



International Conference on: "The Reliability of Statistics & Databases in Measuring Road Safety Performance Index (PIN)"
Tunis, 6-7 May 2016

Monitoring Road Safety Policies and Performance



George Yannis, Professor
Stergios Mavromatis, Assistant Professor
Alexandra Laiou, Research Associate
National Technical University of Athens

A high need for monitoring road safety policies and performance

- Road Safety is a typical field with high risk of important investments not bringing results
- Absence of **monitoring and accountability** limits seriously road safety performance



Tools for road safety accountability

**Monitoring
ROAD SAFETY
INTERVENTIONS**

**Monitoring
ROAD SAFETY
PERFORMANCE INDICATORS
(RSPI)**

**Monitoring
ROAD ACCIDENT
AND CASUALTIES**



Monitoring road safety interventions

Road User Behaviour

- number of road safety **campaigns**
- number of road safety **training** activities
- number of **enforcement controls**
(speed, alcohol, seat belt, helmet etc)
- number of **police staff** taking part in enforcement activities per day / region

Vehicle and Post Crash Care

- incentives for vehicles with advanced **safety equipment**
- new equipment for **emergency services**
- training of emergency services staff
- new equipment for the **Traffic Police** and **Fire Brigade** services



Monitoring road safety interventions

Road Infrastructure

- number of identified **high risk** sites and related interventions
- length of road **sections improved** (lighting, visibility, markings, signing, road surface, etc.)
- number (and length) of **Road Safety Audits** conducted
- number (and length) of **roads assessed** (EuroRap)

Support actions

- Number of studies / analyses on road accident causes



Monitoring road safety performance indicators

Road User Behaviour

- **speeding**, comparison to mean speed, speed variance, speed limit violations
- percentage of **seat belts**, **child restraints** and **helmets** use
- incidence of **drinking and driving**
- incidence of **mobile phone** use
- failure to stop or **yield** at junctions or at pedestrian crossings
- inadequate **headways** – close following
- use of reflective devices for **cyclists** and pedestrians
- use of **pedestrian** crossing facilities by pedestrians



Monitoring road safety performance indicators

Road Infrastructure

- percentage of road network with unclear **hierarchy functions** (flow, distribution, access)
- percentage of high speed roads with **incompatible vehicles** in terms of mass
- length of road sections violating driver's **expectations** and increasing **workload** (lack of consistency – continuity)
- **pavement friction** mostly in winter and on wet road surfaces



Monitoring road safety performance indicators

Vehicle

- percentage of **new cars** with the top star rating according to EuroNCAP
- percentage of vehicles with **worn tires**
- percentage of technically **defective vehicles**

