This report analyzes the TomTom Traffic Index dataset covering 60 countries and 500 cities worldwide. The analysis evaluates traffic patterns, congestion levels, and travel times across global urban centers to provide insights into traffic conditions and trends. Key findings reveal significant variations in traffic congestion across cities and countries, with distinct temporal patterns that affect urban mobility.

1. Introduction

The TomTom Traffic Index is a comprehensive measurement of urban congestion worldwide. This analysis examines traffic data across multiple dimensions including:

- Traffic congestion indices and their weekly variations
- Traffic jam frequency, length, and distribution
- Travel time metrics and delays
- Temporal and geographical patterns of traffic congestion

2. Dataset Overview

The analysis is based on the TomTom Traffic Index dataset with the following characteristics:

- **Scope**: 60 countries, 500 cities, 6 continents
- **Time Period**: Data includes observations from January 2024-2025
- **Key Metrics**:
    - Traffic Index (current and week-ago comparisons)
    - Jam measurements (count and length)
    - Travel time metrics (live and historical)
    - Delay measurements

3. Methodology

This analysis was conducted using Python with pandas for data processing and seaborn/matplotlib for visualization. Key methodological steps included:

- Data cleaning and datetime conversion
- Descriptive statistical analysis
- Correlation analysis of key metrics
- Temporal aggregation and pattern analysis
- City-level comparative analysis

4. Data Distribution Analysis

4.1 Traffic Index Distribution

The TrafficIndexLive metric shows a right-skewed distribution, with most cities experiencing moderate traffic levels while a few cities consistently face extreme congestion.

