Testing of KPIs for the enforcement of traffic regulations

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Abstract

Key Performance Indicators (KPIs) may concern any of the steps of the penal procedure that constitutes enforcement of traffic regulations. Available data on relevant procedures and results vary widely among EU Member States. In order to select appropriate and useful KPIs on traffic enforcement, key road safety problems in each country should be considered and focus should be on particular road safety offences, groups of road users or types of roads that relate to these key problems.

This paper describes the framework for the selection and the results of the pilot application of appropriate KPIs on enforcement of traffic regulations within the Trendline research project.

Selected KPIs, concerned:

- the number of police controls/violation/population
- the number of tickets /violation/population
- the number of urban red-light cameras/ network km or population or population/km2
- the number of fixed speed cameras or section control stretches per km of network or population or population/km2.

Pilot KPIs in three countries revealed that close cooperation with the Traffic Police and other authorities is needed to obtain data on enforcement procedures and results not freely available. Specific traffic violations seem of more interest e.g. speeding and drink-driving. Different approaches concerning driver awareness about enforcement actions were also identified.

Keywords: enforcement, KPI, Trendline, pilot.

Introduction

Worldwide, the intensification of road safety enforcement is proven to be the **primary measure** which can lead to an **immediate improvement** of the behaviour of road users and to the subsequent significant reduction of road crashes.

Enforcement is part of the **Vision Zero** philosophy and the **Safe System approach** as set out in the EU Road Safety Strategy. A part of the 'shared responsibility' in reaching road safety goals of the EU Road Safety Strategy and Safe System approach is that law enforcement officers and the justice system need to work together to increase **compliance with road safety law**.

In the framework of the EU co-funded project "Trendline" (**www.trendlineproject.eu**) methodological guidelines for data collection, data analysis and delivery of road safety Key Performance Indicators (KPIs) were developed. These KPIs will be used within road safety policies to further support evidence-based decision making. KPIs included the eight basic ones listed in the EU road safety policy framework 2021-2030 as well as additional ones.

The latter were selected using a structured process that included consultation with the Member States (MS) and application of selection criteria such as (national) **policy relevance**, (expected) **feasibility** and (likely) **international comparability**. One of the additional KPIs concerned the **enforcement of traffic regulations** and the respective Trendline methodological guidelines were developed by a Key Expert Group (KEG) comprising experts from seven Member States.

The objective of this paper is to present the **framework for the selection and the results of the pilot application of appropriate KPIs on enforcement** of traffic regulations within Trendline.

KPI Enforcement of Traffic Regulations

KPI enforcement may concern **any step of the penal procedure** that constitutes enforcement of traffic regulations.

Methods and **procedures** for the enforcement of traffic regulations vary widely among the Member States. Subsequently **available data** on relevant procedures and results may be **substantially different** among countries.

It is also essential to consider the **key road safety problems** in each country and to focus on KPIs that are related to specific road safety offences, road user groups, or roads types associated with these key problems.

Within Trendline, it was suggested that each Member State chooses to calculate the **most appropriate and useful KPI on enforcement** of traffic rules based on applicability and availability of data as well as on the particular needs in the respective country.

KPI Enforcement Definitions

The minimum **methodological requirements** to qualify for a KPI enforcement of traffic regulations selected from a proposed list of **alternative options** from the international literature were defined within Trendline:

Option 1: Number of **police controls** per infringement (speeding, seat-belt use, helmet use, distraction, drink-driving, red light driving) and population

Option 2: Number of **tickets per infringement** (speeding, seat-belt use, helmet use, distraction, drink-driving, red light driving) and per population

Option 3: Number of **red-light cameras** on the urban network per population

Option 4: Number of **fixed speed enforcement cameras** or section control stretches per population

Option 1 provides a good **measurement of the effort** dedicated to enforcement and of the importance given to specific infringements. In combination with an analysis of key road safety problems in a country, this indicator can be very useful for the identification of enforcement gaps.

Option 2 reflects the **effectiveness of enforcement** activities in terms of identifying violators. Option 2 combined with Option 1 may provide useful insight as for the effectiveness of enforcement as a preventive measure.

Option 3 is a measure of the **level of enforcement** at sites where traffic violations might be frequent and indicates potential gaps.

Option 4 is related to **speeding** which has been highlighted as one of the key road safety issues worldwide.

