The safe system approach in evidence-based road safety policy making

Authors:
Papazikou E., Filtness A., Thomas P., Talbot R., Quigley C., (LOUGH), United Kingdom
Papadimitriou, E., Yannis, G. Theofilatos, A., (NTUA), Greece
Aigner-Breuss, E., Kaiser, S., Machata K. (KFV), Austria
Weijermars W., Van Schagen, I., (SWOV), Netherlands
Hermitte T., (LAB), France

Read more: Filtness A., et al., (2016), The application of systems approach for road safety policy making, **Deliverable 8.1** of the H2020 project SafetyCube.

Summary:

SafetyCube has been developing a Decision Support System (**DSS**) to support European policy making at all levels. Here, the advantages of evidence-based policy making are discussed and the safe system and systems approach within SafetyCube are defined.

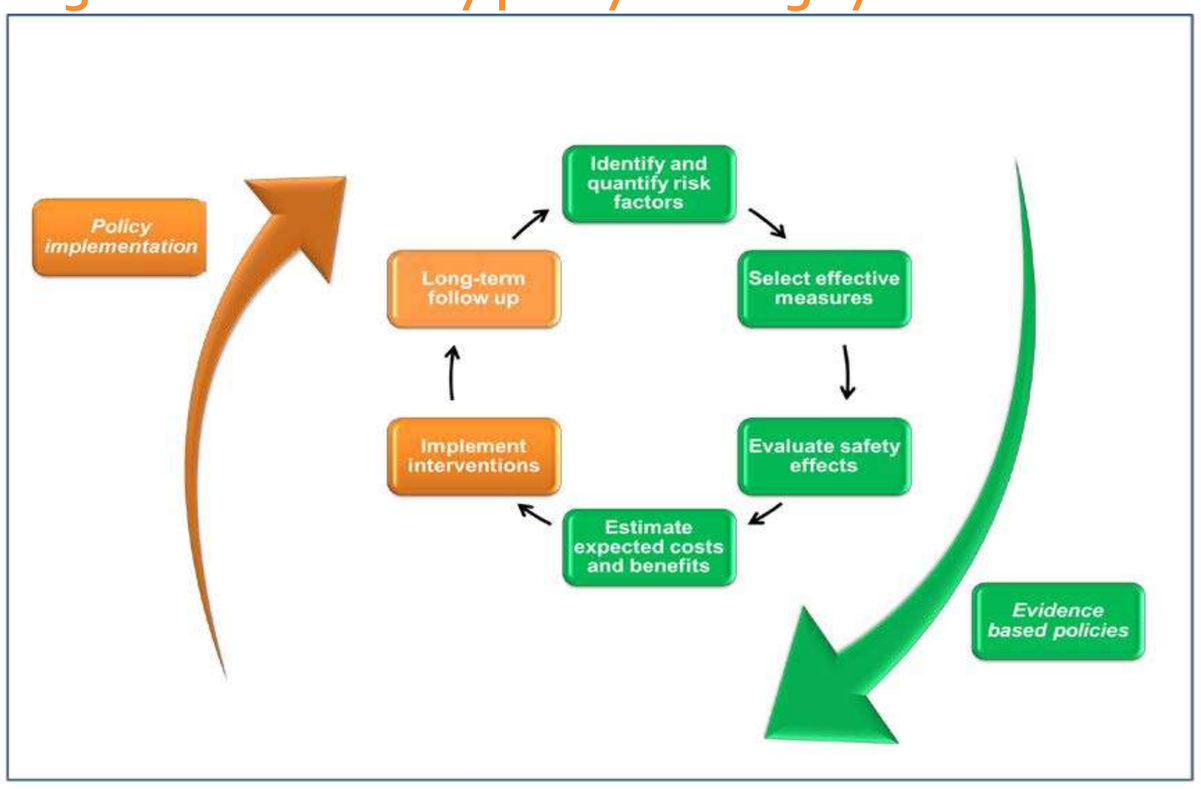
Evidence-based policy making

Evidence-based policy making enables policy makers to make justified decisions in the complex reality of road safety interventions. It refers to the use of objective, scientifically-based evidence in all stages of the policy making process. Two important pillars for evidence-based road safety policy making are:

- ❖ road safety data and statistics &
- ❖ scientific knowledge (Wegman et al, 2015).

