



# Capturing the Social Impact of Demolishing a Historic Street for a New Metro Station: Evidence from a Participatory GIS Survey in Guangzhou, China

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# Outline

- Project Context
- Research Question
- Literature Reviews
- Methods
- Findings
- Challenges & Limitations
- Conclusions

What kinds of connectivity are prioritized **(spatial vs. social)** for whom **(commuters vs. locals)**, at what **(social)** cost?

We argue that the conflict between constructing the metro station and preserving the streetscape are competing interests between **local government's priority to facilitate spatial connectivity** and **locals' priority to maintain a place for social interaction and memories.**

# Study Site: Miaoqianzhi 'jie'

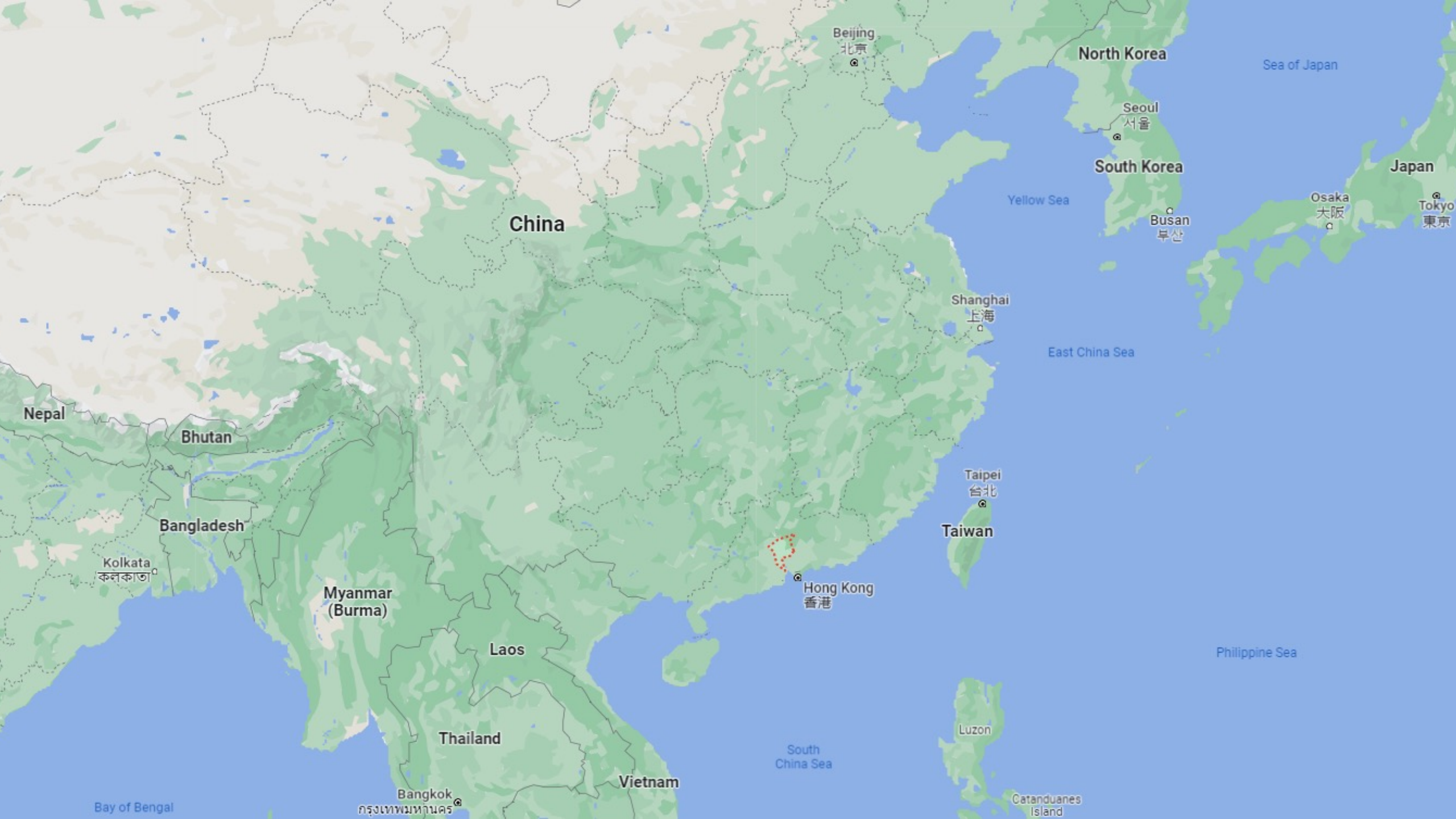
- Miaoqianzhi 'jie' dates back to 1910s, located in Guangzhou's old town.
- 200m long, 9m wide, mixed-use (residential, commercial, institutional etc.)
- There are two primary schools, two middle schools, and a Children's Palace at two ends of the street.



