Using Novel Data Sources for Monitoring SPIs

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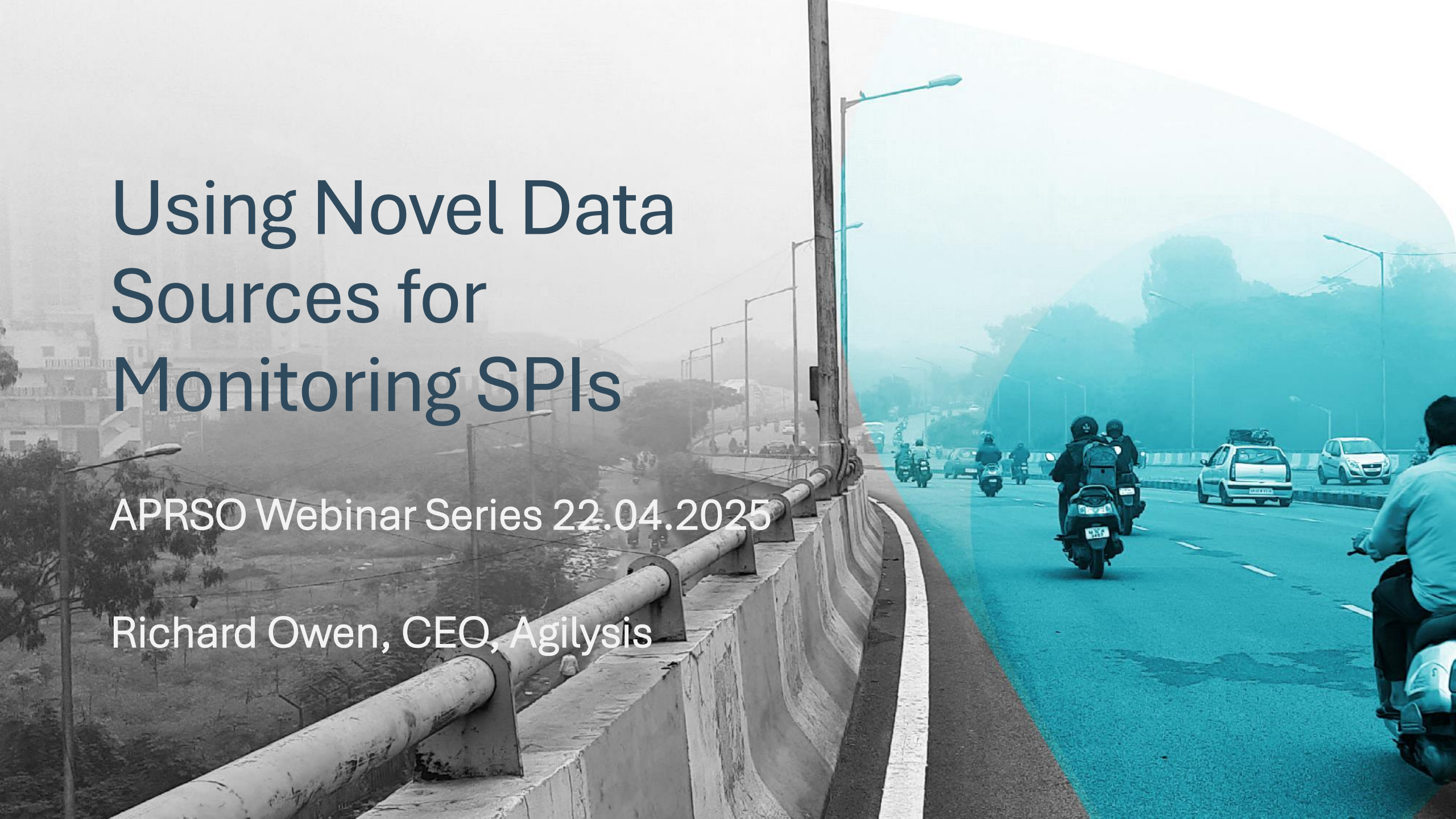
Richard Owen, CEO, Agilysis



Project Team

Richard Owen – *Project Leader*

Wouter Van den Berghe - *Road Safety Performance Specialist*

Felix Wilhelm Siebert - *Performance Analyst/Quantitative Analytics*

Project Aims

This assignment has been created to support the Asia-Pacific Road Safety Observatory (APRSO) mission to improve the quality of road safety data across the region, to monitor the progression of road safety over time, and to compare performance between countries.

This work focusses on collecting, collating and analysing data in order to quantify three target Safety Performance Indicators (SPI):

A. That part of a nation's road network carrying 75% of traffic;

B. The proportion of traffic travelling over the speed limit on the 75% of traffic network; and

C. The proportion of two-wheeler users wearing helmets on the 75% of traffic network.

Project Aims

Significant variability in the availability of data across APRSO countries.

Lack of open and available ‘ground truth’ data to validate novel data sources.

Significant progress has been made in Europe on standardising SPI measurements, but still relies on traditional survey methodologies.

Three distinct phases of the project, originally scheduled to be completed by January 2025, now due for publication in Summer 2025

Methodology Report → Data Demonstration → Full Data Collection

Target 4: By 2030, more than 75% of travel on existing roads is on roads that meet technical standards for all road users that take into account road safety.

Target 6: By 2030, halve the proportion of vehicles travelling over the posted speed limit and achieve a reduction in speed-related injuries and fatalities.

Methodology Report

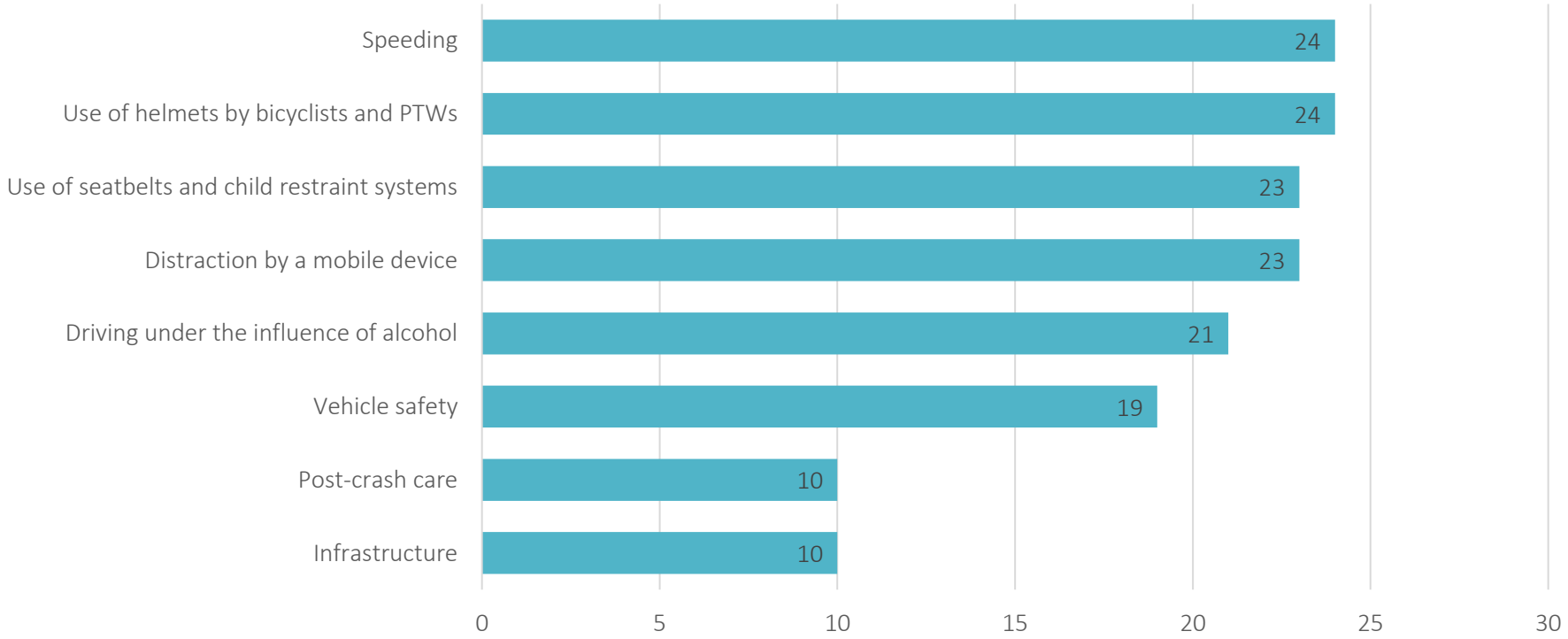
97 page report providing a comprehensive analysis of the following topics:

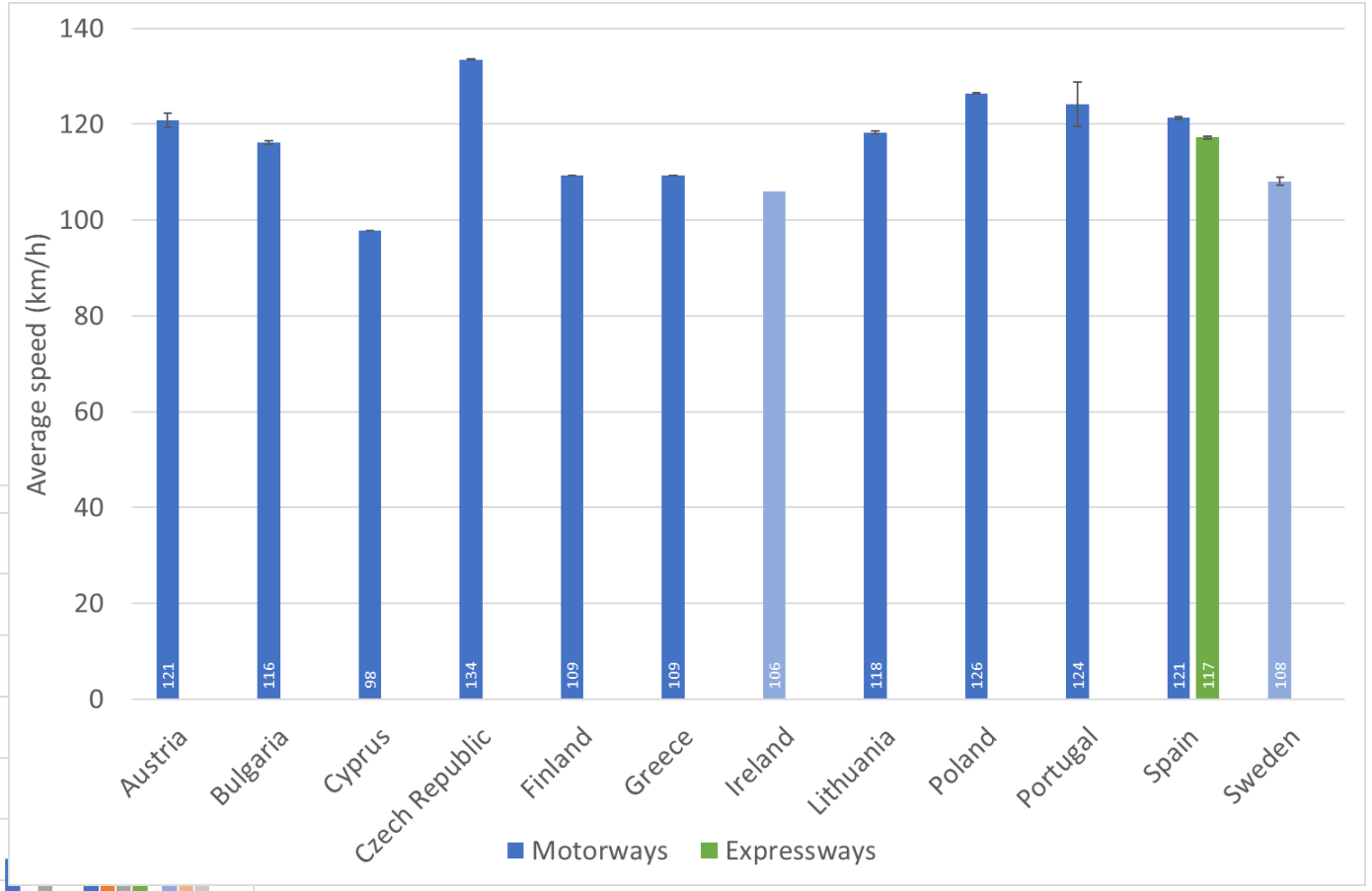
- The use and description of Safety Performance Indicators in general. This includes best practice on data collection, sampling methods and an examination of approaches promoted within the European Baseline and Trendline initiatives.
- Data sources and methodologies for traffic counts and the calculation of the percentage of travel on road networks.
- Data, technologies and methods for calculating SPIs for speeding.
- Data, technologies and methods for calculating SPIs on helmet wearing rates by drivers and passengers of PTWs.
- Initial assessment of suitable target countries and transferability of approaches.
- The analysis includes literature reviews as well as assessment of technologies based on whitepapers and published reports.