The **DSS** that has been developed within **SafetyCube** aims to support decision makers as well as other stakeholders in their evidence-based policy making and covers the green phases in the road safety policy making cycle shown in Figure 1.

Figure 1 Road safety policy making cycle



Evidence-based policy making is **beneficial** for a number of reasons:

- ✓ It is crucial for identifying relevant road safety problems, and selecting the most appropriate road safety interventions.
- ✓ It helps to ensure governments allocate an appropriate share of their total budget to road safety.
- ✓ It enables policy makers to justify expenditure on road safety policy interventions and provides them with convincing arguments in the face of sceptical and sometimes hostile lobbies.

The Safe System and Systems Approach

Systems approach

- Aims to steer away from the more traditionally 'human error' blame focussed approach to road safety,
- Takes into account all 'components' in a system (i.e. road users, vehicles, roads) which contribute to a risk of an accident occurring.

The Safe System (road safety area)
A broad philosophy or ideology

- No human being should be killed or seriously injured in a road crash (OECD/ITF, 2016)
- Applies the systems theory in order to create a Safe System
- Aims to strengthen all dimensions of road safety, including the organisational levels & manage them holistically

Figure 2 Framework for road safety strategies consistent with systems theory. Source: Hughes et al (2016)

A comprehensive set of policy tools have the potential to be applied to all relevant components of the road system in order to improve road safety.

In **SafetyCube**, the systems approach is being integrated in the DSS in two main ways:

- First, the risk factors which relate to the road user, the road or the vehicle will be linked to measures in any or all of these areas if appropriate.
- Second, to clarify the added value of complementary measures rather than measures in isolation, where appropriate, a description of a measure will pay special attention to & link to supporting measures.

References:

1. Wegman, F., Berg, H.Y., Cameron, I., Thompson, C., Siegrist, S., & Weijermars, W. (2015). Evidence-based and data-driven road safety management. IATSS research, 39(1), 19-25.
2. OECD/ITF. (2016). Zero Road Deaths and Serious Injuries: Leading a Paradigm Shift to a Safe System. Paris.
3. Hughes, B. P., Anund, A., & Falkmer, T. (2016). A comprehensive conceptual framework for road safety strategies. Accident Analysis & Prevention, 90, 13-28.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 633485.

SafetyCube Taxonomy

Authors:
Papazikou E., Filtness A., Thomas P., Talbot R., Quigley C., (LOUGH), United Kingdom
Papadimitriou, E., Yannis, G. Theofilatos, A., (NTUA), Greece
Aigner-Breuss, E., Kaiser, S., Machata K. (KFV), Austria
Weijermars W., Van Schagen, I., (SWOV), Netherlands
Hermitte T., (LAB), France

Read more: Filtness A., et al., (2016), The application of systems approach for road safety policy making, **Deliverable 8.1** of the H2020 project SafetyCube.

SafetyCube Taxonomy requirements

- Should be a main structure part of the Decision Support system (DSS)
- Can be used as a search option in the DSS
- Create a uniform structure over all work packages
- Can be used as a basis for linking risk factors with their corresponding measures.

SafetyCube Taxonomies

The structure consists of 3 levels, which are topic, subtopic and specific topic. Below, the figures 1 & 2 represent the hierarchical **3 level structure** for human related risk factors and measures (1) and an Example for division of a main topic in two sublevels (2).

