EXPLORING GEOAI TOOLS FOR GLOBAL AIRPORT RANKING ANALYSIS

A Comparative Study of Open-Source Geospatial Tools
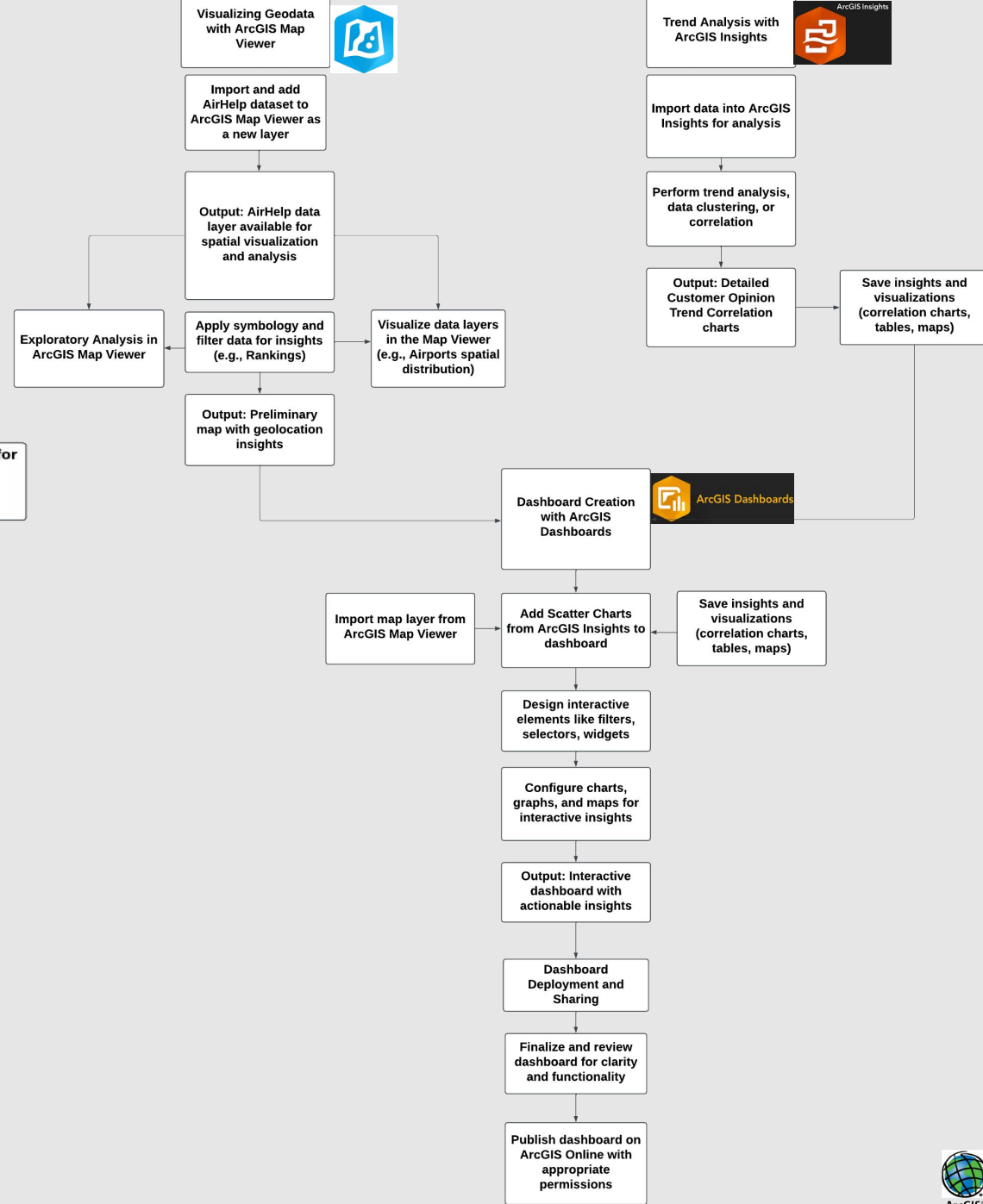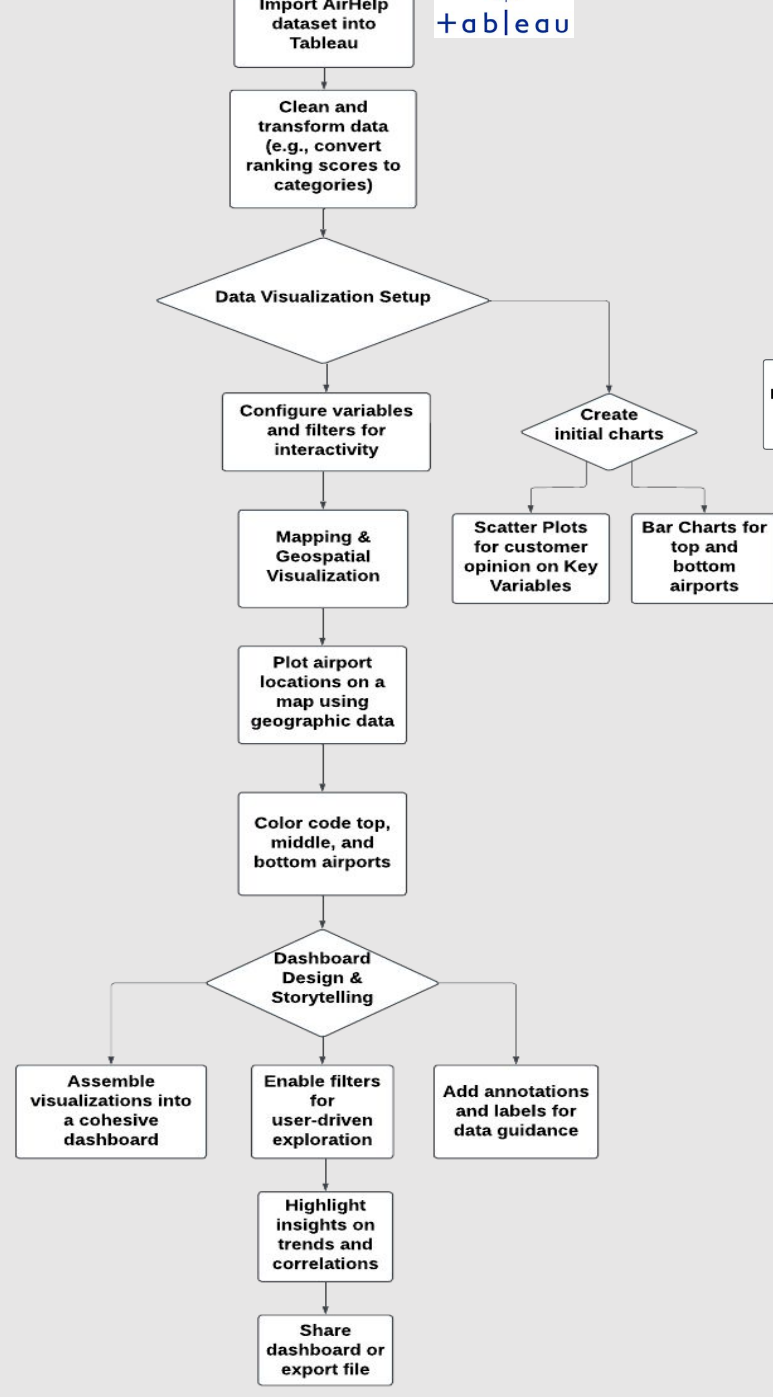