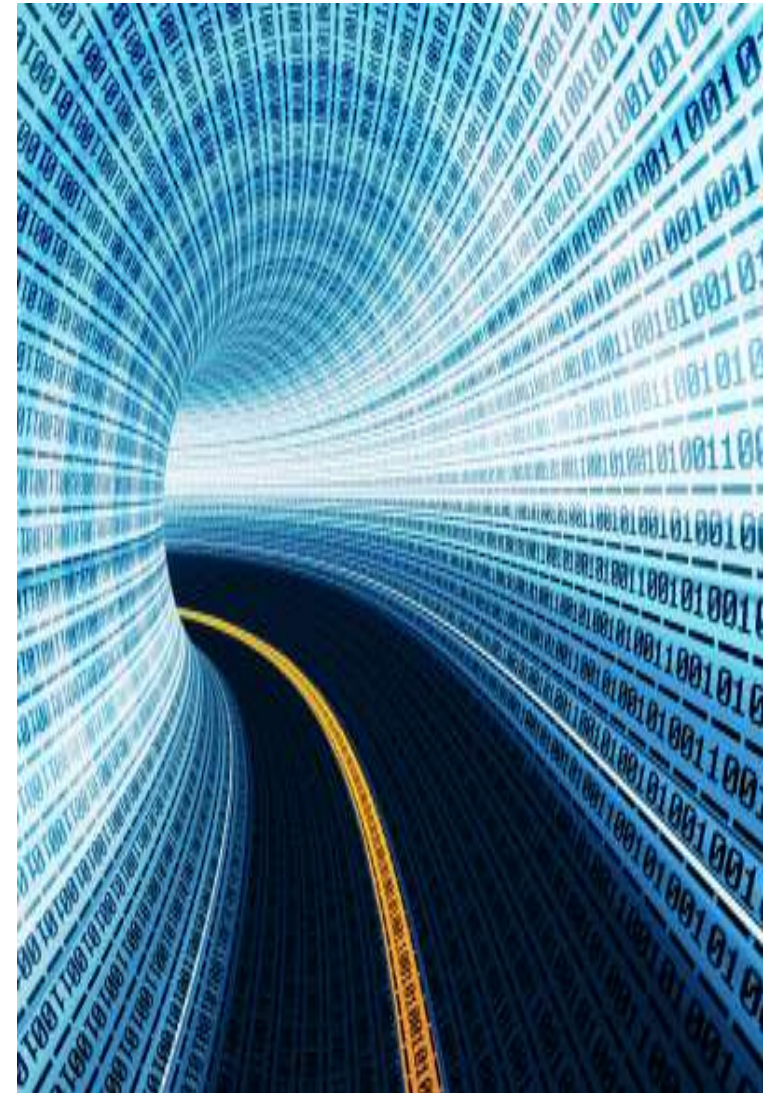
Quality of post-crash care

- average time for intervention at the accident scene
- average casualty transfer time to the hospital
- average casualty hospitalization duration