North streetscape of Miaoqianzhi 'jie'



North streetscape of Miaoqianzhi 'jie'



# Plans to build a metro station

- In 2020, Guangzhou city government released an opinion draft to demolish the north side of the street for building another metro station (Shuqianlu Station) for Line #10, which received huge public pushbacks.
- Miaoqianzhi 'jie' borders the Xinhepu Historic and Cultural Preservation District but is not zoned for historical preservation.
- Two existing metro station (Dongshankou Station and Donghu Station) are 5mins and 20 mins walk away.



Miaoqianzhi 'jie' location in Xinhepu Cultural District



Area to be demolished

# Developer / Civic Disagreement

- The Guangzhou Metro Company wants network structure and efficiency
- While the citizens want their lived experience and memories.

"...After multiple rounds of studies, we picked the current location for a new metro station to improve the coverage and efficiency of the metro network. The new station is also at a reasonable distance between the two adjacent stations (1.6km and 1.3km)"

@Guangzhou Metro



"From my dad to my sisters, we all went to schools on this street. We have a lot of emotional attachments here. We hope the authorities can listen to different perspectives and revise the plan. Please leave this place as a collective memory for the native Cantonese."

@Citizens

# Research Questions

- How might demolition plan impact the local residents' and frequent visitors' **place attachment** and **social ties** to the street?
- What are the "benefits" of the new metro station from the **locals' perspectives**?

# Literature Review

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Network Duality

Social Cost of Infrastructure

Social Infrastructure, Place Attachment, and Social Ties

Participatory GIS and Cultural Mapping

**Network Duality** refers to the perspective that connectivity and the network infrastructure can be an inclusion or exclusion factor (such as exclusive land use; barriers for movements etc.) (Andris, 2018; Liang et.al, 2021)

**The social costs of constructing transportation infrastructure** is often overlooked or narrowly framed under the concerns of land use conflict, community displacement, and gentrification (Gans, 1982; Choi, 2016; Rayle, 2015).

**Social Infrastructure** (i.e., restaurants, businesses, and ) is crucial for people's place attachment, sense of belonging, and social ties (Latham & Layton, 2019; Andris & Lee, 2021).

**Participatory GIS and cultural mapping** have been successful methods to engage citizens to interpret their lived experience (Dunn, 2007) in space and co-create data on cultural assets and community resources (Duxury et.al, 2015).

# Methods

## Participatory GIS Survey

## Social Infrastructure Mapping / Quantify Social Costs

## Comparative Spatial Network Analysis

**Your Spatial and Social Connections to Miaoqianzhi 'jie'**

What are some common visits you made to existing businesses on the street? Please click on the map to drop a pin within the red box of the corresponding businesses on the street and answer the pop-up questions. You can drop multiple pins.

Pin store(s)

What are your memories with the street? Please click on the map to drop a pin at the location of your memories. A text box will pop up for you to write details of your memories. You can drop multiple pins.

Pin memory location(s)

Where is your neighborhood? Please click on the map to drop a pin in the general area (neighborhood, nearby streets, or the country if you live abroad) of your current home address.

Pin your home neighborhood

List the names of the subway stations that you frequently visit. If you list more than one station, separate the station name by comma.

E.g., Dongshankou, Yangji, Zhujiangxincheng

To add a pin, click on the "Pin \_\_\_\_" button. The map will show up, then click on the map to drop a pin. To save, edit, or delete the pin, click on the pin. Phone users can click the map icon below to switch to map view to edit existing pins.