Introduction and Research Objective
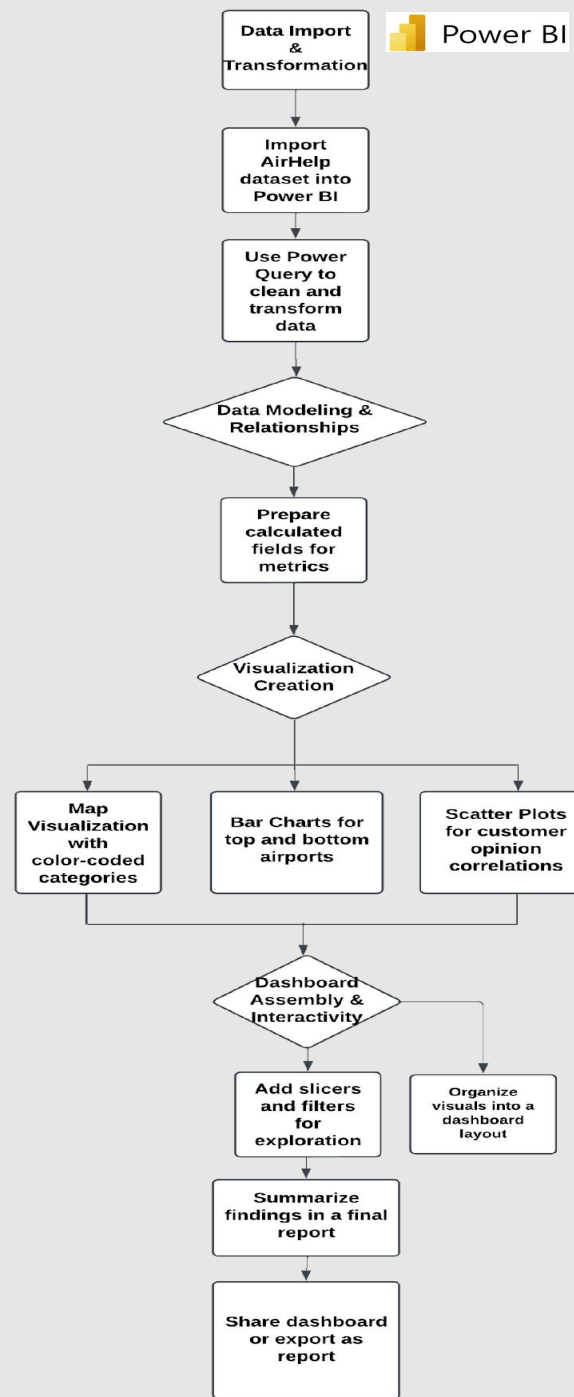
GeoAI Overview: Transforming spatial data with for strategic decision-making.