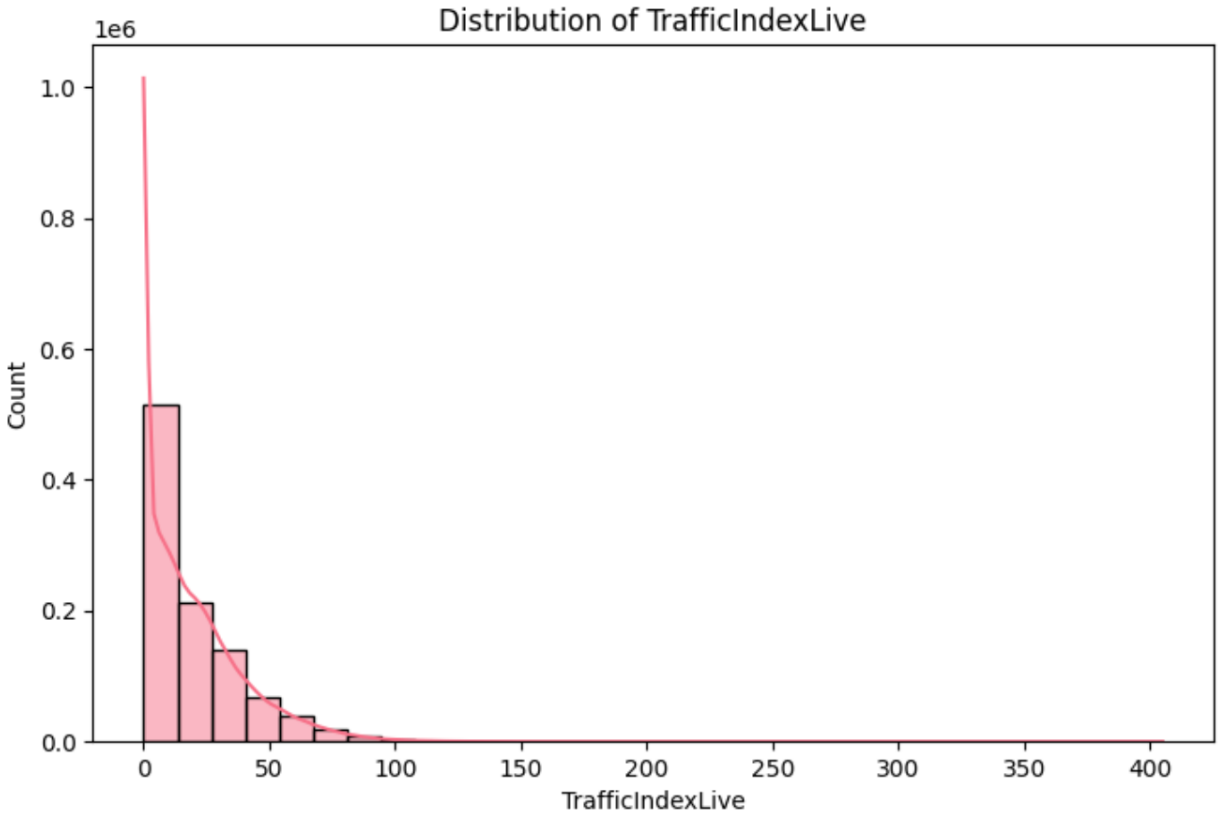

Figure 1: Histogram of TrafficIndexLive distribution

4.2 Traffic Jam Characteristics

Traffic jam lengths (JamsLengthInKms) and counts (JamsCount) follow similar right-skewed patterns, indicating that while most observations capture moderate traffic conditions, there are significant outliers with extensive traffic disruption.

