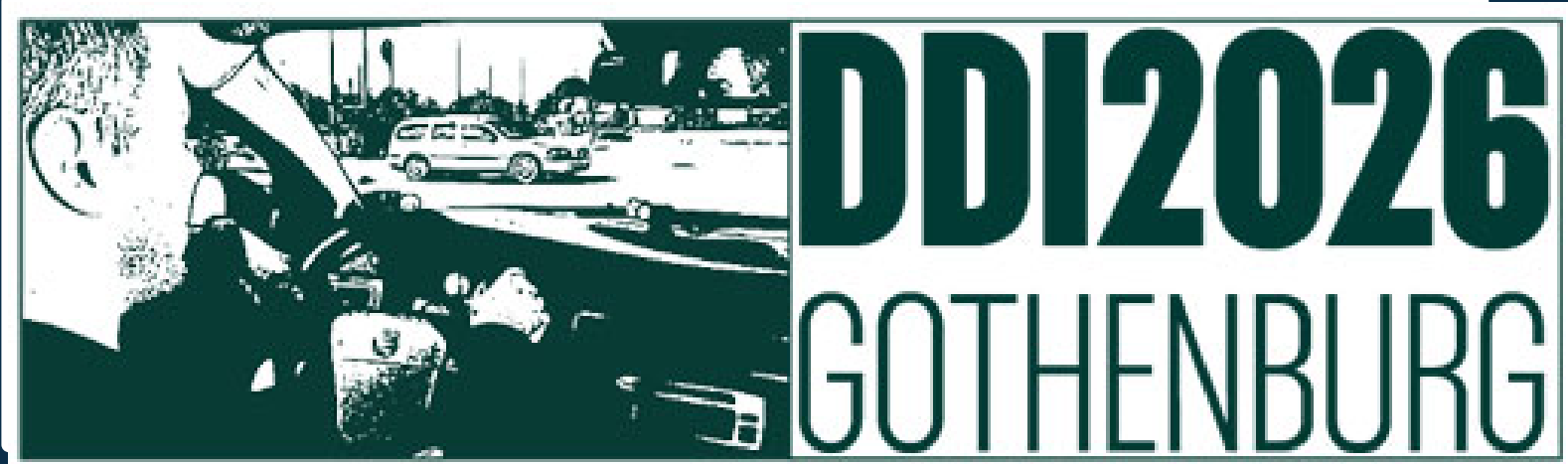




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DRIVER DISTRACTION AND MOBILE DEVICE USAGE: SAFETY PERFORMANCE INDICATOR RESULTS FOR CROATIA

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Trendline



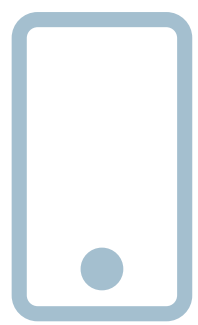
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FACULTY OF TRANSPORT AND TRAFFIC SCIENCES

WEEKDAY NATIONAL KPI

94.39%

95% CI: 92.02 - 96.22%

Weighted · 3 required vehicle types

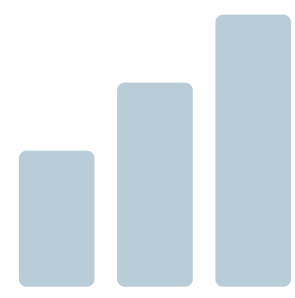


TOTAL OBSERVATIONS

22,675

13,747 in primary weekday KPI

All periods · 4 vehicle categories



FIELD SURVEY

41 sites

61 observation sessions across Croatia

Motorways · rural · urban roads



INTRODUCTION

Driver distraction is a significant road safety concern, particularly when drivers handle mobile devices while operating a vehicle. Such behaviour can divert visual, manual and cognitive resources away from the driving task, impairing hazard perception and vehicle control. Comparable observational indicators are therefore needed to monitor behaviour, identify groups with elevated risk, and inform empirical countermeasures in Croatia and across Europe.

OBJECTIVES

This study estimates Croatia's national safety performance indicator (KPI), defined as the share of drivers not holding a mobile device while driving. It also examines differences between passenger cars, light goods vehicles and heavy goods vehicles, investigates variation between motorway, rural and urban environments, and places the Croatian results within the wider European Trendline framework. The analysis distinguishes descriptive KPI estimates from supplementary statistical tests.

METHODOLOGY

Trained observers recorded drivers of moving vehicles under free-flow traffic conditions at 41 geographically distributed sites during 61 sessions. The primary national KPI uses 13,747 weekday observations of passenger cars, light goods vehicles and heavy goods vehicles and is weighted in accordance with the European methodology. Confidence intervals describe uncertainty. Supplementary regression models based on individual records were used to assess subgroup associations and observation period differences.