Research Objective: Evaluate ArcGIS, Tableau, and Power BI using the AirHelp Global Airport Rankings dataset.

Purpose: Identify the strengths of each tool in mapping, and data visualization for real-world applications.

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Power BI

- Data Import & Transformation
- Import AirHelp dataset into Power BI
- Use Power Query to clean and transform data
- Data Modeling & Relationships
- Prepare calculated fields for metrics
- Visualization Creation
  - Map Visualization with color-coded categories
  - Bar Charts for top and bottom airports
  - Scatter Plots for customer opinion correlations
- Dashboard Assembly & Interactivity
  - Add slicers and filters for exploration
  - Organize visuals into a dashboard layout
- Summarize findings in a final report
- Share dashboard or export as report

Tableau

- Import AirHelp dataset into Tableau
- Clean and transform data (e.g., convert ranking scores to categories)
- Data Visualization Setup
  - Configure variables and filters for interactivity
    - Mapping & Geospatial Visualization
      - Plot airport locations on a map using geographic data
      - Color code top, middle, and bottom airports
  - Create initial charts
    - Scatter Plots for customer opinion on Key Variables
    - Bar Charts for top and bottom airports
- Dashboard Design & Storytelling
  - Assemble visualizations into a cohesive dashboard
  - Enable filters for user-driven exploration
    - Highlight insights on trends and correlations
    - Share dashboard or export file
  - Add annotations and labels for data guidance

Visualizing Geodata with ArcGIS Map Viewer

- Import and add AirHelp dataset to ArcGIS Map Viewer as a new layer
- Output: AirHelp data layer available for spatial visualization and analysis
  - Exploratory Analysis in ArcGIS Map Viewer
  - Apply symbology and filter data for insights (e.g., Rankings)
  - Visualize data layers in the Map Viewer (e.g., Airports spatial distribution)
- Output: Preliminary map with geolocation insights

Trend Analysis with ArcGIS Insights

- Import data into ArcGIS Insights for analysis
- Perform trend analysis, data clustering, or correlation
- Output: Detailed Customer Opinion Trend Correlation charts
- Save insights and visualizations (correlation charts, tables, maps)

