FIG WORKING WEEK 2019
22–26 April, Hanoi, Vietnam
"Geospatial Information for a Smarter Life and Environmental Resilience"

Presented at the FIG Working Week 2019
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Application of Space Syntax and GIS in Assessment of Accessibility Factors Affecting Urban Residential Land Values

(a case study in Trung Hoa – Nhan Chinh area, Hanoi city)

Le Phuong Thuy, Pham Le Tuan, Tran Quoc Binh, Vietnam

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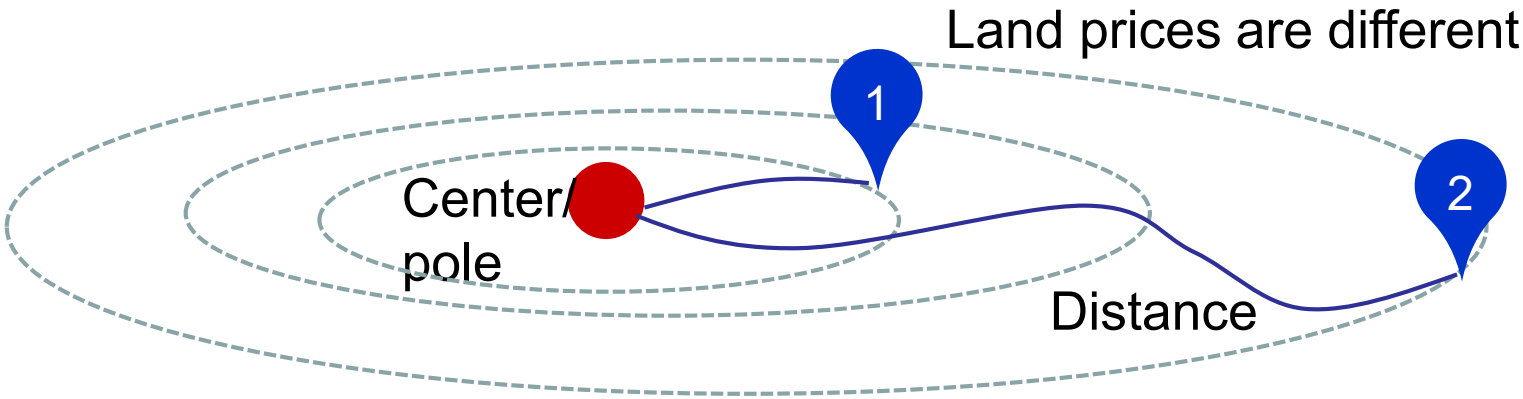
What is accessibility factors?

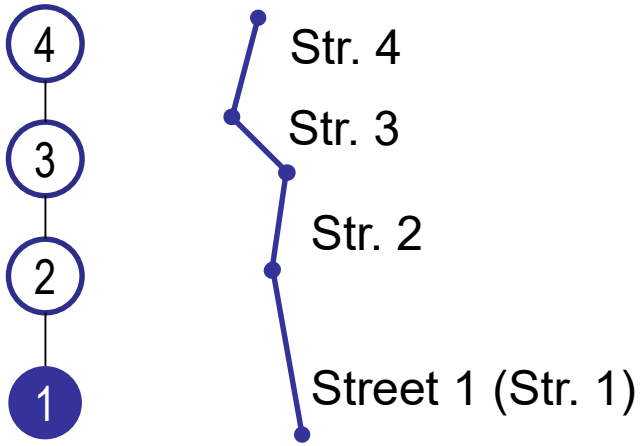
- In network theory, the accessibility is defined as "the extent of overcoming friction that acts spatially and the characteristics of the related space itself" (e.g. Distance, time,...)



What is accessibility factors?

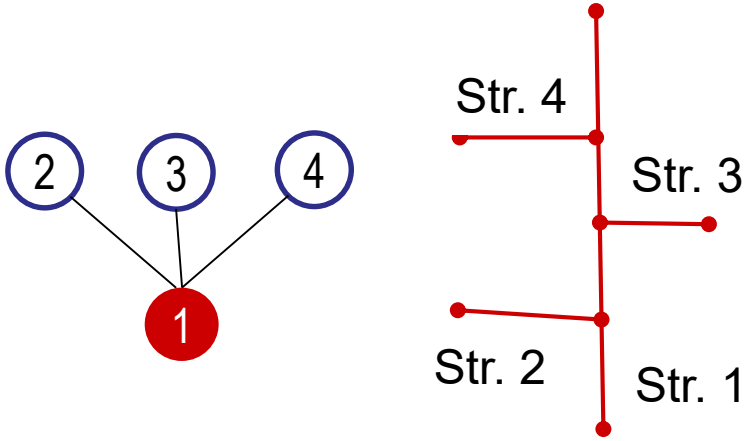
- In space syntax theory, accessibility could be analyzed by spatial configuration according to the street network
- Configuration is defined as “relations that take into account other relations”. These are topological relations.
  - Integration: topological distance of a street segment to all other segments in the network
  - Connectivity: the number of lines directly linked to each individual line

