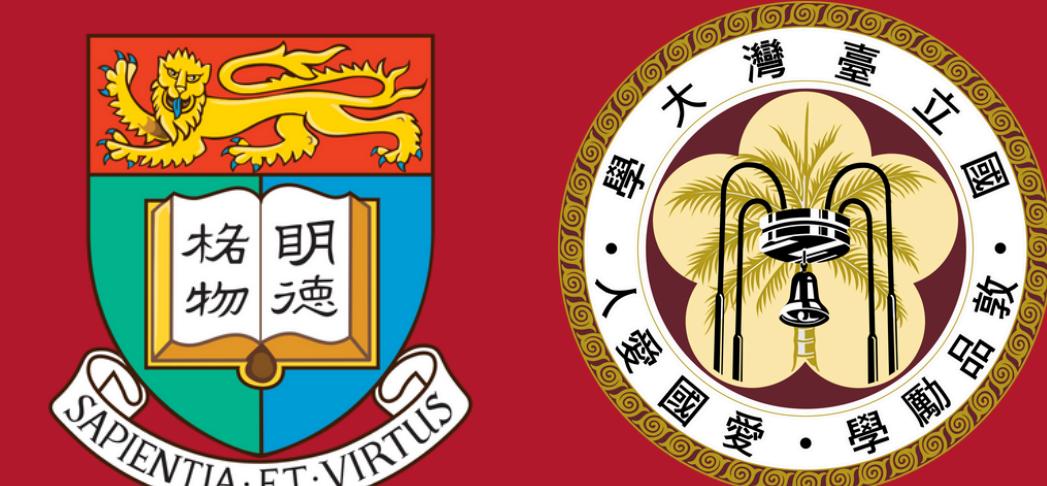


# When 15-Minute Cities Fail: Diagnosing Spatial Misfit in High-Density Urban Contexts

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## Background & Research Question

The 15-minute city has emerged as a celebrated urban planning ideal. It aims to ensure that residents can access essential services within a short walking or cycling distance. This vision promotes sustainability, reduces dependence on private vehicles, and enhances daily quality of life for all, especially for the elderly, children, and disadvantaged groups.

At the core of the 15-minute city model lies a simple assumption: when services are located nearby, people will use them. Proximity is treated as a proxy for accessibility and behavior. This logic also implies a highly mixed-use urban environment, where residential, commercial, and social functions coexist. Many studies rely on spatial proximity or facility counts to evaluate whether a neighborhood fulfills the 15-minute standard.