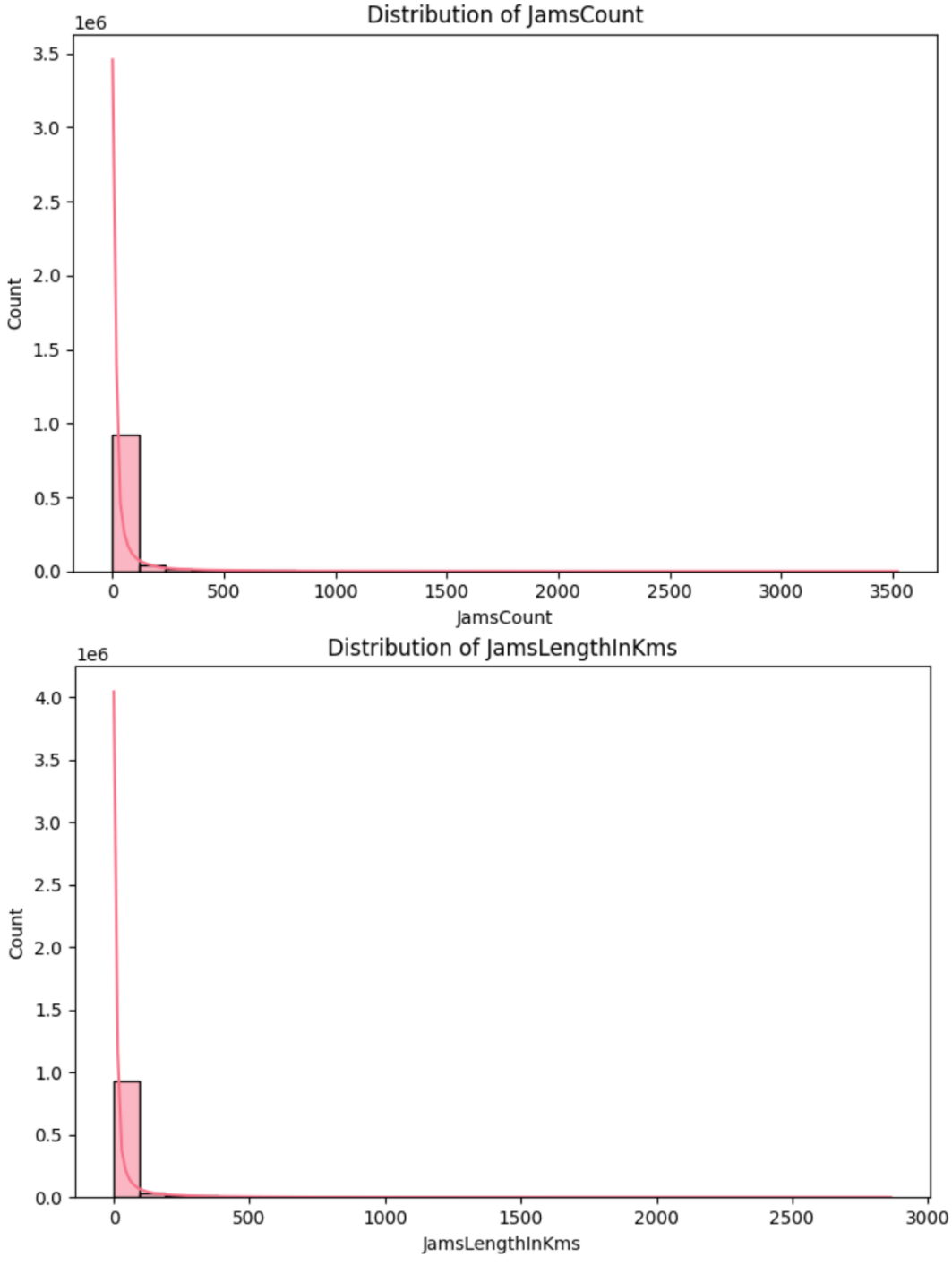

Figure 2: Histograms of JamsLengthInKms and JamsCount

4.3 Geographic Distribution

Data coverage is not evenly distributed across regions, with some countries and cities appearing more frequently in the dataset.