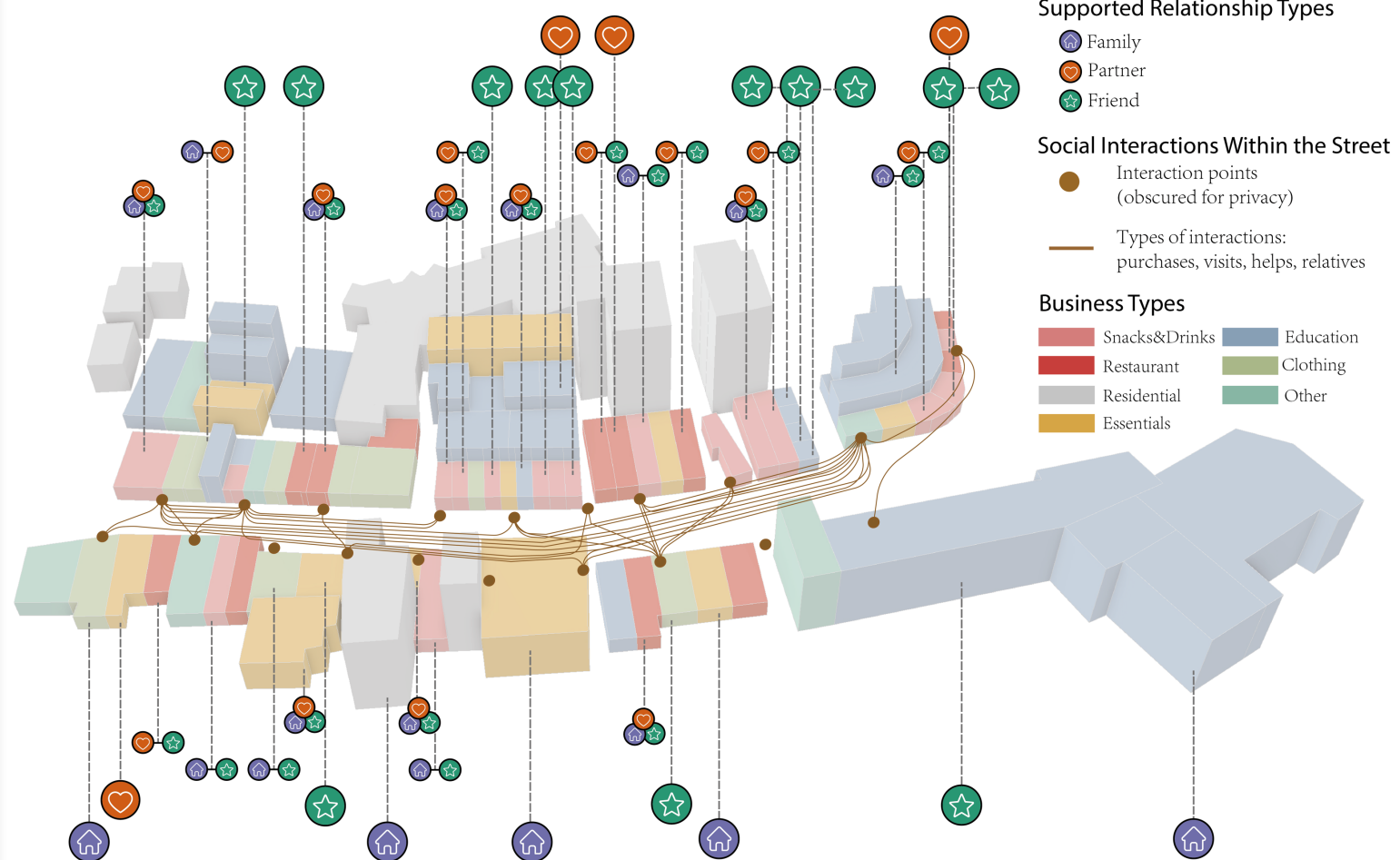
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The participatory GIS survey on Maptionnaire platform

# Social Infrastructure Mapping

- Diverse **commercial types** that closely match nearby population's demands
- From survey, 64% of people who live/work on this street mentioned that they have **helped or received helps** from others on the street.
- Support a diverse range of **social relationships**

## Social Infrastructure Map of Miaoqianzhi 'jie'



3D building footprint and height adjusted for presentation

Credit: Image by Yuxiang Zhao, Lu Chen

## Quantifying Impacts of Place Attachment and Social Ties

- **How important** is the street to your personal identity, daily life activities, social relationships, Guangzhou's history and culture?
- **Who** do you come to the stores with?
- If the street is demolished, **where** would you do such activities **instead**?