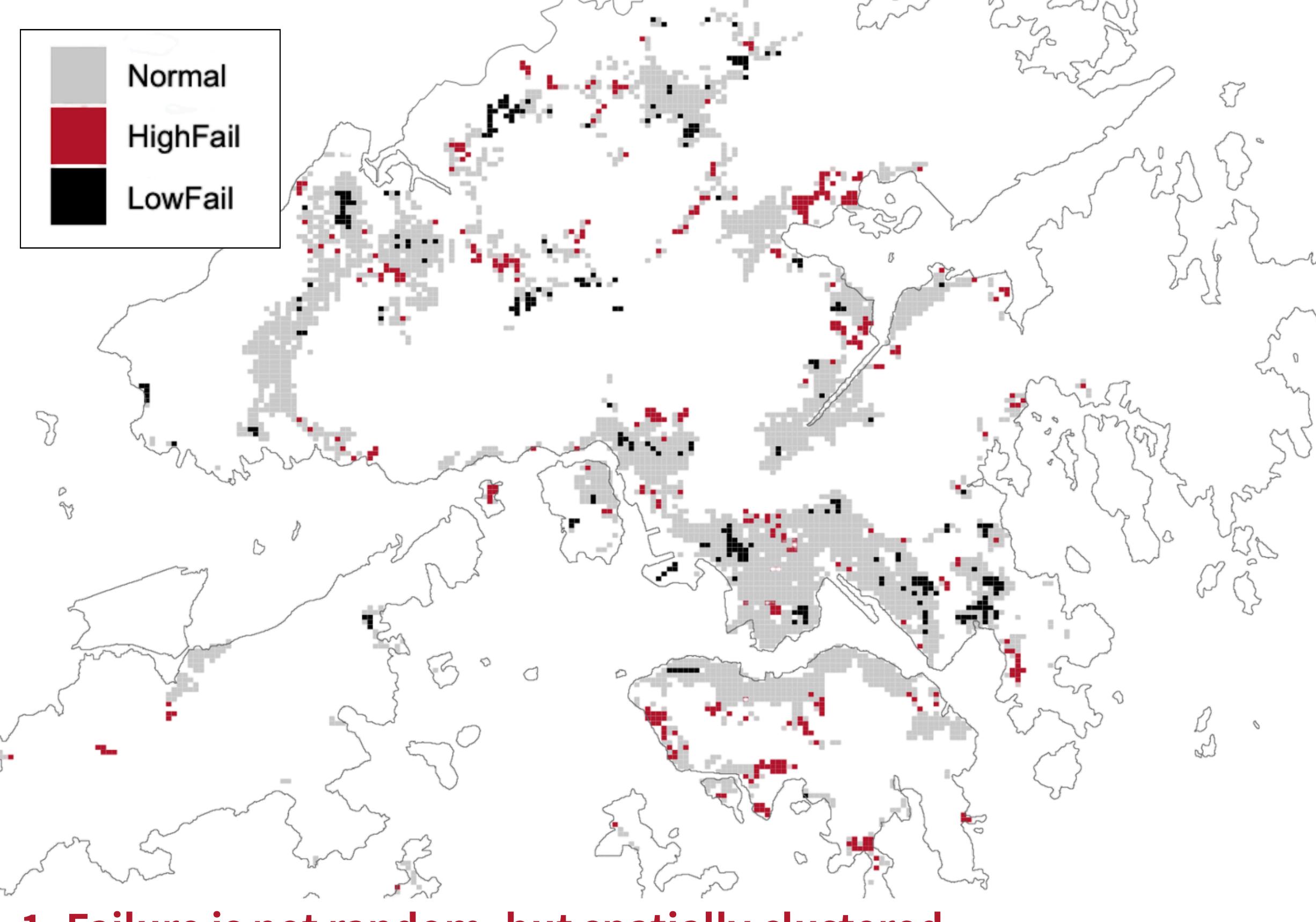
However, in cities that already meet these spatial conditions, such as Hong Kong, this logic may break down. With extreme density, vertical land use, and a highly efficient transit network, proximity does not necessarily lead to local usage. Residents frequently travel across districts for work, consumption, or recreation. This behavioral pattern challenges the core assumption of the model and reveals the limits of a one-size-fits-all planning framework.

This study asks three key questions:

1. Which areas in Hong Kong fail to align with the behavioral assumptions of the 15-minute city model?
2. What are the common spatial or demographic features of these high-failure or low-failure zones?
3. What can the 15-minute city framework learn from its breakdown in a dense and transit-oriented urban context like Hong Kong?

