Getting There is Half The Fun: Intermodal Transport Comparison of Cities of Amsterdam and Bengaluru.

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Navigation, often perceived as simple, is a complex system with interconnected elements. Analyzing its patterns in urban environments reveals areas for improvement. This multimodal comparison focuses on Amsterdam's extensive transport options and Bengaluru's shift towards reducing private transport reliance.

The motivation behind the research is to understand how one city's transit system and its learnings can help with understanding another city's complexities, and how the complexities can be made easy using cartography

Understanding Gaps and Patterns

A gap or inefficiency signifies a significant disparity or deficiency. There are several patterns indicating the gaps and why they occur. The thesis explores three key patterns to understand and address these inefficiencies:

1. Proximity: Examining distances between elements.

2. Connectivity: Evaluating the efficiency of transport connections.

3. Availability: Identifying features that enhance transport patterns for efficiency.

Space Time Cubes

Space-Time Cubes (Fig. 1 and Fig. 2) show route dispersion over time[1]. In Amsterdam, driving takes half the time but covers a longer distance compared to public transport. Conversely, Bengaluru's driving duration is longer than its public transport counterpart. This contrast highlights Amsterdam's deliberate route optimization for public transit, emphasizing efficiency and mode-specific routing. In contrast, Bengaluru lacks distinct routing patterns, indicating a transportation approach where public transit shares road space with other modes, potentially causing congestion and significant time delays.
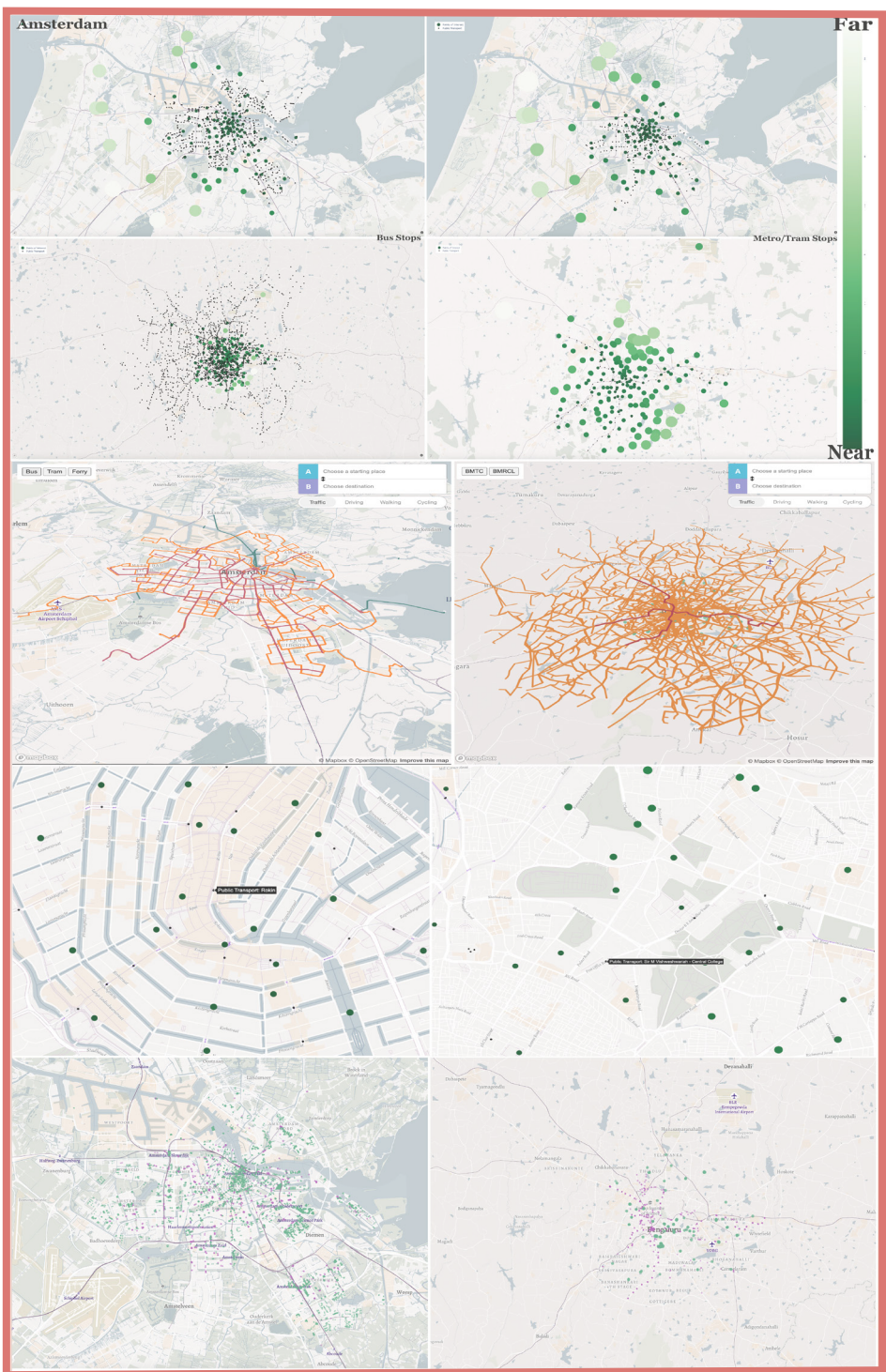
Cartographic visualization of transit patterns between the two cities reveals diverse behaviors in system construction and performance concerning gaps: Proximity (Fig. 1-4): Demonstrates spatial distances. Connectivity (Fig. 5,6): Emphasizes disparities in transport connections. Reachability (Fig. 7,8,9,10): Illustrates quick and good accessibility patterns[3].
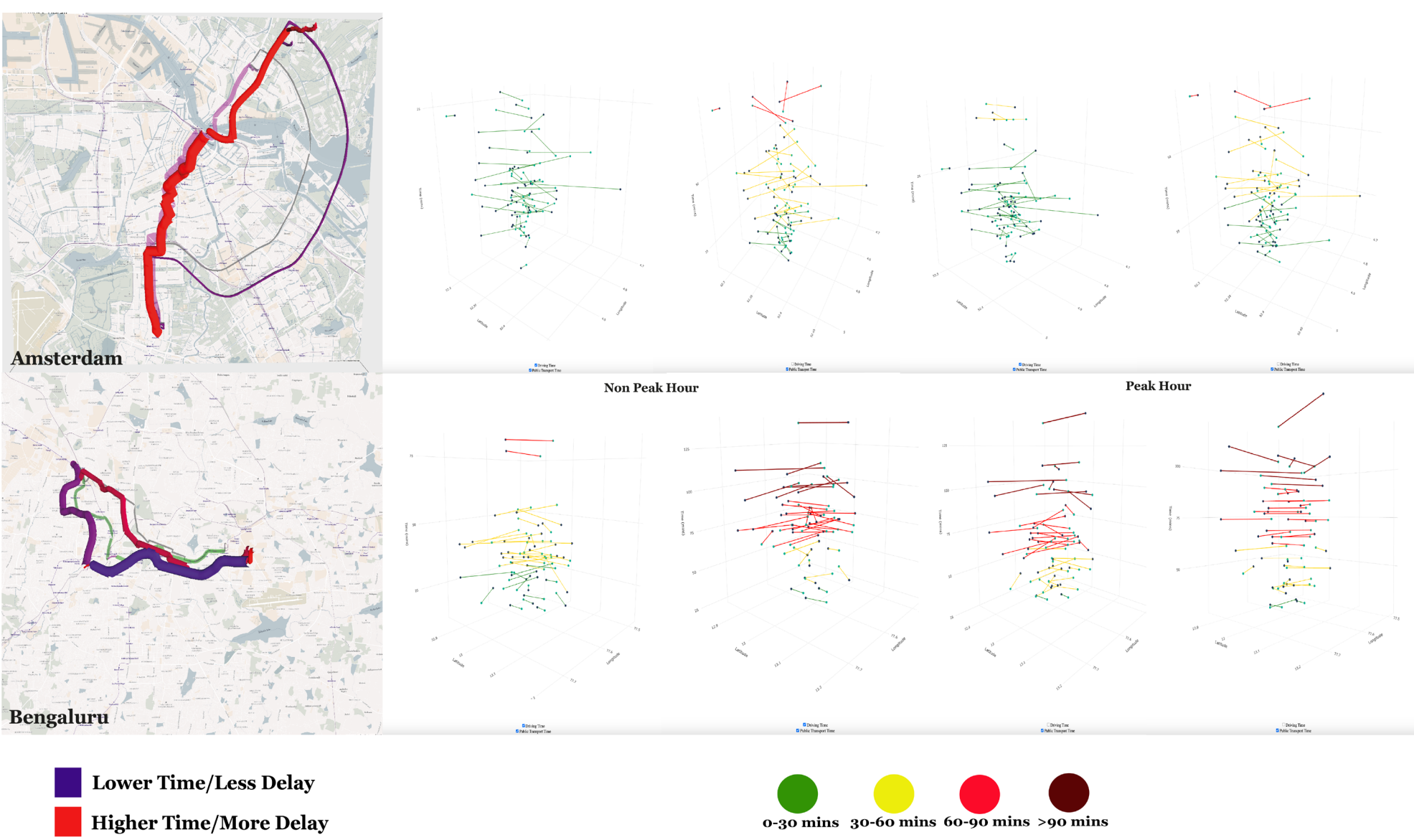

Time-based transport patterns are illustrated in space-time cubes 1 and 2, depicting route spread for driving versus public transport in both cities, while the remaining 8 cubes reveal route performance variations within each city[2].