Dashboard Creation with ArcGIS Dashboards

- Import map layer from ArcGIS Map Viewer
- Add Scatter Charts from ArcGIS Insights to dashboard
- Save insights and visualizations (correlation charts, tables, maps)
- Design interactive elements like filters, selectors, widgets
- Configure charts, graphs, and maps for interactive insights
- Output: Interactive dashboard with actionable insights
- Dashboard Deployment and Sharing
- Finalize and review dashboard for clarity and functionality
- Publish dashboard on ArcGIS Online with appropriate permissions

Dashboard Comparison

Strengths: Excellent visualization and storytelling capabilities, with high interactivity.

Limitations: Limited advanced geospatial functionalities.

Top and Bottom Airports by Customer Opinion (2023)

Top 10 Airports by Customer Opinion

Iata	Airport
TLL	Lennart Meri Tallinn Airpo...
ICN	Seoul—Incheon Internatio...
MCT	Muscat International Airp...
LUX	Luxembourg Airport
DXB	Dubai International Airport
RUH	Riyadh King Khaled Intern...
NRT	Tokyo Narita Internationa...
DOH	Doha Hamad Internationa...
HND	Tokyo Haneda Internation...
DEL	Delhi Indira Gandhi Intern...

Bottom 10 Airports by Customer Opinion

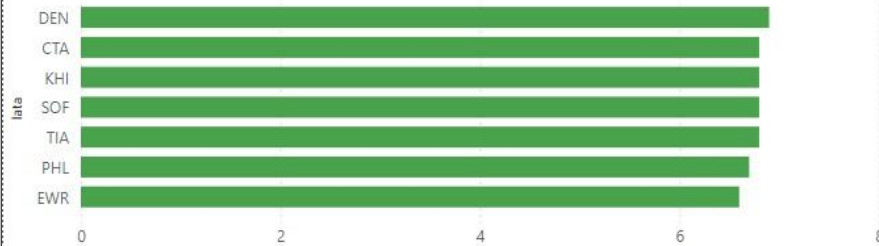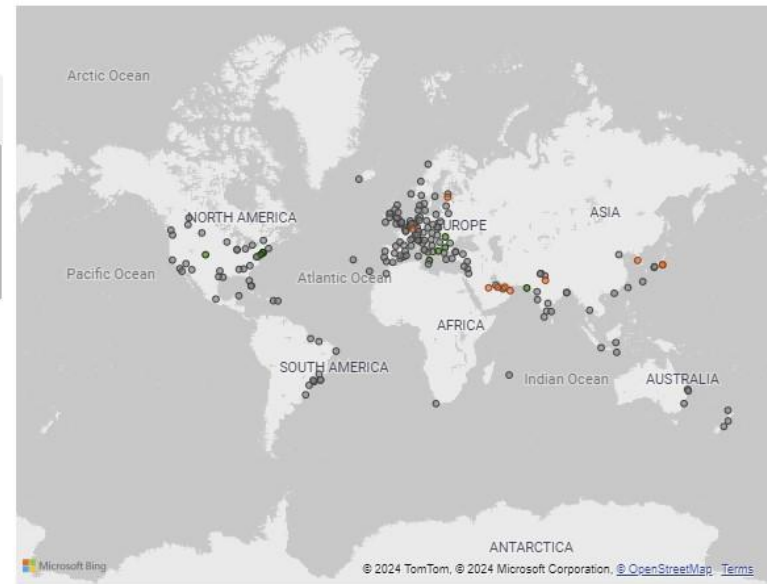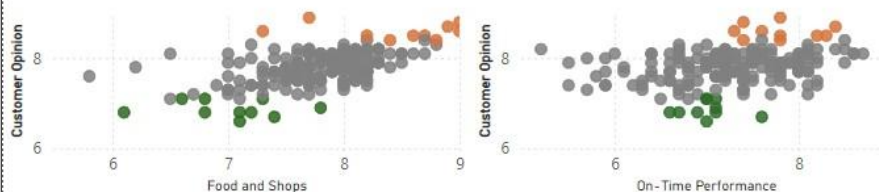| Iata	Airport
LIN	Milan Linate Airport
CRL	Brussels South Charleroi...
CLJ	Cluj-Napoca International...
DEN	Denver International Airp...
TIA	Tirana International Airpo...
SOF	Sofia Airport
KHI	Karachi Jinnah Internatio...
CTA	Catania-Fontanarossa Air...
PHL	Philadelphia Internationa...
EWR	Newark Liberty Internatio...

