28'8"	
F5	Coordinator	F	26	5	Community service center	26'14	SWK
F6	Resident	M	48	28	Community Center	11'46"	
F7	Resident	F	68	30	Community service Center	18'11"	Block Chief
F8	Resident	M	80	52	Neighborhood elder activity center	33'23"	
F9	Coordinator	M	38	3	Park	12'08"	Guard
F10	Resident	F	31	4	Square	15'53"	
F11	Resident	F	45	7	Square	8'06"	
F12	Resident	F	31	1	kindergarten	8'56"	
F13	Resident	F	69	4	kindergarten	17'34"	
F14	Coordinator	F	32	—	Community service center	10'56"	SWK
F15	Resident	F	62	6	Community activity space	18'59"	
F16	Resident	F	76	4	Community activity space	25'43"	
F17	Resident Volunteer	F	59	48	Community garbage sorting site	19'57"	
F18	Shopper	M	34	—	Day-care class	7'51"	Shopper
F19	Resident	F	32	7	Primary school	16'28"	
F20	Resident	M	48	21	Neighborhood garden	17'29"	
F21	Resident	M	80	41	Park	24'49"	
F22	Shopper	F	53	20	Restaurant	10'06"	Shopper
F23	Resident	M	37	6	Neighborhood garden	18'32"	
F24	Shopper	M	78	5	Neighborhood garden	19'45"	Shopper
F25	Resident	M	34	5	Park	31'21"	
F26	Resident	M	71	3	Park	19'04"	
F27	Resident	F	32	5	Park	13'23"	
F28	Resident	F	56	30	Park	10'56"	
F29	Resident	F	85	38	Neighborhood elder activity center	32'56"	
F30	Resident Coordinator	M	79	50	Neighborhood elder activity center	38'21"	Resident representative
F31	Resident	M	45	17	Community Center	14'26"	
F32	Resident	M	28	3	Street	12'04"	

F, female; M, male; SWK, social worker, employed by government to provide public services for the community, such as organizing volunteer activities.



### 2.3.3. Selective coding

Based on a certain theoretical basis, it excavates the potential logic between different categories, so as to seek the primary and secondary relationship in the category, and summarize the hierarchical relationship between the primary category and its corresponding categories. Based on the analysis and induction of 51 categories, this study summarizes and summarizes 9 main categories: individual differences, physical health, local cultural acceptance, activity, activity place, shopping tendencies, types of residence, built environment characteristics, community social capital. The main categories and their corresponding categories and specific connotations are shown in Table2.

**Table 2. Main Category Mining. Source: Author.**

Main category	Extract features	Connotation description
Individual differences	Gender	Men and women perceive community social capital differently, men have more structural community social capital, and women are more sensitive to the perception of cognitive community social capital.
	Age	Older people are more dependent than younger people on social capital in the community.
	Education	People with different educational backgrounds have different attitudes towards community participation. People with higher educational backgrounds have more structural community social capital, but less cognitive community social capital.
	Political status	Communist Party members have a more positive attitude towards community participation and support services.
	Occupation	Different occupations pay slightly different attention to community social capital, which may be closely related to working hours, but not related to specific occupations.
	Personality	Extroverts have a higher level of community social capital and are more willing to enter the community public space to participate in community collective activities.
	Living time	The longer they live, the more social capital they have in the community.
	Family number	Different family structures have different needs and perceived levels of community social capital.
	Children	Children at home who need to accompany travel will have a relatively high level of community social capital.
	Registration	People with local household registration have higher social capital in the community.
Physical health	Native language	People who can speak local dialects have higher social capital in the community.
	Travel preference	Non-motorized people tend to have higher levels of community social capital.
	Commuting time	Longer commutes have lower perceived community social capital because of limited leisure time and lower social willingness.
	Excellent	Have more ability to go out independently and adjust the body quickly, which contributes to higher social willingness.