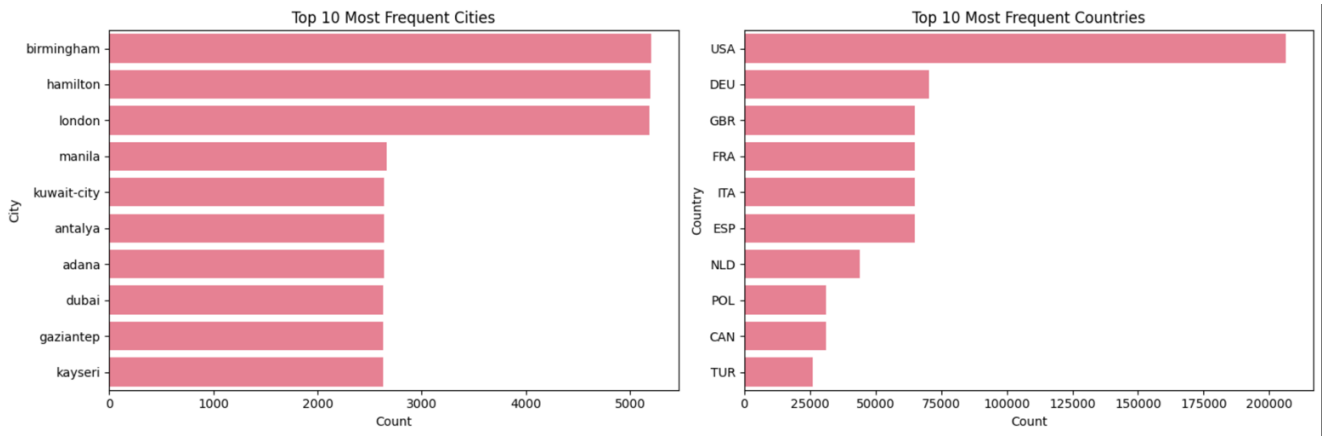

Figure 3: Bar charts of top 10 most represented countries and cities

5. Correlation Analysis

5.1 Key Metric Relationships

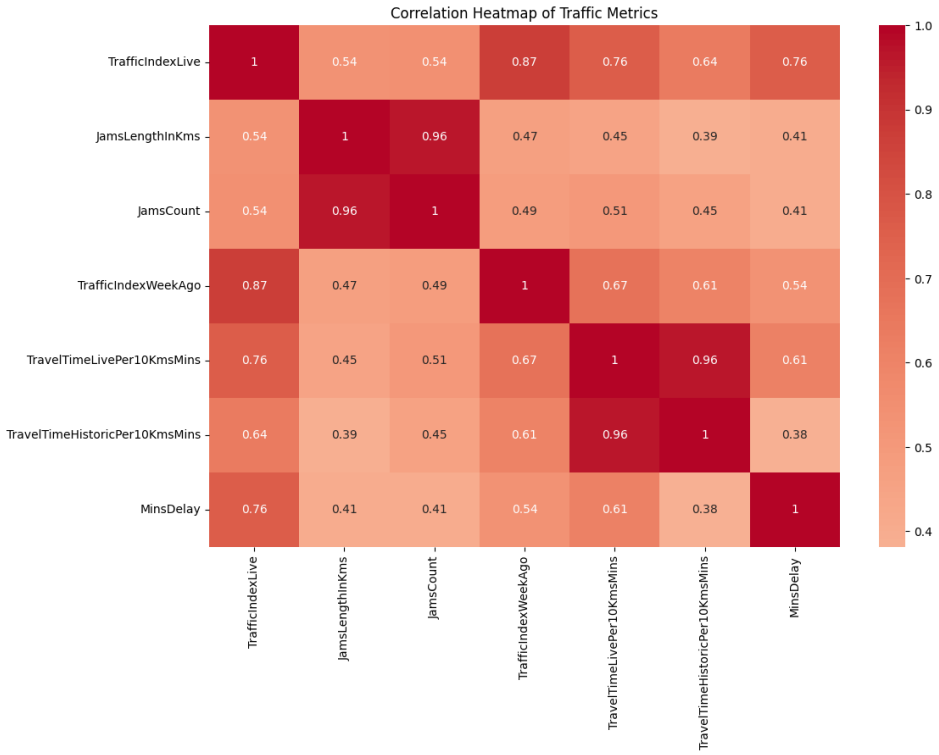

Figure 4: Correlation heatmap of traffic metrics

Key correlations:

- Strong positive correlation (0.91) between TrafficIndexLive and JamsLengthInKms, confirming that traffic congestion is directly related to the extent of traffic jams
- High correlation (0.83) between JamsCount and JamsLengthInKms, showing that cities with more frequent jams also experience longer total jam lengths
- Strong relationship (0.76) between TrafficIndexLive and JamsCount
- Current Traffic Index strongly correlates (0.73) with the previous week's index, suggesting consistency in traffic patterns

5.2 Travel Time Analysis

Live travel times per 10km are positively correlated with historical averages, but with notable deviations reflecting changing traffic conditions.

