Build Community Resilience Beyond Covid-19

—— Towards a liveable and smart future

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MSc Urbanism
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All the sources of the figures can be found in the reference list of the report of the same project.

KEY WORDS

Spatial Planning
The Covid-19
Governance
Community Resilience
Urban Renewal
Digital Transition

1 CONTEXT

2 PROBLEM

3 CONCEPTUALIZATION

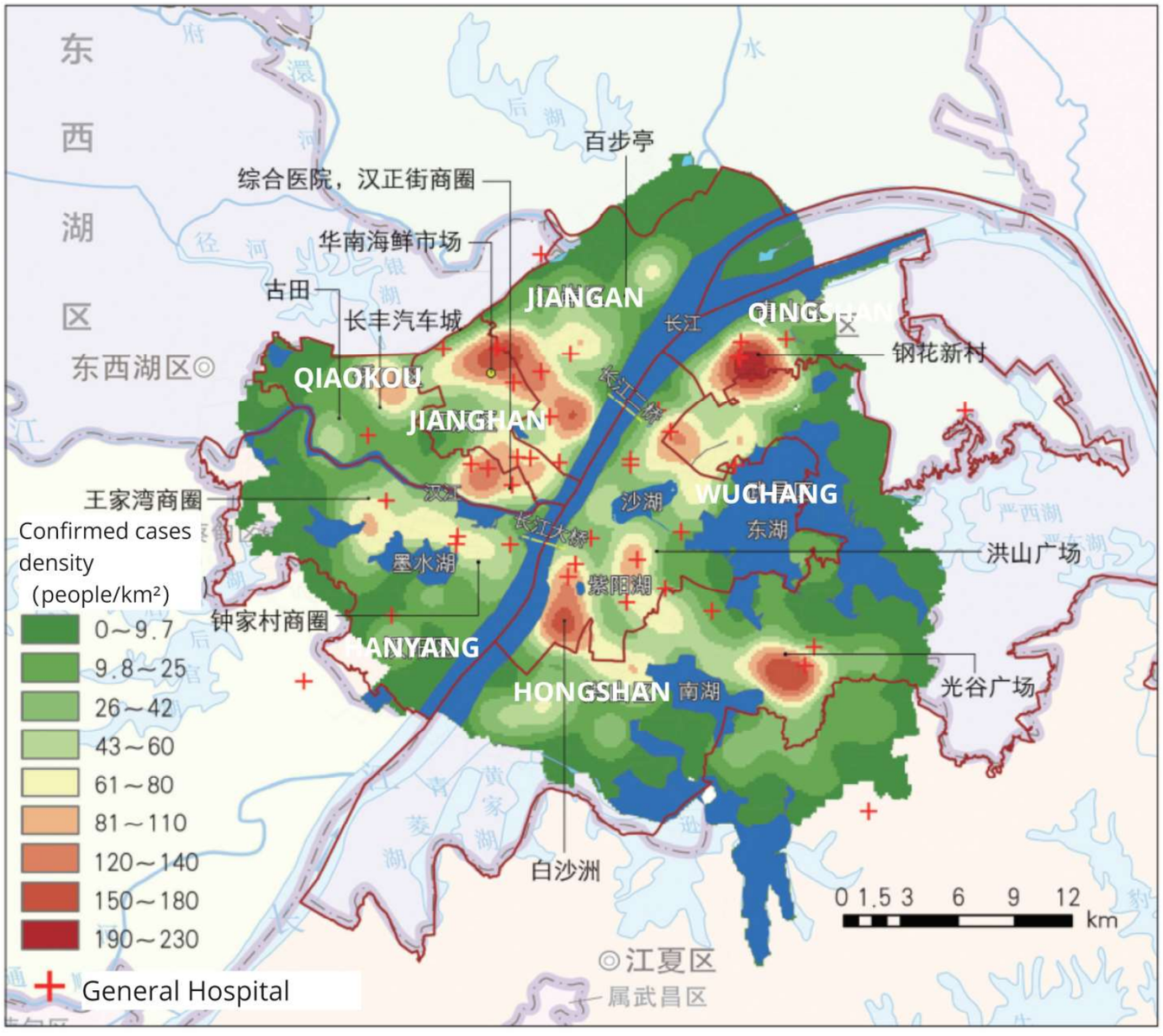
4 VISION & STRATEGY

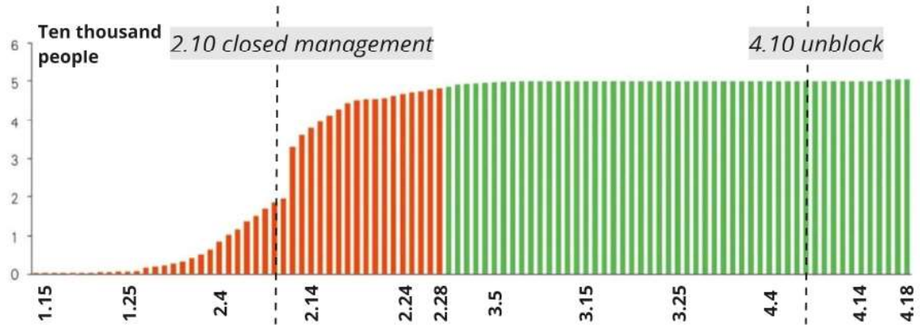
5 DESIGN

6 CONCLUSION

What happened in Wuhan in early 2020 ?

Covid-19 outbreak in Wuhan

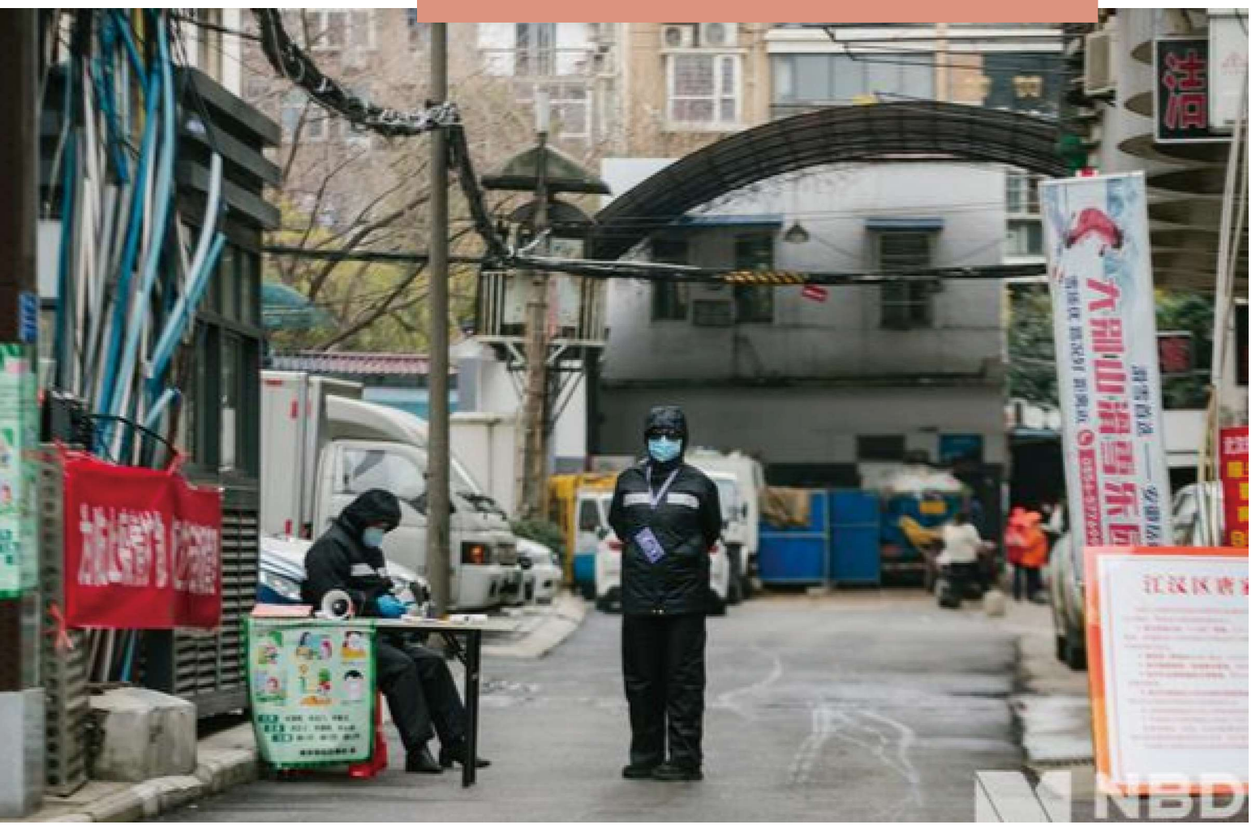




Community response

Community response

Community closure management



Supplies of daily necessities

The high-frequency word of big data platform

What problems were exposed during the response?

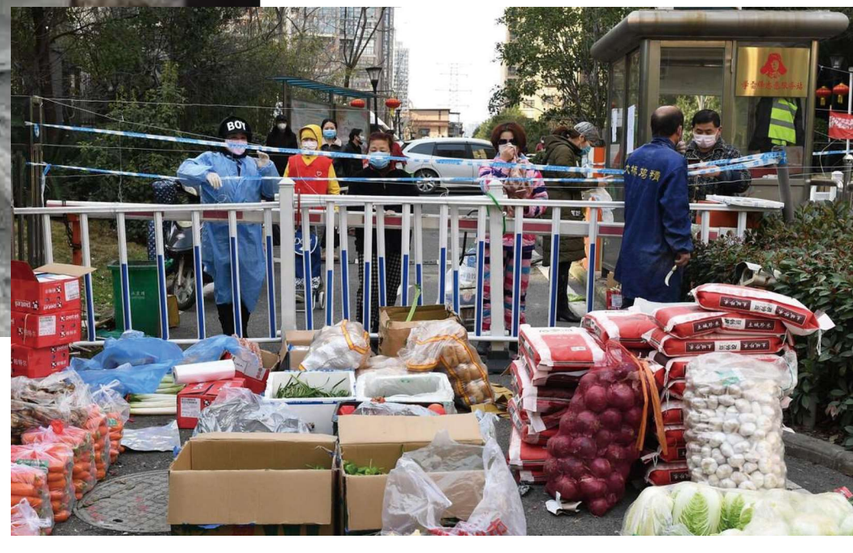
Problematic community capacities seen from the response

Spatial planning

low quality space

Inadequate public facilities

Insufficient open space



Governance

Shortage of human resources

Lack of emergency space planning

Poor self-governance mechanism

Human capital

Weak knowledge and self-help capabilities

A weak sense of community belonging

Vulnerable groups suffer most

Knowledge gaps in study

Limited scope of community resilience (dimension & assessment)

Dimensional division	针对社区类型	参考文献
Physical, institutional, demographic, economic factors	非特定类型	[17]
Community organizations, community residents, material space	城市社区	[4]
Social factors, management (system) factors, economic factors	非特定类型	[41]
Collective memory, diversity, adaptability	山区社区	[42]
Social capital, economic capital, human capital, material capital, natural capital	非特定类型	[43]
Connecting and caring, having resources, the capacity for change, disaster management, information and communication	非特定类型	[18]
Versatility, redundancy, ecological and social diversity, effective network connectivity, adaptability	城市社区	[28]
Climate disaster resilience, economic resilience, community resilience, organizational resilience, infrastructure resilience	城市社区	[44]
Ecological resilience, social resilience, economic resilience, technological resilience and organizational resilience	非特定类型	[45]
Technological resilience, organizational resilience, social resilience and economic resilience	保障房社区	[5]
Social resilience, economic resilience, institutional resilience, infrastructure resilience	非特定类型	[46]

资料来源：搜集相关文献资料的基础上自绘。

表 2-8 国内减灾防灾社区建设概况

时间	主导部门	Theme	主要思想及措施
2004	民政部	"Disaster Reduction into Communities" activities	社区是城市防灾减灾的基础，重视风险高发区社区的防护[1]。
2006	国务院	National Overall Emergency Response Plan for Public Emergencies	强调社区为工作重点
2007	国务院	National 11th Five-Year Plan for Comprehensive Disaster Reduction	开展“全国综合减灾示范社区”建设活动
2010	国务院	May 12th is national Disaster Prevention and Mitigation Day	主题为“减灾从社区做起”
2010	国家减灾委	National Model Community Standards for Comprehensive Disaster Reduction	进一步指导各地开展社区综合减灾工作[82]
2011	国务院	National Comprehensive Disaster Reduction during the 12th Five-Year Plan Period	提出创建 5000 个“全国综合减灾示范社区”
2012	民政部	Guidelines for Establishing National Demonstration Communities for Comprehensive Disaster Reduction	进一步规范全国综合减灾示范社区创建管理
2015	民政部	Interim Measures for the Establishment and Administration of National Demonstration Communities for Comprehensive Disaster Reduction	确定 1390 个全国综合减灾示范社区

Limited strategies and practice

表1 风险应对下社区韧性指标汇总表

Tab. 1 Summary of community resilience indicators under risk response

Classification of indicators	Types of indicators	Elements of indicators	Resilience characterist
Community governance	Public Management	Emergency organization training, rescue division of labor and command, emergency evacuation measures, security and protection" status, emergency plans, rescue personnel organization, emergency facilities redundancy	Redundancy Robustness
	Political Economy	Medical and health facilities, reserve of relief materials, emergency communication equipment, economic situation of communities, social groups, special status of communities	
	Demographic Composition	Population density, sex ratio, proportion of minors, proportion of the elderly, proportion of the sick and disabled, family structure	
Community space	Public Space	Open space utilization, spatial accessibility, arterial road, number of community entrances and exits, emergency places	Adaptability Redundancy
	Landscape Environment	Built environment quality, greening situation, building ventilation environment	
	Infrastructure	Accessibility of roads, storage space for epidemic prevention, garbage disposal facilities and medical facilities	
	Disaster Prevention Measures	Facilities for epidemic prevention and rescue shall be built, channels for epidemic prevention and rescue shall be unblocked, emergency response measures shall be taken, and emergency service facilities shall be provided	
Community organization	Organizational Approach	Community leadership, community building, and resident participation	Self-organizat ion
	Organizational Governance	Safeguard mechanism, preparation and response plan, big data information platform construction, emergency rescue efficiency, volunteer organization, disaster prevention publicity	
	Organizational Construction	Community "Workshop" co-governance co-management, community self-organization committee	

1 Problem statement

Deficiencies in community resilience

2 Research questions

CONTEXT

1 What are the most important Covid-19 community responses and their mechanisms in Wuhan?

PROBLEM

2 What problematic community abilities are exposed by Covid-19 response?

What can we learn from **Covid-19 response** in Wuhan to enhance **community resilience** in the long term by adopting **planning strategies**?

