Visualizing Trends in Public Transport Ridership in Singapore

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I. Introduction

Public transport is essential for urban mobility in Singapore, serving millions daily. Understanding ridership trends is crucial for urban planning and policy making. Current visualizations highlight broad trends but lack context, interactivity, and data granularity. This project aims to enhance an existing ridership visualization by incorporating better color differentiation, trend indicators, and interactive elements to provide deeper insights into usage patterns.

II. Original Visualization

A stacked bar chart published by The Straits Times (2025) presents annual ridership trends for MRT, LRT, and buses. While effectively conveys general trends, it lacks annotations, detailed breakdowns, and interactive features, making it harder to analyze fluctuations in riderships.

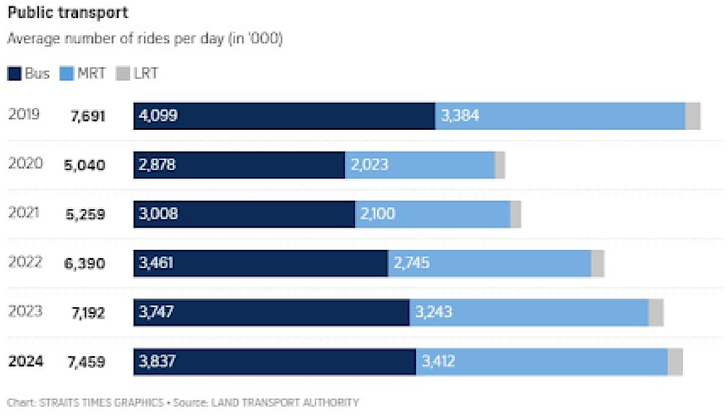

Figure 1: Original Visualization from the Straits Times (2025) .

III. Critical Assessment of the Original Visualization

1. **Lack of Contextual Annotation**-No annotations to explain major events affecting riderships, such as the COVID-19 pandemic.
2. **Minimal Color Differentiation** - MRT, LRT, and bus ridership segments are not distinct enough, making it difficult to differentiate between them.
3. **No percentage Change Indicators** - The chart displays raw numbers but lacks insights into year-over-year growth or decline.
4. **Limited Data Granularity** - Only annual data is presented, missing seasonal patterns or short-term ridership fluctuations.
5. **Axis in Time Series** - The original graph places years on the y-axis, which is unconventional for time series data. This reduces readability and makes it harder to identify patterns or trends over time

IV. Suggested Improvement

1. **Add Contextual Annotations** - Highlight key events impact,(e.g., COVID-19 impact, fare adjustments) to explain ridership shifts.
2. **Improve Color Differentiation** - Use distinct, high-contrast colors for each transport mode to enhance readability.
3. **Include Percentage Change** - Show year-over-year ridership variations for clearer trend analysis.
4. **Increase Data Granularity** - Incorporate monthly or quarterly breakdowns to reveal seasonal patterns.
5. **Use Appropriate Time Axis** - Place time (years or months) on the x-axis instead of the y-axis to follow standard time series conventions. This improves readability and makes it easier to observe trends and temporal patterns.

V. Improved Visualization

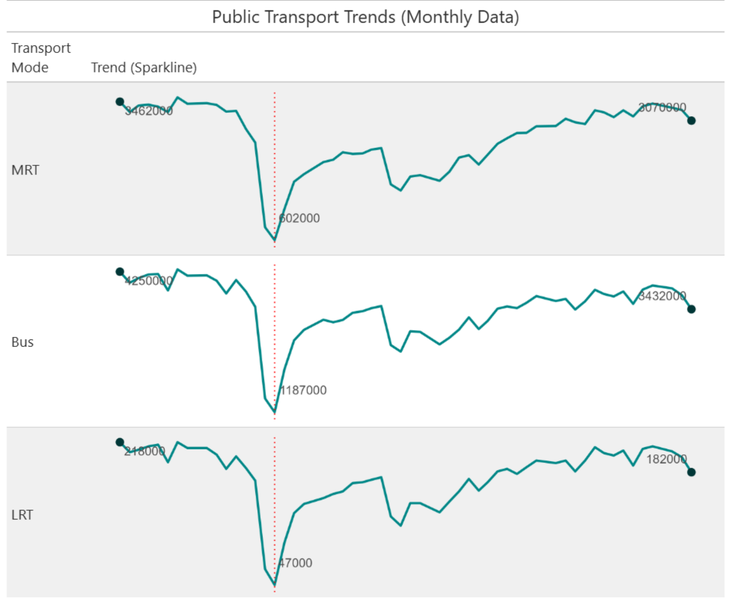

Figure 2: Improved Visualization

VI. Data Analysis

1. Analysis of monthly ridership reveals strong alignment with major real-life events:

a) **First significant dip** observed in April to June 2020, which aligns with Singapore's Circuit Breaker period during the initial wave of COVID-19 restrictions.

b) **Second dip** occurs between May to July 2021, corresponding with Singapore reverting to Phase 2 (Heightened Alert) due to the Delta variant outbreak.

These drops are not random but coincide with periods of restricted movement, remote working, and school closures.

2. Seasonal Effects and Monthly Trends

June and December has the lowest ridership aligning with school holidays when fewer students commute.Ridership patterns align with Singapore's school and work calendar, where demand drops during school holidays (June, December).

3. Year-over-Year Ridership Trends

Comparing 2019 (pre-COVID) and 2023 (post-COVID), ridership in 2023 remains slightly lower despite improvements in transport infrastructure.

This suggests lasting lifestyle shifts, such as hybrid work, remote learning, and flexible commuting patterns, have reduced the need for daily travel. Lifestyle changes brought by the pandemic continue to influence public transport usage, even as services recover and expand.

VII. Further Improvements

To further enhance the analysis of public transport trends, incorporating additional data dimensions would be highly beneficial. For example, breaking down MRT data by individual train lines could reveal more detailed usage trends and highlight lines with greater variability, potentially linked to local demographics, major employment areas, or residential zones.

Additionally, integrating age-related data would provide valuable insights into how different age groups adjusted their travel behavior over time—such as whether younger populations returned to public transport more quickly than seniors post-disruption.

VIII. Conclusion

The sparkline can effectively communicate the trend of a bivariate time series data (ridership across multiple transport mode in our case). Users can compare the similarity (or differences) of trends across the multiple categories, as well as visualize common anomaly that affects all categories.

IX. References

- The Straits Times. (2025). MRT, LRT ridership surpasses pre-COVID-19 levels for first time in 2024. The Straits Times. https://www.straitstimes.com/singapore/transport/mrt-lrt-ridership-surpasses-pre-covid-19-levels-for-first-time-in-2024
- McKinsey & Company. (2021). Building a transport system that works: Insights from 25 global cities. McKinsey & Company. https://www.mckinsey.com/~/media/mckinsey/business%20functions/operations/our%20insights/building%20a%20transport%20system%20that%20works%20new%20charts%20five%20insights%20from%20our%2025%20city%20report%20new/elements-of-success-urban-transportation-systems-of-25-global-cities-july-2021.pdf
- The Straits Times. (2022). New Covid-19 rules kick in: Timeline of S'pore's measures over the last 2 years. The Straits Times.https://www.straitstimes.com/singapore/two-years-of-twists-and-turns-a-timeline-of-singapores-covid-19-measures