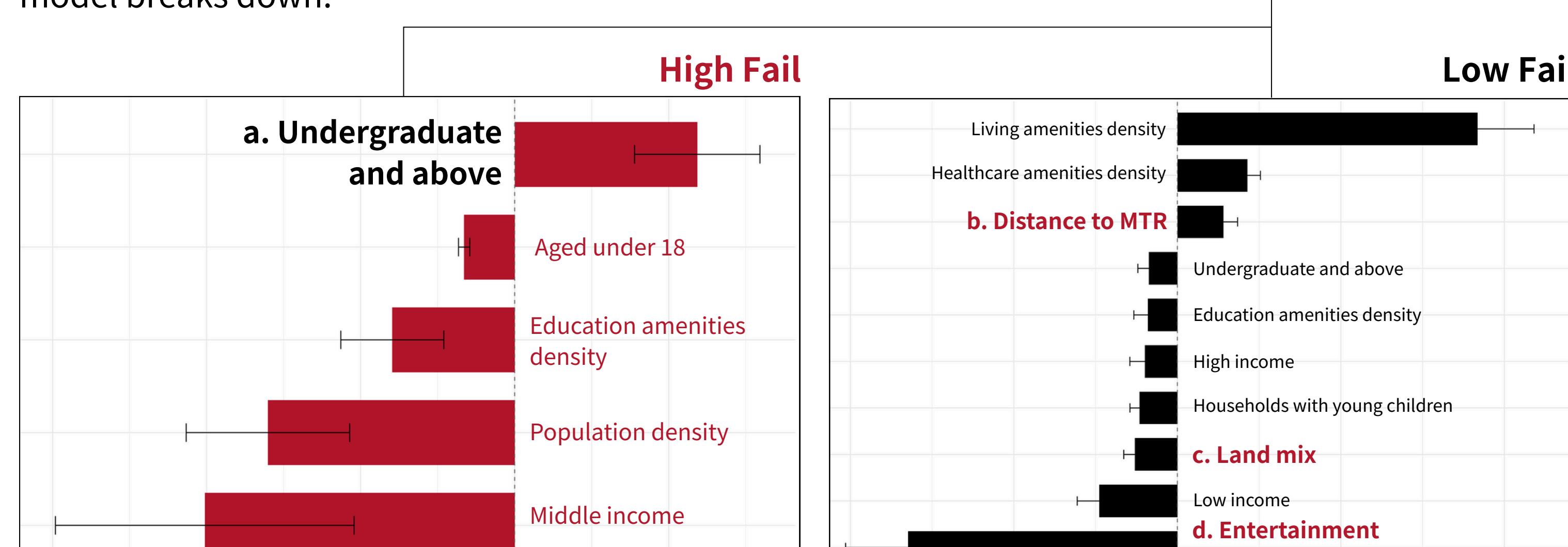
By identifying zones of consistent behavioral misfit, this study aims to reveal the limits of the current planning logic and offer insights into the need for context-sensitive approaches to urban accessibility and design.

## Result & Discussion



Spatial Gi\* analysis reveals that areas with strong mismatch between modeled accessibility and actual behavior form significant clusters. This suggests that model failure is not scattered or incidental, but emerges as a consistent spatial pattern.