What is accessibility factors?



The most segregated space

Connectivity = 1



The most integrated space

Connectivity = 3

What is accessibility factors?

- Accessibility factors are defined by the **metric distance** measures from each land parcel to facility locations, the **topological distance** measures through spatial configuration analysis, as well as the **location of land parcel relative to adjacent street(s)**

Which accessibility factors have a major impact on urban residential land prices in Trung Hoa - Nhan Chinh area?

Methodology

Field survey
(collect the land price information)

Stage 1

GIS analysis

Network analysis
Location of land parcel

Space syntax analysis

Integration measure
Connectivity measure

Stage 2

Correlation analysis
(to find the factors mostly affecting on urban residential land values)

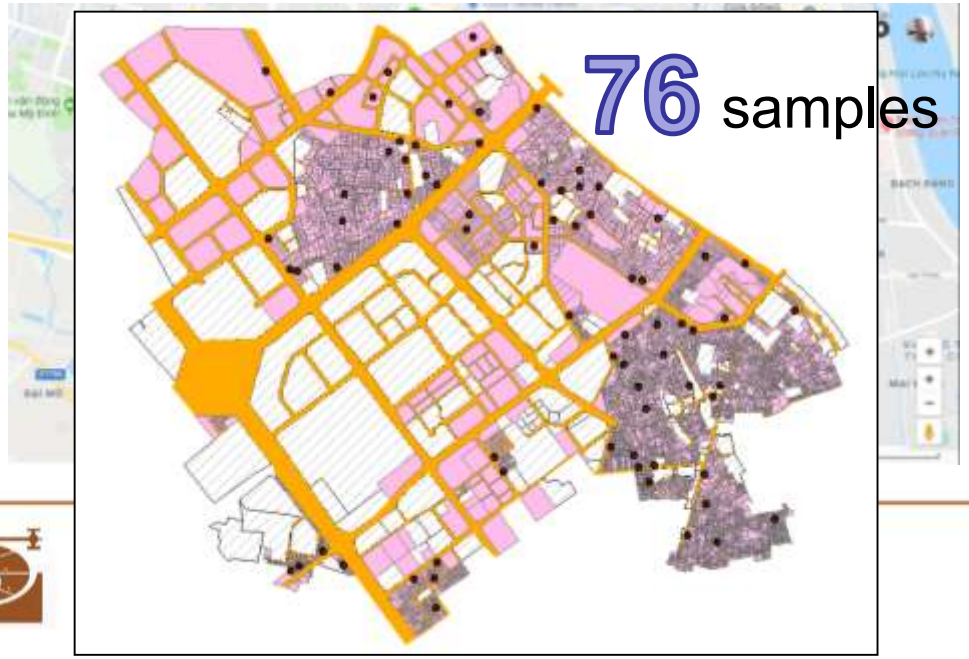
Stage 3

Field survey, Trung Hoa – Nhan Chinh area

22 named streets

32 questions

(landowner information, land parcel information, house information, supplement information)