### How important:

Personal identity



60%

Daily life



49%

Social Ties



43%

GZ Culture



81%

### Who:

Alone



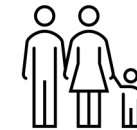
22%

Friend(s)



39%

Family



29%

Partner



8%

### Where instead:

No more



40%

Online



7%

Nearby



27%

Other places

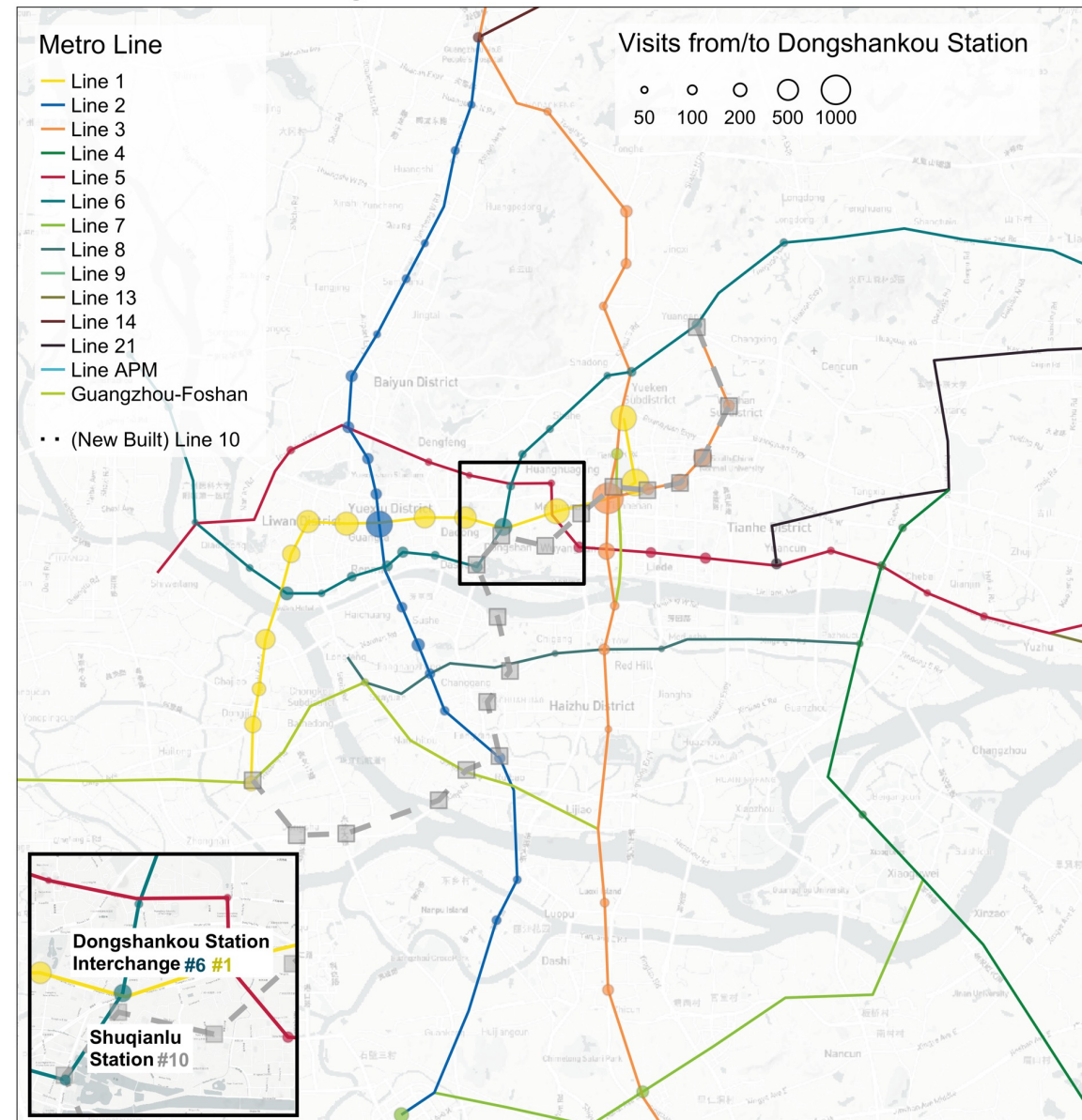


25%

# Comparative Spatial Network Analysis

- Locals' OD are visits to/from **Dongshankou Station** (5mins from Miaoqianzhi 'jie')
- Major ODs distribute in close distance **and are on Line #1, 2, 3.**
- The N.E. segment of Line 10 overlaps more with locals' destinations, but **more direct via existing lines.**
- The S.W. segment of Line 10 overlaps **little** with locals' destinations.