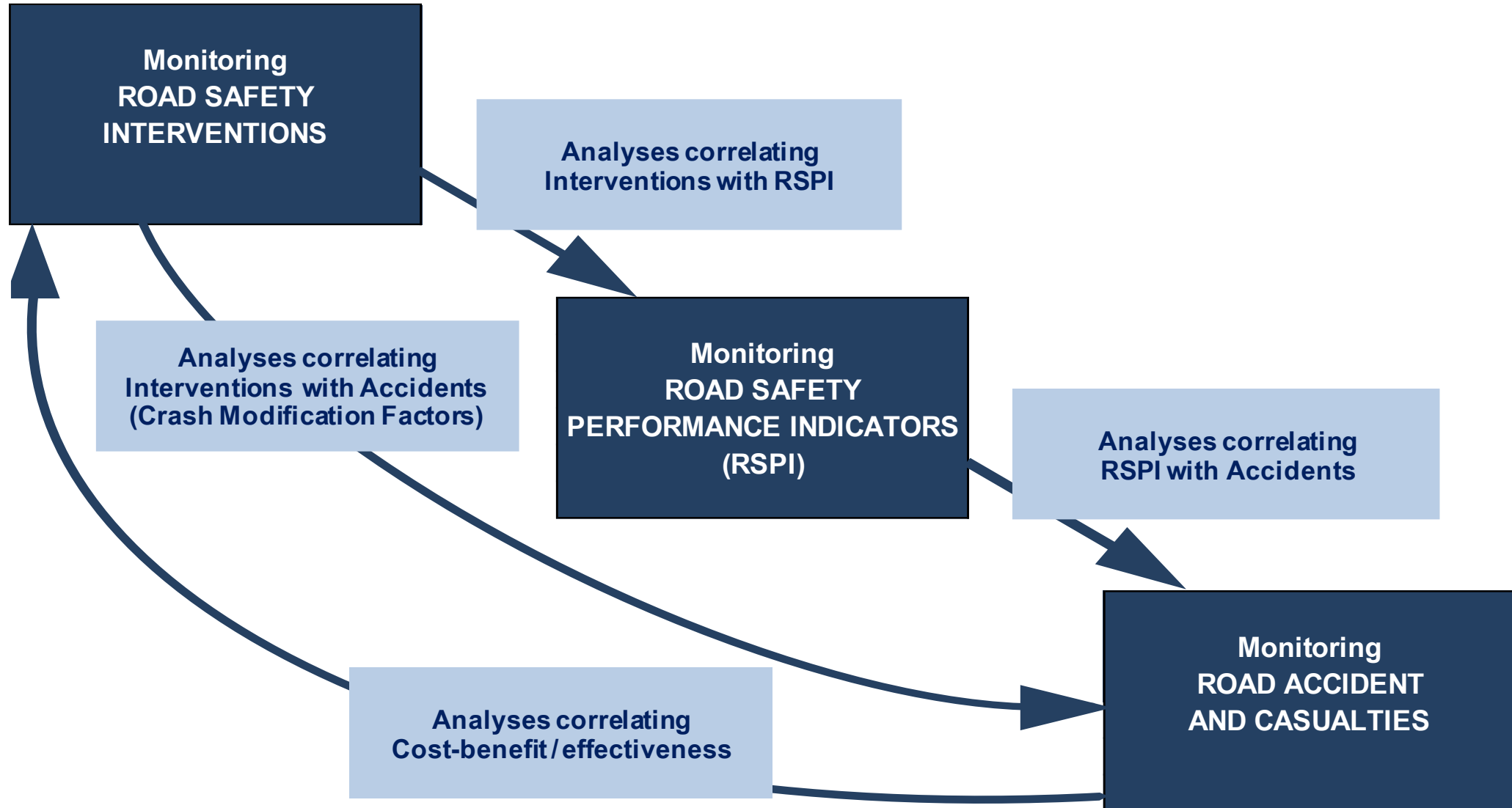


Monitoring road accidents and casualties

- number of **road accidents** with injuries or material damage only (per road type, vehicle type and road user type)
- number of **fatalities**, serious and slight **injuries** (drivers, passengers, pedestrians, etc.)
- **risk indicators** (number of accidents/injuries per vehicle-kms or passenger-kms, fatalities per million inhabitants, etc.)
- **severity indicators** (fatalities per 100 accidents, etc.)