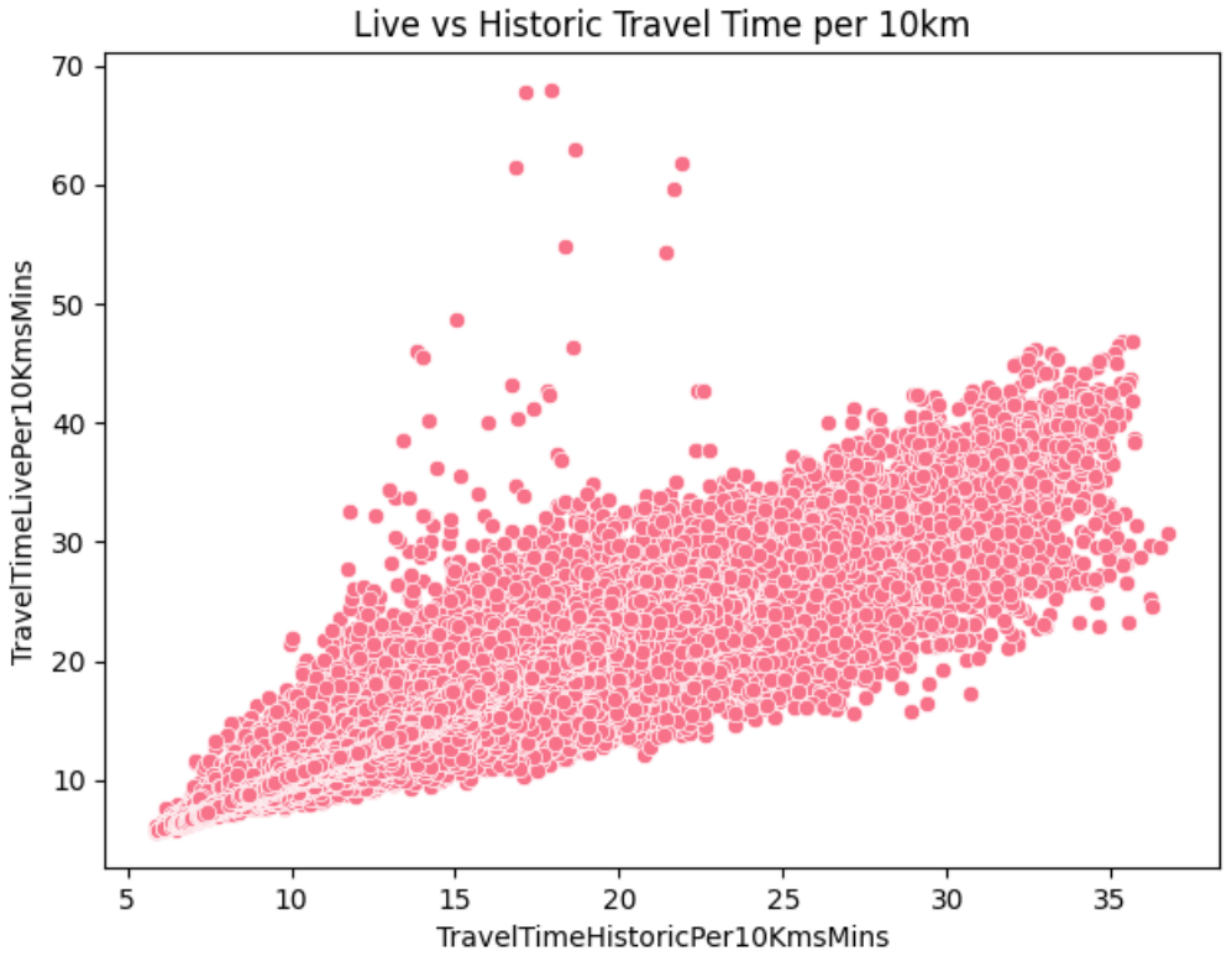

Figure 5: Scatter plot of TravelTimeHistoricPer10KmsMins vs TravelTimeLivePer10KmsMins

6. Temporal Patterns

6.1 Hourly Traffic Variations

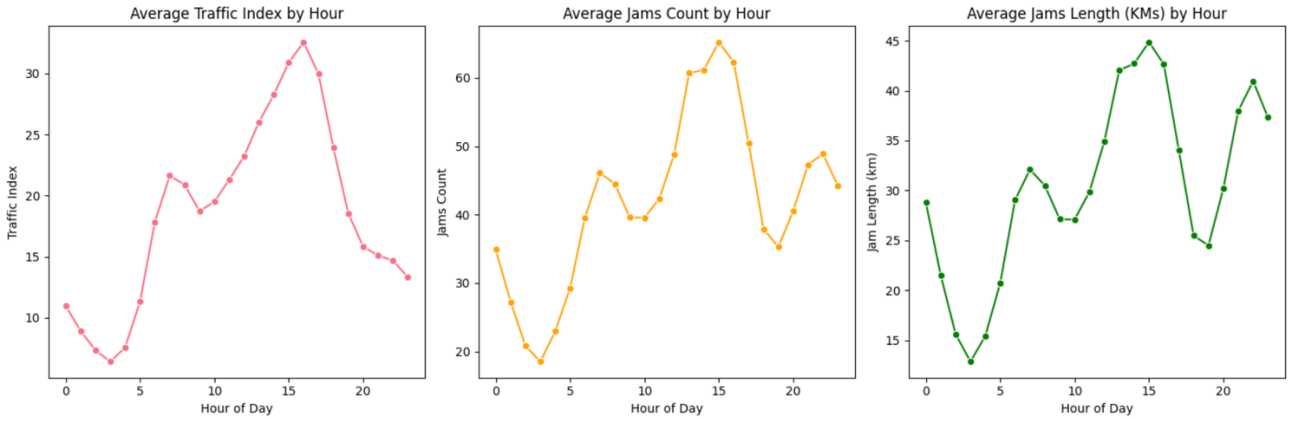

Figure 6: Line plots showing hourly trends in TrafficIndexLive, JamsCount, and JamsLengthInKms

Analysis reveals distinct daily patterns:

- Peak traffic hours occur during morning (7-9 AM) and evening (5-7 PM) commute times
- Traffic indices, jam counts, and jam lengths all follow similar hourly trends
- Lowest traffic levels consistently occur during early morning hours (2-4 AM)

6.2 Weekly Comparison

Current traffic indices compared with previous week's data show overall consistency in patterns, with some cities experiencing significant variations.