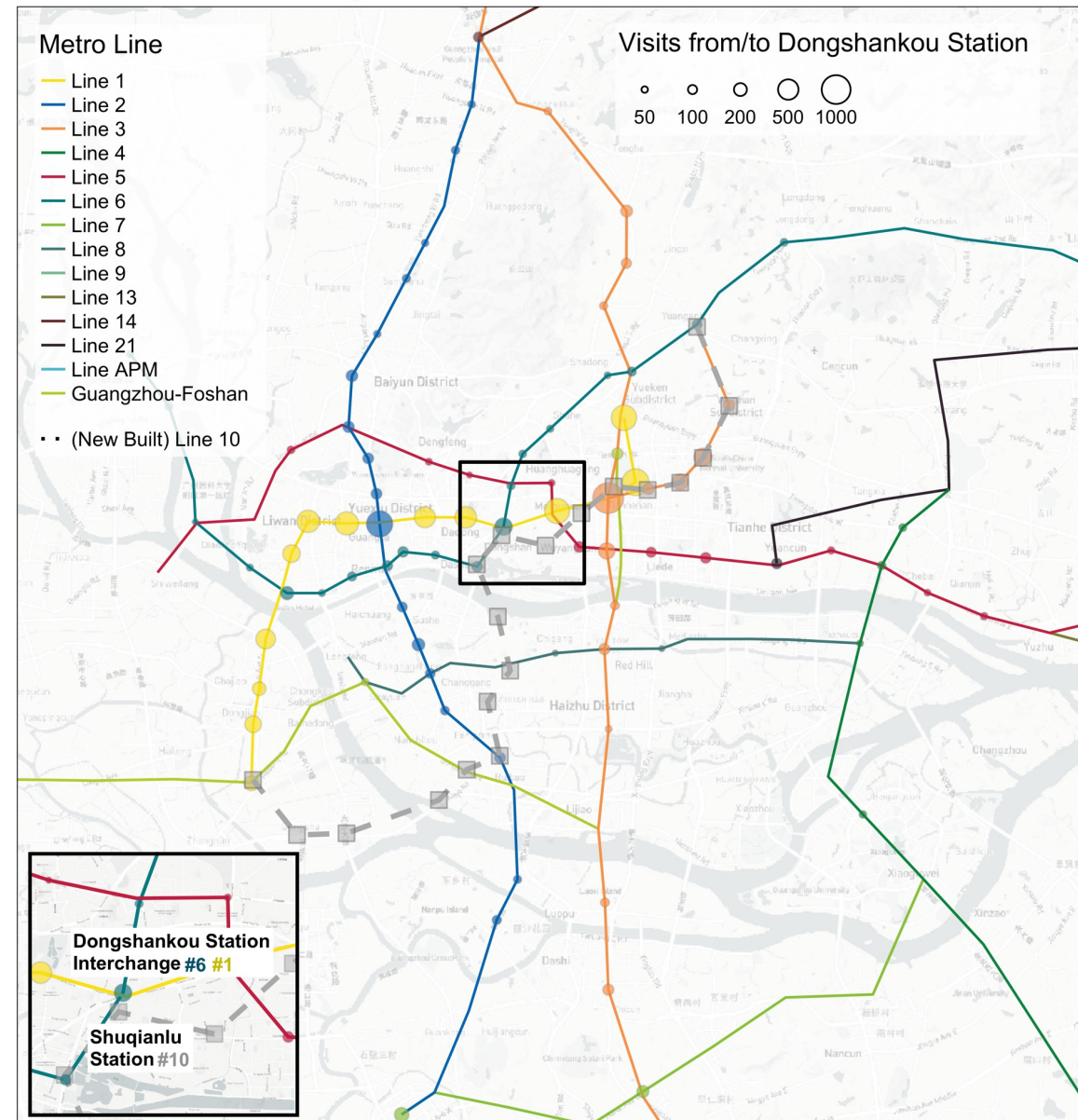
## Locals' Origin-Destination visits vs. Line 10



# Comparative Spatial Network Analysis

- Calculate the number of hops between Dongshankou Station and destinations, weighted by flow volume. **1 hop is from one station to its adjacent station.**
- With Line #10, **25%** of locals (n=21K) reduces at least 1 hop in metro network; **1%** reduces >2 hops.
- With Line #10, **26%** of locals benefit from having at least one additional route to reach their destinations with the same number of hops.