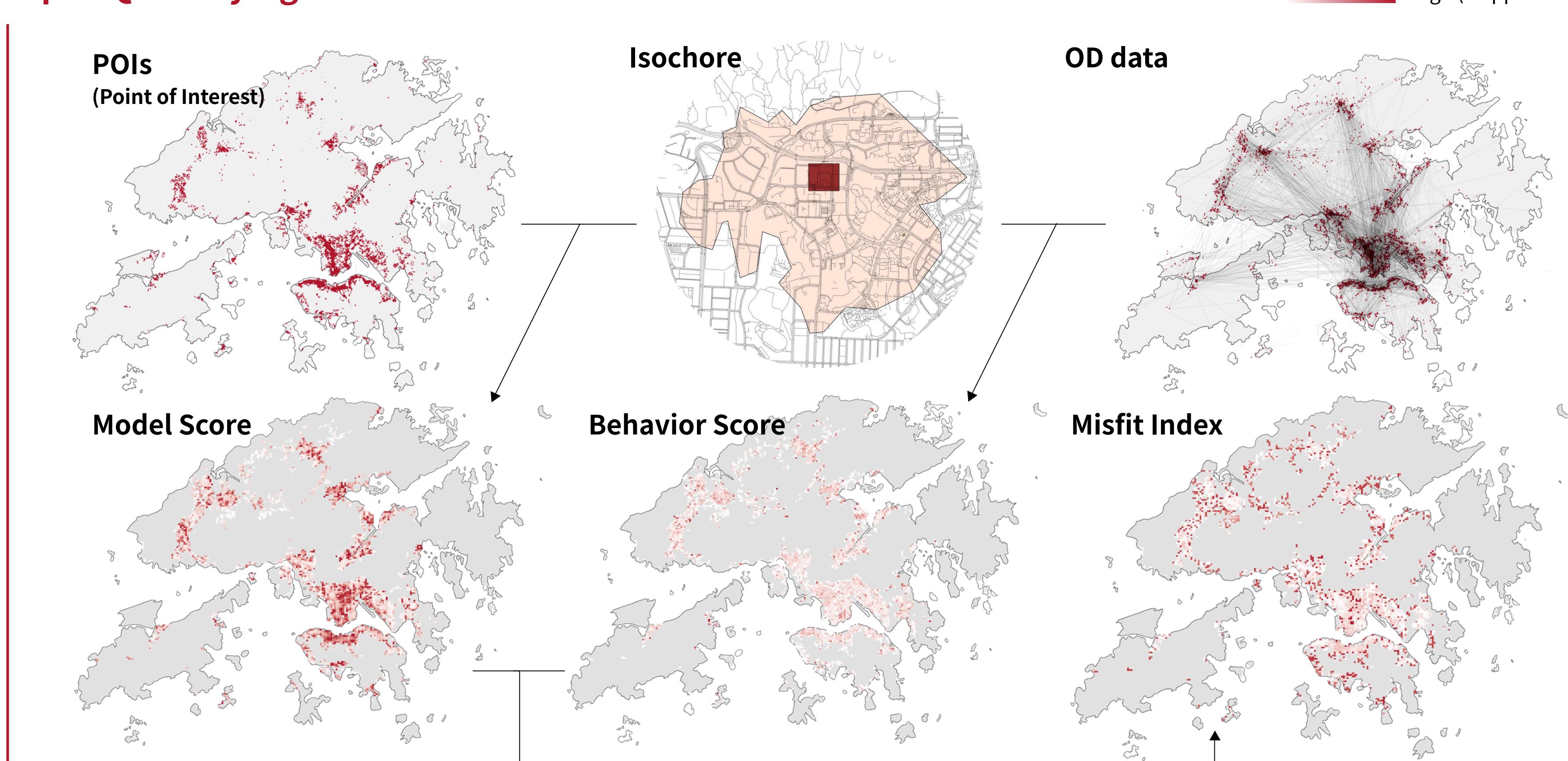
The multinomial logistic regression results reveal distinct patterns in the spatial and demographic characteristics of areas where the 15-minute city model breaks down.



## Methodology

This study integrates spatial data analysis and behavioral data to assess the misalignment between the 15-minute city model and real-world usage patterns in Hong Kong.