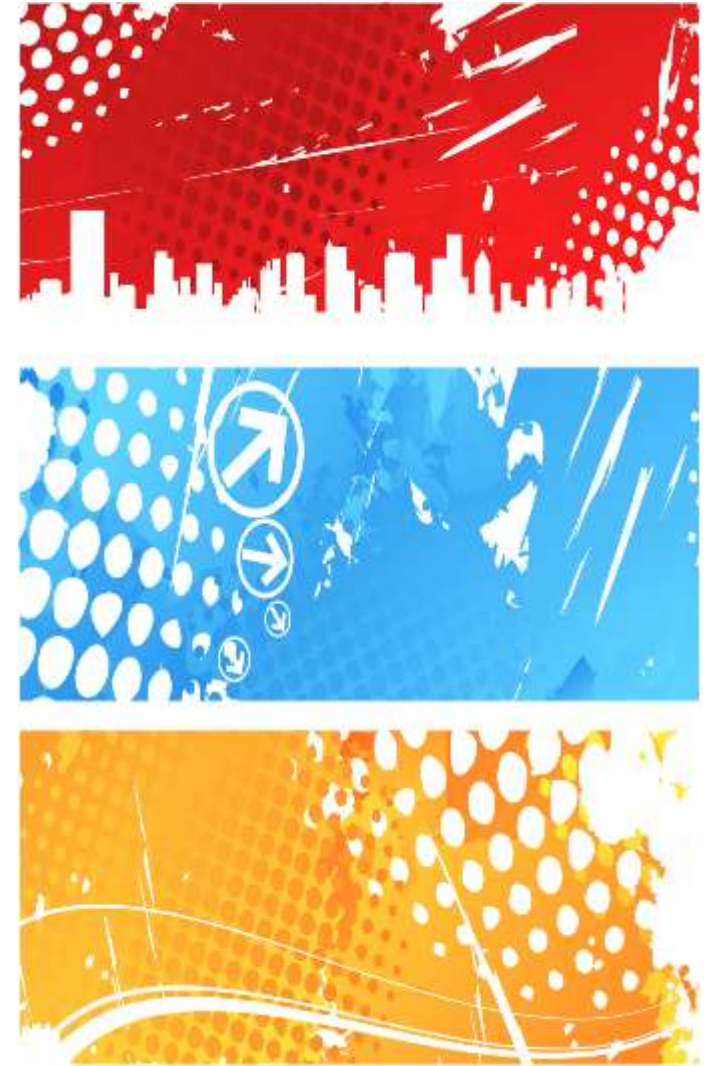


Tools for road safety accountability



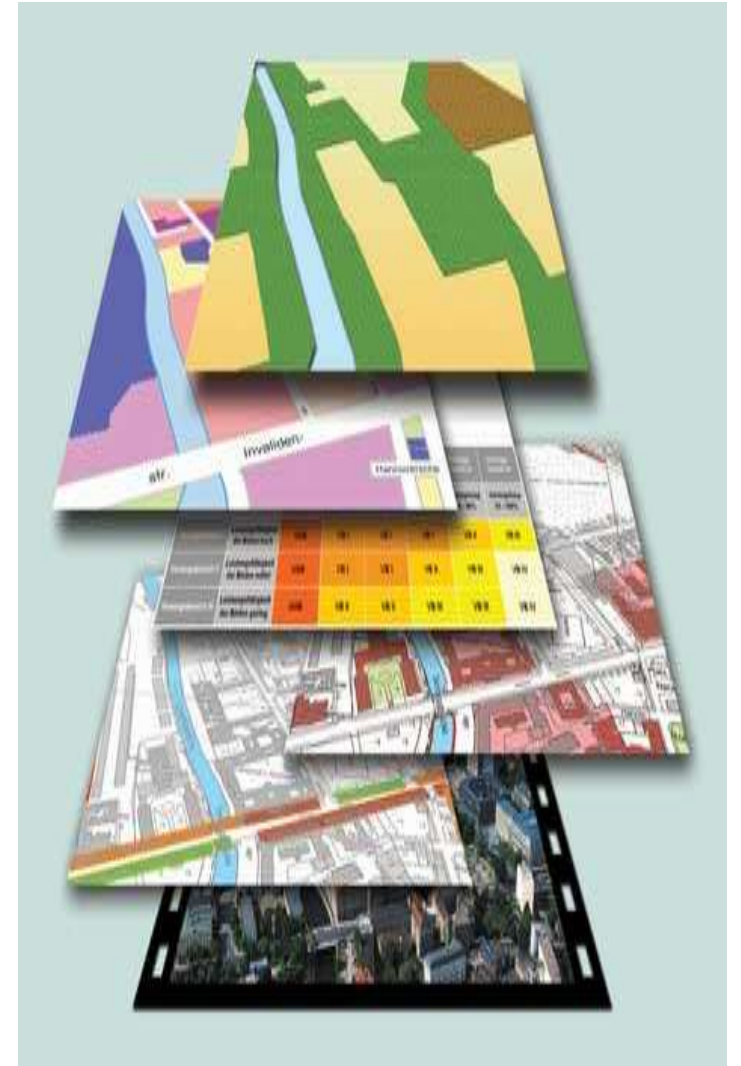
Road Safety analyses

- Road safety analyses: important tool in the hands of decision makers but also a **complex task**
- Road safety analyses require:
 - high **expertise** to deal with the analyses complexity,
 - impartiality and expert **independence**,
 - maximum **transparency**
- **Accident Prediction Models (APMs) and Crash Modification Factors & Functions (CMFs)** are fundamental for estimating road safety outcomes and identifying the most effective safety measures



The need for good and transferable Analysis Results

- An APM aims to **forecast safety outcomes** on the basis of traffic and other site-specific conditions (including CMFs)
- A CMF is a synthesis of diverse evaluation results that allows for more **universal understanding** and application of safety measures
- ex-post evaluations → meta-analyses → **theorizing**
- The more correct the functional form of the APM, and the narrower the CMF distribution, the larger is the probability that policy decisions are correct
- APMs/CMFs could allow more rapid adoption and dissemination of **new safety measures**
- They can be the basis for evidence based safety policies



Technical barriers for road safety interventions assessment

- difficulties in **isolating the safety effect** of a specific measure
- difficulties in **aggregating** information/data due to high diversification of the measures
- difficulties in comparing information/data among countries:
 - differences in road traffic environments,
 - differences in the actual investment costs among the countries,
 - differences in methodologies of safety effect calculation



Political barriers for road safety interventions assessment

- Authorities and other stakeholders may fear that ex-post evaluation of measures may prove that important road safety investments had little or limited impact
- Comparisons of measures effectiveness between different regions and between different countries may reveal **high discrepancies** not only in the unit cost of the measures but also in the implementation effort



Barriers for international cooperation for road safety interventions assessment

Transferability is not easy:

- not all successful measures are suitable for all different road traffic environments,
- it is very much possible that the same interventions may lead to significantly different results in two different traffic environments

The **scientists'** competition and quest for the "excellent" methodology, together with the inherent difficulties of measures efficiency assessment, puts in question any initiative.

Sometimes measures assessment invited by the **authorities** tend to use faster and less rigorous methodologies, favouring prevailing opinions and decisions already taken, creating thus a wide variety of non-converging efficiency results.