CONCEPTUALIZATION

3 What is the conceptual framework of building community resilience in Wuhan from the perspective of pandemic ?

4 What is the analytical framework for measuring pandemic community resilience ?

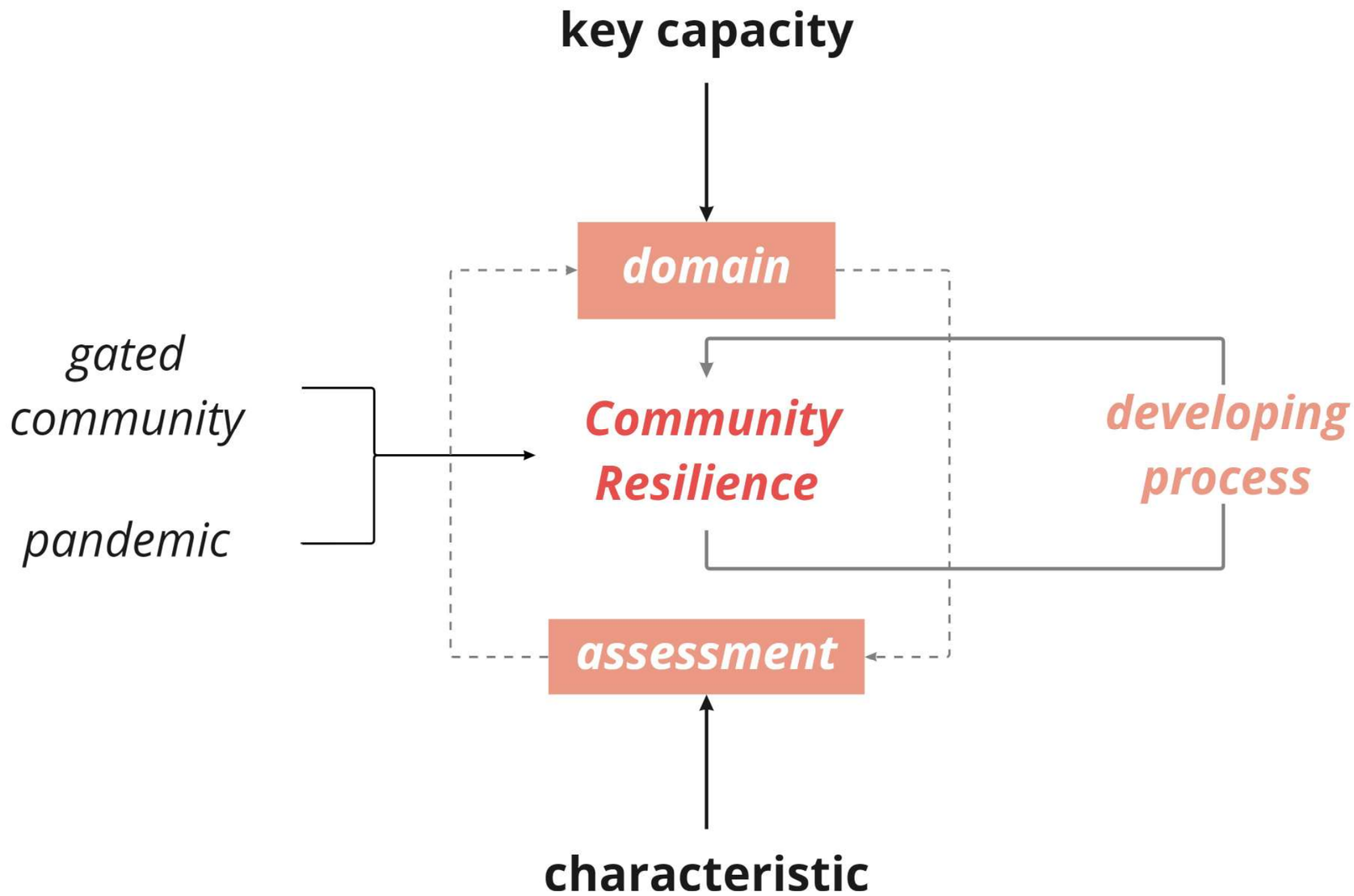
SOLUTION

5 How can the strategic planning interventions strengthen community resilience through vision?

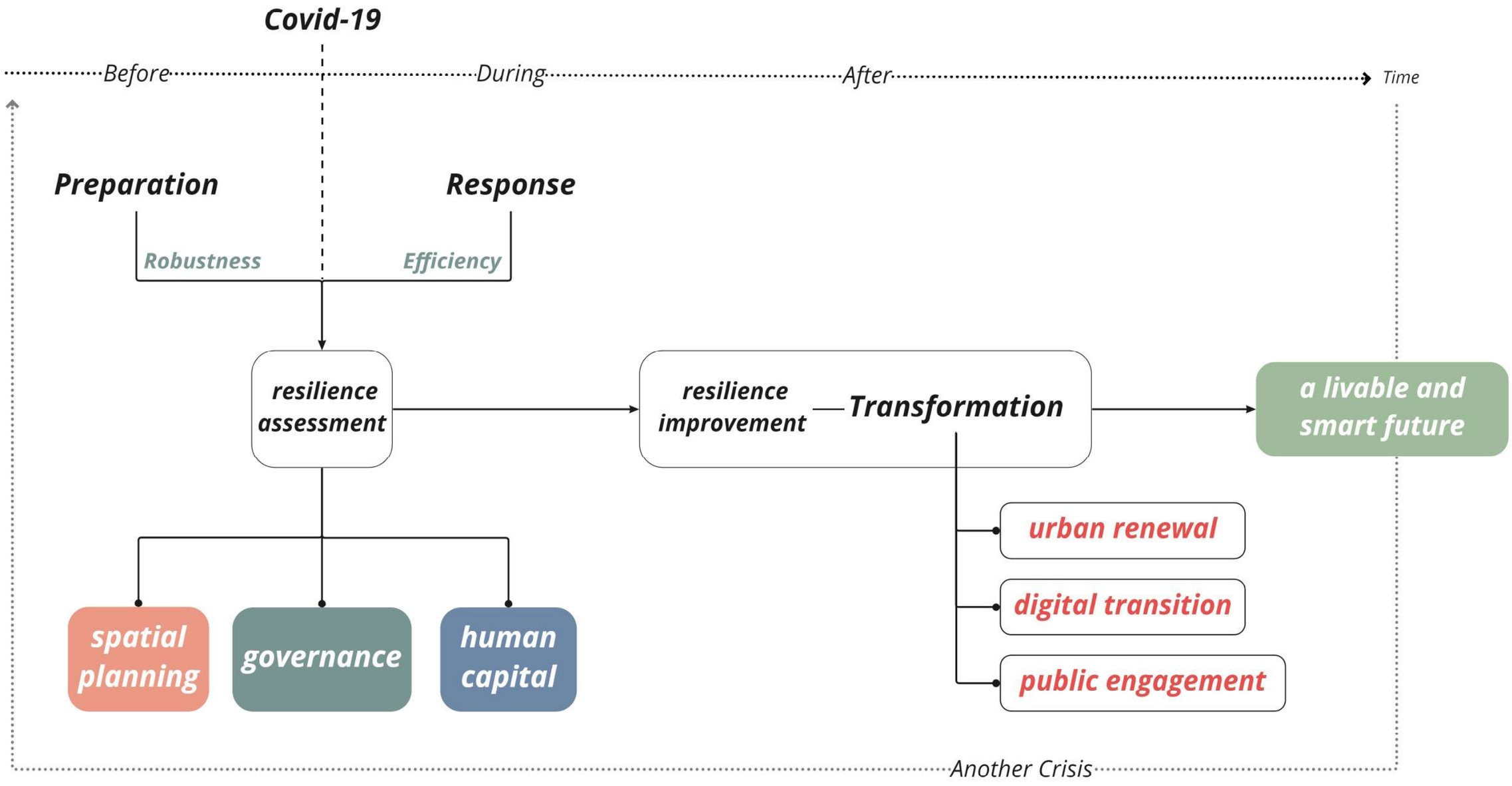
6 How to improve integration and coordination between planning strategies by design?

How to conceptualize ideas for enhancing Community Resilience?

1 Theoretical framework



2 Conceptual framework



3 Analytical framework

Dimension	Scale	Primary Indicators	Secondary Indicators
spatial planning	*neighborhood*	**public space**	system of open space system of green space system of sports field
		public facility	medical(aging) facility commercial facility comprehensive center
		infrastructure	delivery facility street furniture supporting infrastructure (Parking, water, electricity, communication infrastructure etc.)
		traffic	pedestrian & cycling network
	community	**public space**	open space green space sports field
		Building	density quality
		infrastructure	street furniture supporting infrastructure (Parking, water, electricity, communication infrastructure etc.)
		traffic	pedestrian & cycling network entrance and exit
governance	*neighborhood*	**governance structure**	type of actors degree of engagement
	community	**Emergency management**	self-governance mechanism emergency plan
		Information and communication	information channels communication activities
human capital	*neighborhood*	**Economic basis**	industry structure and diversity
	community	**Demographic composition**	Aging rate incomes' level residents' knowldege and skills social activities
		Social network	residents' organizations commuity relationships sense of belonging

4 Methodology

RESEARCH QUESTION

MAIN RESEARCH QUESTION

What can we learn from Covid-19 response in Wuhan to enhance community resilience in the long term by adopting planning strategies?

SUB RESEARCH QUESTIONS

CONTEXT
1 What are the most important Covid-19 community responses and their mechanisms in Wuhan?

PROBLEM
2 What problematic community abilities are exposed by Covid-19 responses?

CONCEPTU-ALIZATION
3 What is the conceptual framework of building community resilience in Wuhan from the perspective of pandemic ?

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SOLUTION
5 How can the strategic planning interventions strengthen community resilience through vision?

6 How to improve integration and coordination between planning strategies by design?

RESEARCH METHODS

Observation
Spatial analysis
Literature review
Policy analysis
Stakeholder analysis
Case study
Vision design

EXPECTED OUTCOMES

MAIN OUTCOMES

A conceptual framework
& An analytical framework
& Planning strategies

PHASED OUTCOMES

1.Problematic community abilities in Wuhan pandemic context

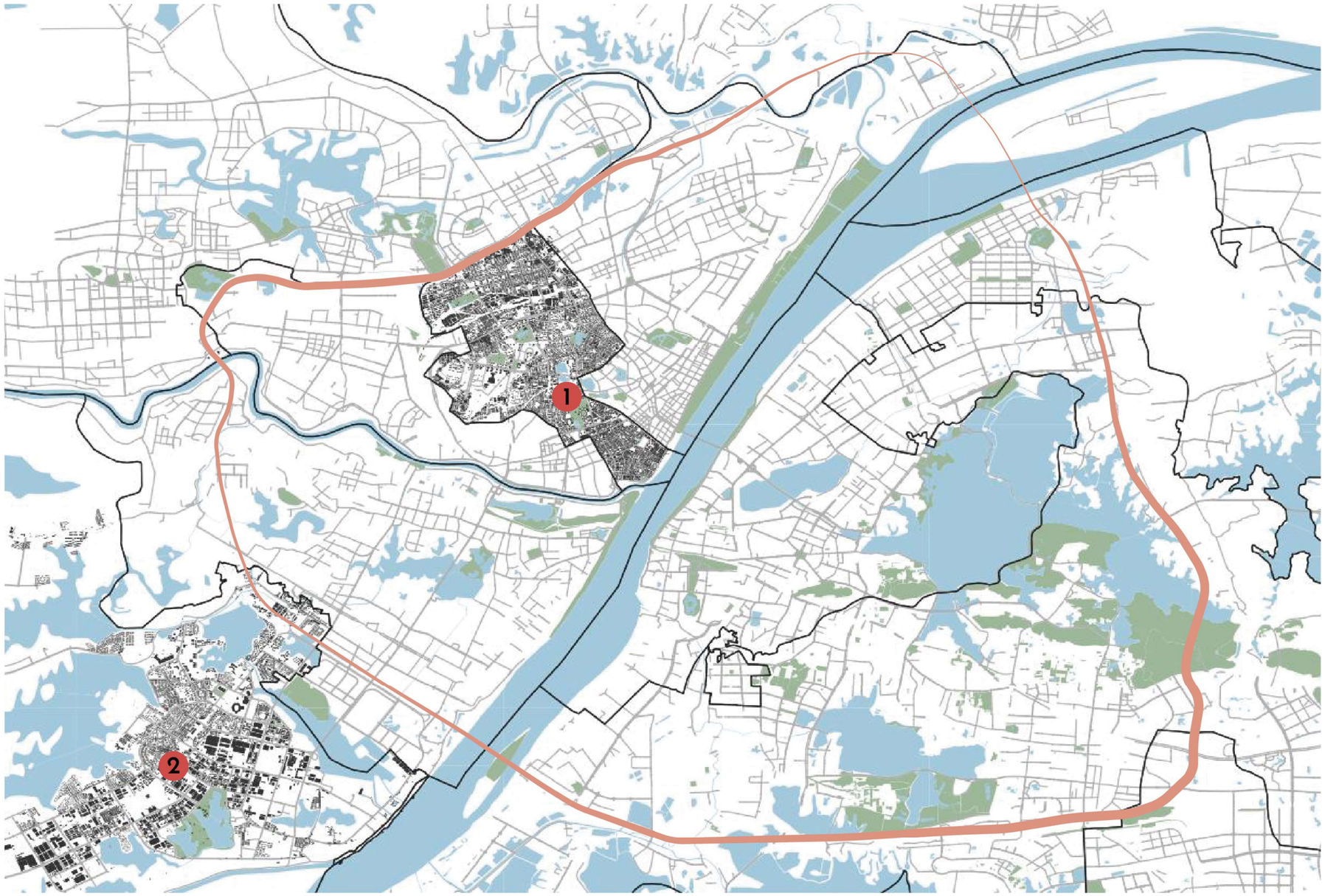
2. A conceptual framework of building pandemic community
3. An analytical framework of community resilience

4. vision
5. planning strategies
6. local design
7. evaluation & conclusion

How do Wuhan communities perform in terms of Community Resilience?

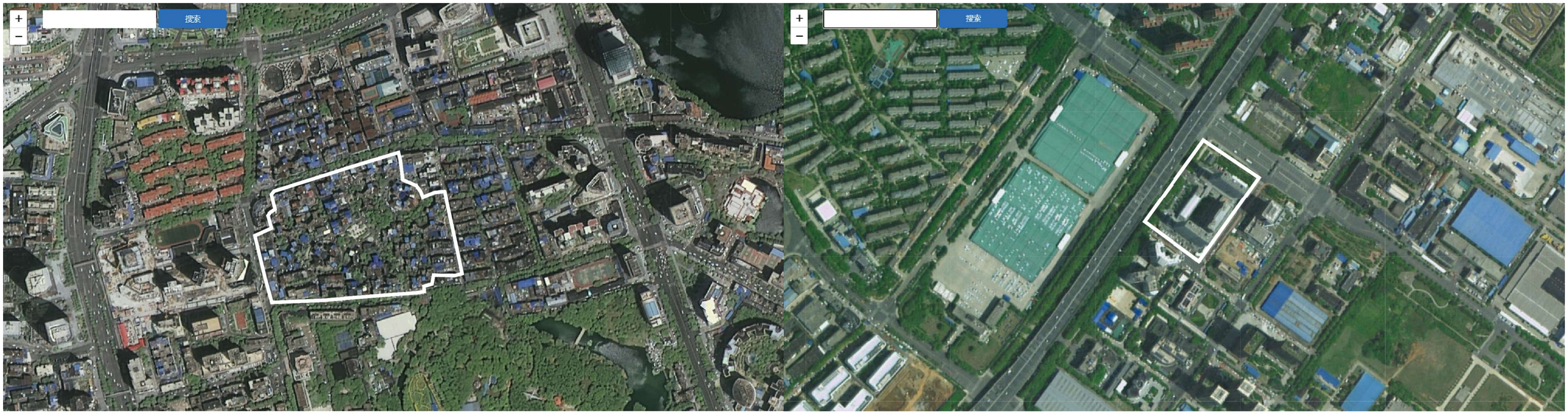
1 Old Community VS Modern Community

Old VS Modern



	1 *Old Community*	2 *Modern Community*
Name	Wansongyuan northern xiaoqu	Jinsegangwan xiaoqu
Year of construction	Before 2000	After 2000
Community typology	a medium-rise compound	a high-rise residential complex

1 Old Community VS Modern Community

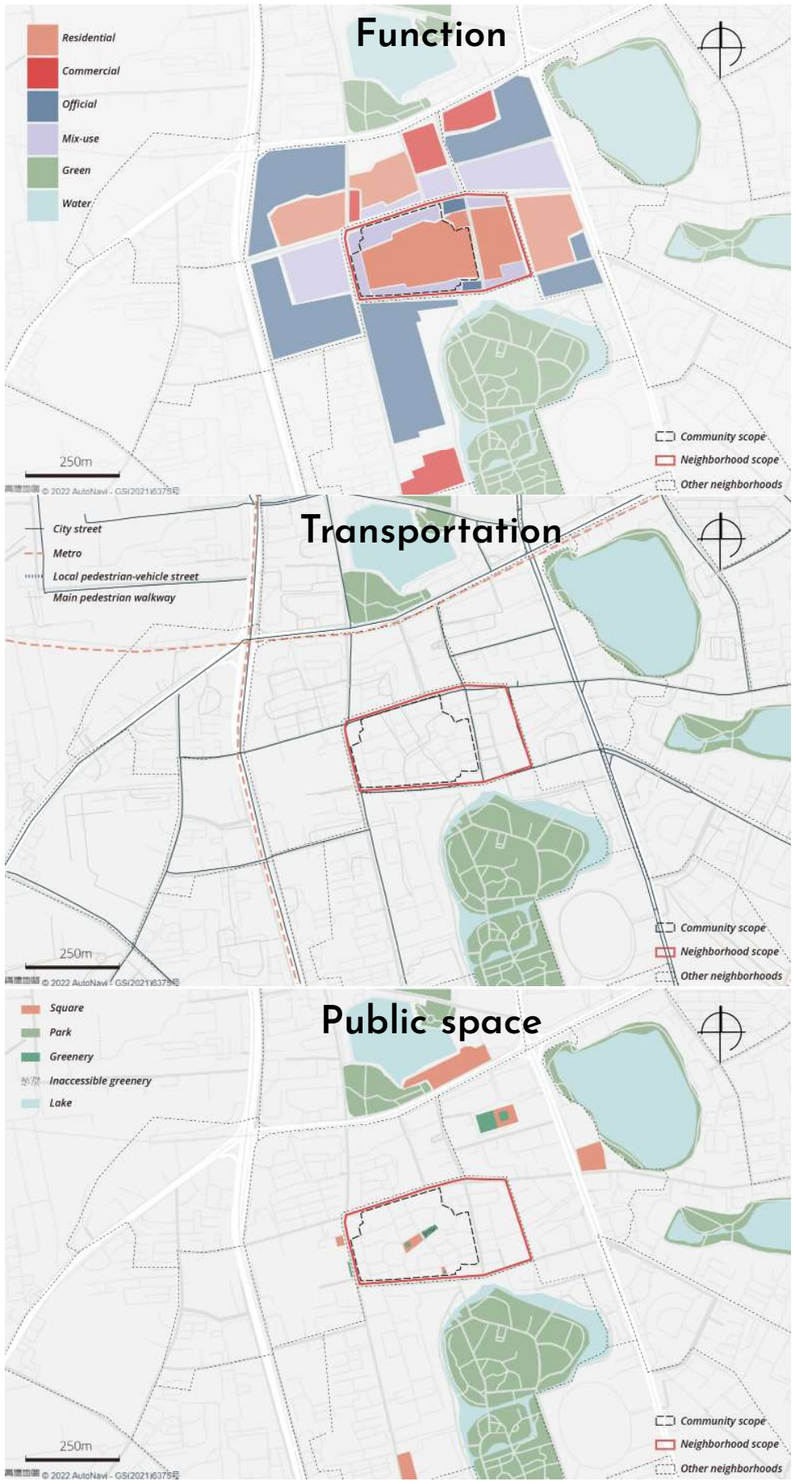


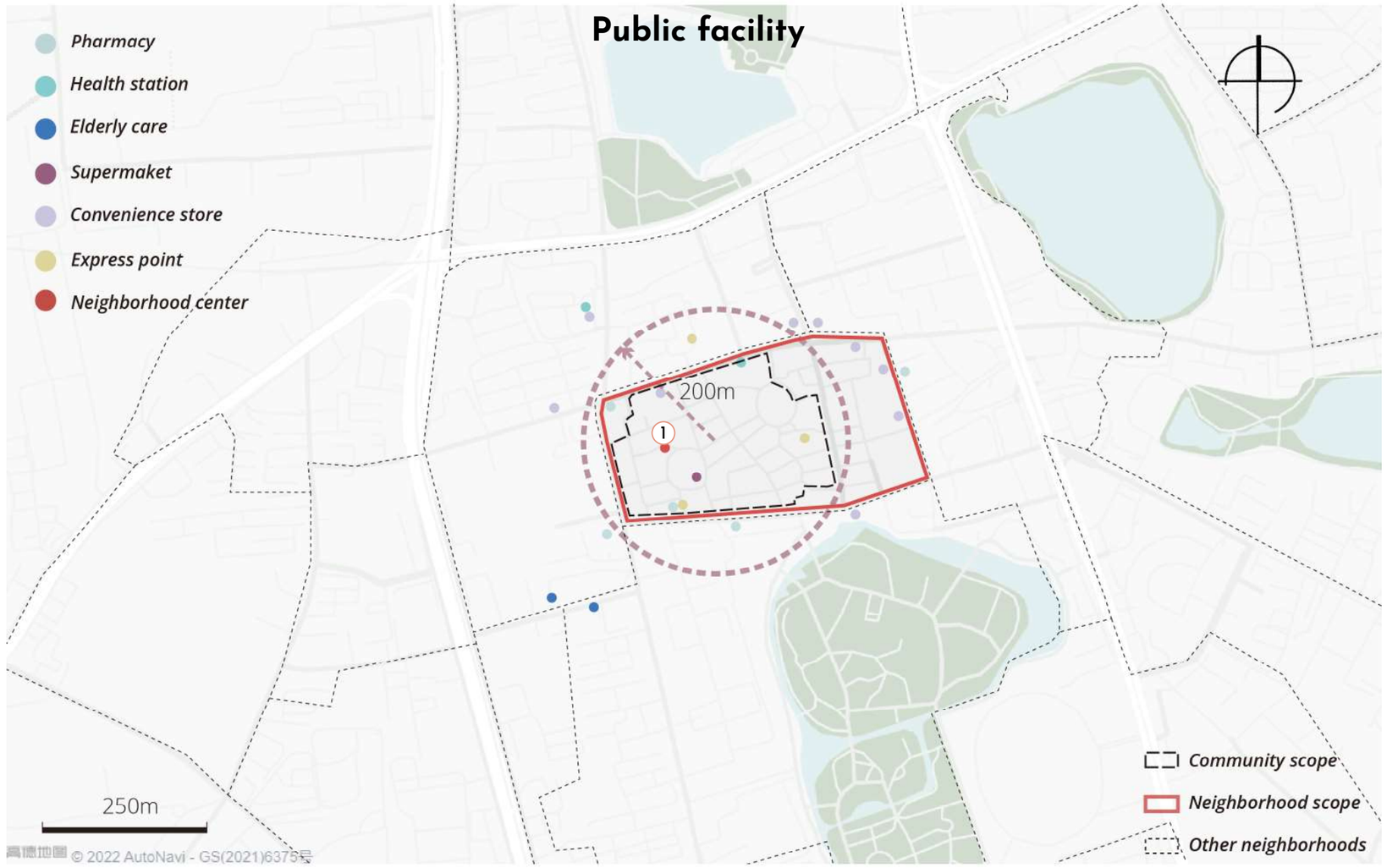
	1 *Old Community*	2 *Modern Community*
Built age	1996	2019
Households	1599	1542
Floor area	≈ 65000 m^2	17294 m^2
Building density	medium-rise	high-rise
Maintenance management	unregulated	regulated
Community infrastructure	decayed	well-kept
Community boundary	Open	strictly regulated