Figure 1

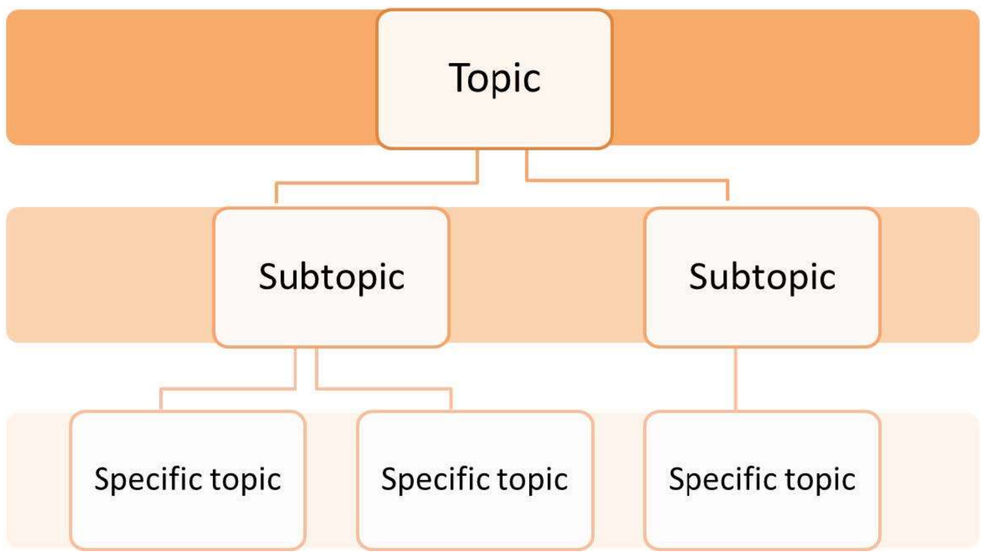
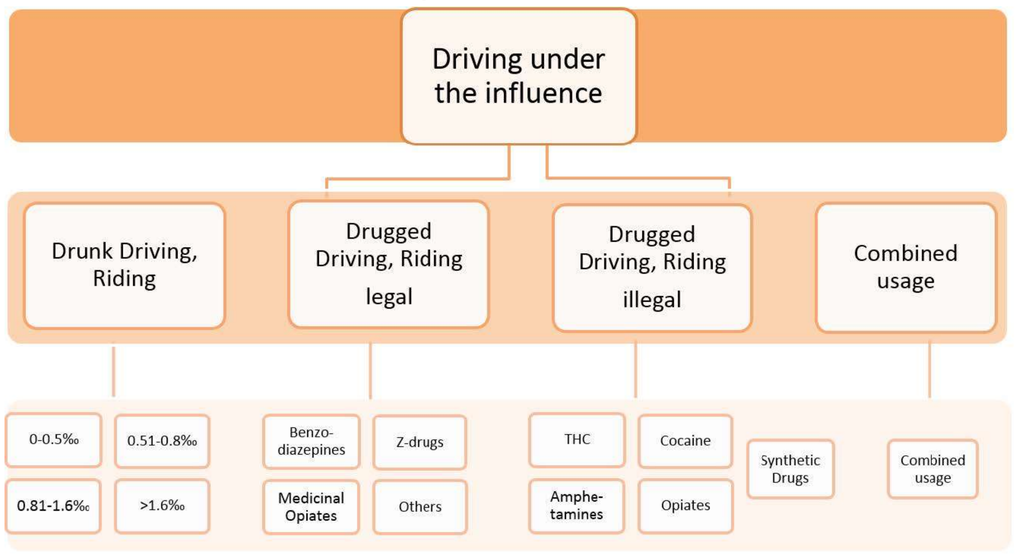