## Locals' Origin-Destination visits vs. Line 10



## Result Summary

- How might demolition plan impact the local residents' and frequent visitors' **place attachment** and **social ties** to the street?
- What are the benefits of the new metro station from the **locals' perspectives**?

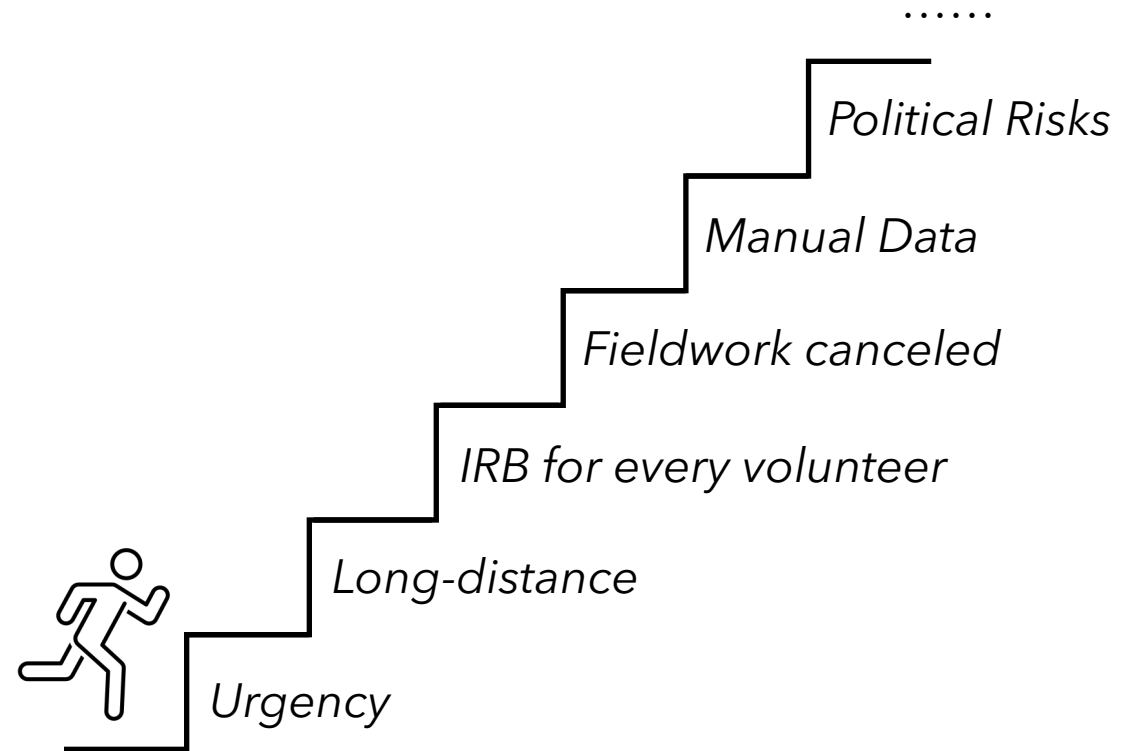
Demolition removes many small businesses that are **critical social infrastructure for people's personal identity, daily activities, social relationships**.

Many activities (40%) dependent on these infrastructure will disappear.

The benefits of a new metro station for the locals is **low**: 1% of passengers shortens their trips with >2 hops; 26% can reach their destinations with additional routes.

# Challenges

- The time of this project (2020-2021) is in the middle of **COVID-19**.
- **Data** are not widely available (and publicly shareable) in China.
- **Grassroots**; up to 25 volunteers.
- Juggle between **research and activism**