Medium-rise VS High-rise

Decayed VS Well-kept

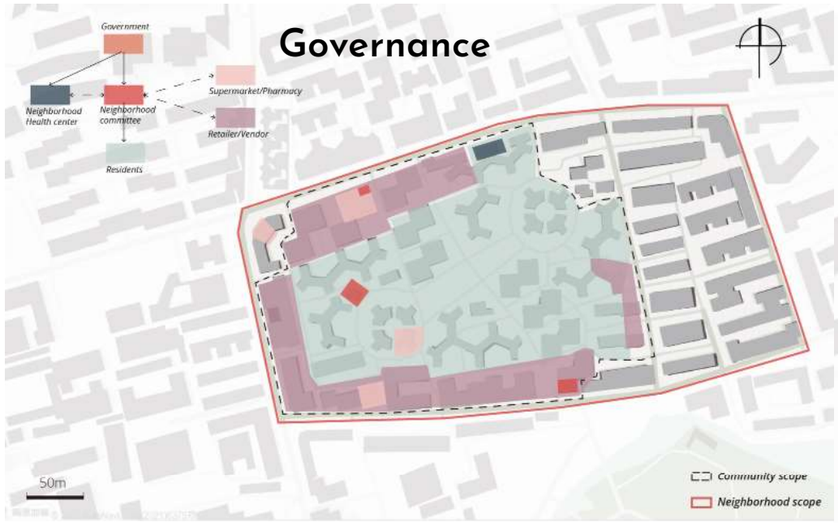
Unregulated VS Regulated



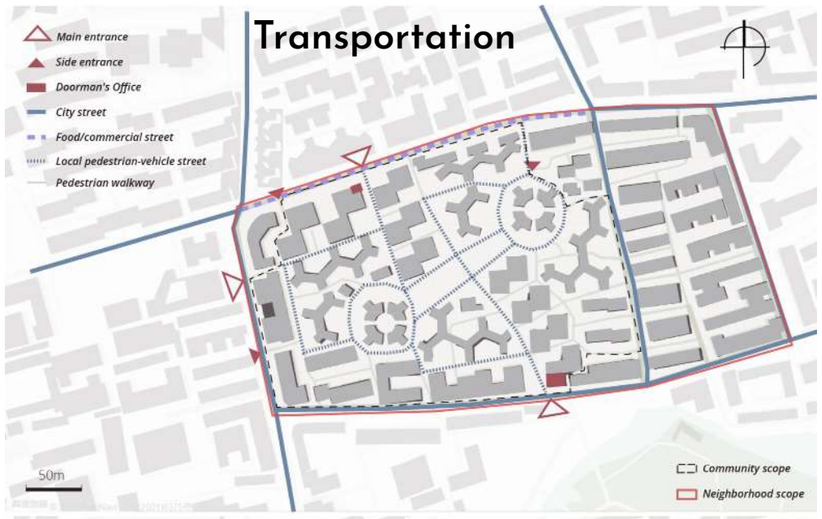


Community at the larger scale

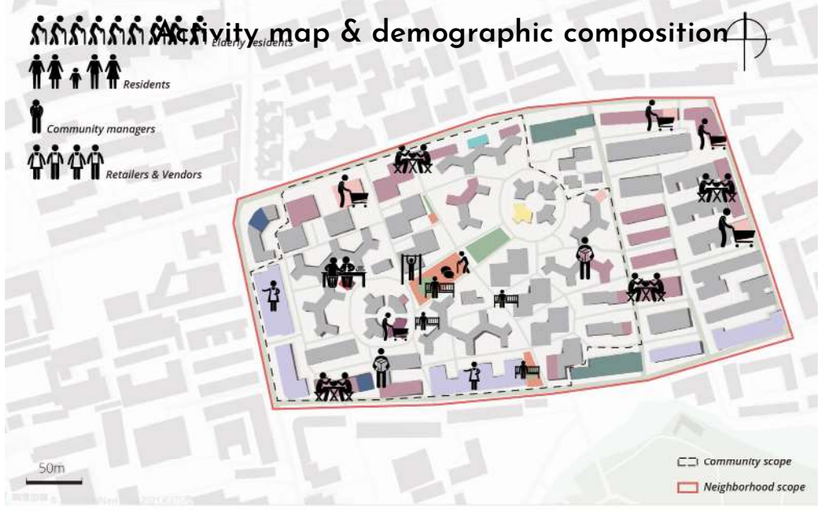
Governance



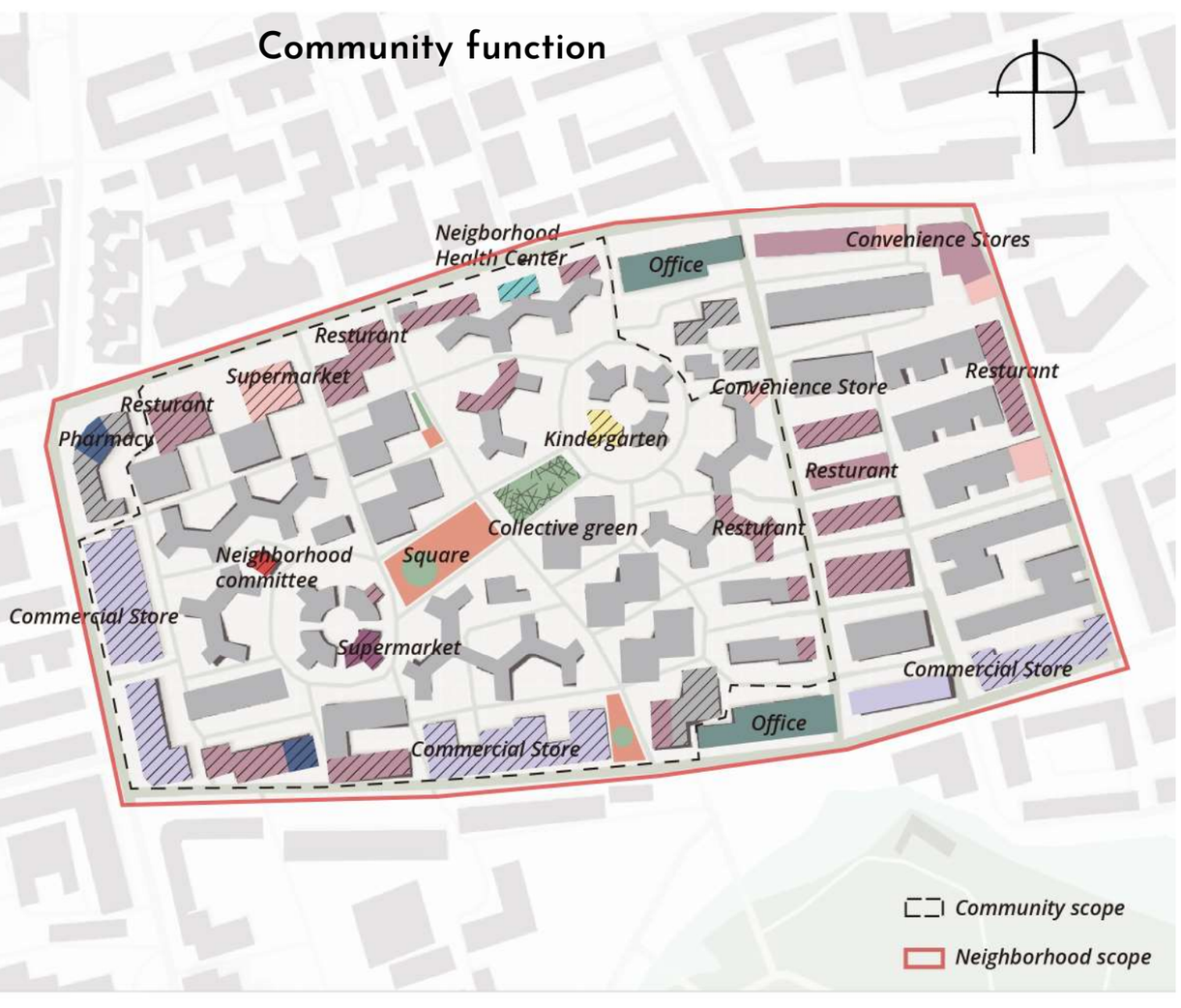
Transportation



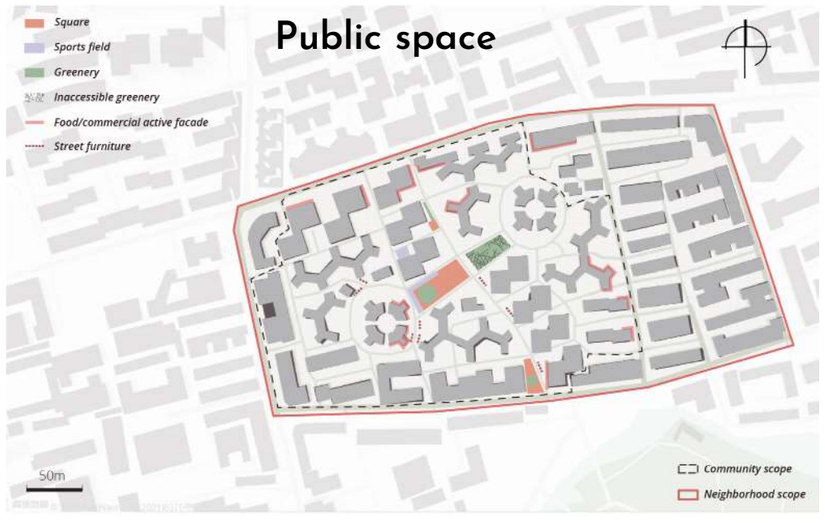
Activity map & demographic composition



Community function

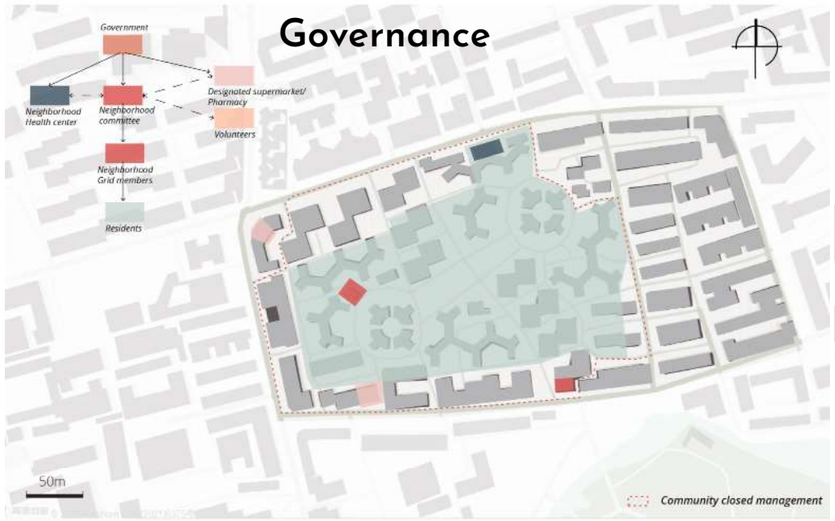


Public space



Community in the normal situation

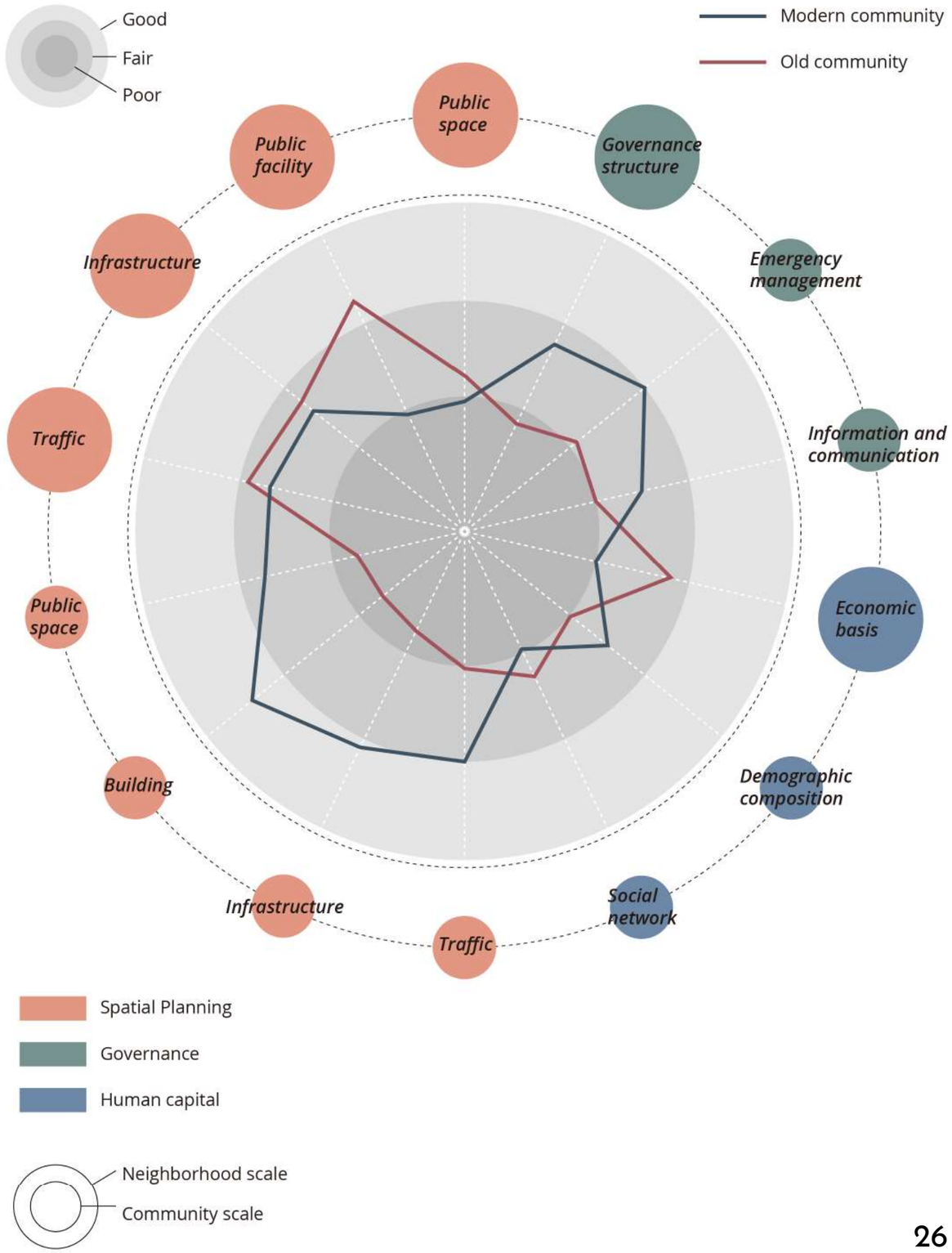
Governance



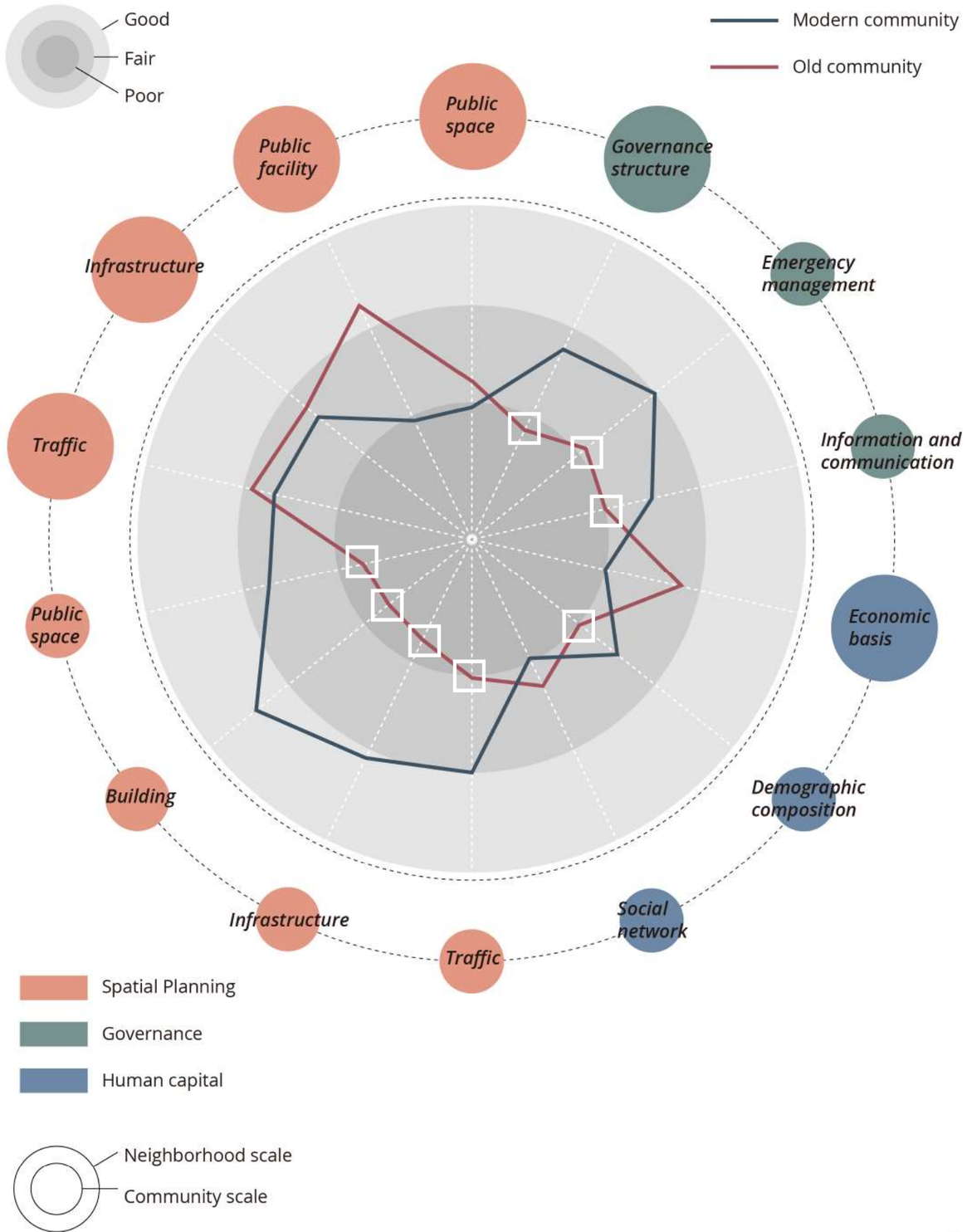
Community emergency spatial plan

Community in the pandemic situation

		Old Community	*Modern Community*
Spatial planning	Neighborhood	Lack of systematic greenery and open space Lack of a good-quality and multi-functional comprehensive center	Lack patches of greenery and open space Public facilities are far away Not enough functional diversity
	Community	Lack of acessible greenery and open space Old buildings and deteriorated infrastracture Blocked sidewalks and insufficient parking Lack of interaction and vitality in public spaces	Lack of accessible greenery and open space Lack of fitness facilities Good-quality but high-density buildings Sufficient parking
Governance	Neighborhood	Lack of diverse public engagement Lack of human resources	Lack of diverse public engagement Professional property management team
	Community	Lack of emergency spatial planning Delayed communication because of lagging technology and low education of residents	Enough open space for emergency planing Timely communication because of property management and ease of Internet use among young residents
Human capital	Neighborhood	Qingsong Neighborhood, consisting of several food streets, whose economy is diverse but not strong	Xindu Neighborhood, consisting of numerous technology companies and industrial parks, whose economy is diverse and vigorous
	Community	Wansong Southern Community A large number of elderly people Low income and low education level High trust among neighbors	Jinsegangwan MIMI Community A large number of young office workers A high portion of mobile population Low frequency of residents' interaction



	Old Community	*Modern Community*
Neighborhood	Public space Public facility Governance structure	Public space Public facility Economic basis