	Good	Have the ability to go out independently and be able to adjust the body properly.
	General	These persons may have sub-health problems, or gradually began to experience periodic joint pain. These problems would limit their distance and frequency of travel.
	Bad	People with one or two chronic diseases would need to use crutches to go out independently, and there are certain burdens for them to go up and down the stairs.
	Worse	People lose the ability to go out independently, and interests in social activities except family members.
Local cultural acceptance	Like	Have a high degree of cultural acceptance of the local community, be able to integrate into it, and have more structural community social capital.
	General	Able to accept local culture, adapt to local living habits to a certain extent, and have a low attitude towards integrating into community life.
	Dislike	Unable to accept local culture, have a feeling of rejection of local culture, low social capital due to geography, pay more attention to family.
Activity	Physical activity	Walking, running, jogging, exercises (Tai Chi, Baduanjin, aerobics, square dance), ball games, skipping rope.
	Social interaction activity	Playing chess and cards (mahjong, solitaire, chess), chatting, doing volunteer jobs, having common hobbies (playing, singing and dancing), having dinner parties.
	Life necessities	buying food, buying daily necessities, going to the hospital, taking children to and from school, commuting.
Activity place	Outdoor space	Parks, squares, walking paths, small and micro activity spaces, outdoor sports and fitness venues.
	Indoor space	Catering facilities, cultural facilities, public welfare leisure facilities, retail facilities, indoor sports and fitness venues.
	Other functional space	Medical facilities, educational facilities, commercial and recreational facilities, convenient commercial services, community service stations.
Shopping tendencies	Offline purchase	go to offline stores to buy most kinds of household and other necessities.
	Offline & online purchase	buy things though online and offline shops according to prices and needs.
	Online purchase	rely on online shopping, such as Meituan.
Types of residence	Danwei housing	Most of the neighbors are colleagues from the same unit, and the neighborhoods within the community are closely connected. However, with the relocation of the original residents, more tenants enter this type of community, which makes the social capital in the community appear polarized.
	Commercial housing	Individually funded housing, most of which are closed housing with little public space.
	Traditional housing	The original traditional street-style residence has a relatively long history and a relatively close neighborhood relationship.



Built environment characteristics	Relocation house	The collective housing built after the original village was converted into urban land due to urban development changes. Most neighbors share a common clan relationship.
	Facility type	Cultural facilities can be actively promoted, but excessive commercial facilities can weaken social capital, bring chaos to the community, and bring convenience to residents and cause dissatisfaction.
	Facility density	There may be a non-linear relationship between facility density and community social capital. Residents of some communities want to increase facilities, while residents of other communities feel that too many convenience facilities will increase the flow of people in the community and bring noise, etc.
	Facility accessibility	Accessibility to facilities has a positive impact on activities within the community.
	Construction period	The construction period is related to the residence time, which will have a positive impact on the social capital of the community.
	Surrounding historical and cultural elements	The historical elements in the neighborhood where the community is located can increase residents' sense of belonging, pride in the living area, and more topics that can be discussed together, thus having a positive impact on the social capital of the community.
	Walking path	Actively promote resident travel and increase opportunities to meet community residents, thereby promoting social capital.
	Public spaces	Public spaces play a large role in the social capital of communities and are the main places for residents to communicate. However, due to the outbreak of the epidemic, a large number of indoor public spaces have been closed, affecting some residents' communication activities, such as playing mahjong.
	Type of public space	Small parks within a community are more useful than parks at the city or regional level, especially for families with children under 12, parents are able to connect with other community residents in these small spaces through children.
	Building density	People generally reject living in high-density communities and prefer to live in lower-density communities with more public spaces, such as parks and green spaces.
Community social capital	Participation in community voluntary organizations or activities	Understand or actively participate in public welfare activities carried out in the community, such as homes for the elderly, party members' homes, volunteer service stations, fun games, Respect for the Elderly Day, etc.
	Community social network	including the number of familiar neighbors, the number of close neighbors, the reasons for the formation of the social relationship.
	Social interaction	including the frequency of interaction with the neighborhood line, the way the interaction is usually taken, and the reasons for the interaction.

Trust	The degree of trust with the main community affairs participation roles such as residents in the community, owners' committees, neighborhood committees, property management companies, etc..
Public participation	Whether actively participate in public affairs in the community, whether actively convene to solve community affairs, whether willing to spend money and time due to community affairs, etc..
Social support	Will neighbors help each other, share information, take the initiative to seek help from neighbors, and get some help from others in the community.
Community cohesion	The degree of harmony between neighbors and the willingness of residents to participate in activities in the community as a whole.
Community sense of belonging	How you feel at home in the community you live in, do you like the community you live in, do you feel proud to live here, and do you feel reluctant to leave the community.