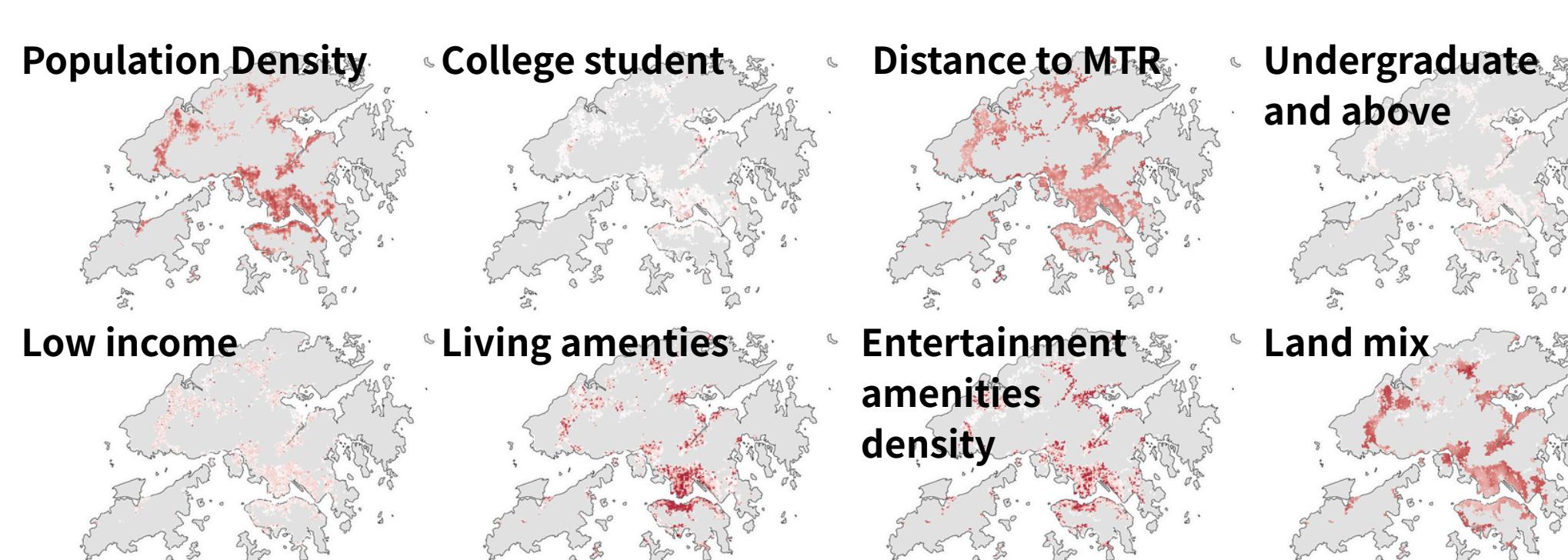
### Step 1: Quantifying the model-behavior mismatch



### Step 2: Identifying spatial clusters of failure

Using Gi\* spatial statistics, we identify statistically significant clusters where misfit index is particularly high (High Fail) or low (Low Fail). This step allows us to shift focus from isolated mismatches to broader spatial patterns of systemic failure or success.

### Step 3: Explaining the spatial logic of failure



A Multinomial Logistic Regression is applied to compare High Fail, Low Fail, and Normal zones. The independent variables include sociodemographic composition, functional diversity (e.g., types and mix of facilities), proximity to key services (e.g., metro stations, universities), and built environment indicators, with nineteen variables in total.

The model identifies which factors are significantly associated with different types of spatial misfit.

### 2. Failure Is Driven by Demographics and Urban Form

**a. Lifestyle Overrides Proximity**  
Districts with a higher share of university or postgraduate residents tend to exhibit greater misfit. This group often travels across districts for study, work, or leisure, suggesting that lifestyle-based mobility overrides the assumed influence of local service proximity.

#### b. Transit Enables Cross-District Patterns

Neighborhoods located closer to metro stations tend to show greater behavioral divergence. This suggests that Hong Kong's highly accessible public transit network enables routine cross-district movement, thereby weakening the spatial logic that underlies the 15-minute city framework.

#### c. Mixed-Use ≠ Local Use

Zones with high diversity of amenities, such as retail and leisure, tend to show wider activity ranges. Rather than encouraging people to stay local, functional richness may actually pull them outward. This questions the idea that mixed land use ensures local behavior.

#### d. More Services, Less Local Use?

Higher concentrations of entertainment facilities are unexpectedly correlated with increased model failure. This challenges the assumption that more nearby services always increase local use. It also supports recent research questioning facility-based performance metrics.

### 3. Rethinking the planning logic

These findings indicate that the 15-minute city model, as currently measured, overlooks key drivers of behavior. In dense, transit-rich cities like Hong Kong, spatial proximity and facility counts are insufficient indicators of accessibility or local usage. The framework underestimates the role of public transit, cross-district mobility, and lifestyle segmentation, which are central to how cities like Hong Kong actually function.

## Conclusion

- The urban structure of Hong Kong is fundamentally incompatible with the 15-minute city model.
- The issue lies not in the number of facilities or distance thresholds but in the flawed assumption that proximity determines behavior.
- This study affirms the model's underlying goals but challenges its simplified measurement approach.
- Future planning in high-density cities should prioritize mobility patterns and cross-district behavioral networks over static walkability zones.

## Reference

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