Community	Public space Building Infrastructure Traffic Emergency management Information and communication Demographic composition Social network	Public space Building Social network



1

A low-quality comprehensive center

1

A comprehensive center that can't evoke a sense of place

1

Unpleasant walking experience around the comprehensive center

1

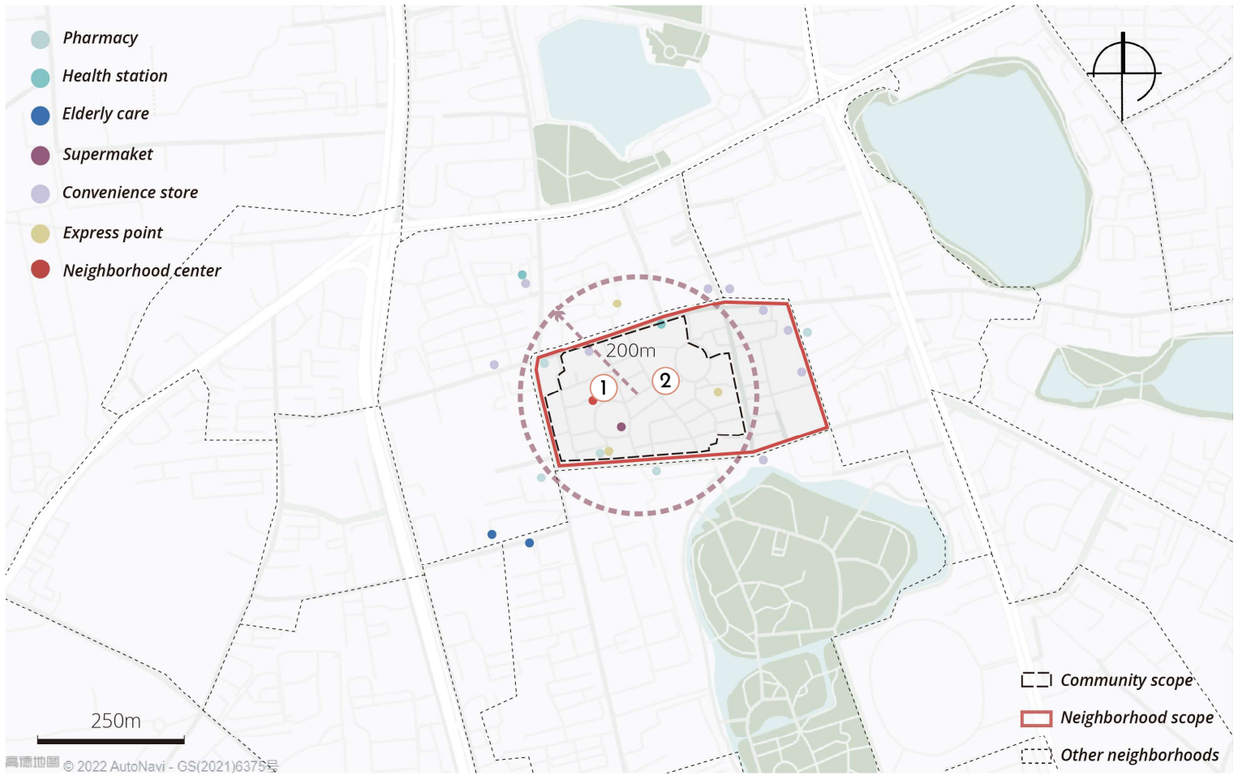
Chaotic surroundings of the comprehensive center

2

Inadequate accessible greenery space

2

Inadequate accessible open space



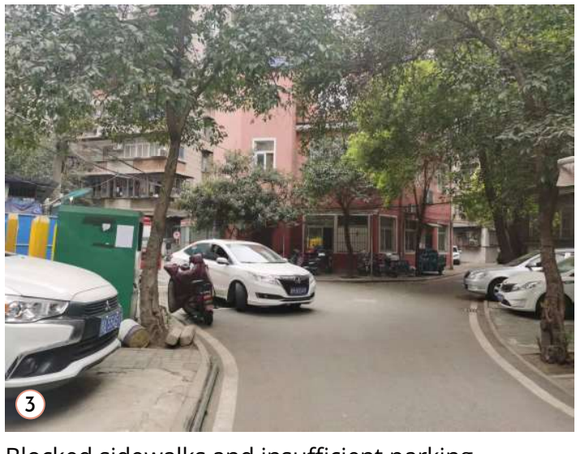
Spatial problem map——neighborhood scale

Blocked public space

Deteriorated street infrasturacture

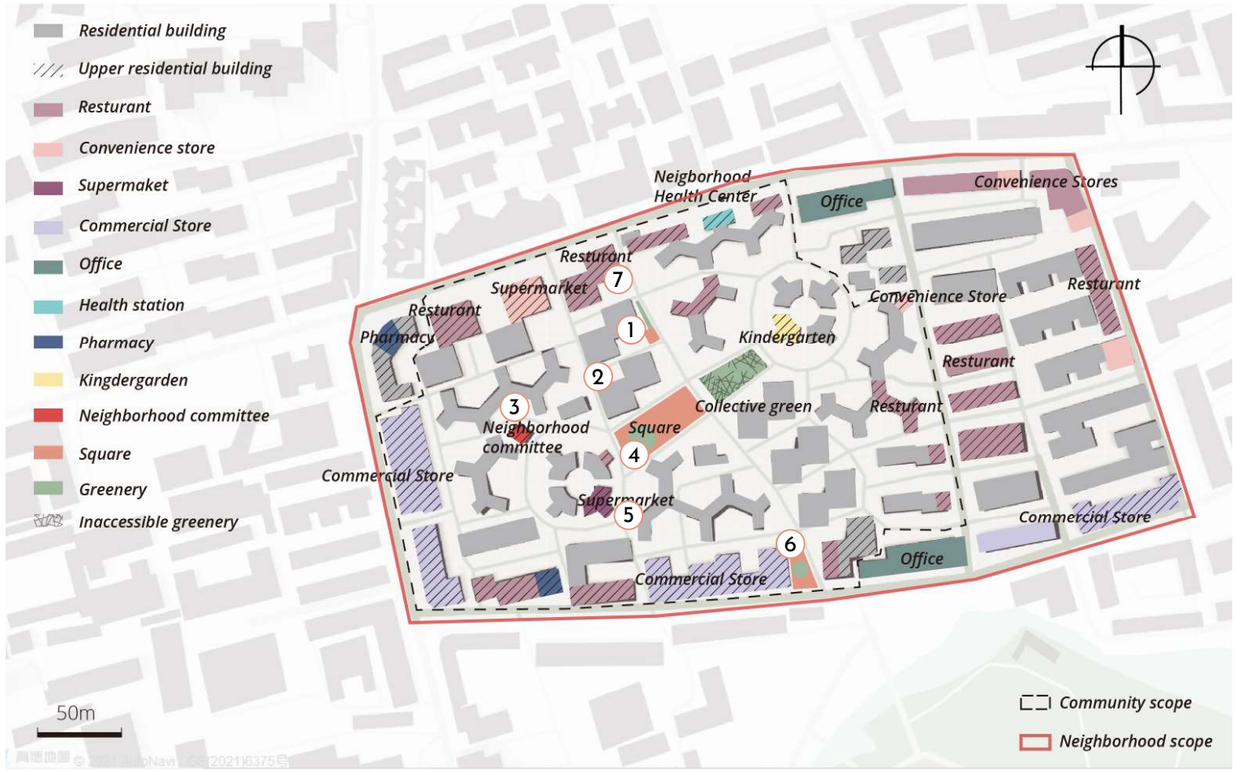
Old and low-quality residential building

Low-quality public space



Blocked sidewalks and insufficient parking

Chaotic parking



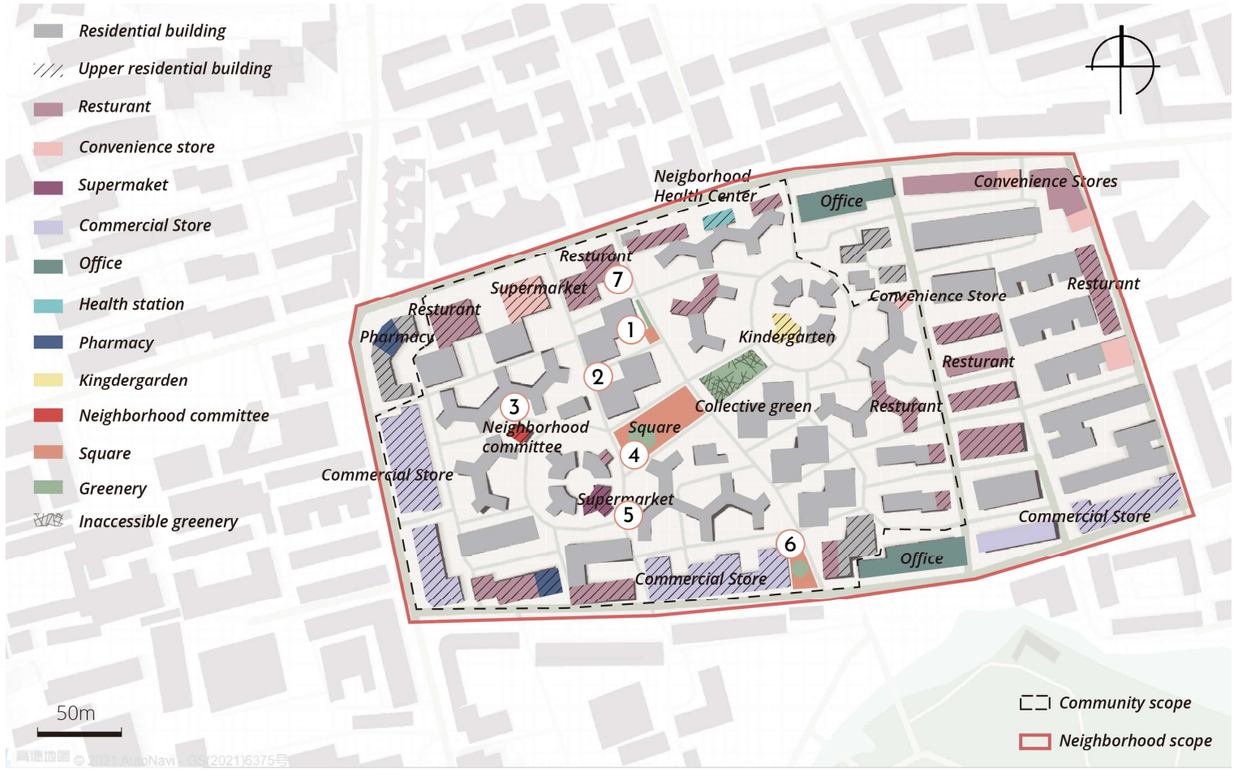
Spatial problem map——community scale

The current square is fragmented due to unmaintained greenery and decayed sports facilities

The current square is largely occupied by electric vehicles

The inactive square two years ago

The empty square two years ago

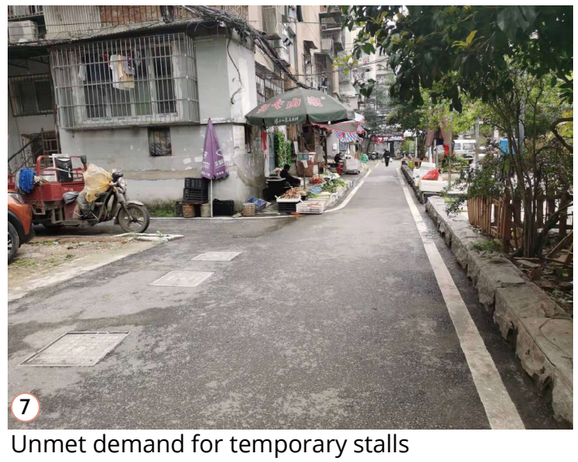


Spatial problem map——community scale

Deteriorated street furniture and unmet demand for dining

Poor pedestrian infrastructure

Public space that lacks emergency planning



Unmet demand for temporary stalls

What are the vision and strategies that can strengthen community resilience?

1 A liveable and smart future

Vision: a liveable and smart future where the community is well prepared, enabling people to adapt quickly and lead normal lives if a crisis happens

2 Principles for vision

liveable

Community meets the changing needs of residents in different periods, ensuring their higher standards of living.

Human-orientation

Meet the needs of different groups
Focus on the changing needs of different periods
Human scale design

Inclusion

Encourage the public engagement
Support all community groups

Ecologization

Design multi-functional open green space
Design for both human and ecosystem

smart

Innovative digital technology aids community function and benefits every member in the community, in both daily life and emergent situations.

Innovation

Adopt advanced technology
Enhance links between virtual services and real space
Combine online and offline services