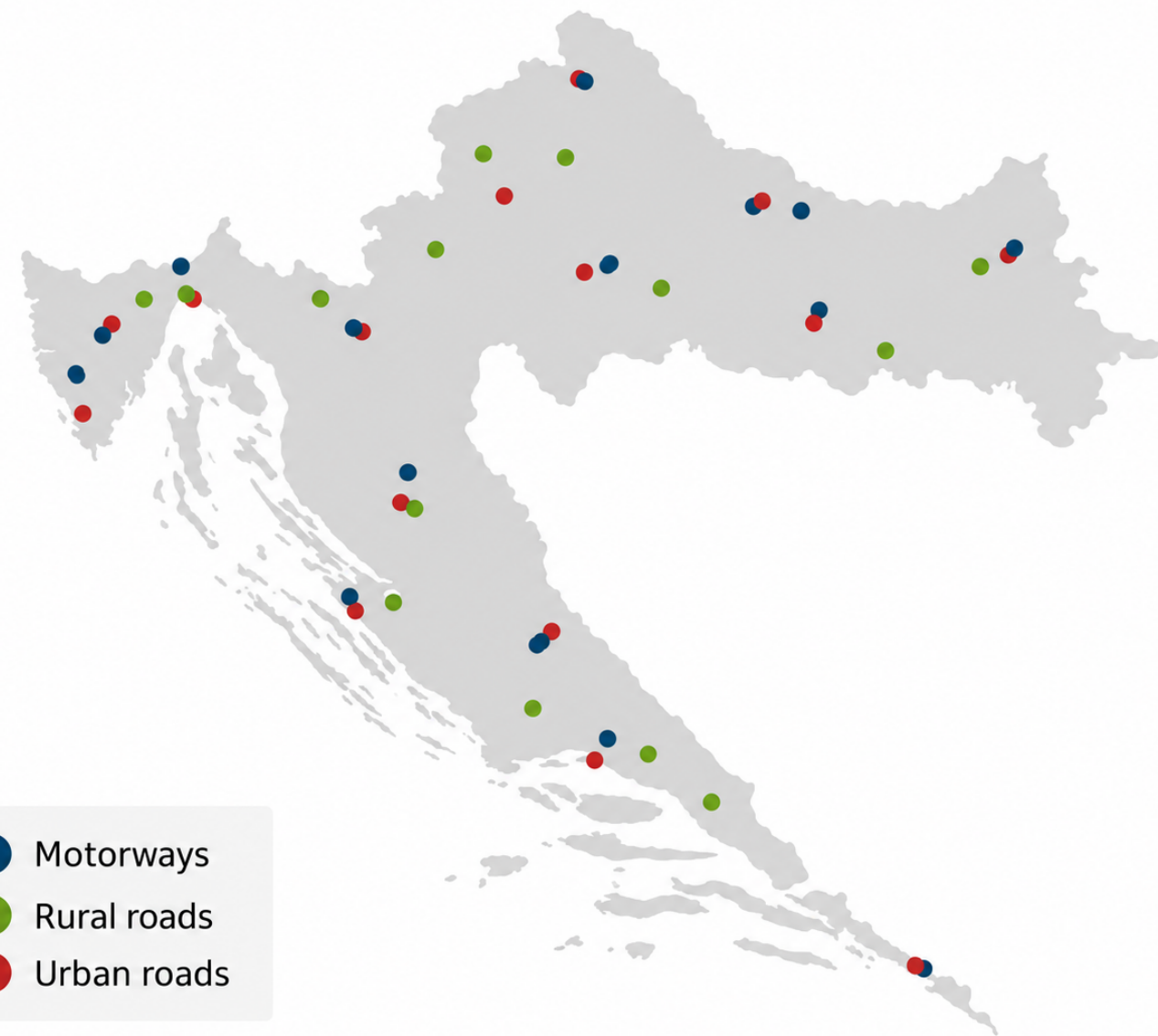
DATA COLLECTION & ANALYSIS

National field campaign

Observers monitored vehicles travelling in free-flow daytime conditions on motorways, rural roads and urban roads. Locations were geographically distributed across Croatia to cover different parts of the national road network and ensure representation of different driving environments. Traffic counts were conducted alongside roadside observations to support the weighting of the national indicator.

13,747

weekday records for the primary KPI; the full dataset also includes weekends and buses (22,675 observations in total).



VEHICLE CATEGORY

Weighted weekday KPI · 95% confidence intervals

Passenger cars

94.5%

Light good vehicles

91.2%

Heavy good vehicles

89.5%

5.0 PERCENTAGE-POINT DIFFERENCE: CARS vs HGVs

HGV drivers had higher observed handheld device use; adjusted model: $p < 0.001$.

ROAD CATEGORY

Weighted weekday KPI by road environment

Motorways

94.3%

Rural roads

95.6%

Urban roads

94.1%

No significant road category differences in the adjusted weekday model ($p = 0.974$).