Time Patterns

- In Bengaluru, 70% of peak-hour routes take over 60 minutes to drive, covering 10-20 km, while public transport takes less than an hour for similar distances. During non-peak hours, all routes take 30-60 minutes for driving, and 73% of public transport routes take 60-90 minutes.

- In Amsterdam, 80% of peak-hour routes take 30 minutes to drive, covering 10-20 km. During non-peak hours, 65% of routes take 20-30 minutes for driving, and 76% of public transport routes take 30-60 minutes due to longer waiting times.

Gaps
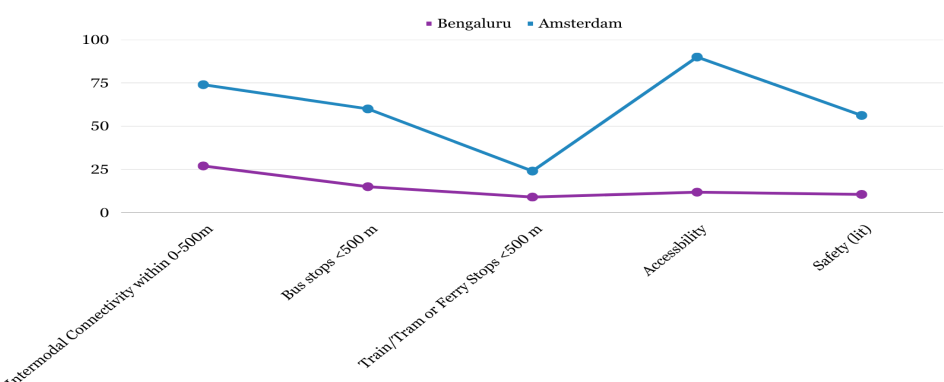
Amsterdam's transportation system demonstrates a higher degree of predictability and efficiency in travel times, particularly during peak hours, in contrast to Bengaluru's system, which exhibits greater variability and congestion during peak periods. The analysis of space-time cube patterns highlights the significant influence of factors like lack of connectivity among transport modes, lack of reachability of public transport stops, lack of proper accessbility and good frequency are some of the main contributors to time delays. Amsterdam boasts approximately 60% of transit stops within walking distance, facilitating efficient use of public transport and bicycles. In contrast, Bengaluru has only 15% of such stops, leading to reliance on private vehicles and inefficiency. This pattern is also highlighted by user study where they highlight the major reasons for time delays. An aggregate of 74% responses highlight:

1. Traffic congestion

2. Unreliable public transport

3. Lack of proper transport infrastructure

4. Safety concerns while using public transport

Results

Amsterdam's transit patterns show how small tweaks can improve transport efficiently. The same tweaks can be applied to Bengaluru by:

1. Increasing frequencies; optimising the routes taken by including all areas; increasing the usage of existing network and transport fleets; assigning public transport lanes and cutting down the importance given for driving; assigning pedestrian only zones and areas; improving the connectivity by giving equal focus to all available modes of transport and adding transport stops in all areas for efficient usage.

2. These results underscore the vital role of maps in highlighting transport efficiencies and inefficiencies. Cartographic comparisons offer visual insights that go beyond mere knowledge, facilitating the identification of areas for improvement, which is essential for policymakers.

Discussion

Differences in transport efficiency, as seen in cities like Bengaluru, often stem from the difficulties in creating smooth last-mile connections and resolving network gaps. However, by adopting strategic measures inspired by cities like Amsterdam, it's possible to enhance transportation systems even in intricate urban environments. Cartographic comparisons play a pivotal role by providing clear and insightful visuals that help identify, understand, and address these challenges effectively.

Conclusion

When adopting another city's transportation model, understanding its nuances and identifying gaps is essential. Analyzing patterns and gaps in Amsterdam's transit model provides valuable insights that can be strategically applied to improve Bengaluru's transit system, enhancing efficiency and accessibility. Bridging the gap between cities like Amsterdam and Bengaluru is facilitated through impactful cartographic visualization and comparison, enabling effective solutions.

References

[1] Menno-Jan Kraak & Irma Kveladze (2017) Narrative of the annotated Space–Time Cube – revisiting a historical event, Journal of Maps, 13:1, 56-61, DOI: 10.1080/17445647.2017.1323034.

[2] Osman, Robert & Ira, Vladimír & Trojan, Jakub. (2021). A tale of two cities: The comparative chronourbanism of Brno and Bratislava public transport systems. Moravian Geographical Reports. 28. 269 282. 10.2478/mgr20200020

[3] Scheurer, Jan & Curtis, Carey. (2016). Planning for Public Transport Accessibility: An International Sourcebook. 10.4324/9781315600758.

[4] Map style: Mapbox, Space Time Cube Code Reference: Yuhang Gu

[5] Data: GVB, BMTC, BMRCL, OpenData BLR and OpenDataNL

Interactive Map: Getting There is Half the Fun

MAP

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