Intelligence

Encourage standardization
Customize to local context

Green transition

Promote green building and energy
Advocate sustainable lifestyle

3 Strategy toolkit

3.1 Temporary planning

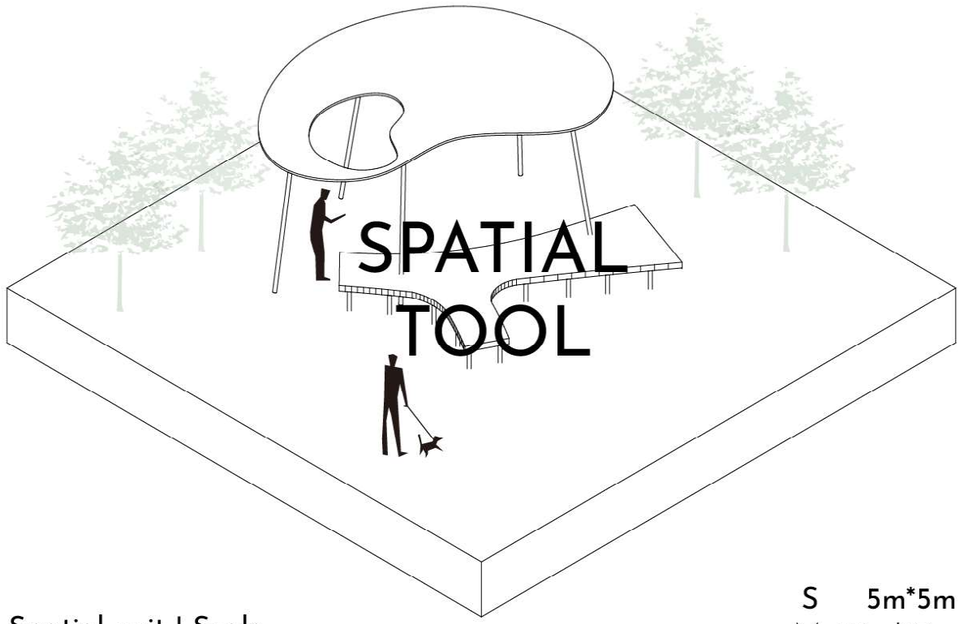
3.2 Urban renewal

3.3 Digital transition

3.4 Public engagement

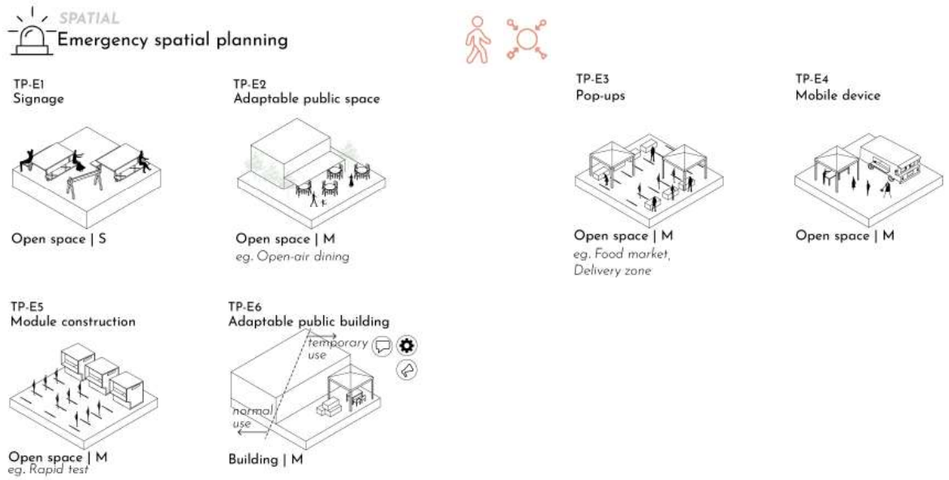
How to read spatial tool illustrated

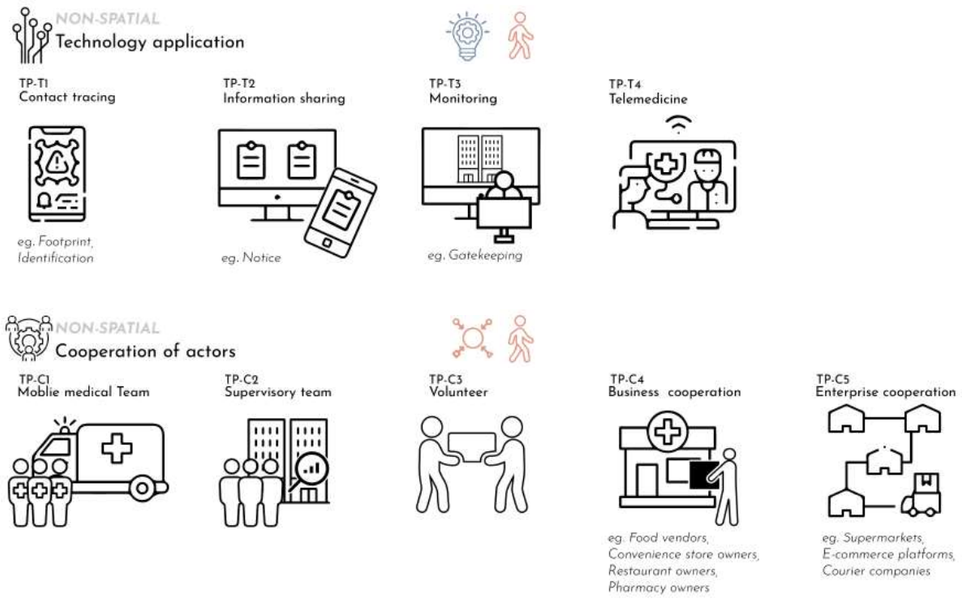
Tool number
Tool name



Spatial unit | Scale
Examples

S 5m*5m
M 10m*10m
L 25m*25m

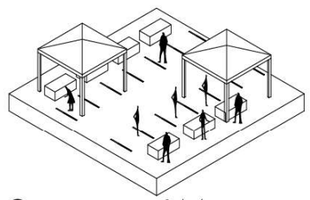




3.1 Temporary planning

emergency spatial planning,
technology application,
cooperation of actors

TP-E3
Pop-ups

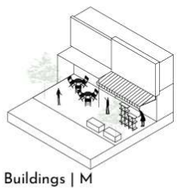


Open space | M
eg. Food market,
Delivery zone

Figure 2. Corona Plaza, Queens, June 2019.
The Corónate festival. Photo Credit: Martin Bolivar and the Queens Museum.

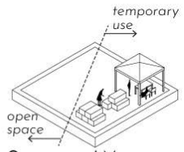
SPATIAL
Multi-use public space

UR-M1
Public frontage activation



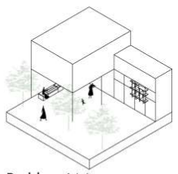
Buildings | M

UR-M2
Adaptable public space



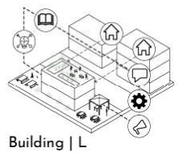
Open space | M

UR-M3
Open ground floor



Building | M

UR-M4
Comprehensive center

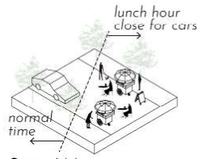


Building | L

UR-M5
Mixed use

Buildings | L

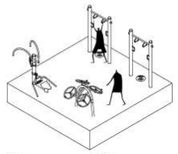
UR-M6
Use at different time of the day



Street | M

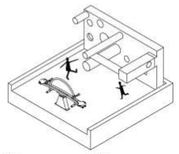
SPATIAL
Accessible open and green space

UR-A1
Sports field



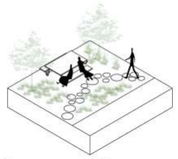
Open space | S

UR-A2
Playground



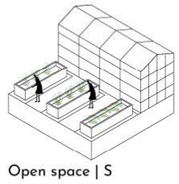
Open space | S

UR-A3
Pocket park



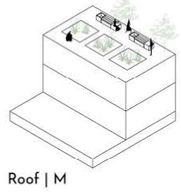
Green space | S

URA-4
Urban farming



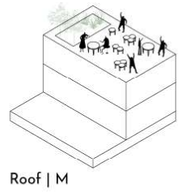
Open space | S

UR-A5
Green rooftop



Roof | M

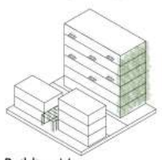
UR-A6
Social activity rooftop



Roof | M

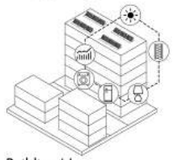
SPATIAL
Renovated building

UR-R1
Increased greenery



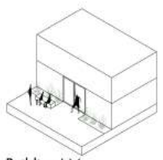
Building | L
eg. Green facade, Green balcony, Creeper grille

UR-R2
Energy-saving retrofit



Building | L
eg. Building envelope, Energy monitoring, Smart appliance etc.

UR-R3
Activated entrance



Building | M

SPATIAL
Climate-resilient utility

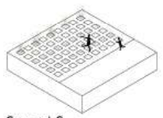
UR-C1
Micro-climate

Green space | S

UR-C2
Rainwater harvesting

Building | M

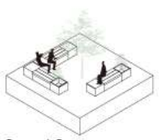
UR-C3
Permeable surface



Street | S

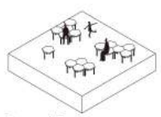
SPATIAL
Prioritized soft mobility

UR-P1
Modular furniture



Street | S

UR-P2
Movable furniture

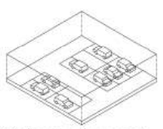


Street | S

UR-P3
Streetscape design

Open space | M

UR-P4
Underground parking



Underground space | L

UR-P5
Bicycle parking

Street | S

UR-P6
No-vehicle pedestrian walkway

Street | M

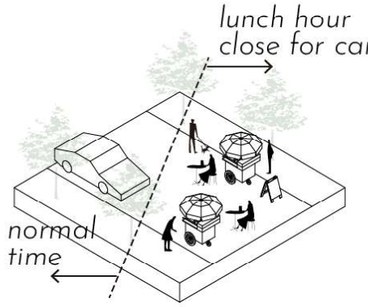
3.2 Urban renewal

multi-use public space,
accessible open and green space,
renovated building,
prioritized soft mobility,
climate-resilient utility

UR-M5
Mixed use

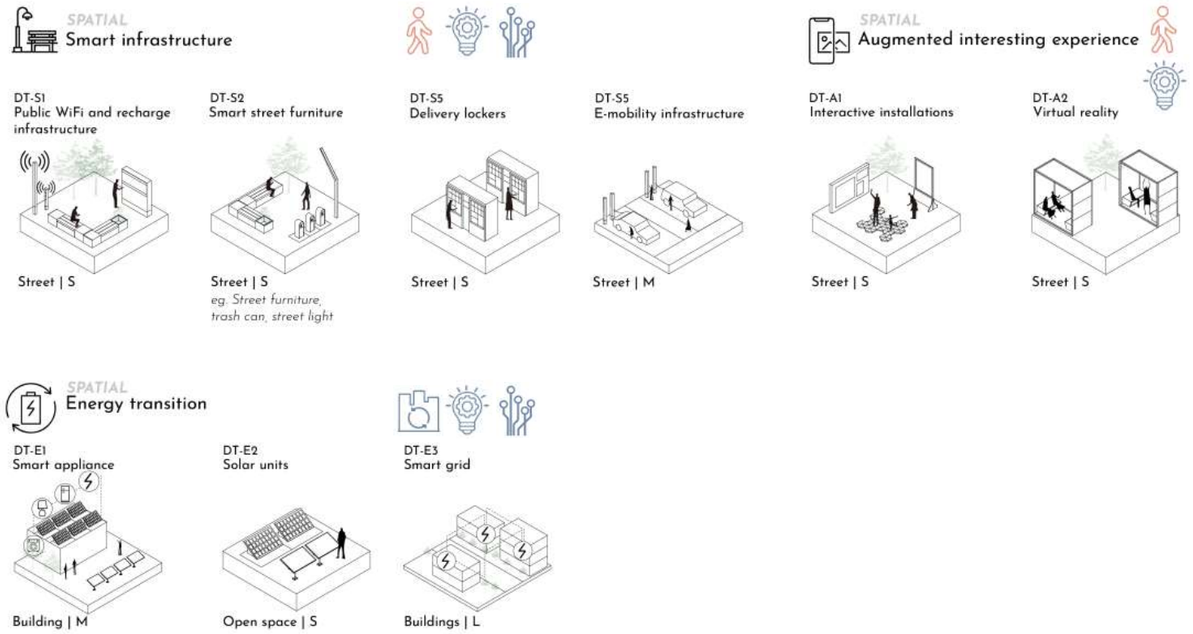
Buildings | L

UR-M6
Use at different time of the day



Street | M

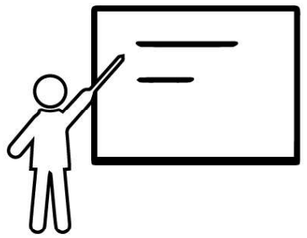
Nakadori Street in Tokyo



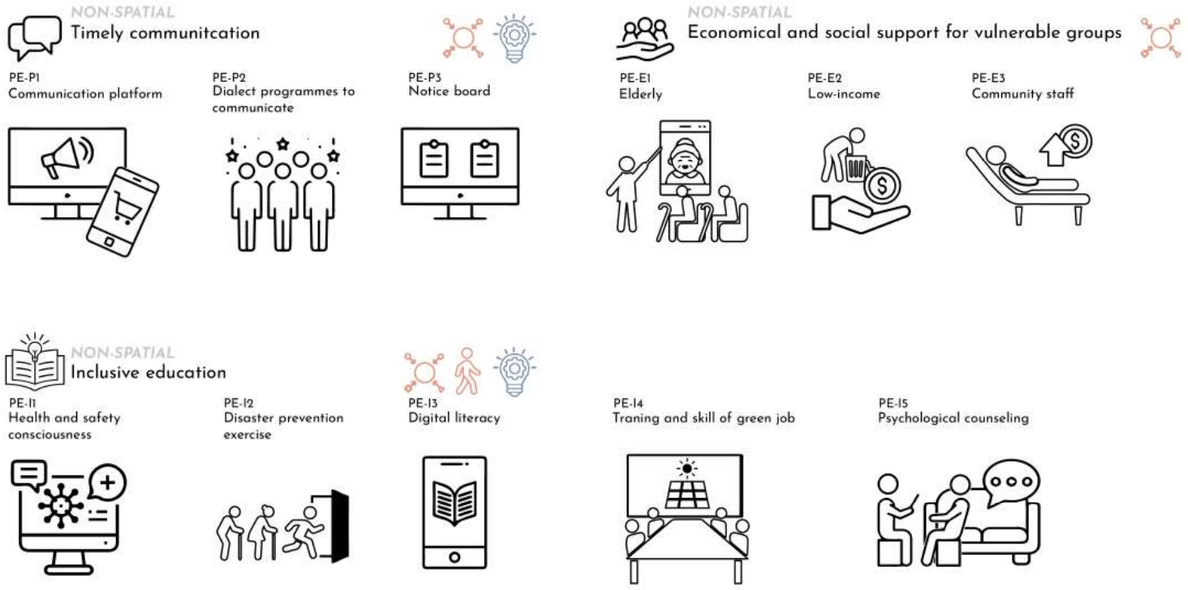
3.3 Digital transition

smart infrastructure,
augmented interesting experience,
energy transition,
offer online service for off-line,
digital inclusive access,
digital literacy

DT-L1
Knowledge dissemination

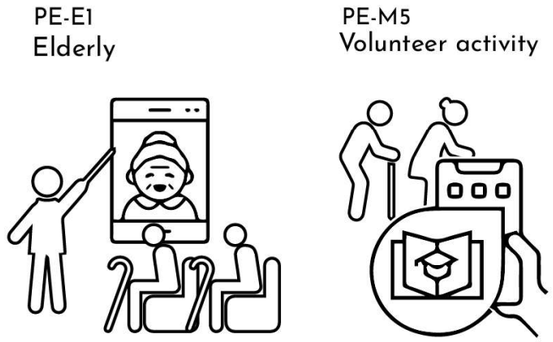


Volunteers providing one-on-one assistance to seniors with their mobile phones at the Digital Clinic at L³@Radin Mas: Your LifeLong Learning Journey event



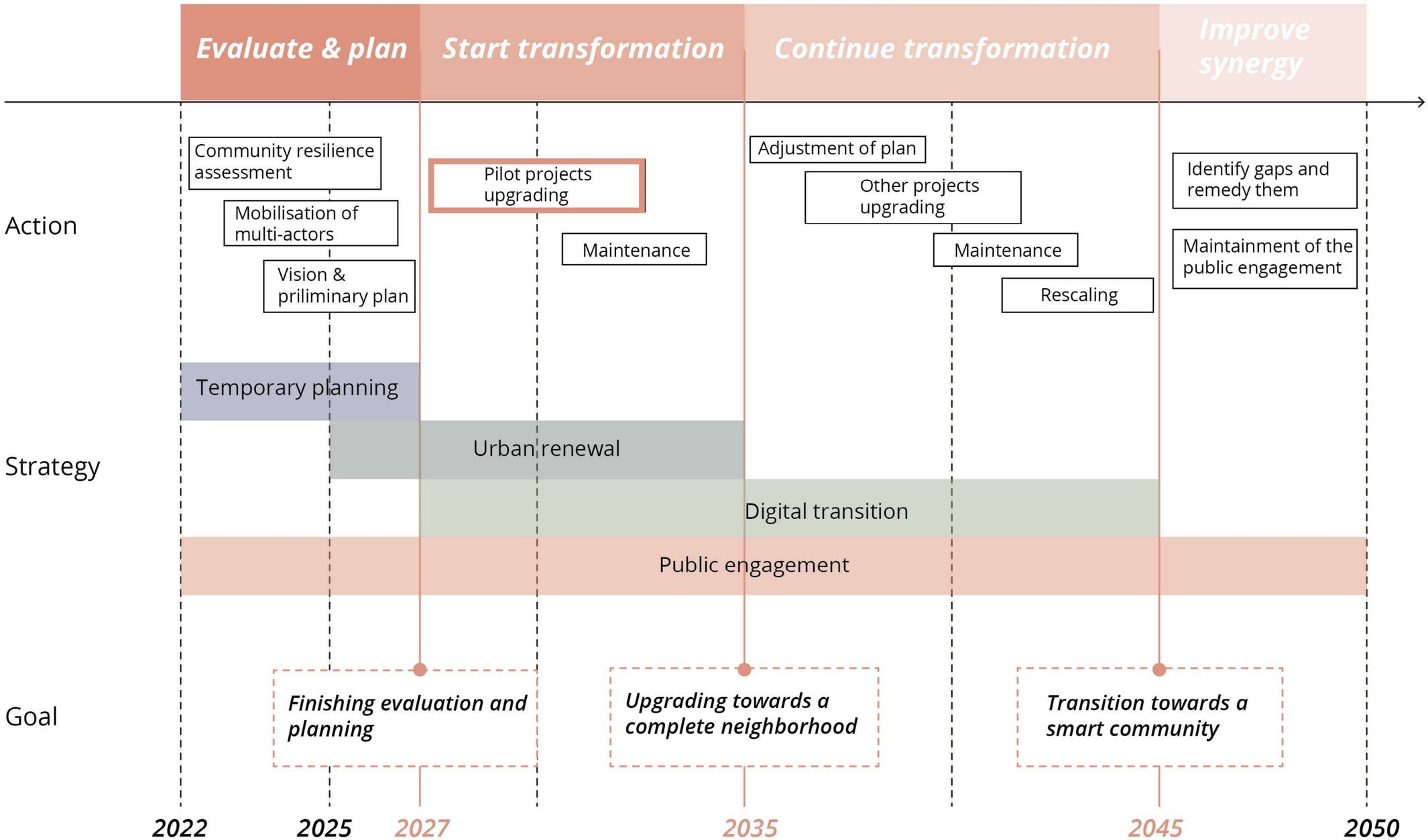
3.4 Public engagement

timely communication,
economic and social support for vulnerable groups,
inclusive education,
multi-sectors' engagement,
foster a sense of belonging