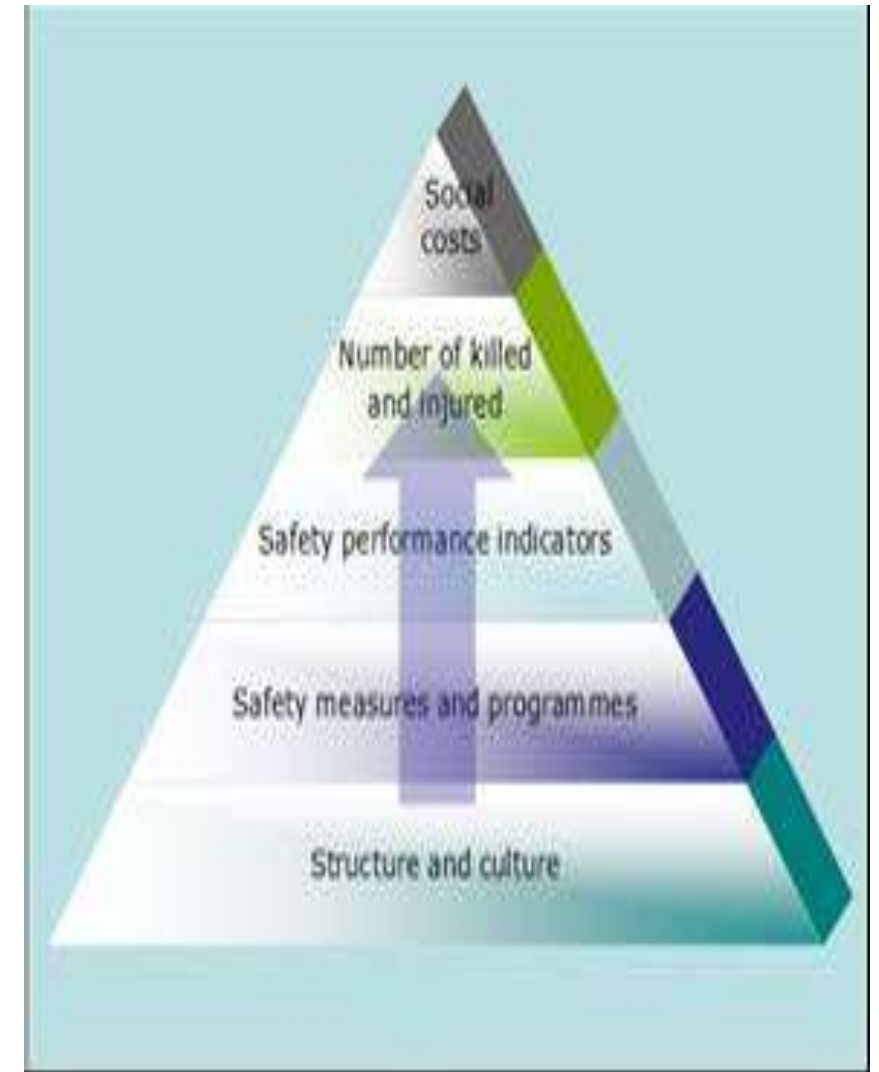
Correlating road safety management and performance

- Economically stronger countries have a higher composite road safety performance index.
- Countries with **regular measurement** of road safety attitudes and behaviours have a higher operational level of road safety.
- Countries with **dedicated road safety budget**, systematic monitoring and evaluation of interventions, have a higher operational level of road safety.
- The presence of a **national vision and strategy** is not sufficient alone for a better operational level of road safety