Top Airport Trends

- Excellent WiFi service
- Efficient ground transportation to airport
- Clean and well maintained
- Efficient, with short lines at security and immigration
- Plenty of power outlets, seating and passenger spaces

Botton Airport Trends

- Not well cleaned
- Poor WiFi service
- Delay at security and immigration
- Old and outdated facilities
- Hard to access via ground transport
- Overcrowded
- Limited restaurant options

Correlation Between Key Variables

Top & Bottom Airports ...
- Bottom
- Top
- Middle
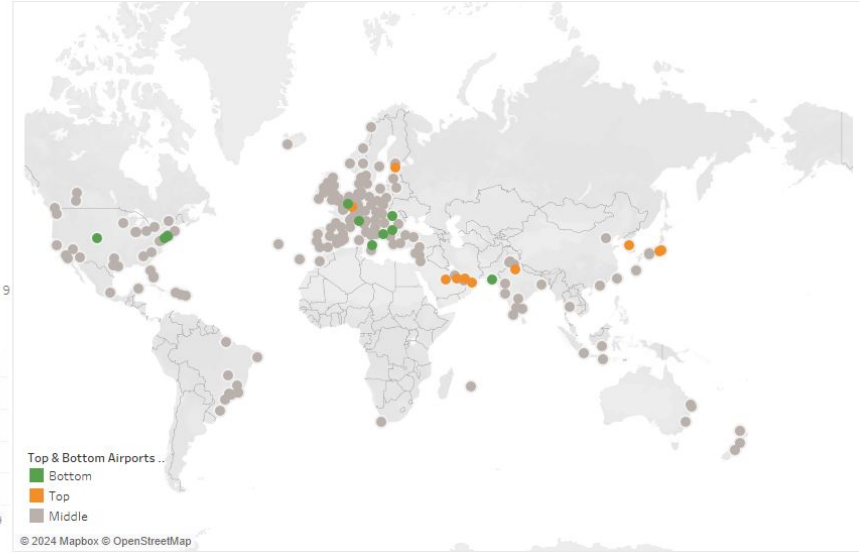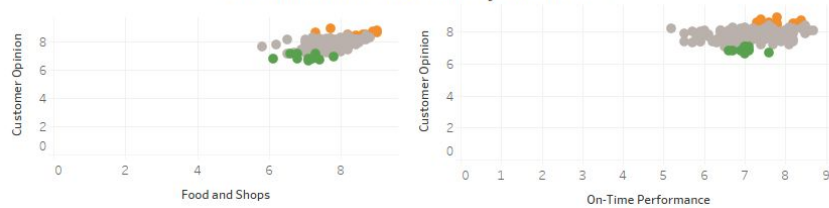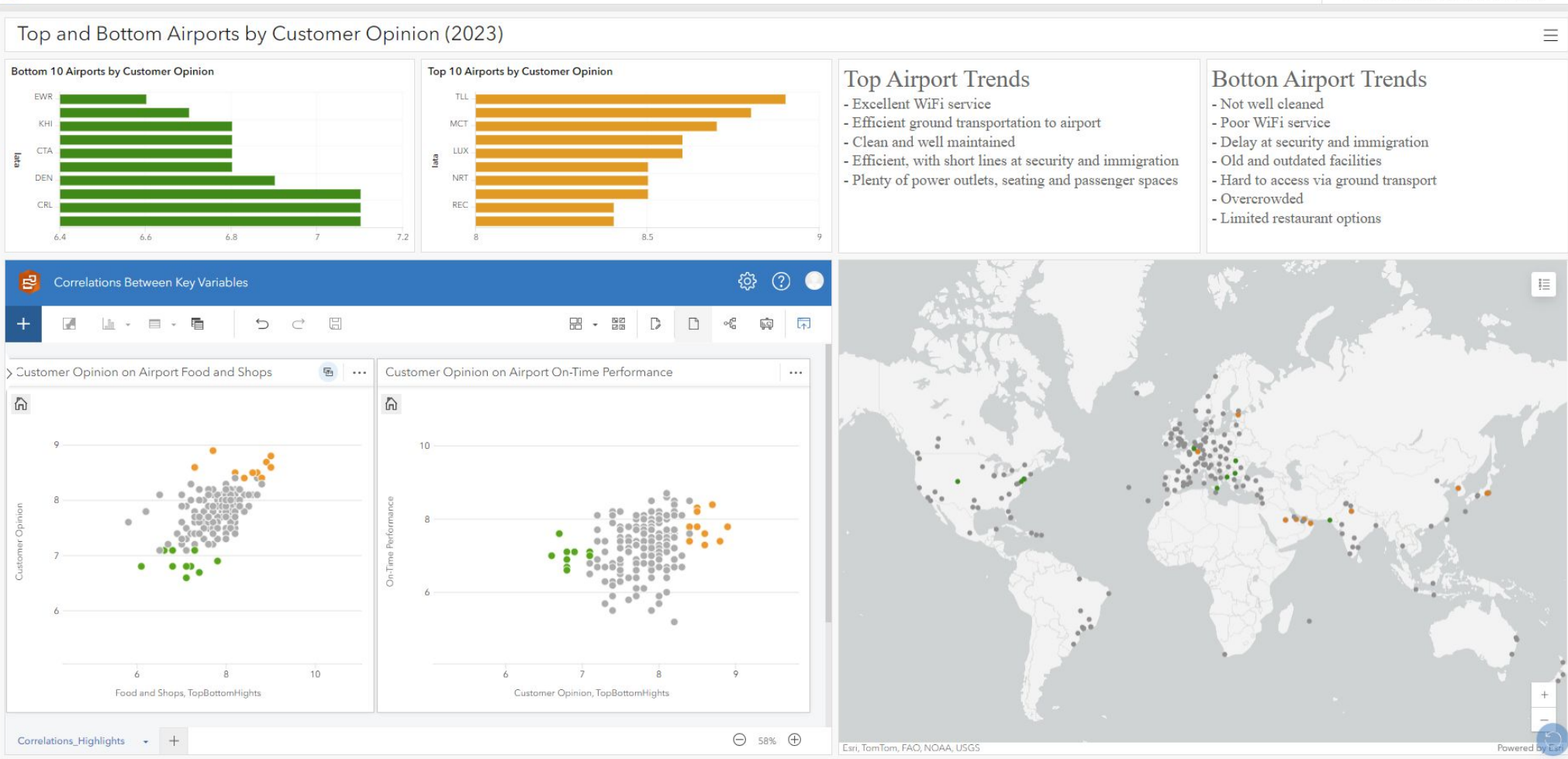
Strengths: Advanced geospatial analysis capabilities, excellent for geographic and spatial pattern visualization.

Limitations: Steeper learning curve and less intuitive for non-GIS users.

Dashboard Comparison

Top and Bottom Airports by Customer Opinion (2023)

Strengths: Seamless integration with other Microsoft tools, suitable for business intelligence and reporting.

Limitations: Moderate mapping capabilities compared to specialized GIS tools.

Findings and Recommendations

Software Name	Findings	Recommendation
ArcGIS	▪Best for **detailed spatial analysis and advanced mapping**. ▪Offers strong geospatial tools, ideal for in-depth clustering and spatial patterns.	▪Tasks requiring robust geospatial analysis and mapping capabilities. ▪Suitable for GIS professionals or those needing advanced spatial insights.
Tableau	▪Excels in **interactive visualization and user-friendly dashboard design.** ▪Strong **storytelling capabilities** but limited in-depth geospatial functions.	▪Users focused on data visualization and storytelling. ▪ For analysts or educators who need interactive and accessible data presentations.
Power BI	▪Strong in **business intelligence integration and reporting**. ▪ Suitable for **creating business-focused reports with moderate geospatial analysis**.	▪Users in business settings who need data integration with reporting. ▪Tasks that combine basic mapping with business insights and reporting.

THANK YOU