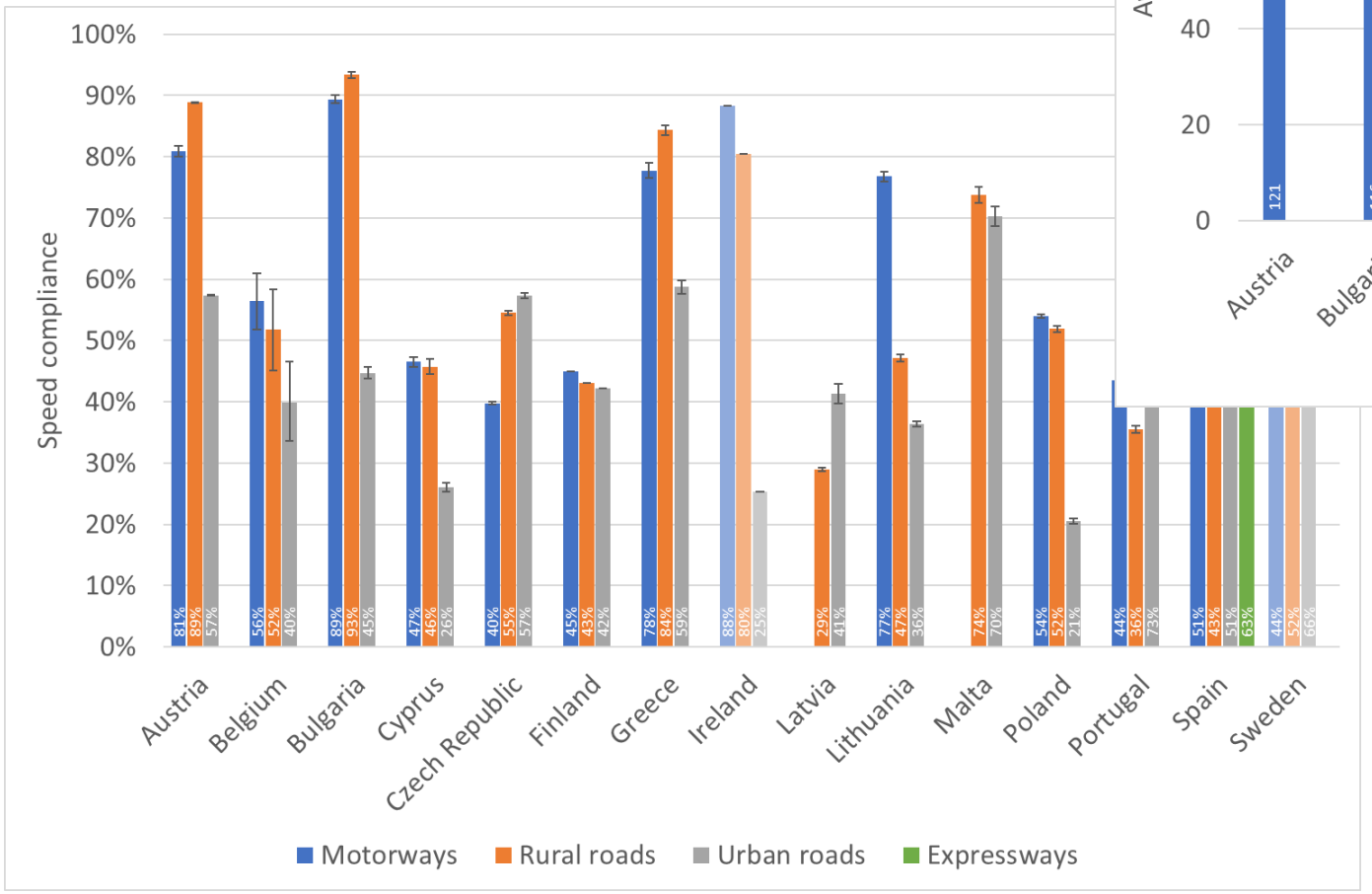
Methodology Report

Analysis of SPI used in the EU shows the focus on behavioural measures

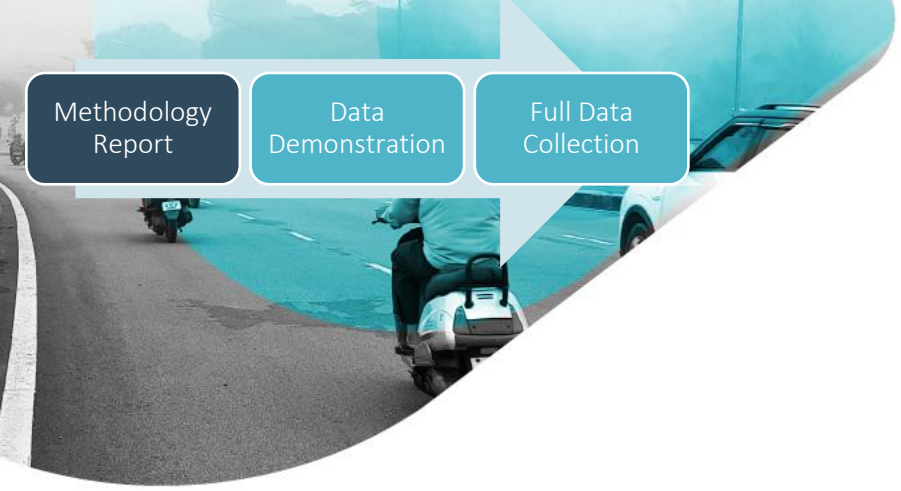
Analysis tends to be at a national level, not regional



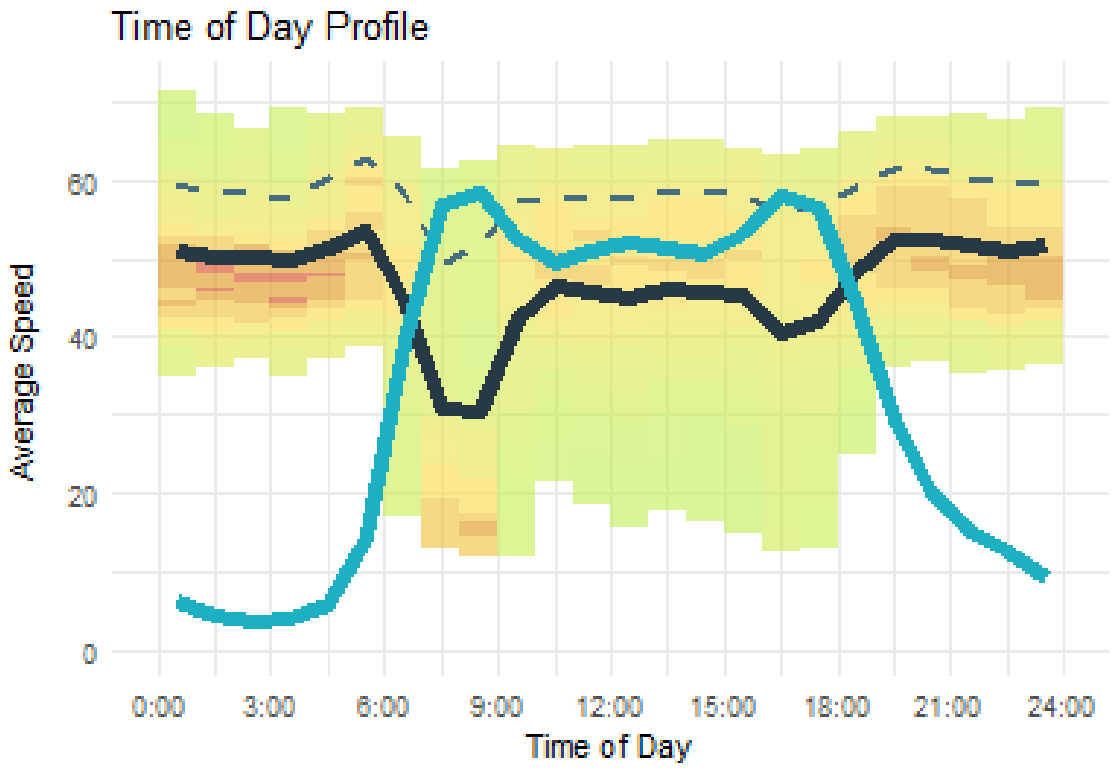




Speeding SPI



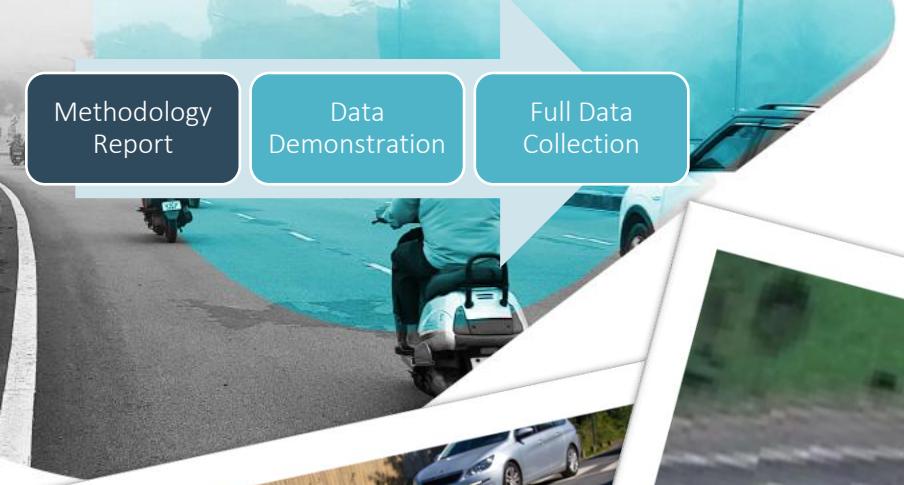
Speeding SPI

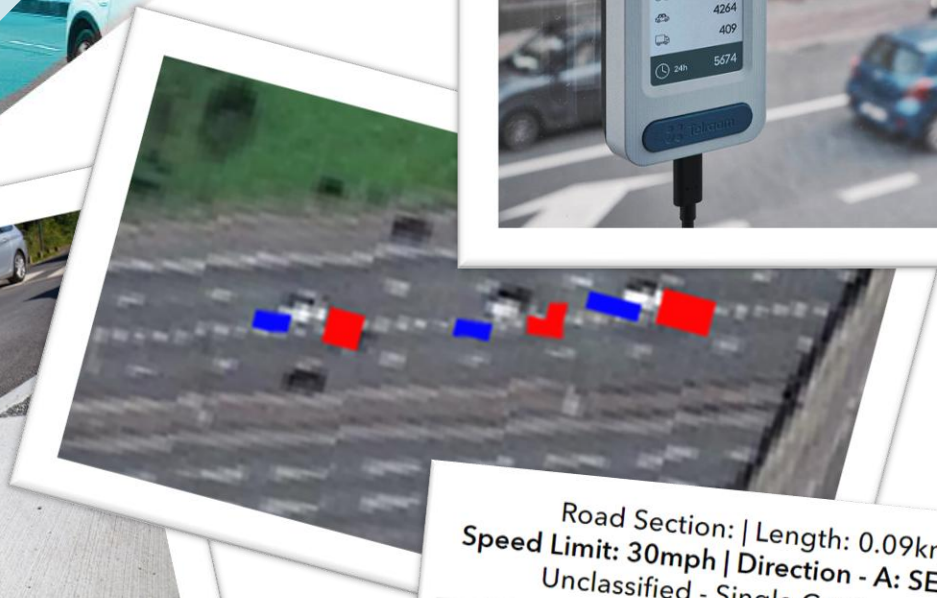


- Speeds are not uniform throughout the day.
- Traffic may impact ‘free flow’ speed and this will need to be understood for each location.
- Is it important to measure speeds for individual vehicle classes, perhaps there will be different limits applied?
- Holidays and other unusual period may need to be excluded