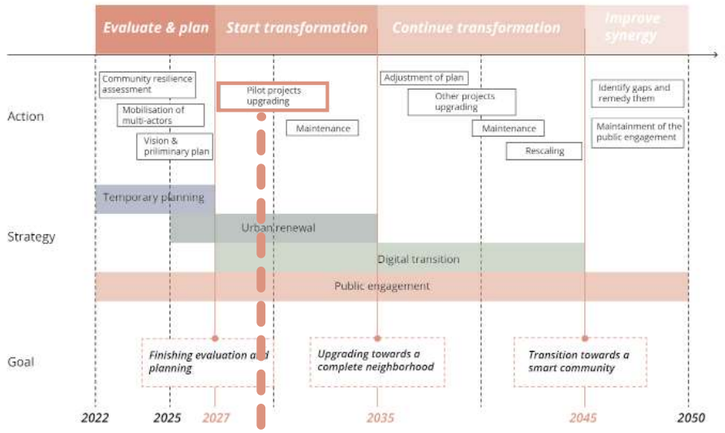


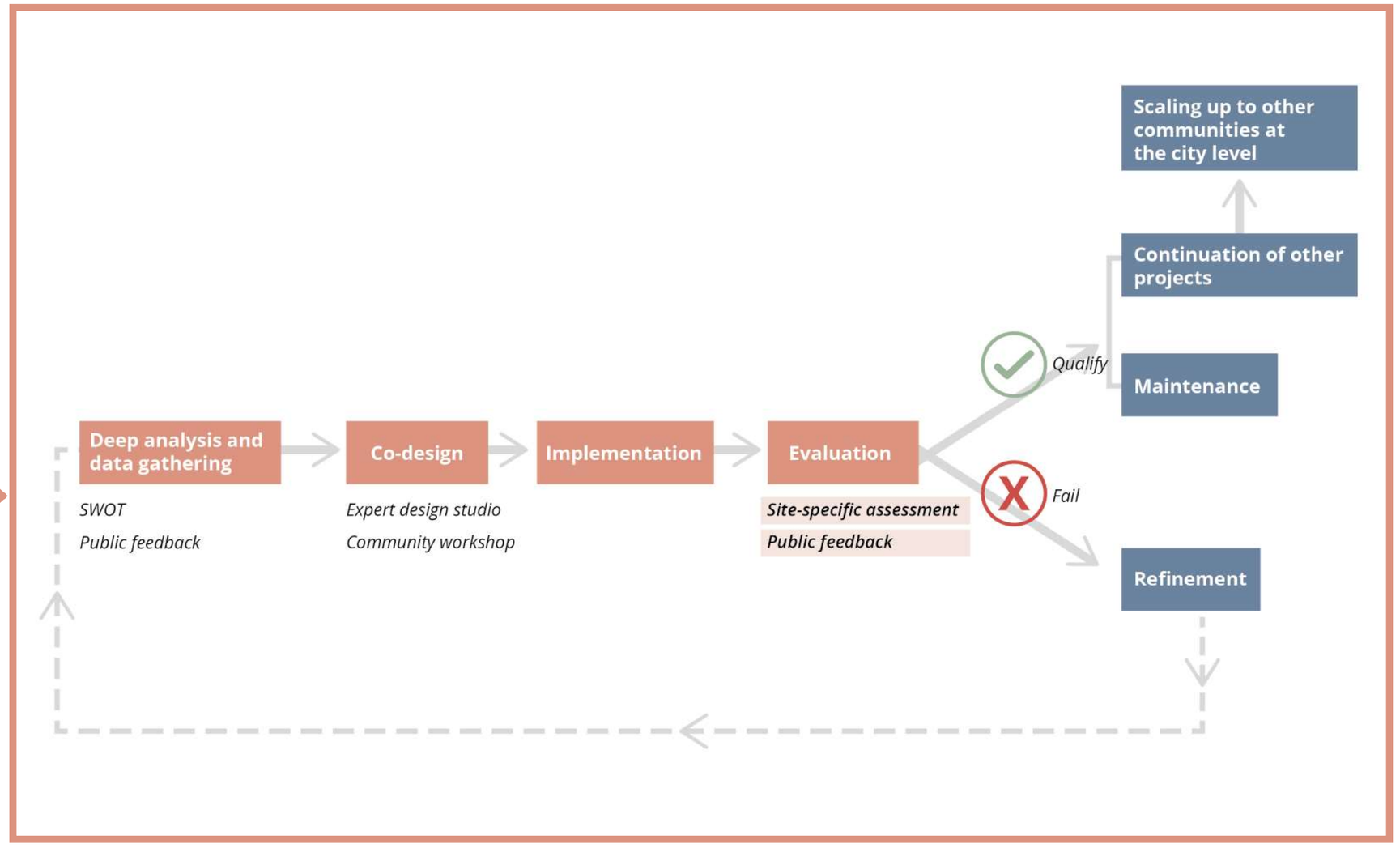
Intergenerational co-living
Affordable and community-driven / Deventer, Netherlands

4.1 Strategic framework overall timeline

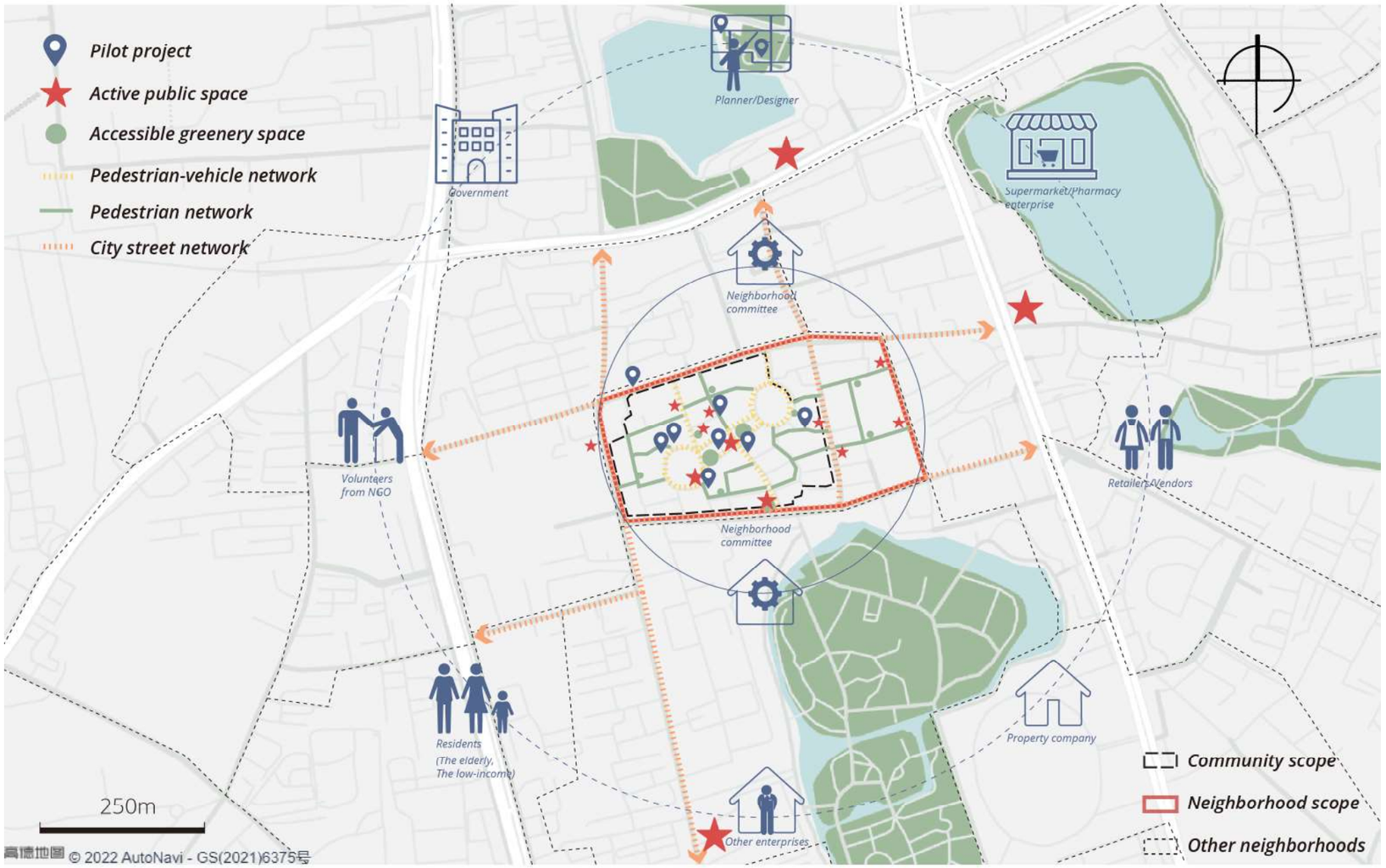


4.2 Project upgrading guideline





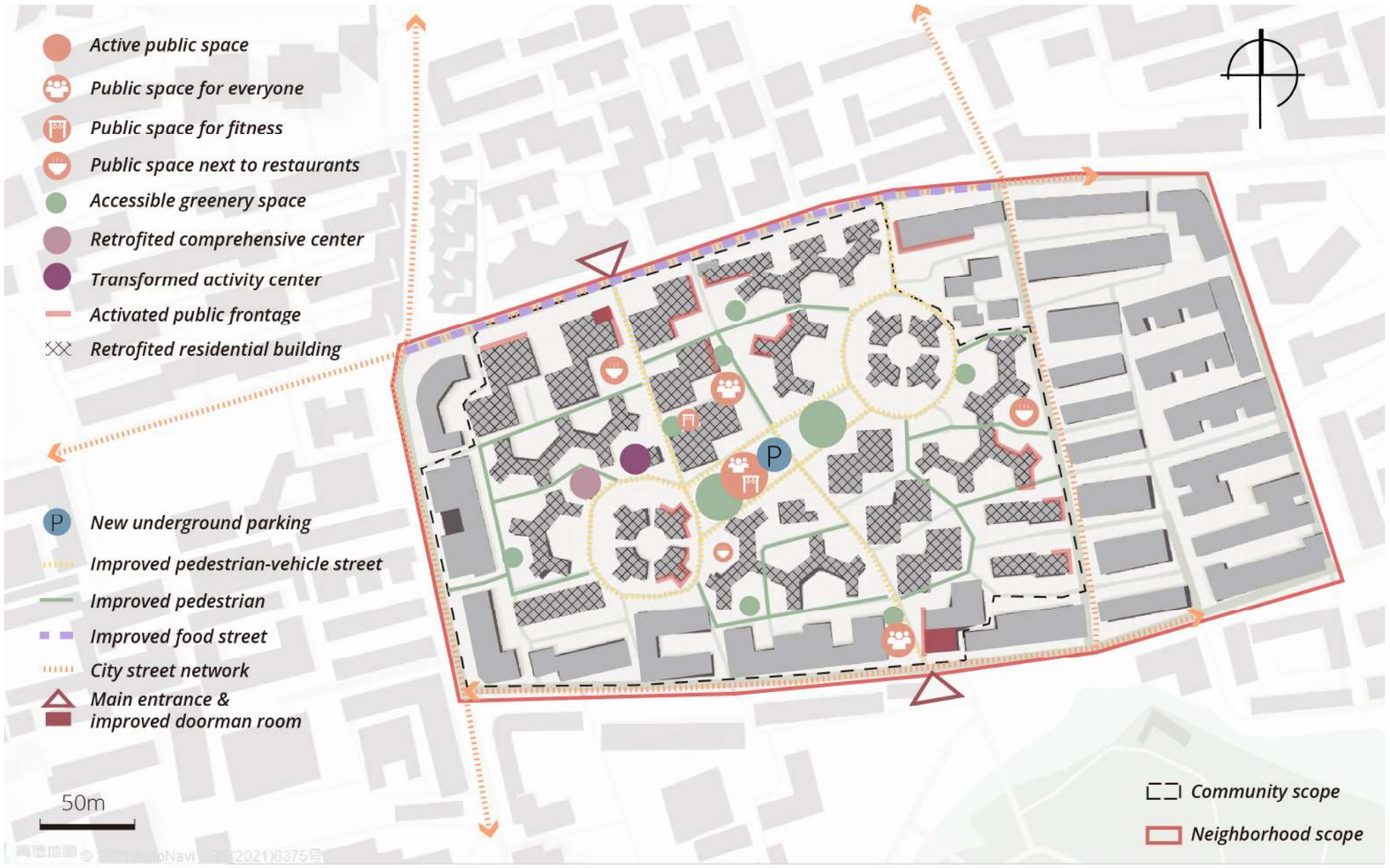
5.1 Vision plan —— neighborhood scale



A connected and active neighborhood plan

Mutually cooperative governance

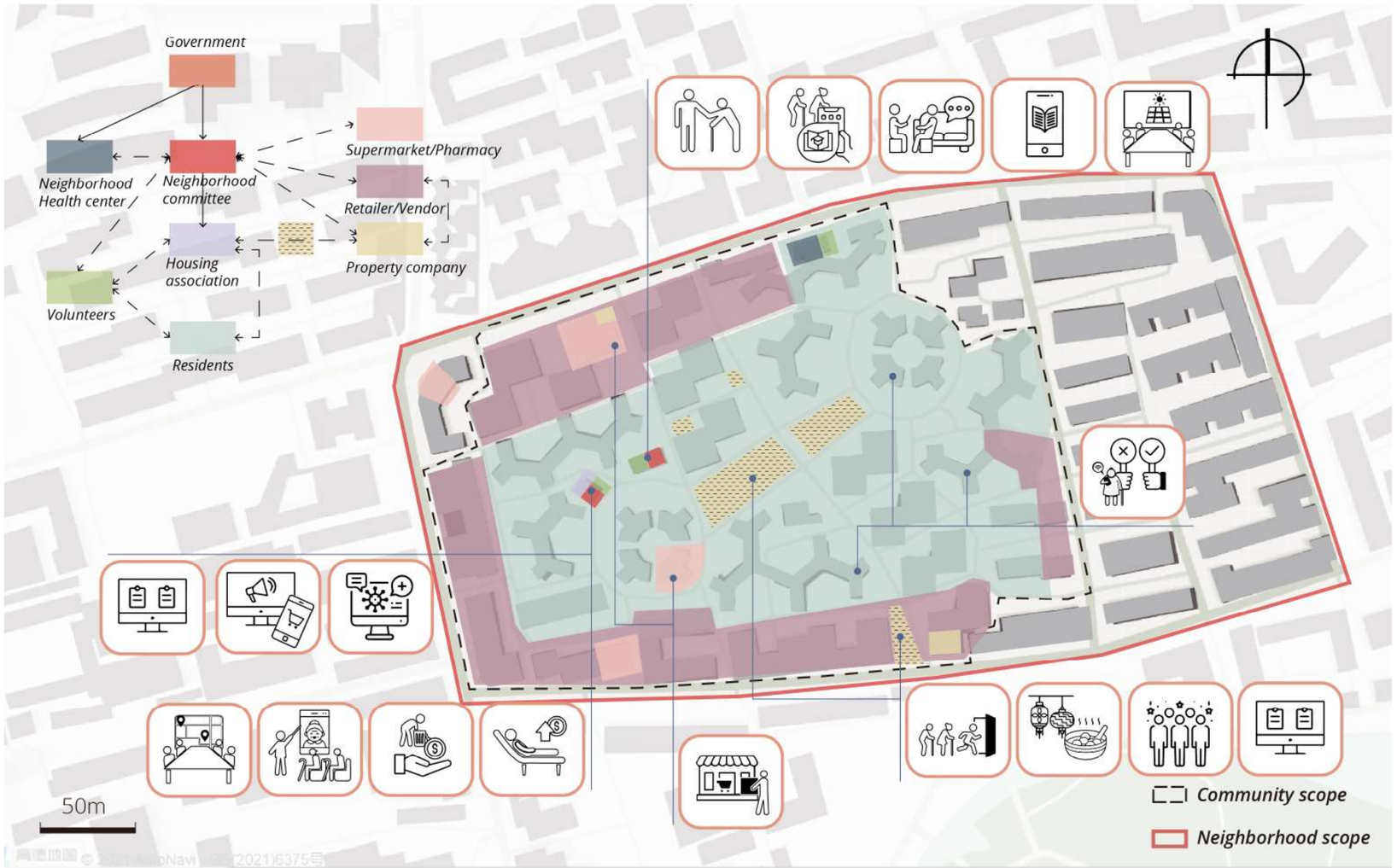
5.2 Spatial framework –– community scale



Active and high-quality

public space,
greenery space,
pedestrian and
pedestrian-vehicle network

5.3 Governance framework —— community scale



Neighborhood committee acts as an intermediary

Public sector

Investment and subsidies from the government

Private sector

Cooperation with social enterprises
Introduction of a property company

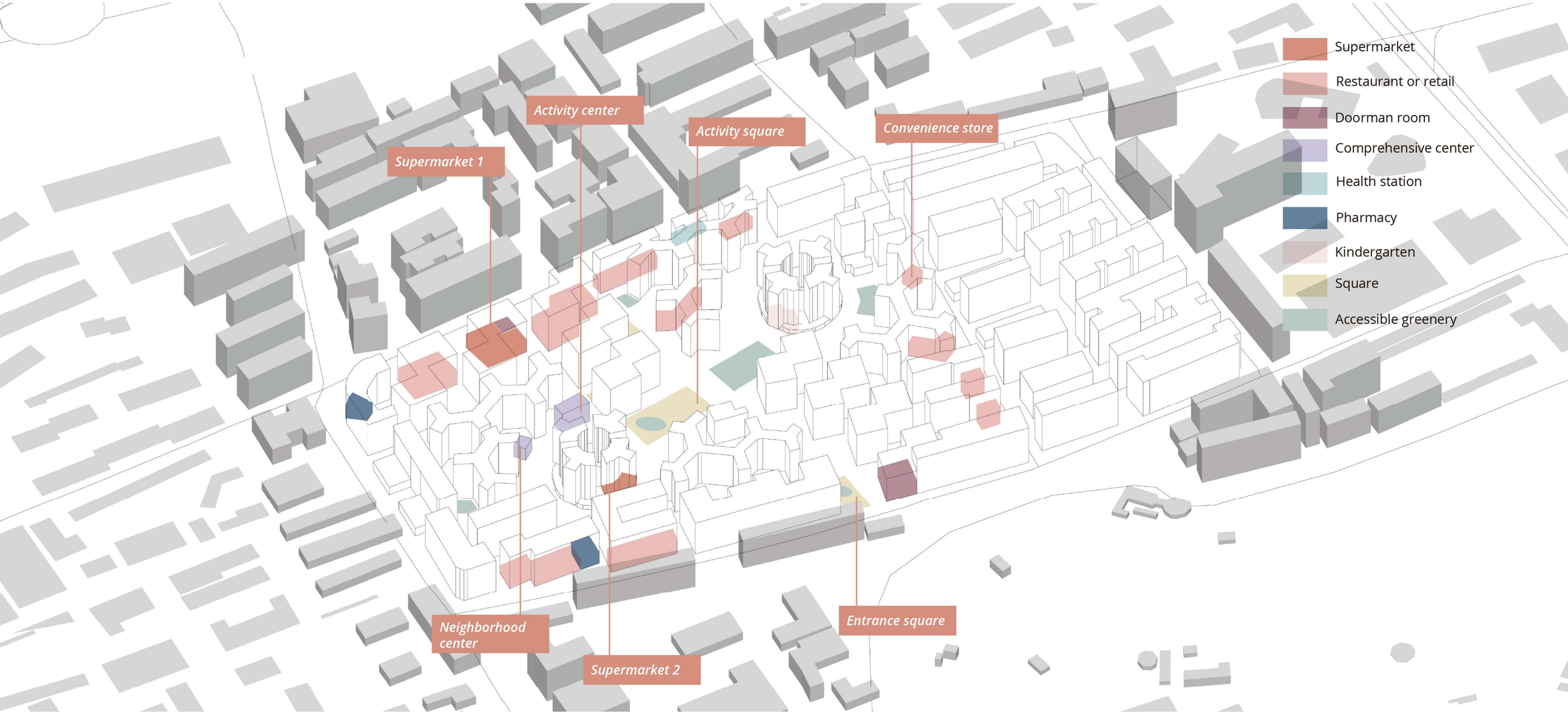
Civil society

Cooperation with voluntary agencies
Mobilization of residents and housing organizations