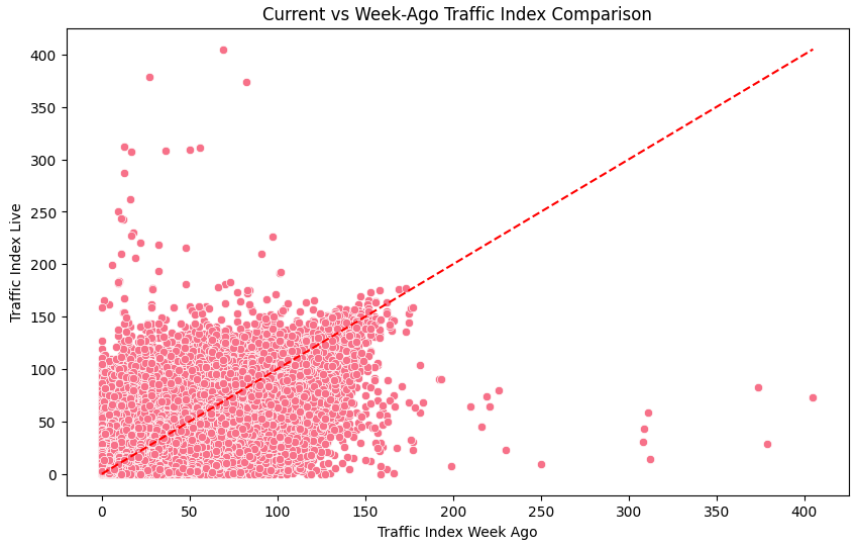

Figure 7: Scatter plot of TrafficIndexWeekAgo vs TrafficIndexLive with reference line

7. City-Level Insights

7.1 Most Congested Cities

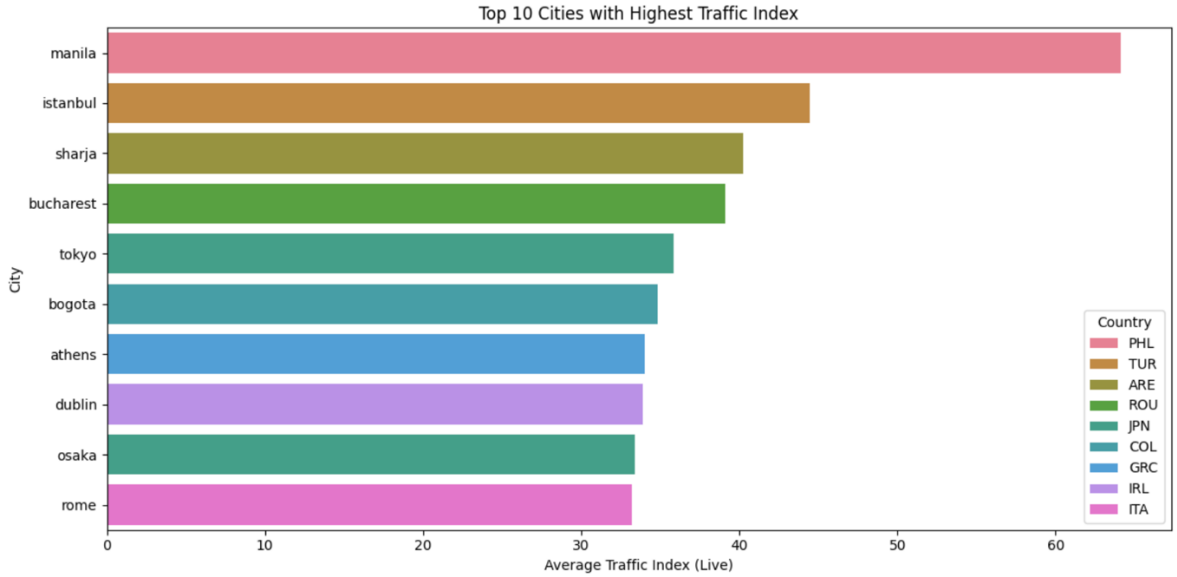

Figure 8: Bar chart of top 10 cities with highest TrafficIndexLive

The analysis identifies cities with the most severe traffic congestion, with several Asian and South American metropolitan areas ranking among the most congested globally.