Speeding SPI

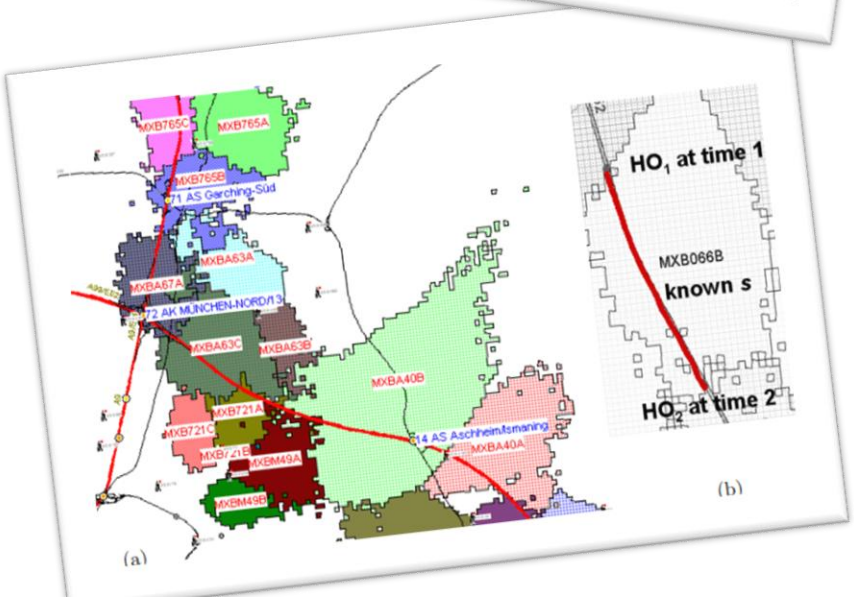
Methodology Report | Data Demonstration | Full Data Collection

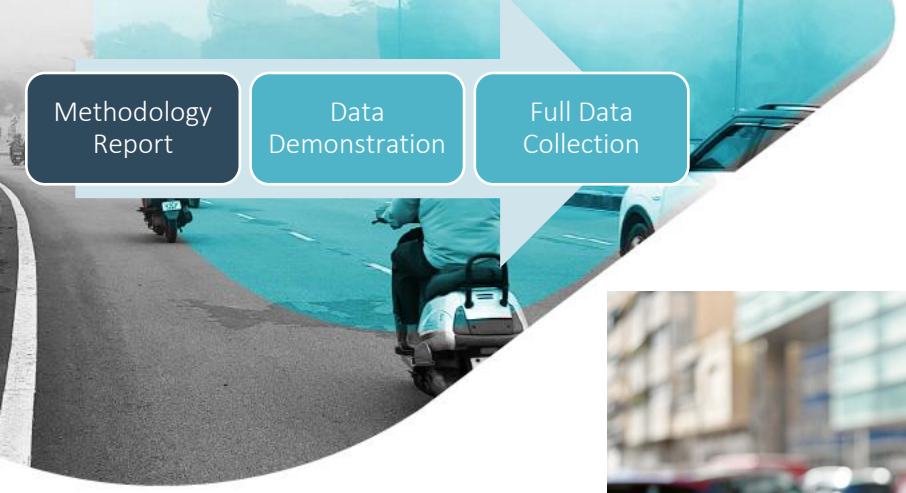




Road Section: | Length: 0.09km
Speed Limit: 30mph | Direction - A: SE / B: NW
Unclassified - Single Carriageway

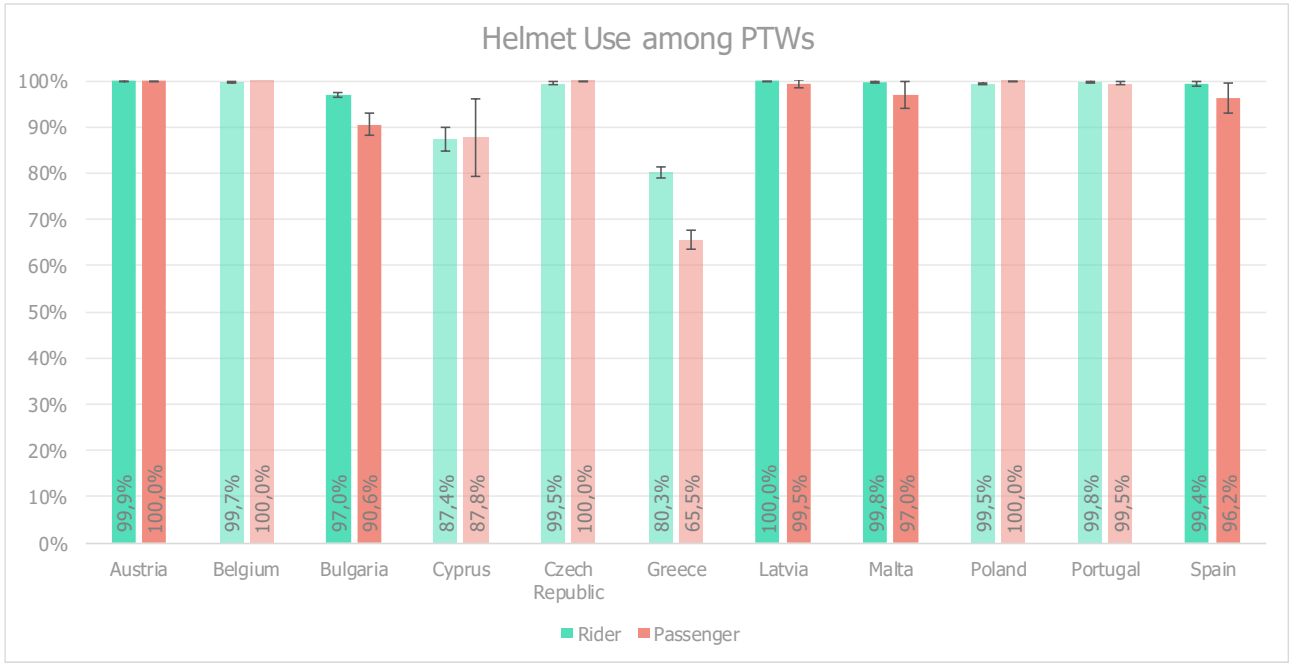
Percent over Limit	Number over Limit
55.0%	4,290
All Day Average Speed	**All Day 85th Percentile Speed**
30.6mph	35.3mph