Table 1 Overview of minimum requirements for KPI enforcement of traffic regulations

KPI	Minimum requirement	Optional
KPI	**Option 1:** Number of police controls per infringement (speeding, seat-belt, helmet, distraction, drink-driving, red lights) and per population **Option 2:** Number of tickets per infringement (speeding, seat-belt, helmet, distraction, drink-driving, red lights) and per population **Option 3:** Number of red-light cameras on the urban network (per population) **Option 4:** Number of fixed speed cameras or section control stretches (per population) For Options 1 and 2: minimum three different infringements considered	Additional Options on KPI Additional infringements Additional versions of Options 1-4 using different measurement units e.g. per km of network OR per population OR per population/km^2 OR per traffic volume based on available data and special interests of the Member States.
Road type (if relevant)		Motorway Expressway including urban express roads Rural road Urban road (or road inside urban areas)
Vehicle type (if relevant)		Passenger cars / taxis Motorcycles Light goods vehicle Heavy goods vehicle Buses / coaches
Time period (if relevant)		Weekdays / Weekend Daylight / Night-time hours Special days
Sample size	Representative at national level	

Pilots on KPI Enforcement

Pilot calculation of KPI enforcement of traffic regulations was conducted in Finland, Poland and Portugal between autumn 2024 and spring 2025. Each Member State chose which option(s) for the KPI to calculate **based on the available data and resources**.

In **Finland**, Options 1-4 were examined:

- the number of police controls (Option 1) is only available for **drink-driving**.
- Option 2 (effectiveness) seems more challenging as a **two-tiered system for "tickets"** is implemented i.e. fines and traffic penalty fees are given for the infringements. Fines for each infringement are clearly marked, but traffic penalty fees may appear in hundreds of potential categories, and one infringement can be assigned several traffic penalty fees.
- Option 3 (enforcement level) requires **cooperation with cities** and municipalities since they hold the information on red light cameras.
- Concerning Option 4 (speeding), cameras are **geographically distributed**, but it is not possible to determine their number per urban/rural areas based on police records so to not reveal the exact locations of speed enforcement cameras.

In **Poland**, Options 1, 3 and 4 were considered:

- the number of controls is available only for drink-driving. Still, no distinction per vehicle type is made. The total number of **controls** is available, however **without any distinction per infringement**, instead per vehicle type.
- the number of red-light cameras, fixed speed cameras and section control stretches (Options 3, 4) are **available only centrally** i.e. through the Centre for Automatic Enforcement of Road Traffic within the General Inspectorate for Road Transport.

Pilots on KPI Enforcement

In **Portugal**, Option 4 was selected:

- data **before and after radars'** activation reveal 36% reduction in accidents involving injuries, 74% decrease in fatalities, 44% reduction in serious injuries, and 36% decrease in slight injuries.
- speed enforcement is **totally visible** and **communicated** as all speed control locations are clearly indicated on roads through traffic signs, listed on a website and integrated in an application.

Table 2 Overview of pilots on KPI enforcement of traffic regulations

KPI	Finland	Poland	Portugal
Number of police controls per infringement and per population	Number of police controls for drink driving (NO other substances besides alcohol)	Number of police controls for drunk driving (OR under the influence of other substances)	-
Number of tickets per infringement and per population	Number of fines and traffic penalty fees per: - infringement (speeding, seat belt, helmet, distraction, drink-driving, red lights) and - population in the last 3 years	Number of tickets per: - infringement (speeding, driver seat belt, helmet, distraction, drink- driving, red lights) - vehicle type, - day, - time of the day, - population, - 18+ population, - number of driving licenses	-
Number of red-light cameras on the urban network	Not available	Red light cameras on the urban network per: - 1000 km of network, - 1 mln total population, - 1 mln population in urban areas, - population / km^2	-
Number of fixed speed enforcement cameras or section control stretches	Speed enforcement cameras/ population	Fixed speed cameras Section control stretches per: - 1000 km of network, - 1 mln total population, - population / km^2	Fixed speed cameras Speed control locations per population

Conclusions and recommendations

The proposed options for the KPI on the enforcement of traffic regulations concern **procedures** (i.e. controls) and respective **results** (i.e. tickets) as well as the use of technical **equipment** (red light or speed cameras).

For all four proposed options, **data** collection does not require on-site measurements. Instead of that, a solid, **unhindered cooperation** with competent road authorities is necessary. This may be considered a drawback in some cases.

In several Member States, specific traffic **infringements** are of more **interest** i.e. speeding and drink-driving. Still other infringements that are often listed among the main killers on the road should not be overlooked when enforcement methods and results are explored.

Each Member State should choose the most **appropriate** and **useful KPI** enforcement based on the applicability and the availability of data as well as on the particular needs in the respective country.

No single definition for the KPI enforcement of traffic regulations is provided in the respective Trendline methodological guidelines. However, minimum methodological requirements for KPI enforcement options related to different aspects of enforcement are set.

Further research on enforcement practices and needs in order to better specify appropriate KPIs, could address:

- the possibility to **improve data availability** on enforcement effort and effectiveness (i.e. by supporting Traffic Police improve recording of conducted checks and results),
- the question of drivers being (fully) **aware of enforcement** systems (e.g. location of speed cameras) or not and
- the need for a **centralized system** that will include all information on enforcement of traffic regulations procedures, equipment, activities and results from all responsible stakeholders (e.g. Traffic Police, local and regional authorities, road operators).

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