7.2 Cities with Most Frequent Traffic Jams

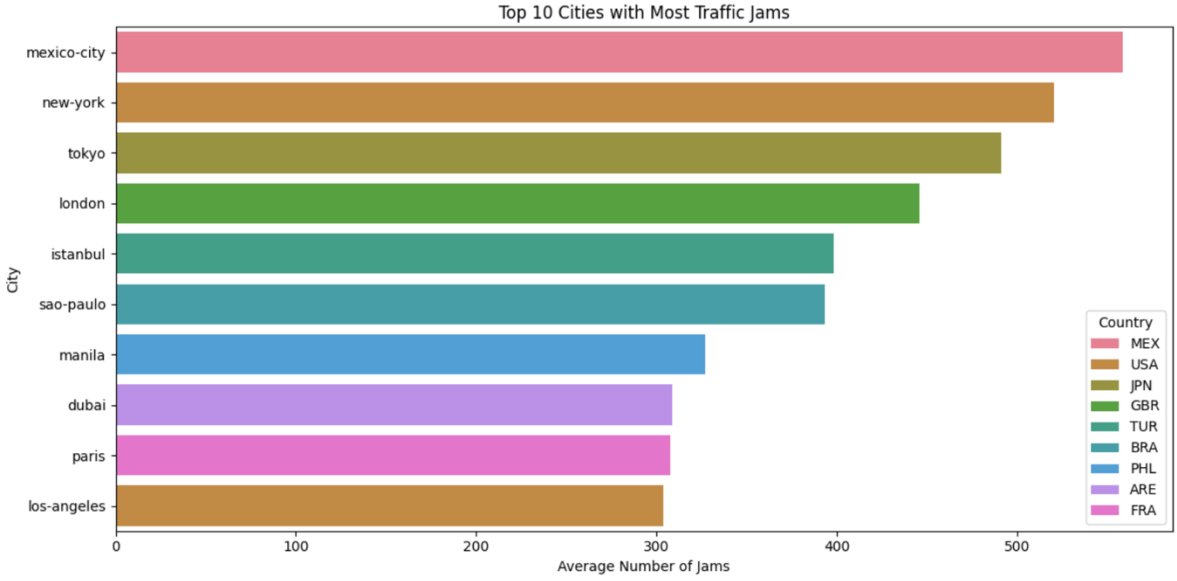

Figure 9: Bar chart of top 10 cities with highest JamsCount

Cities with the highest number of concurrent traffic jams tend to be large metropolitan areas with complex road networks.