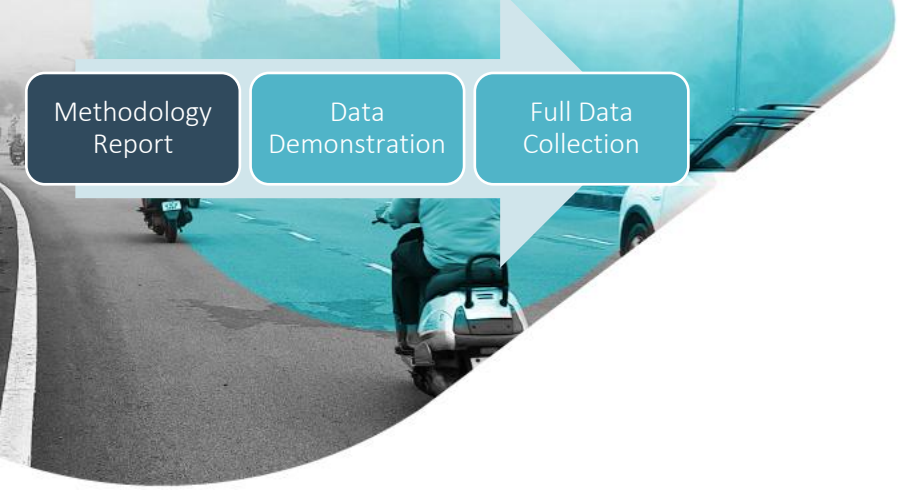




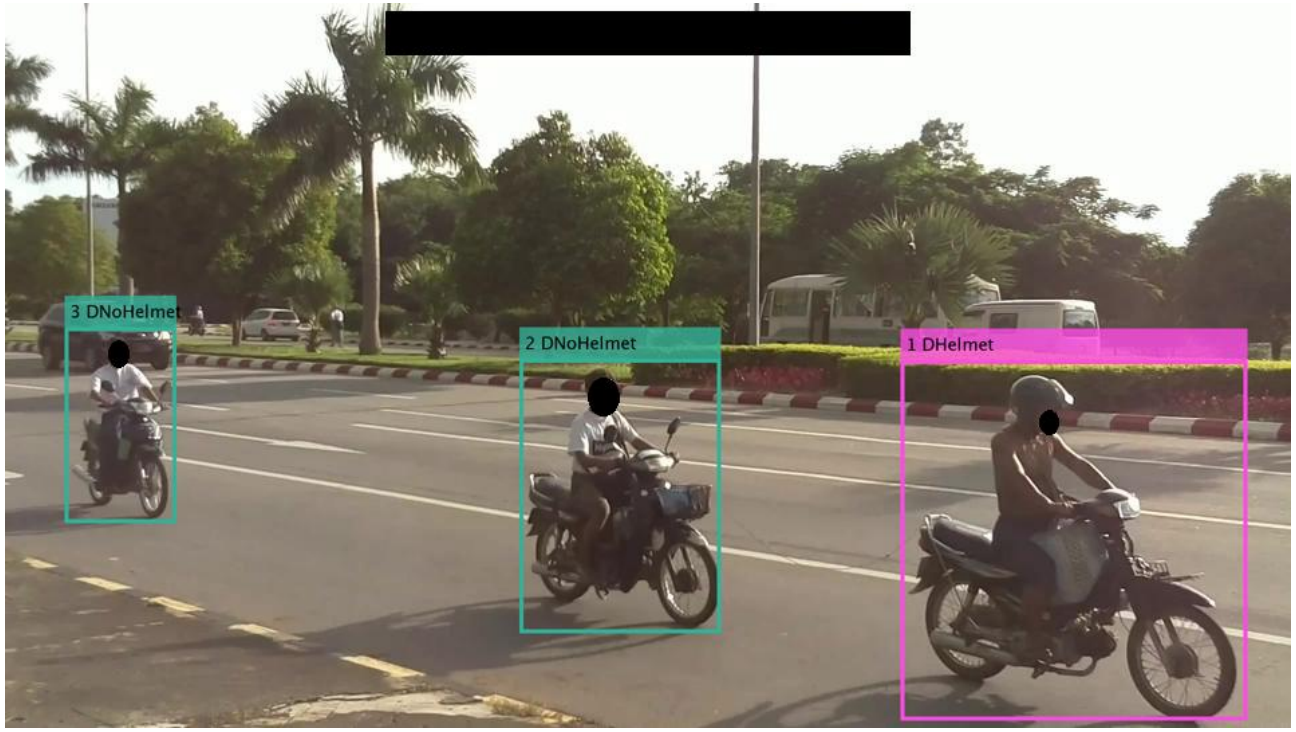
Helmet wearing

- All current approaches require observational surveys.
- Compliance already demonstrated to vary between countries in Europe.
- Lower compliance for pillion passengers.
- Lower compliance in rural areas.