### 3. Discussions

Selective coding aims to further extract and integrate on the basis of principal axis coding, isolate core categories, and analyze typical relationships between categories. That is, using researchers as research tools, based on certain theoretical foundations and factual materials, "identifying" "core categories" from many main categories, and then analyzing and interpreting the relationship between different types of categories through the "story line" that runs through the core categories. The logical relationship between the core categories, so as to gradually build a new theoretical framework. The "story line" not only involves the relationship between the main categories, but also includes the influence mechanism of the whole process. With in-depth analysis of the above 51 categories and 9 main categories, and on the basis of repeated review of original text materials and field survey materials, this study finally proposes a model based on the impact of the built environment in high-density areas on community social capital.

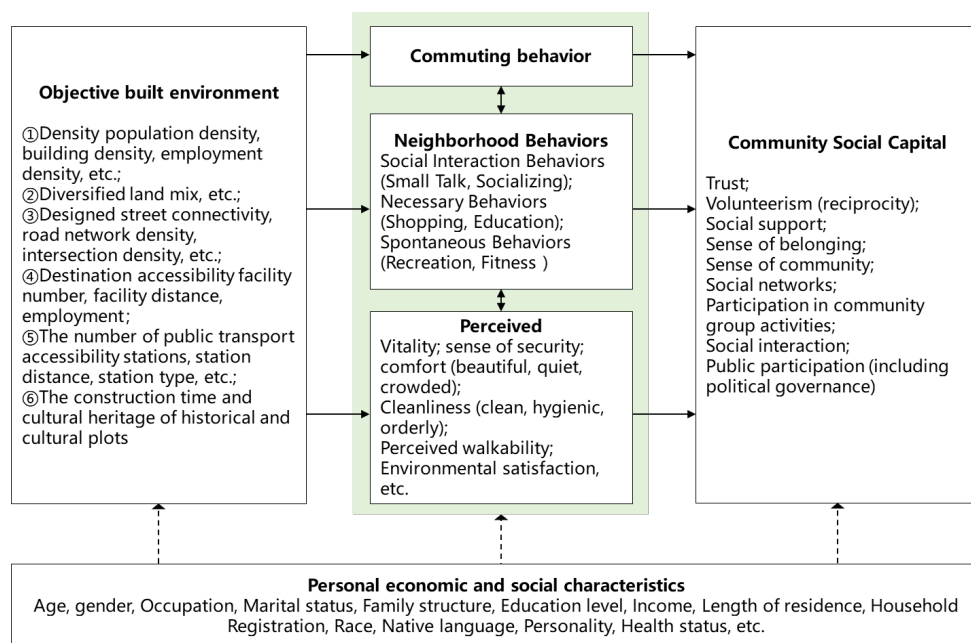


Figure 3. The flowchart of grounded theory. Source: Author.

We found that: 1) The elements of the built environment will potentially affect the choice of residents' travel mode, and then affect the levels of various dimensions of community social capital by affecting the frequency of residents' leisure and fitness activities, social interaction activities, and life activities in the community. Among them, the impact of social interaction activities is relative. Many well-built micro activity spaces in the community can promote outdoor activities for residents of multiple age groups and enhance community interaction and the personal perception of community social capital.

2) Parks, squares, and supermarket facilities at the regional and above levels can promote the improvement of community social capital of people under the age of 75 but have little effect on the elderly people over 75 years old, which is related to the individual's ability to travel independently and physical health.

3) Children who can't go out independently are becoming a new driving force of social capital in the community, for the demand for outdoor activities prompting their family members to go out with them. Besides, with the establishment of children's friendship, promotes the improvement of trust, reciprocity, social network, and so on within the community.

4) The improvement of land mixed-use and space quality, such as the enrichment of living facilities, public transportation system, outdoor activity facilities, and high-quality educational resources, can greatly reduce people's dependence on virtual online shopping, which promotes maintenance activities in the surrounding area, increases opportunities for social interaction and creates comfortable and vibrant community atmosphere, enhancing the level of community social capital.

Eventually, the paper explores the theoretical framework for further empirical research.

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