VEHICLE TYPE × ROAD TYPE

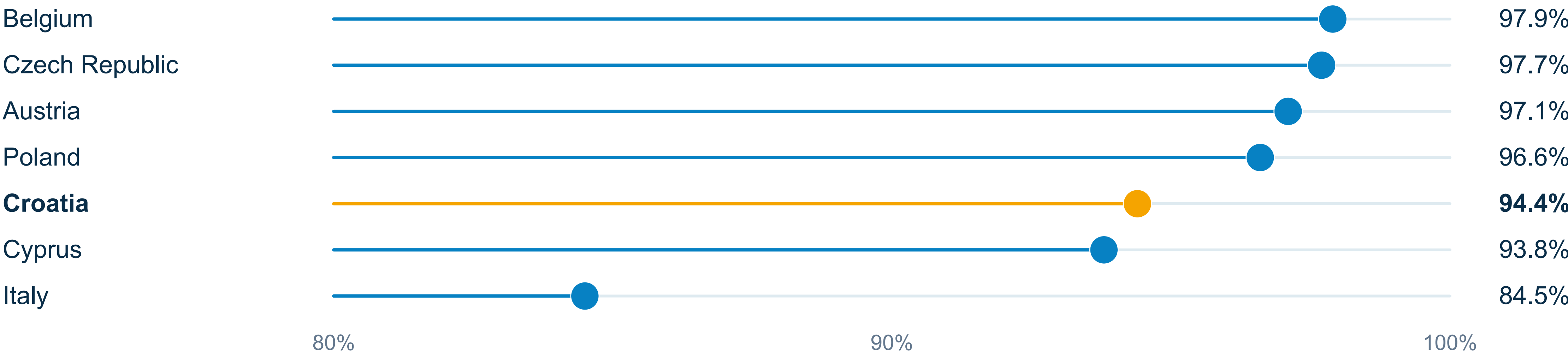
Weighted weekday KPI (%) across nine subgroups

	Motorway	Rural	Urban
Passenger cars	95.5%	95.8%	94.1%
Light good vehicles	95.2%	91.6%	90.7%
Heavy good vehicles	85.7%	87.1%	95.2%

Largest gap on motorways: HGVs 85.7% versus passenger cars 95.5% (9.8 pp).

EUROPEAN CONTEXT

Croatia compared with selected countries in the Trendline programme (weekday KPI)



OBSERVATION PERIOD

WEEKDAY → WEEKEND

94.4% → 96.6%

Supplementary analysis examined differences in handheld mobile device use between weekdays and weekends. The observed share of drivers not holding a mobile device increased from approximately 94.4% on weekdays to 96.6% on weekends. In the adjusted regression model based on individual observations, the odds of observed handheld mobile device use were significantly lower on weekends (OR = 0.70; 95% CI: 0.58-0.84; $p < 0.001$). These findings indicate that observation period may be associated with differences in driver distraction behaviour. However, the official national KPI refers specifically to weekday observations and is calculated using the prescribed weighting methodology.

RESULTS

The national weekday KPI was estimated at 94.39% (95% CI: 92.02-96.22%), indicating that most observed drivers were not holding a mobile device while driving. Nevertheless, statistically significant differences were identified between vehicle categories ($p < 0.001$), with the highest compliance among passenger car drivers (94.5%), followed by light goods vehicle drivers (91.2%) and heavy goods vehicle drivers (89.5%). Differences between road categories were relatively modest, with KPI values ranging from approximately 94.1% on urban roads to 95.6% on rural roads, and were not statistically significant in the adjusted weekday model ($p = 0.974$). The largest descriptive difference was observed on motorways, where the KPI for heavy goods vehicle drivers was 85.7%, compared with 95.5% for passenger car drivers.

DISCUSSION

The findings indicate that handheld mobile device use remains a relevant road safety concern in Croatia despite the relatively high national KPI value. Differences between vehicle categories were more pronounced than those between road types, particularly among heavy goods vehicle drivers. The largest descriptive difference appeared on motorways, where the KPI was 85.7% for heavy goods vehicles and 95.5% for passenger cars. Professional driving may involve additional communication demands related to logistics, delivery schedules and operational coordination, although the observational study design does not allow these factors to be established as causal explanations. The supplementary analysis also indicated lower handheld mobile device use during weekends, suggesting that travel purpose and working conditions may warrant further investigation.

CONCLUSIONS & LIMITATIONS

The study provides a national assessment of mobile device use among drivers in Croatia using the harmonised European road safety KPI framework. Although most drivers were observed without using mobile devices, driver distraction remains a relevant road safety concern. Significant differences between vehicle categories, particularly the lower compliance among heavy goods vehicle drivers, highlight the need for targeted interventions, continued enforcement and awareness campaigns. The main limitations include the observational study design, potential underestimation of mobile device use, observations limited to daytime conditions and smaller sample sizes for certain vehicle categories. Differences in sampling and weighting procedures may also affect comparisons between countries.