## Limitations

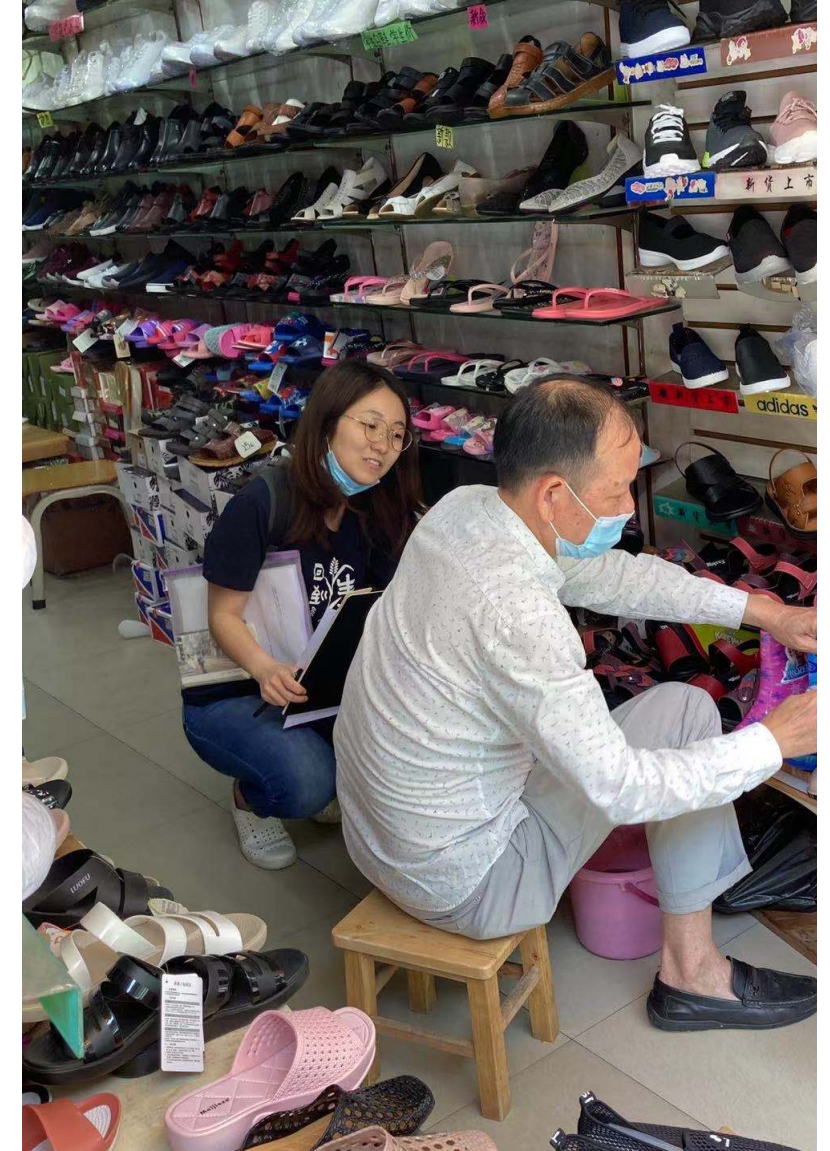
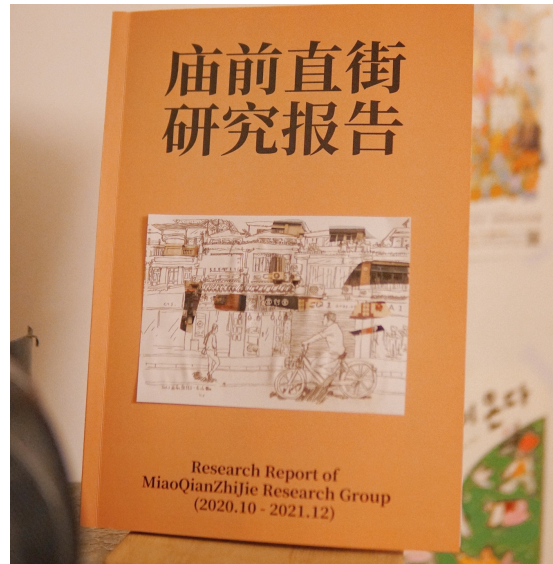
- Our survey respondents tend to be **younger**.
- Not all citizens are against the demolition; we represent **pro-preservation** voices.
- Our comparative analysis of the spatial 'benefits' of new metro station did not account for the station's **secondary or tertiary network effects** in the metro system.

"Though I know many businesses I like will be removed, but I am still supportive of the demolition. This is a chance to renovate and rebuild the old buildings and infrastructure on the street, and for some residents to exchange for a quality home. In addition, the new metro line and this station are crucial for the commuters to go to the financial district and will alleviate the current congestions"

@SurveyRespondent

# Conclusion

- Our findings elevate the voices of the locals through data collection and visualizations and provide a case to **critically examine spatial vs. social connectivity tradeoffs**.
- Our mixed methods exemplify that what planners and citizens can do to **quantify the social impacts** of constructing transit infrastructure.
- Beyond academic contribution, this research also inspired and built upon work conducted by **a local activist group formed around this issue**.





# Q & A

More questions?

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