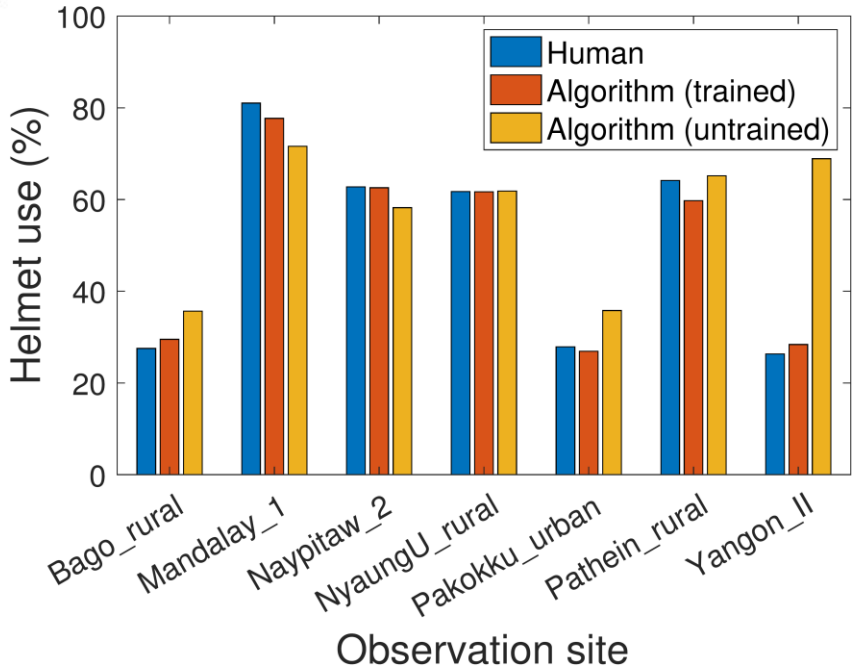
Helmet wearing

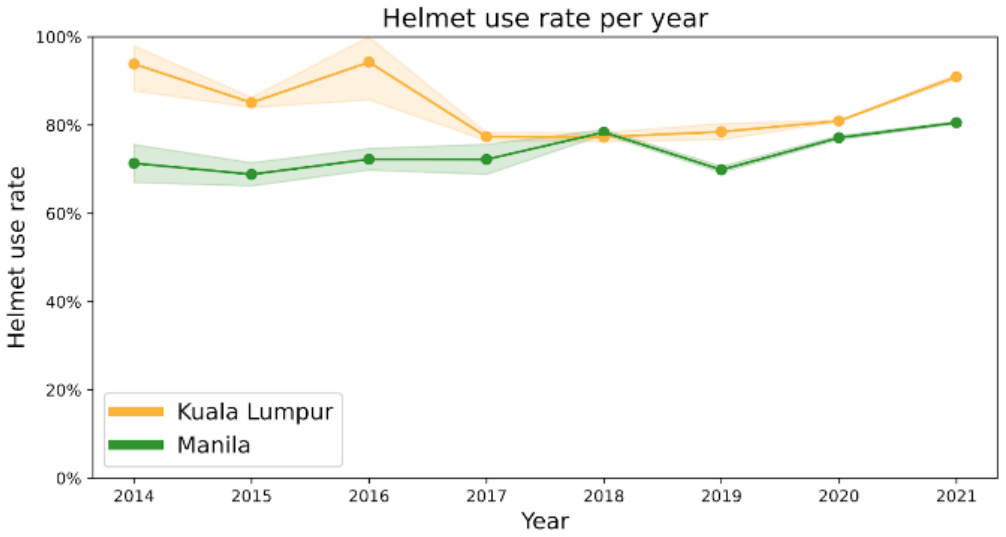


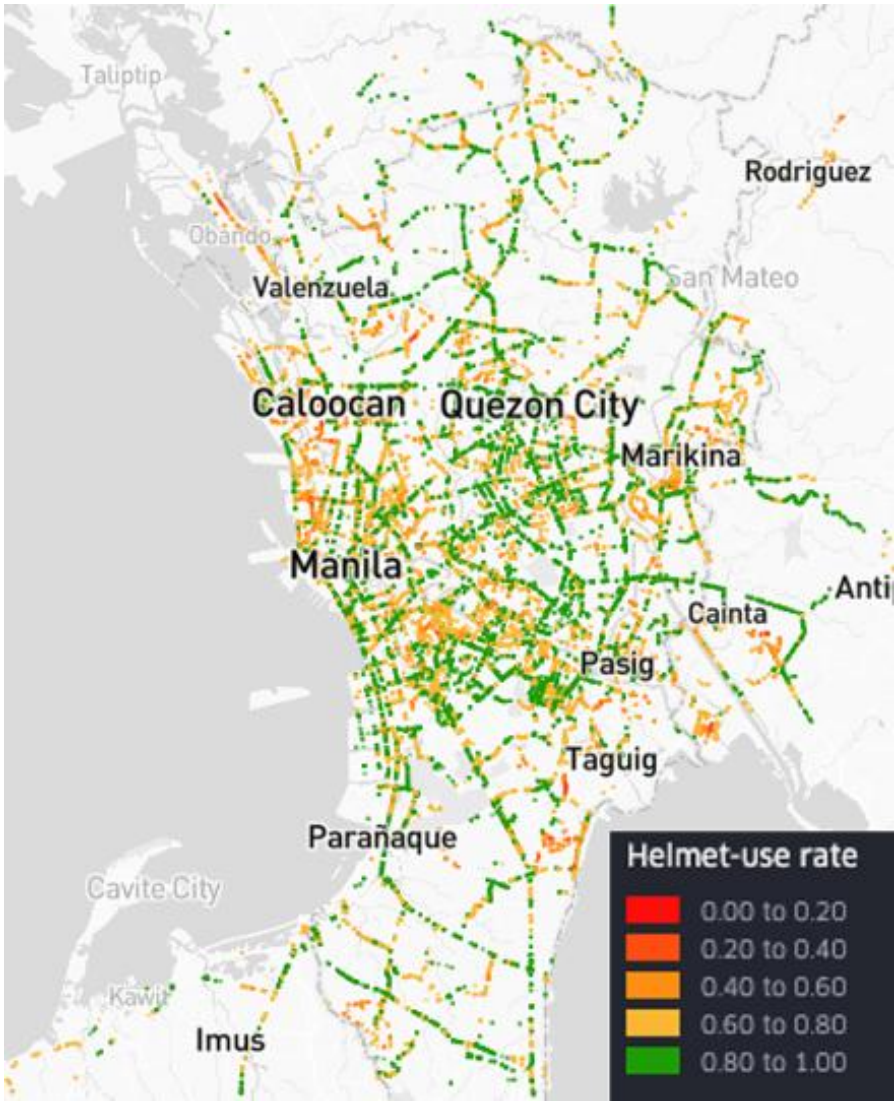
- Novel techniques available using AI (computer vision).
- Can differentiate between motorcycles, cyclists, and pedestrians.
- Can also identify riders and passengers.
- Requires access to medium-resolution imagery which can be open-source or purchased (not Google StreetView)

Helmet wearing

- Previous papers have assessed reliability vs human observations.
- Time series analysis.
- Spatial variation.