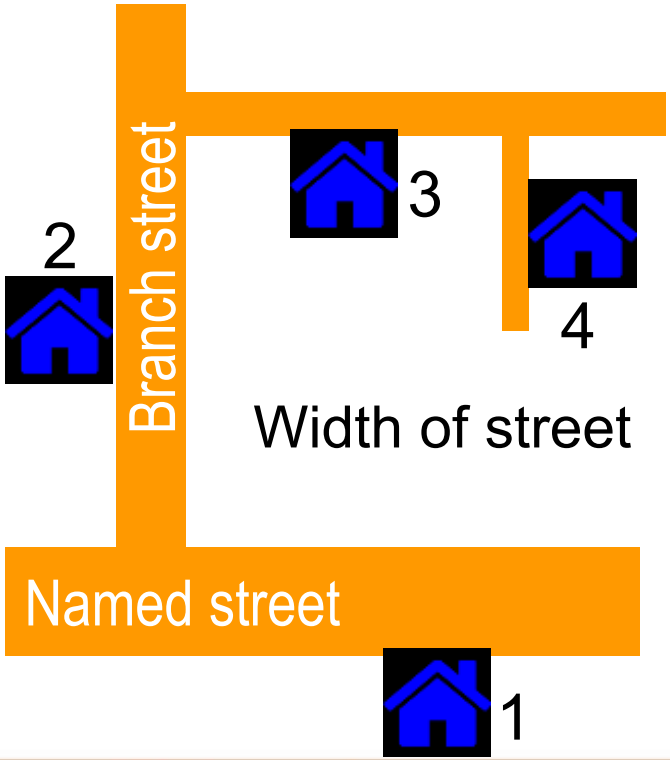


Identify variables

Type of variable	Name of variable	Note
Dependent variable	Urban residential land price	
Independent variable	Integration	
	Connectivity	
	Distance to hospitals	Include hospitals and clinics
	Distance to schools	Include high schools, secondary schools, and primary schools
	Distance to markets	Include supermarkets and markets
	Distance to urban blocks	
	Distance to parks	Include parks and urban green spaces, recreation objects
	Ranking of street	Include high, medium, and low level
	Location of land parcel	Classified into one of location groups 1, 2, 3 and 4

GIS analysis

Location of land parcel



1st location	Land parcels are adjacent to named streets
2nd location	the width of branch streets is more than 3.5m
3rd location	the width of branch streets is 2m – 3.5m
4th location	the width of branch streets is less than 2m

(Vietnam, People's Committee of Hanoi)

Network analysis

To calculate the shortest distance from each land parcel to the closest facilities