Figure 2

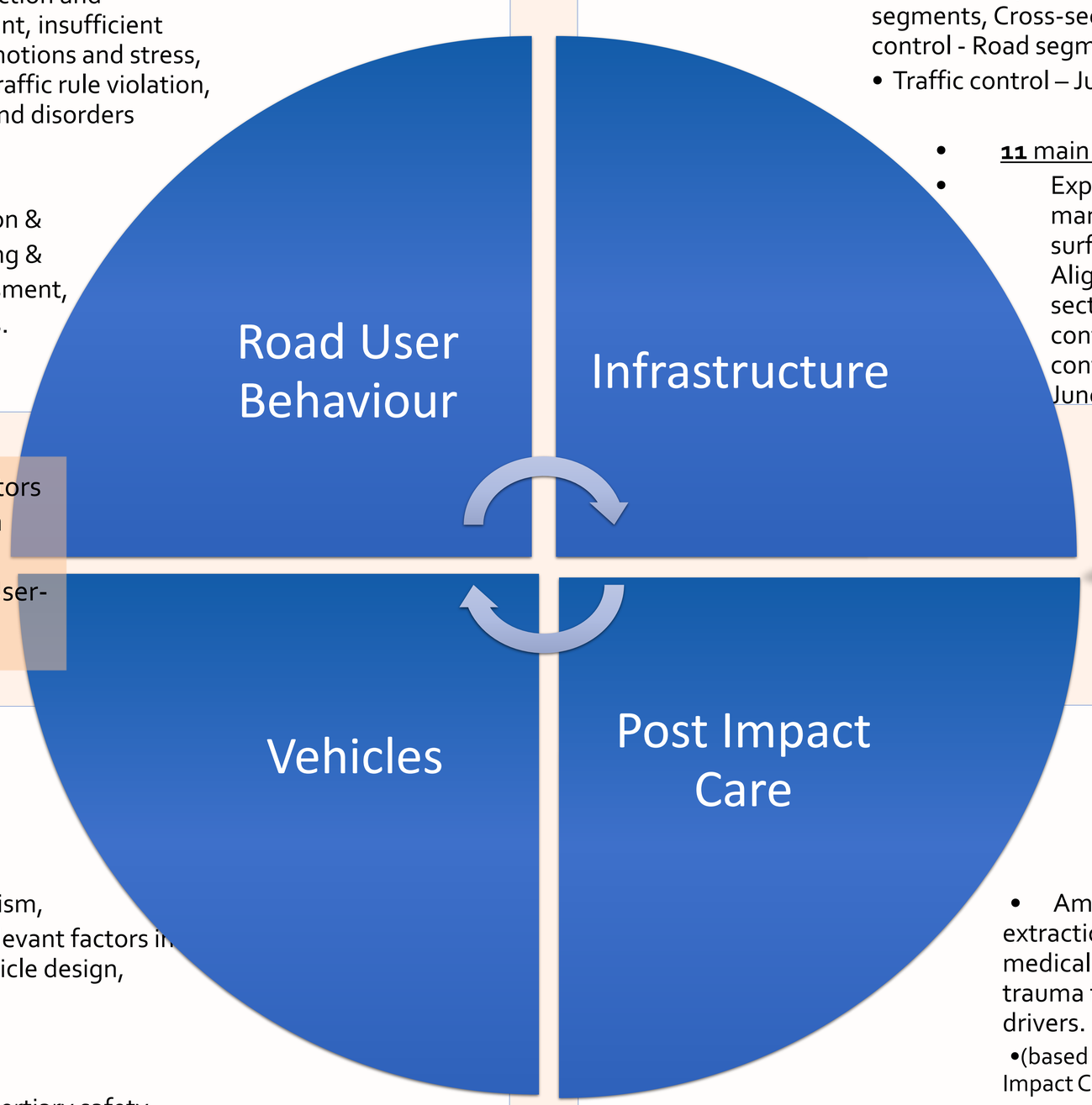


- **14** main **risk factor** topics
- Speed choice, influence driving by alcohol & drugs, risk taking, fatigue, distraction and inattention, functional impairment, insufficient skills, insufficient knowledge, emotions and stress, misjudgment and observation, traffic rule violation, personal factors, age, diseases and disorders

- **5** main **measures** topics
- Law and enforcement, education &
- voluntary training, driver training &
- licensing, fitness to drive assessment,
- Awareness raising & campaigns.

- **10** main **risk factor** topics
- Exposure, Road type, Road surface, Road environment, Work zones, Alignment–Road segments, Cross-section - road segments, Traffic control - Road segments,
- Traffic control – Junctions, Alignment- Junctions.

- **11** main **measures** topics
- Exposure, infrastructure safety management, Road type, Road surface, lighting, Work zones, Alignment–Road segments, Cross-section - road segments, Traffic control - Road segments, taffic control – Junctions, alignment-Junctions.



Some **overlaps** between risk factors in one taxonomy & risk factors in another (e.g. is poor vehicle maintenance a Vehicle or Road User-related risk factor?)

Some **overlaps** where a topic could be a risk factor or a countermeasure

- **7** main **risk factor** topics
- Crashworthiness, injury mechanism,
- protective equipment design, relevant factors in crash data, technical defects, vehicle design,
- visibility & conspicuity

- **3** main **measures** topics
- Crashworthiness, active safety, tertiary safety

- **5** main **measures** topics
- Ambulances & helicopters, extraction from vehicle, pre-hospital medical care, triage & allocation to trauma facilities, first aid training for drivers.
- (based on the DaCoTA webtext on Post Impact Care, 2012)

References: *DaCoTa. (2012a). Roads, Deliverable 4.8q of the EC FP7 project DaCoTA.*

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 633485.