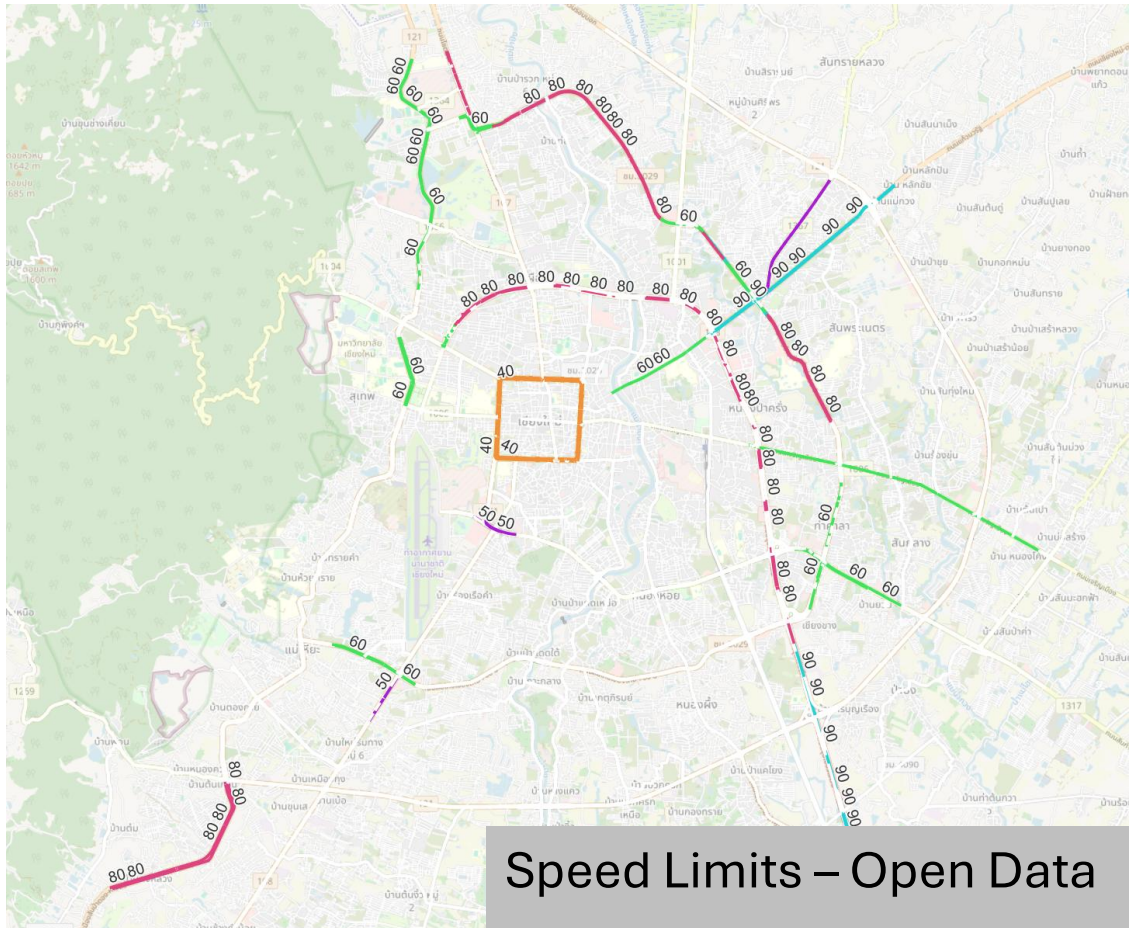




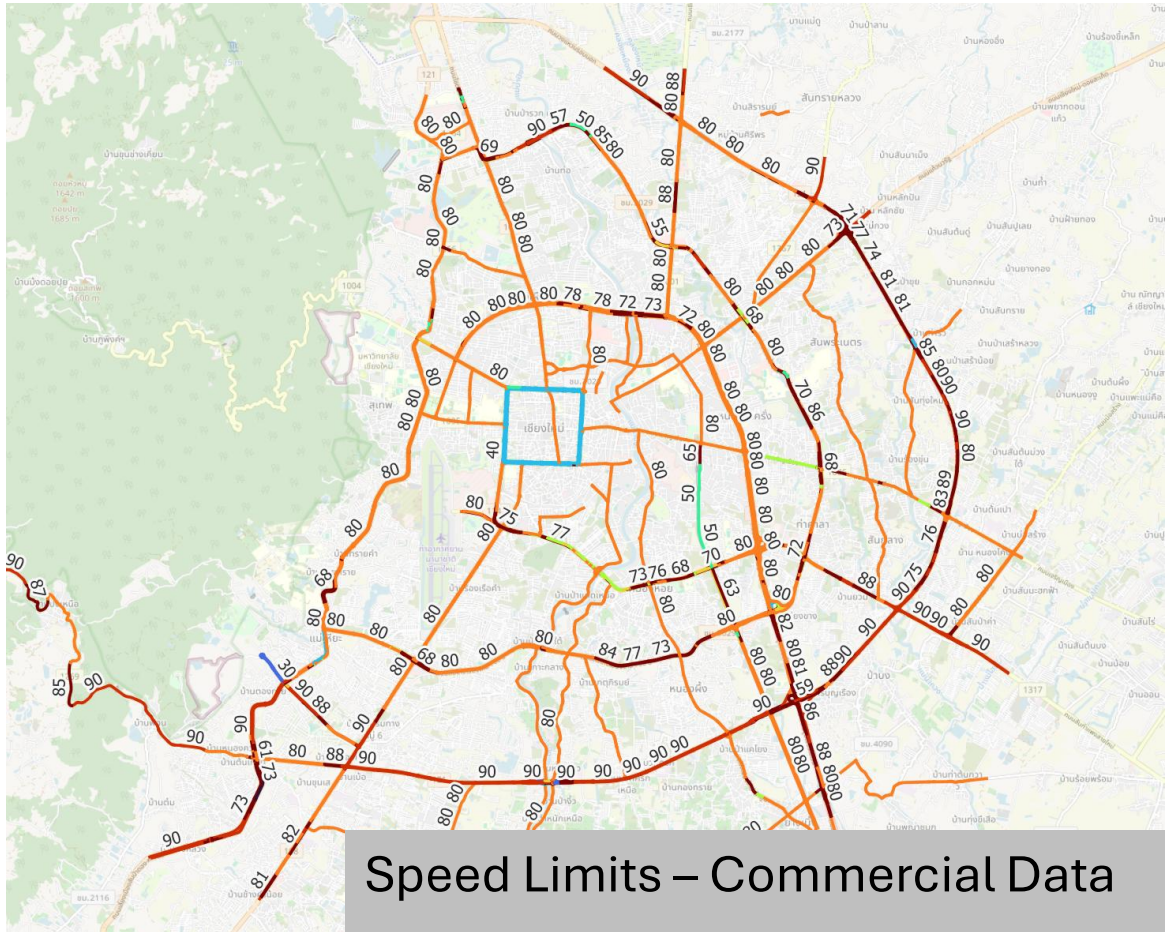
Data Demonstration

- Six-month process of collecting and evaluating data in three countries (The Philippines, Thailand, India).
- Significant early efforts required to establish reliable road network data.
- Explored difficulties in matching various data sources to networks.
- Refined methodologies to exclude busy junctions and develop a sampling strategy for a whole country.
- Identified preferred suppliers for data procurement.

Data Demonstration

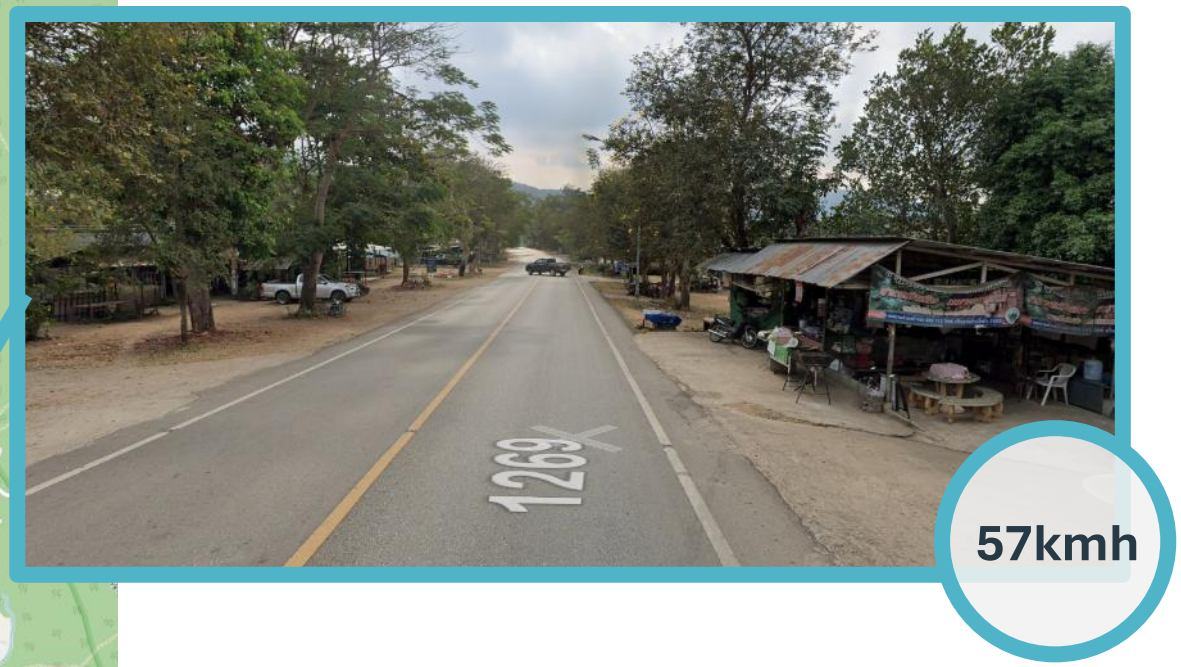


Speed Limits – Open Data



Speed Limits – Commercial Data

SAMPLE VEHICLE SPEEDS IN THAILAND



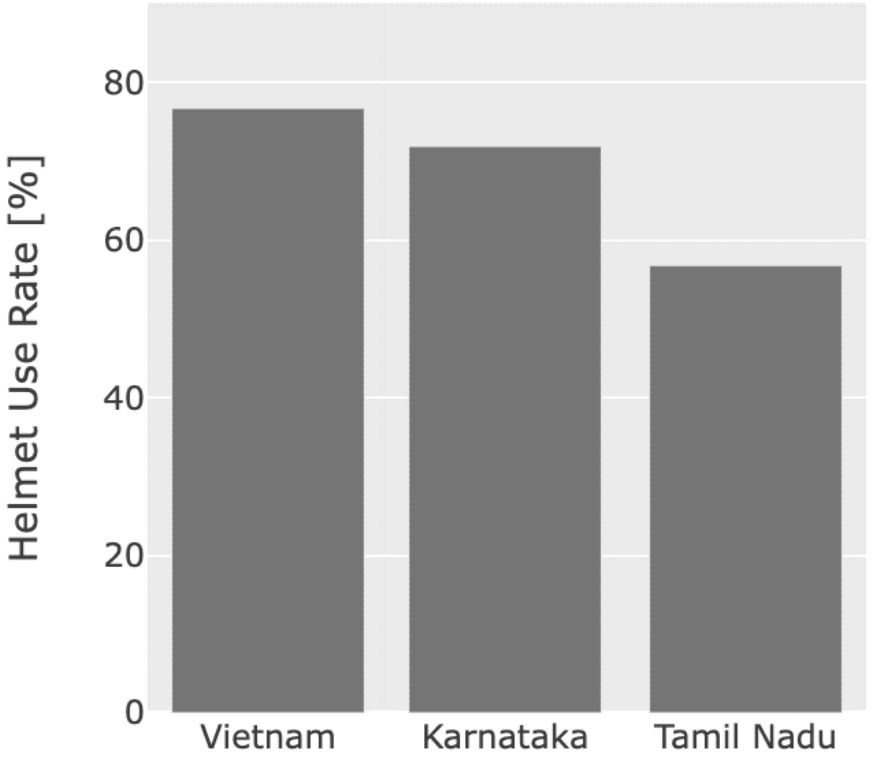
Helmet wearing

Country / region	Distance covered [%]	Images
Vietnam	6.0	1,225,411
Malaysia	13.4	1,507,722
Luzon (Philippines)	13.5	1,997,705
Karnataka (India)	5.7	230,295
Tamil Nadu (India)	4.9	88,372
Thailand	20.0	2,547,393
Indonesia	8.4	2,018,538