7.3 Cities with Longest Traffic Jams

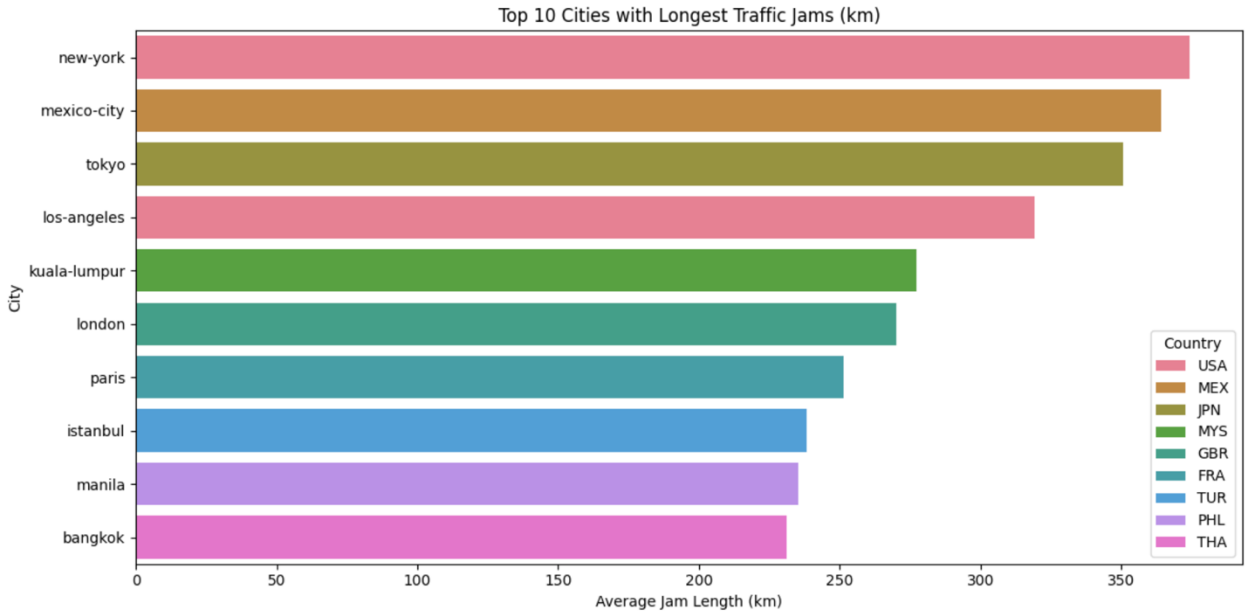

Figure 10: Bar chart of top 10 cities with longest JamsLengthInKms

Certain cities consistently experience particularly extensive traffic jams, often correlating with urban sprawl and limited alternative routes.

8. Regional Comparisons

The data shows clear regional patterns in traffic congestion:

- Asian megacities frequently show high congestion metrics
- European cities generally exhibit moderate but consistent traffic levels
- North American cities show greater variance between peak and off-peak times
- Cities in developing economies often face more severe congestion relative to their size

9. Impact Analysis: Delays and Economic Costs

The MinsDelay metric (difference between live and historical travel times) reveals the tangible impact of traffic congestion on daily commutes.

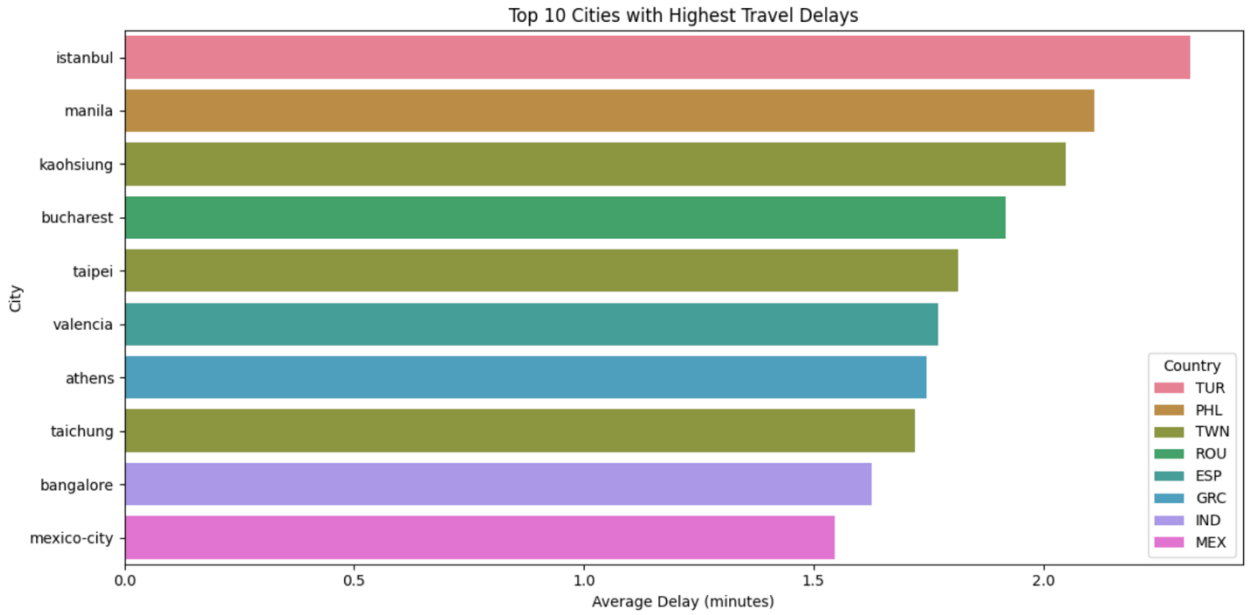

Figure 11: Bar chart of top 10 cities with highest MinsDelay

Cities with the highest delays represent areas where traffic conditions have deteriorated most significantly compared to historical norms.

10. Conclusions

Key Findings

1. Traffic congestion shows strong temporal patterns that are consistent across metrics
2. A small number of cities account for disproportionately high levels of global traffic congestion
3. Strong correlations exist between jam frequency, jam length, and overall traffic indices
4. Weekly traffic patterns show consistency with some notable exceptions