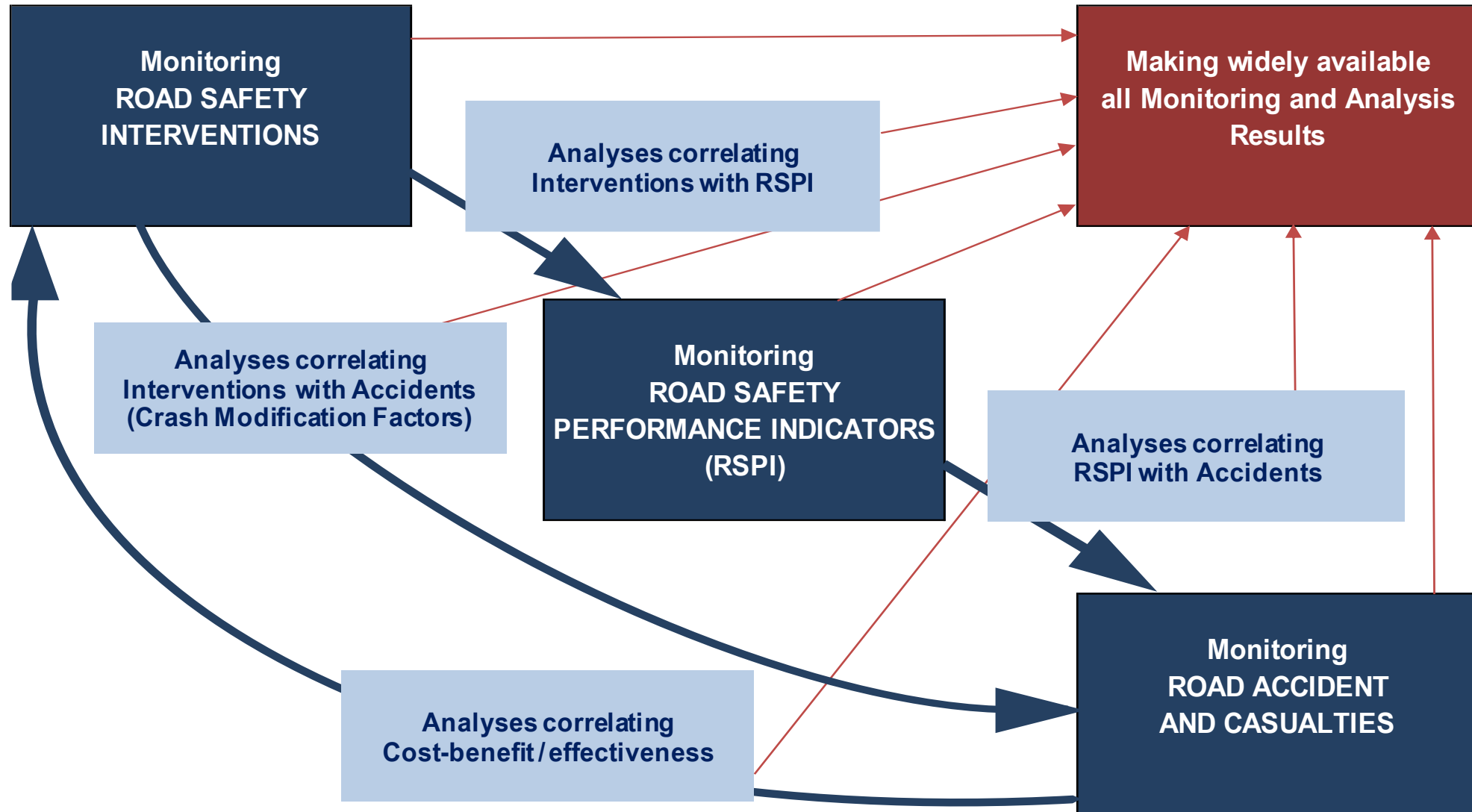


Correlating road safety management and performance

- Road safety management indicators **do not directly affect** road safety results.
- However, they do **affect the operational level** of road safety, as reflected by the safety performance indicators.
- Subsequently, higher safety performance indicators have a direct impact on the **decrease of accidents and casualties** (confirming the SUNflower pyramid)



Tools for road safety accountability



Next steps for efficient monitoring of road safety policies and performance

- More **surveys** for exposure, performance indicators, driver behaviour
- More large scale **experiments** (in-depth investigation, naturalistic driving, driving simulator)
- More **research and analyses**
- More **solutions** to (new) real life problems
- More data and knowledge **widely available**
- More rigid European and National Road Safety **Observatories**



In conclusion: Monitor - Analyse - Publish

- Beneath each high road safety performance lies **a powerful system** for the monitoring and analysis of interventions, indicators and safety results.
- Road safety Monitoring and Analysis should become a **mandatory procedure** for all road safety investments. Any following investments should be linked with the performance of the previous investments.
- The level of **economic and social development** of a society is based on and reflected in the level of road safety, as assessed by the Performance Indicators.





International Conference on: "The Reliability of Statistics & Databases in Measuring Road Safety Performance Index (PIN)"
Tunis, 6-7 May 2016

Monitoring Road Safety Policies and Performance



George Yannis, Professor
Stergios Mavromatis, Assistant Professor
Alexandra Laiou, Research Associate
National Technical University of Athens