- Early success demonstrated suitability of approach at a national level.
- Was able to go beyond the original aim and produce overview results for all areas.
- Significant coverage across road networks, although reliant on third party street view images

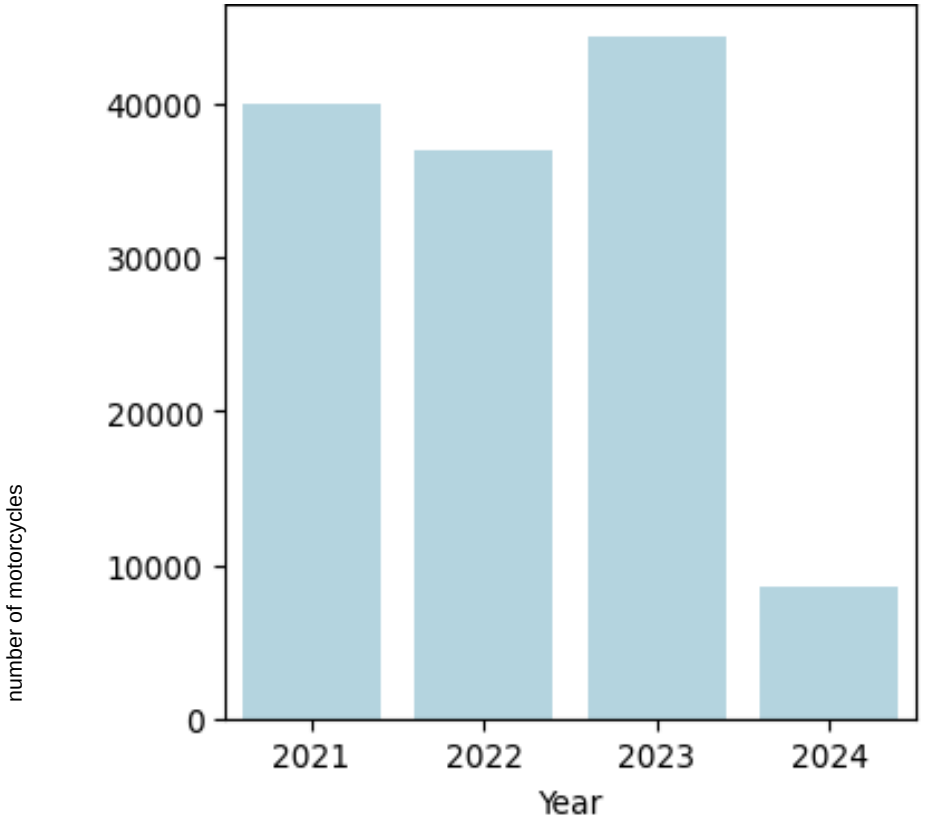
Helmet Wearing

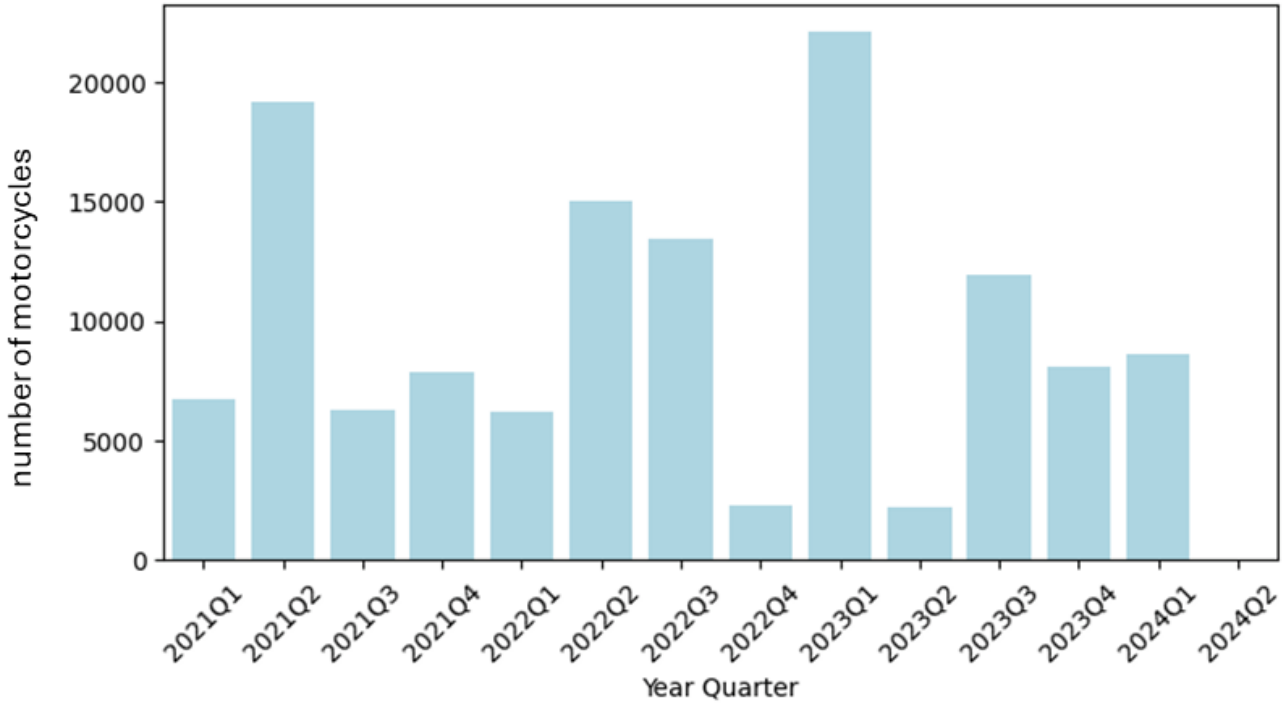
- Reviewing possibility to create national maps of compliance.
- Sub-regional and spatial analysis also being explored



Helmet Wearing

Methodology Report → Data Demonstration → Full Data Collection





Full Data Collection

- Focus on data for Thailand to complete SPI for the whole country.

Road Class	Section Count	Length (km)
Motorway	775	855.1
Primary	3,769	13,129.70
Secondary	6,710	35,038.50
Trunk	4,434	16,401.80
TOTAL	15,688	65,425

Road Class	RURAL	URBAN
Motorway	308	548
Primary	9,072	4,058
Secondary	28,863	6,175
Trunk	11,359	5,043
TOTAL	49,601	15,824

Methodology Report | Data Demonstration | Full Data Collection

Result Status: All | Valid | Preliminary

Percentage Travel Between: 0 - 100

Speed Limit Filter: 80

Land Use Filter: Urban

Province: All Provinces

Average Drivers % Within Limit
77.5

Total Sample Road Length km
0.8

Total of Average Sample Size
1.4M

Average Median Speed
69.1

Average 85th %-ile Speed
83

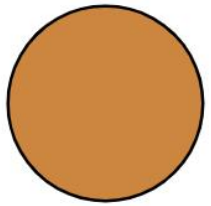
Somphot Chiang Mai 700 Pi Road

Zoom to | Pan

Street View (Start)
Street View (End)

OvertureID	7247
english_ro	Somphot Chiang Mai 700 Pi Road
RoadClass	primary
LandUse	Urban
ProvinceID	50
RoadLength	0.80
Computed Length	803.68
SpeedLimit	80
SpeedLimitFloor	80
SampleSize_avg	1370177
WeightedSample	1096142
TotalSample	1370177
Percent_	0.000073
Percentile	0.85
RankedPercentile	67.26
AnalysisStatus	Valid
MedianSpeed	69.10
85thPercentileSpeed	83.00
NumberOverLimit	308290
PercentOverLimit	0.23

Speed Classification



Land Classification

ADB Solving Complex Challenges Together

agilysis

Full Data Collection

- First draft now produced showing national results.
- Interactive dashboard also produced.
- Now reviewing results and ordering further data to fill any gaps.
- Preparing final summary report and dissemination materials for later in 2025.
- Considering scalable delivery for new countries and how this data can support road safety initiatives.
- Many potential use cases beyond simple SPI production