5.4 Normal situation VS pandemic situation

Key nodes: space and function

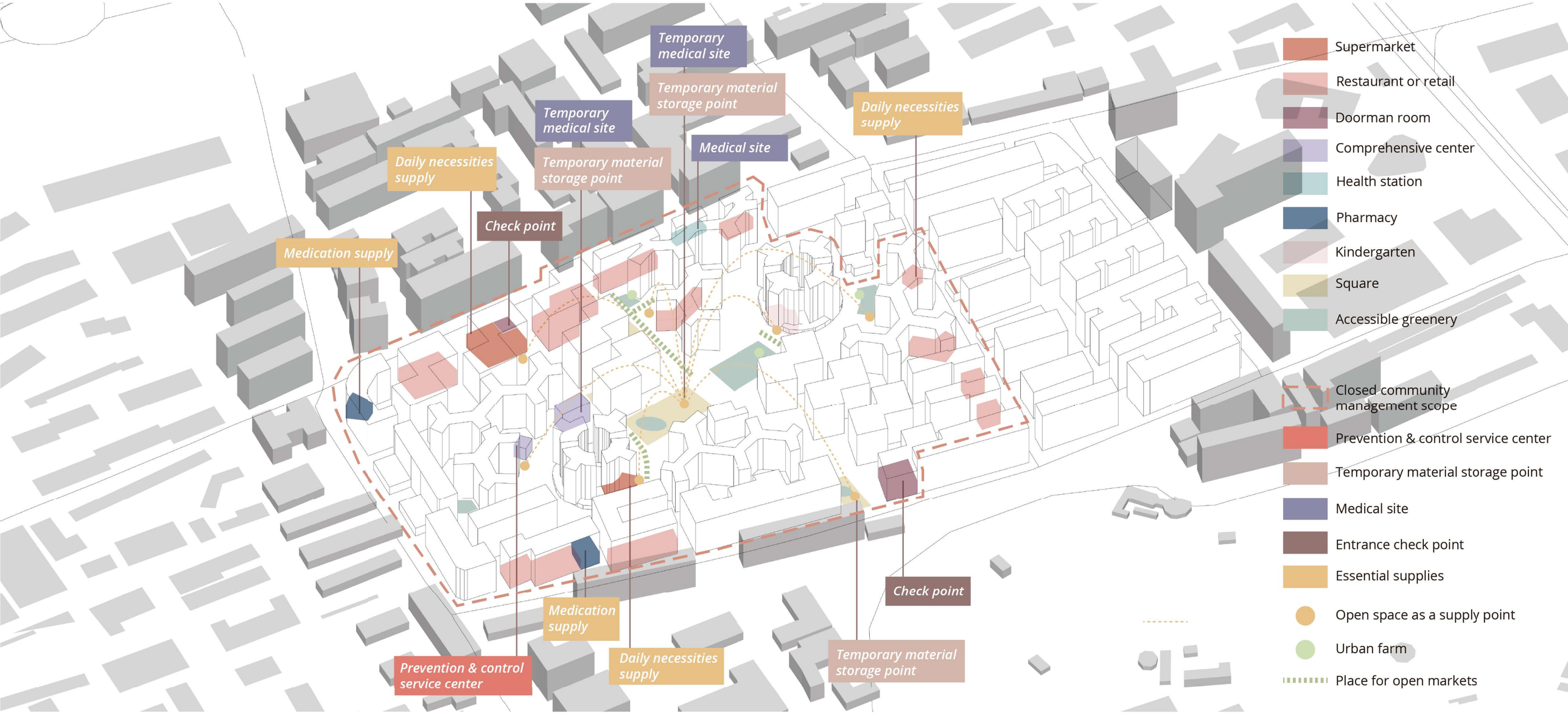
Daily Planning



5.4 Normal situation VS pandemic situation

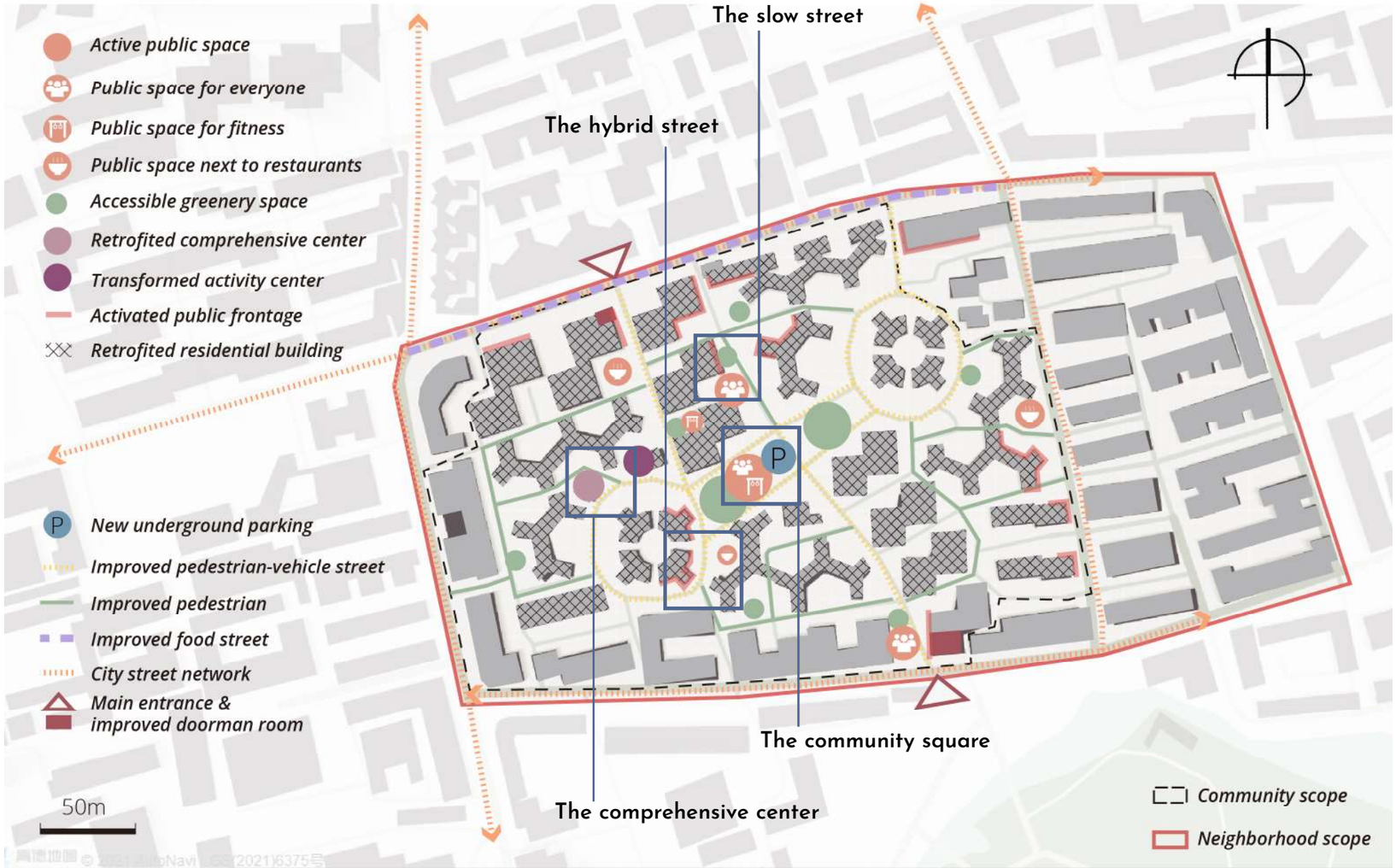
Key nodes: transformation of space and function

Emergency Planning



How to integrate the strategies by local design?

1 Selected pilot projects



4 hot spots of activity with notable problems and huge improving potential

2 The comprehensive center

Before

Main functions

Communication · *Cultural events* · *Education* · *Administrative management*

Main users

The low-income · *The elderly* · *Community staff* · *Residents* · *Volunteers*

UR-M4 Comprehensive center
Building | L

1 UR-M3 Open ground floor
Building | M

2 UR-A5 Green rooftop
Roof | M

3 UR-R2 Energy-saving retrofit
Building | L

4 DT-A1 Interactive installations
Street | S

5 DT-S1 Public WiFi and recharge infrastructure
Street | S

6 DT-S5 E-mobility infrastructure
Street | M

7 UR-R1 Increased greenery
Building | L

8 PE-F1 Activity club
Open space | L

9

After

A good-quality and multi-functional comprehensive center

10 PE-I1 Health and safety consciousness

1 PE-P1 Communication platform

2 DT-L1 Knowledge dissemination

3 DT-L2 Skills development

4 PE-E1 Elderly

5 PE-E2 Low-income

6 PE-E3 Community staff

7 PE-M3 Design workshop

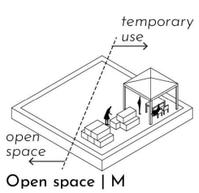
8 DT-O2 Monitoring system
eg. Energy footprint

9

UR-R3 Activated entrance
Building | M

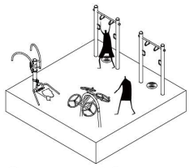
3 The community square

UR-M2
Adaptable public space



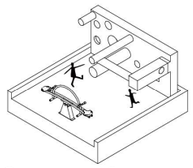
Open space | M

1 UR-A1
Sports field



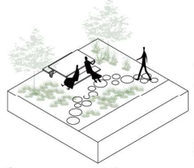
Open space | S

2 UR-A2
Playground



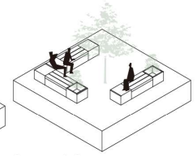
Open space | S

3 UR-A3
Pocket park



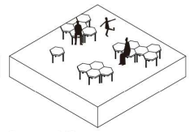
Green space | S

4 UR-P1
Modular furniture



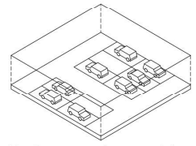
Street | S

5 UR-P2
Movable furniture



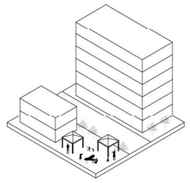
Street | S

6 UR-P4
Underground parking



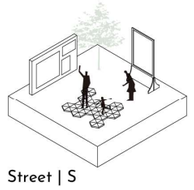
Underground space | L

7 PE-F1
Activity club



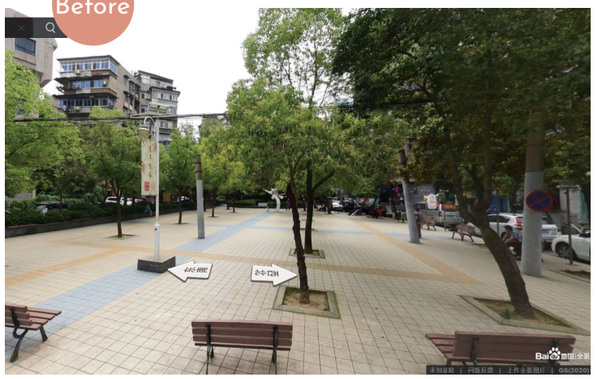
Open space | L

8 DT-A1
Interactive installations



Street | S

Before



After

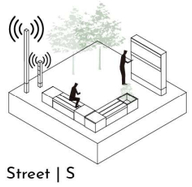
Main functions

Communication
Cultural events
Sports
Leisure
Education

Main users

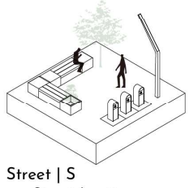
The low-income
The elderly
Residents
Volunteers

DT-S1
Public WiFi and recharge infrastructure



Street | S

10 DT-S2
Smart street furniture



Street | S
eg. Street furniture, trash can, street light

11 DT-D3
Public access to internet

1 PE-I2
Disaster prevention exercise

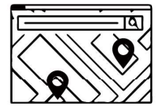
2 PE-I1
Health and safety consciousness

3 PE-M5
Volunteer activity

4 PE-P2
Dialect programmes to communicate

5 PE-M6
Festival activity

6 DT-O3
Information sharing



7
eg. Community service map, Heat map

4 The slow street

Before

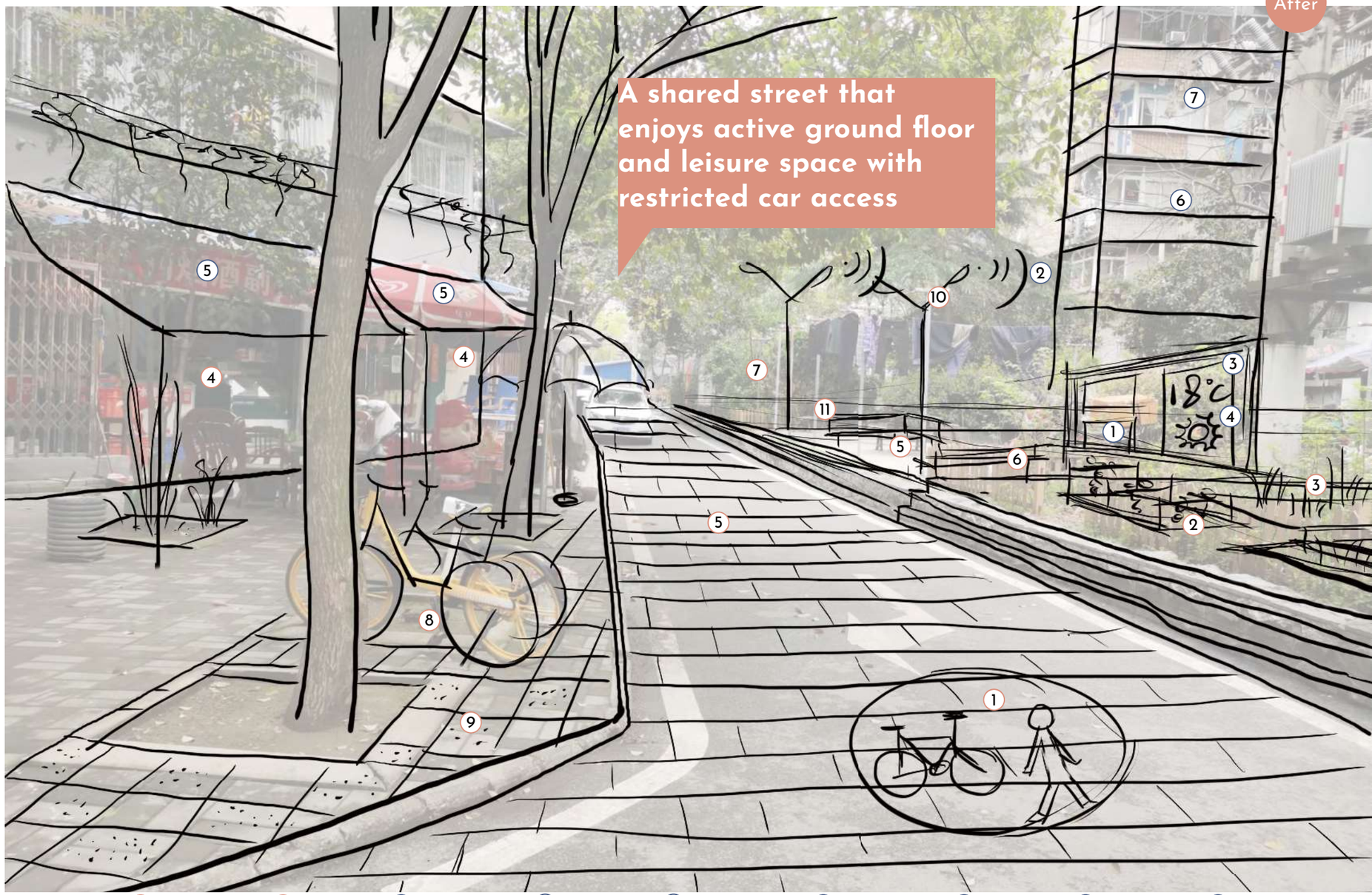
Main functions

Shopping · Communication · Cultural events · Leisure

Main users

Retailers/Vendors · Residents

After



UR-P6 ① No-vehicle pedestrian walkway
Street | M

URA-4 ② Urban farming
Open space | S

PE-F3 ③ Circular gardens
Green space | S

UR-M1 ④ Public frontage activation
Buildings | M

UR-M2 ⑤ Adaptable public space
Open space | M

UR-P1 ⑥ Modular furniture
Street | S

UR-P3 ⑦ Streetscape design
Open space | M

UR-P5 ⑧ Bicycle parking
Street | S

UR-C3 ⑨ Permeable surface
Street | S

DT-S1 ⑩ Public WiFi and recharge infrastructure
Street | S

DT-S2 ⑪ Smart street furniture
Street | S
eg. Street furniture, trash can, street light

PE-P3 ① Notice board

DT-D3 ② Public access to internet

DT-O2 ③ Monitoring system
eg. Energy footprint

DT-O3 ④ Information sharing
eg. Community service map, Heat map

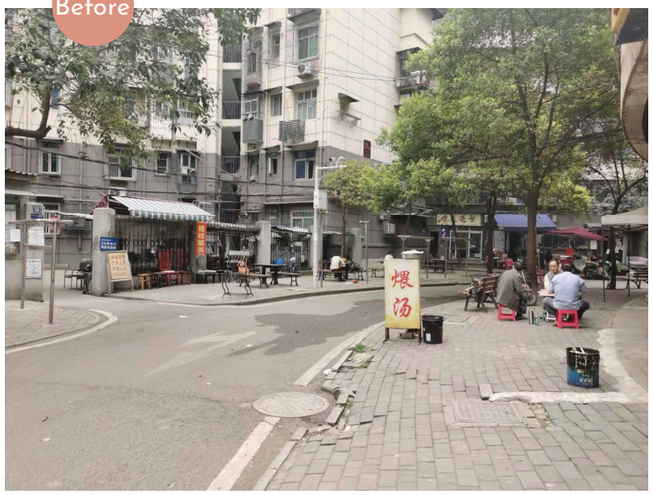
PE-M1 ⑤ Enterprise/business collaboration

DT-D2 ⑥ Home access

PE-M2 ⑦ Digital engagement

5 The hybrid street

Before



Main functions

Shopping | Communication | Leisure

Main users

Retailers/Vendors | Residents

After

UR-M5 Mixed use
Buildings | L

1 UR-M6 Use at different time of the day
lunch hour close for cars
normal time
Street | M

2 UR-M1 Public frontage activation
Buildings | M

3 UR-M2 Adaptable public space
temporary use
open space
Open space | M

4 UR-R1 Increased greenery
Building | L

5 UR-P5 Bicycle parking
Street | S

6 UR-P2 Movable furniture
Street | S

7 UR-P1 Modular furniture
Street | S

8 UR-C3 Permeable surface
Street | S

9

10 DT-S5 Delivery lockers
Street | S

11 UR-R2 Energy-saving retrofit
Building | L

12 DT-E1 Smart appliance
Building | M

13 DT-E2 Solar units
Open space | S

14 DT-E3 Smart grid
Buildings | L

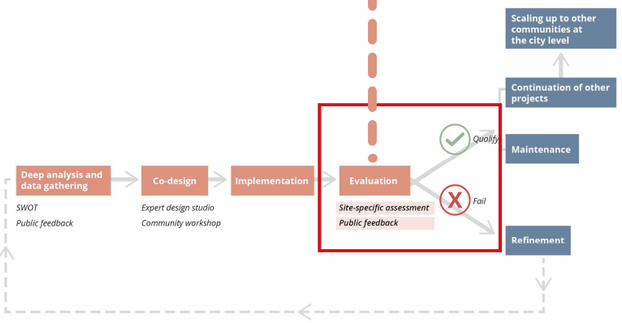
1 DT-D2 Home access

2 PE-M2 Digital engagement

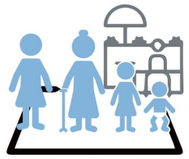
3 DT-O4 Home service: healthcare, office, education etc.