Distance to hospitals

47m -1744m

Distance to parks

11m - 509m

15m - 737m

Distance to schools

305m - 2021m

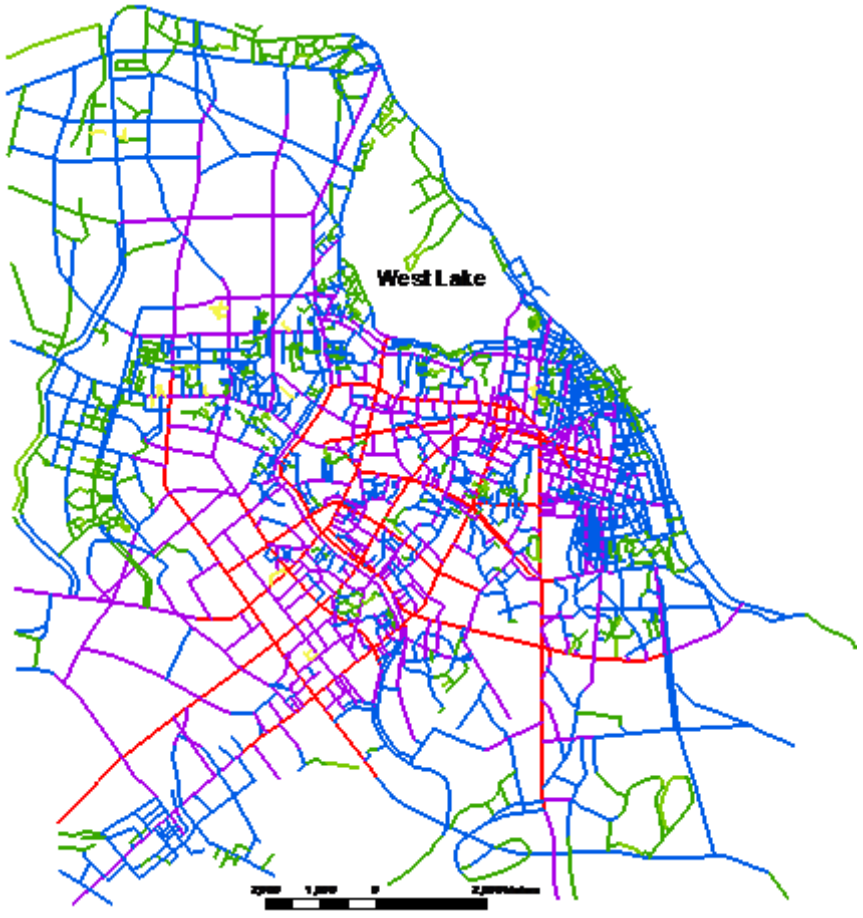
Distance to urban blocks

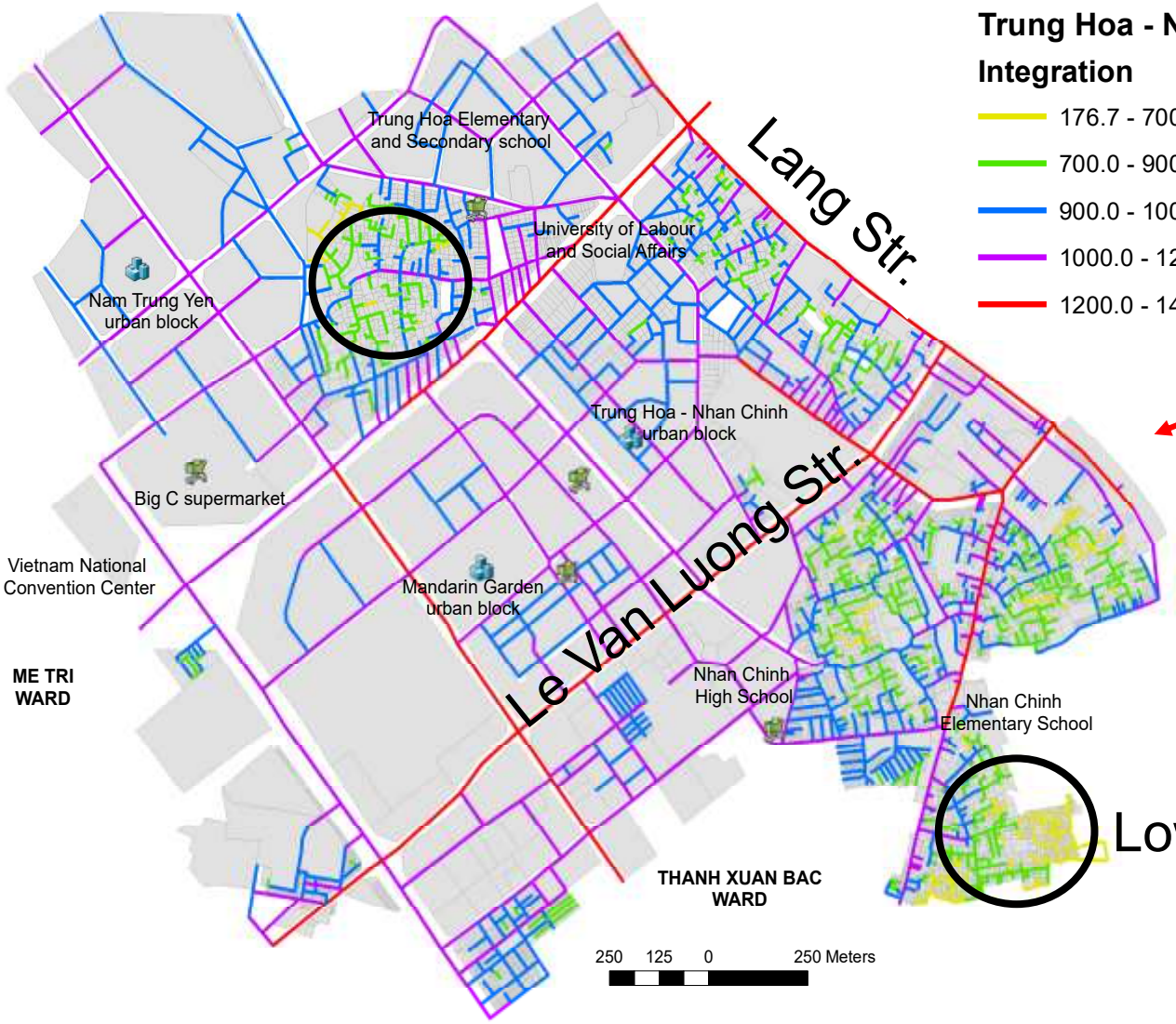
73m - 1349m

Distance to markets

N=76

Integration analysis





Trung Hoa - Nhan Chinh
Integration

- 176.7 - 700.0
- 700.0 - 900.0
- 900.0 - 1000.0
- 1000.0 - 1200.0
- 1200.0 - 1428.3

