Assessing Physical Environment of TOD Communities using Street View Photos
Research question

Comprehensively, effectively and repeatedly

How to evaluate the physical environment of the transit-oriented communities around metro stations?
Scope of analysis

Covers 201 stations within the 5th Ring Road of Beijing, focusing on areas within 10-minute walking distance from the metro stations.

Methodology and data

Pattern recognition powered by machine learning models using over 2 millions street view photos collected by map service providers (i.e., Gaode, Tencent and Baidu Maps).

Beijing’s Metro network: 20 lines, 391 stations and over 10 million passengers/day
Convenience: diversity of urban land uses / functionalities

- Station areas in the **northeastern** part of the city have highly-mixed land uses and diversified urban functionalities (*i.e.*, daily services, sports & recreation facilities, hotels, educational service, retreatants, medical services, tourism sites and shopping center).
Comfort: analytic results for selective indicators

- **Openness**: Areas around terminal stations in the **suburbs** have the most sky view due to low development density.

- **Greenness**: Station areas in the **northwest** have highest vegetation coverage as they are close to big parks and the Royal Gardens.

- **Safety score**: Station areas rated as safe are mostly **job centers** and/or **commercial complexes**.

- **Asthenic score**: Appealing station areas partially overlap with safe ones. They are featured by **human-scale street design** and **high quality amenities**.
Vibrancy: informal economy

- Street vendors cluster around stations in inner city with **pedestrian-friendly environment** and in southeastern district that is short of shopping centers.
Characteristics: similarity in street landscape

- The 201 station areas cluster around six groups as marked by different colors. Size of the circle represents the distinctiveness of the station area from other types (right figure).

- For instance, the purple group seems to be dominated by monumental and historical buildings and public space.
Aggregated scores for the four types of indicators

1. Convenience
2. Comfort
3. Vibrancy
4. Characteristics
Conclusion

- The analytic results can be used to support evidence-based city planning and zoning. Specific interventions can be deployed at the targeted locations as identified from the thematic maps.

- The results can be further interpreted and attributed by making connections to relevant information from other data sources.

- This exercise is easily replicable in other cities and at different time points to monitor the change over time.

Thank you for listening! 😊

For questions kindly contact: wfang1@worldbank.org