4 PE-M1 Enterprise/business collaboration

6 Evaluation



1 Site-specific assessment

Use and user 	Number of users during the day and night			
	Variety of users in the space (age, gender, ability, ethnicity)			
	Presence of different inclusive activities in the public space among time (for children, elderly, disable people, etc)			
	Presence of non-designed, temporary activities, organised by the local governance and the community			
	Presence of formal and informal economic activities (food sellers, kiosks/shops, etc)			
Comfort & safety	Protection against vehicular traffic			
	Level of security of the public space			
	Quality of censorial experience (pleasant sounds/smellls/views)			
	Presence of a public space identity, determined by cultural background and users' enjoyment			
	Aesthetic value			
	Human scale design			
Amenities & furniture	Presence and quality of amenities for recreational structures			
	Presence and quality of seating			
	Presence and quality of bike racks			
	Presence and quality of signage and emergency items			
	Presence and quality of digital structures			
Green environment	Presence and quality of biodiversity in the public space			
	Presence of energy effcient elements in the public space			
	Presence of green or blue spaces against environmental risks			

= ***GOOD***

(There are many improvements.)

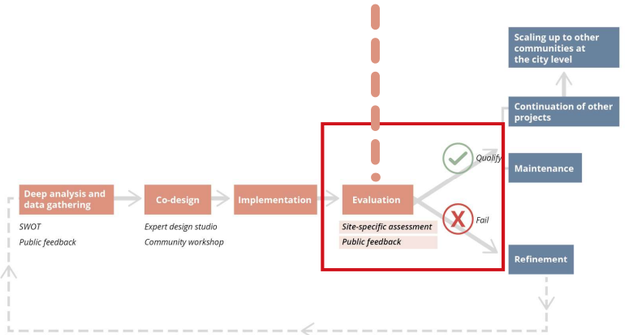
= ***FAIR***

(No change required in itself, or it is slightly improved.)

= ***POOR***

(Conflicts or problems arise.)

6 Evaluation



2 Public feedback (led by neighborhood committee and planning institute)

Primary Stakeholders

Residents (housing association)

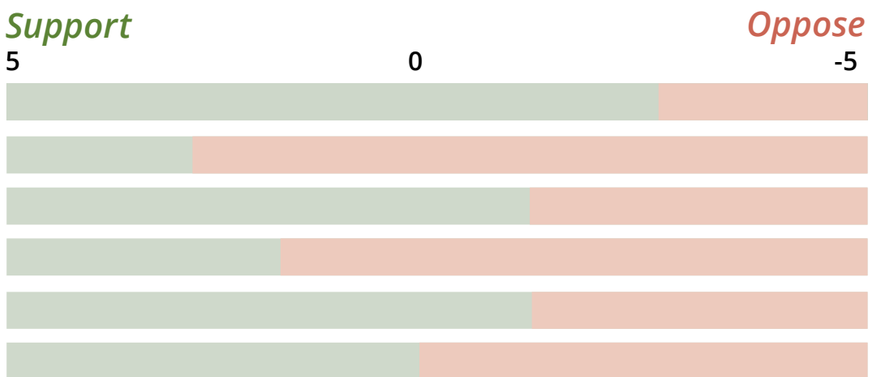
The low-income

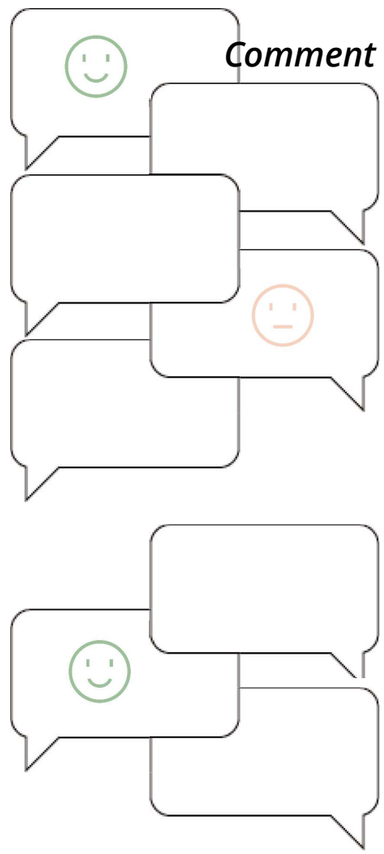
The elderly

Property company

Neighborhood staff

.....





Secondary Stakeholders

Vendors/Retailers

Supermarket/pharmacy enterprises

Volunteers

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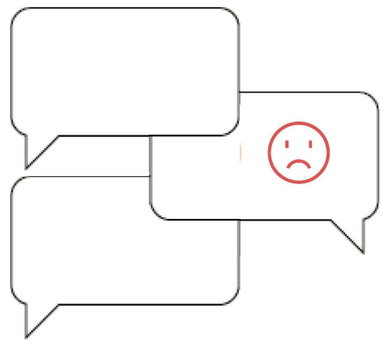
Wider Stakeholders

Passers-by

NGO

Other enterprises

.....

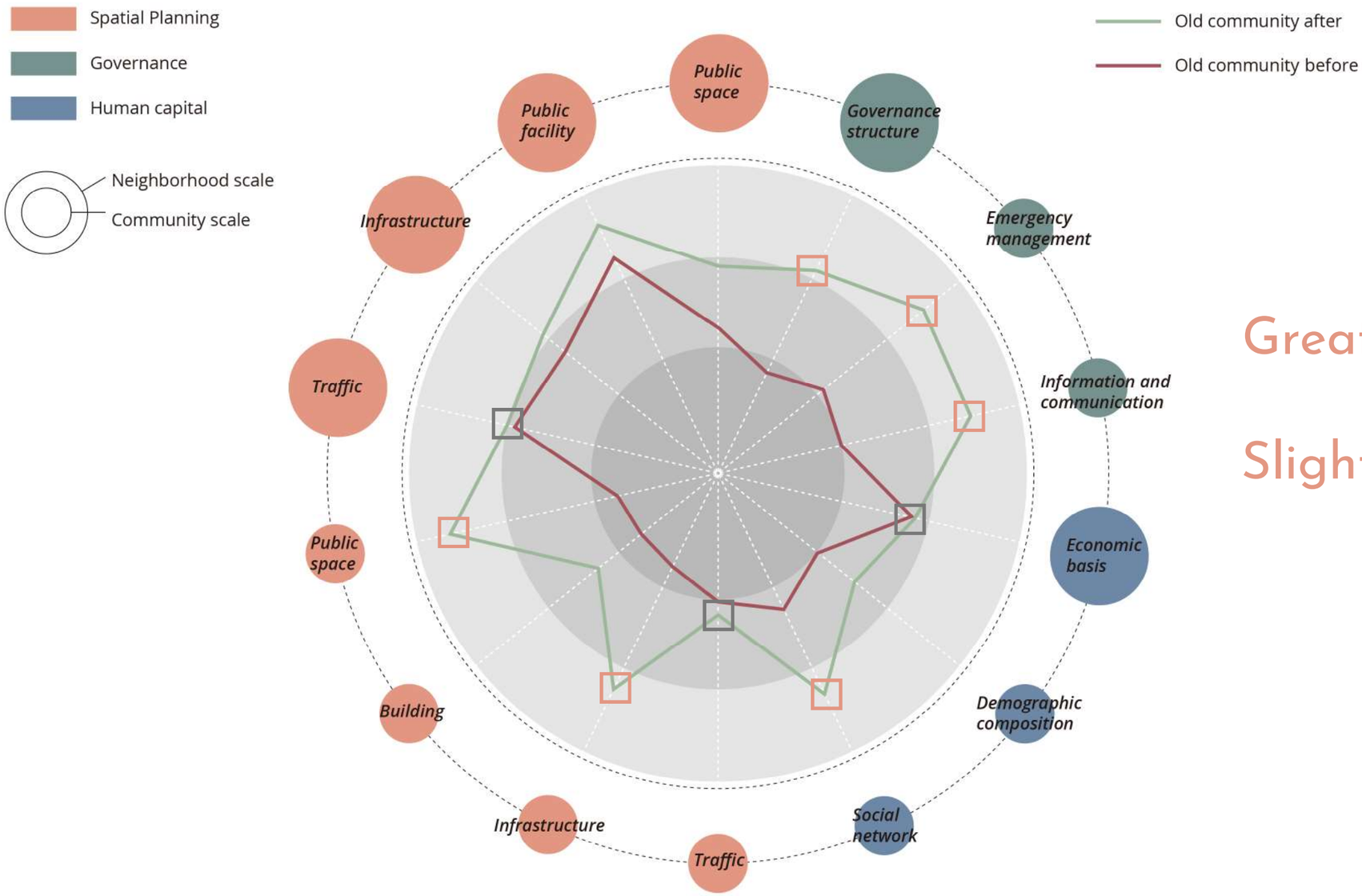


Normal situation

Pandemic situation

CONCLUSION

1 Reevaluation of community resilience



Great improvement
VS
Slight improvement

2 Answering research questions

CONTEXT *1 What are the most important Covid-19 community responses and their mechanisms in Wuhan?*

PROBLEM *2 What problematic community abilities are exposed by Covid-19 response?*

What can we learn from **Covid-19 response** in Wuhan to enhance **community resilience** in the long term by adopting **planning strategies**?

CONCEPTUALIZATION

3 What is the conceptual framework of building community resilience in Wuhan from the perspective of pandemic ?

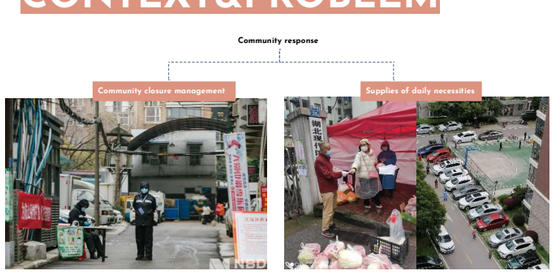
4 What is the analytical framework for measuring pandemic community resilience ?

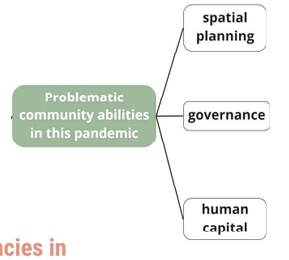
SOLUTION

5 How can the strategic planning interventions strengthen community resilience through vision?

6 How to improve integration and coordination between planning strategies by design?

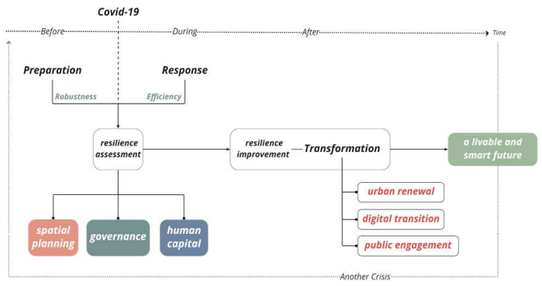
CONTEXT&PROBLEM





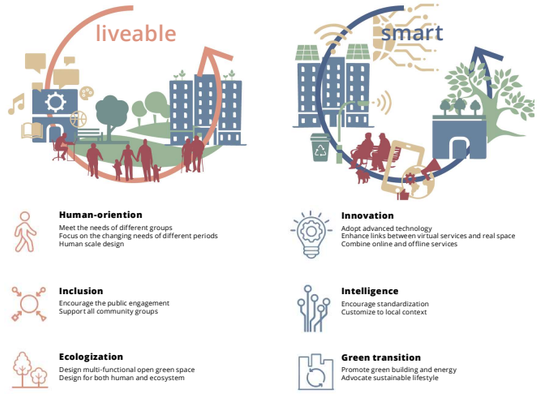
Deficiencies in community resilience

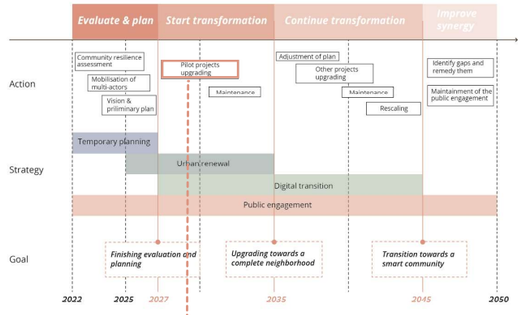
CONCEPTUALIZATION

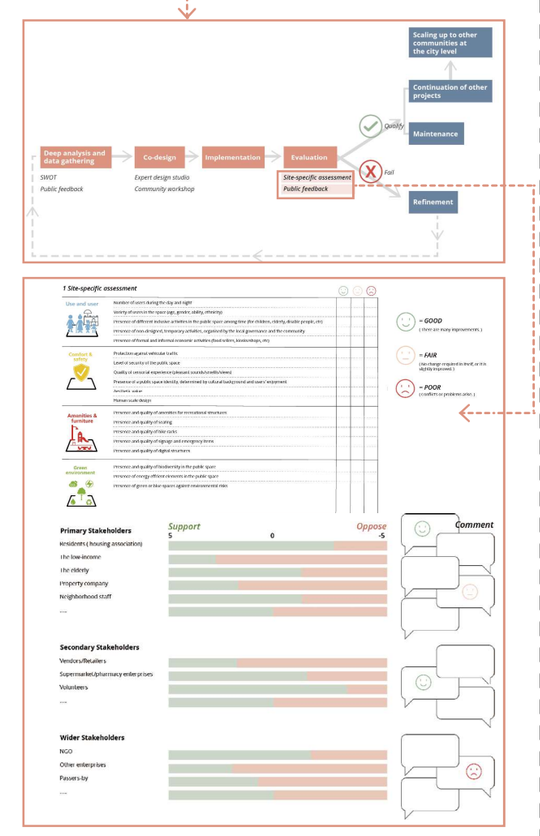


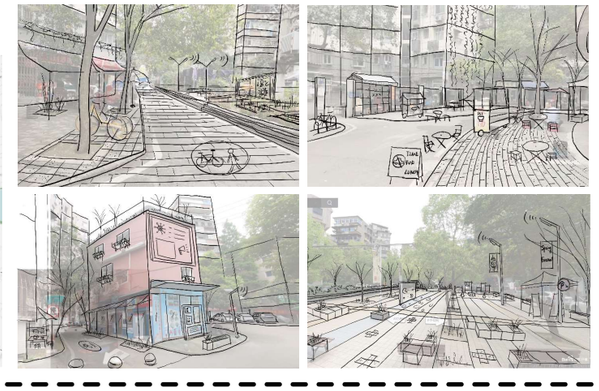
Dimension	Scale	Primary Indicators	Secondary Indicators
spatial planning	neighborhood	public space	system of open space system of green space system of sports field
		public facility	medical(aging) facility commercial facility comprehensive center
		infrastructure	delivery facility street furniture supporting infrastructure (Parking, water, electricity, communication infrastructure etc.)
		traffic	pedestrian & cycling network
	community	public space	open space green space sports field
		Building	density quality
		infrastructure	street furniture supporting infrastructure (Parking, water, electricity, communication infrastructure etc.)
		traffic	pedestrian & cycling network entrance and exit
governance	neighborhood	governance structure	type of actors degree of engagement
	community	Emergency management	self-governance mechanism emergency plan
		Information and communication	information channels communication activities
human capital	neighborhood	Economic basis	industry structure and diversity
	community	Demographic composition	Aging rate incomes' level residents' knowledge and skills social activities
		Social network	residents' organizations community relationships sense of belonging

SOLUTION



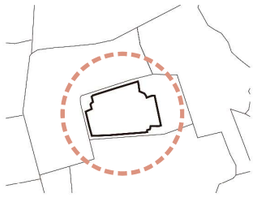






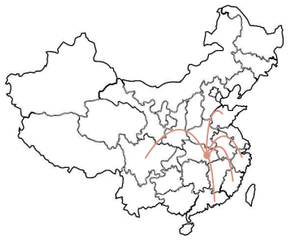
3 Transferability

Only used in the selected community

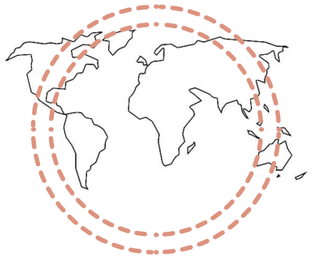


Other communities in Wuhan city

Communities in other Chinese cities



Urban residential communities worldwide



Reference value of overall products

ANALYSIS	SOLUTION	DESIGN
Community resilience assessment	Vision Principles for vision	Vision plan Spatial framework Governance framework
Framework of building community resilience	Strategy toolkit	Community emergency planning
Mapping	Strategic framework Project upgrading guideline Site-specific evaluation Public feedback	Pilot projects design
Policy context		

THANK YOU FOR LISTENING!

Limitations

- difficult to obtain data for the period of the outbreak
- difficult to obtain community-scale, location-specific data
- unable to conduct field visits and interviews because of the pandemic
- many typologies in Wuhan more than just new and old types
- this project has chosen to be evaluated qualitatively

Further research

- uncertainty of future outbreak variants, in addition to the possibility of other black swan events
- community resilience relies to a considerable extent on social resilience
- not explore too much the impact of technological development on the way people live, produce and work