Lower integration value

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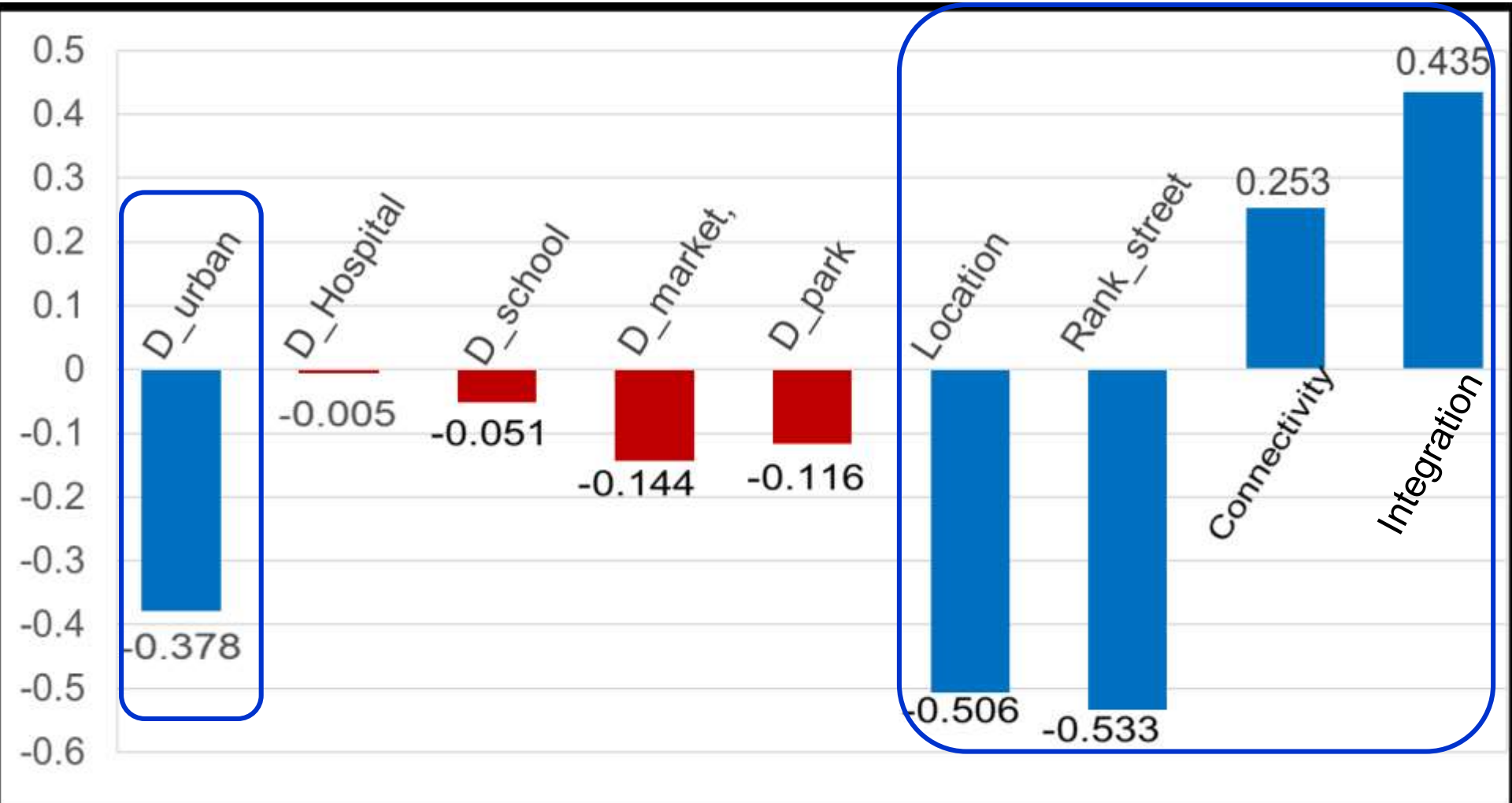
Correlation analysis



Conclusion

- Five factors which have major effects on urban residential land price in Trung Hoa – Nhan Chinh area: 1) ranking of street, 2) location of land parcel, 3) integration, 4) distance to urban blocks, and 5) connectivity
- Among them, integration factor showed the degree of center of space. Therefore, it could be used as one of the criteria in order to determine status poles in the multi-polar city (the highest points of social desire or the most attractive poles).
- This study could be improved by increasing the bigger samples and it contributes the further studies in urban planning, land valuation.

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