

European Thematic Network ROSEBUD



**– Cost benefit analysis of
road safety measures –**

Efficiency Assessment Tools (EAT)

Why EAT?

- Safety budget is limited
- Rational approach required

Objectives:

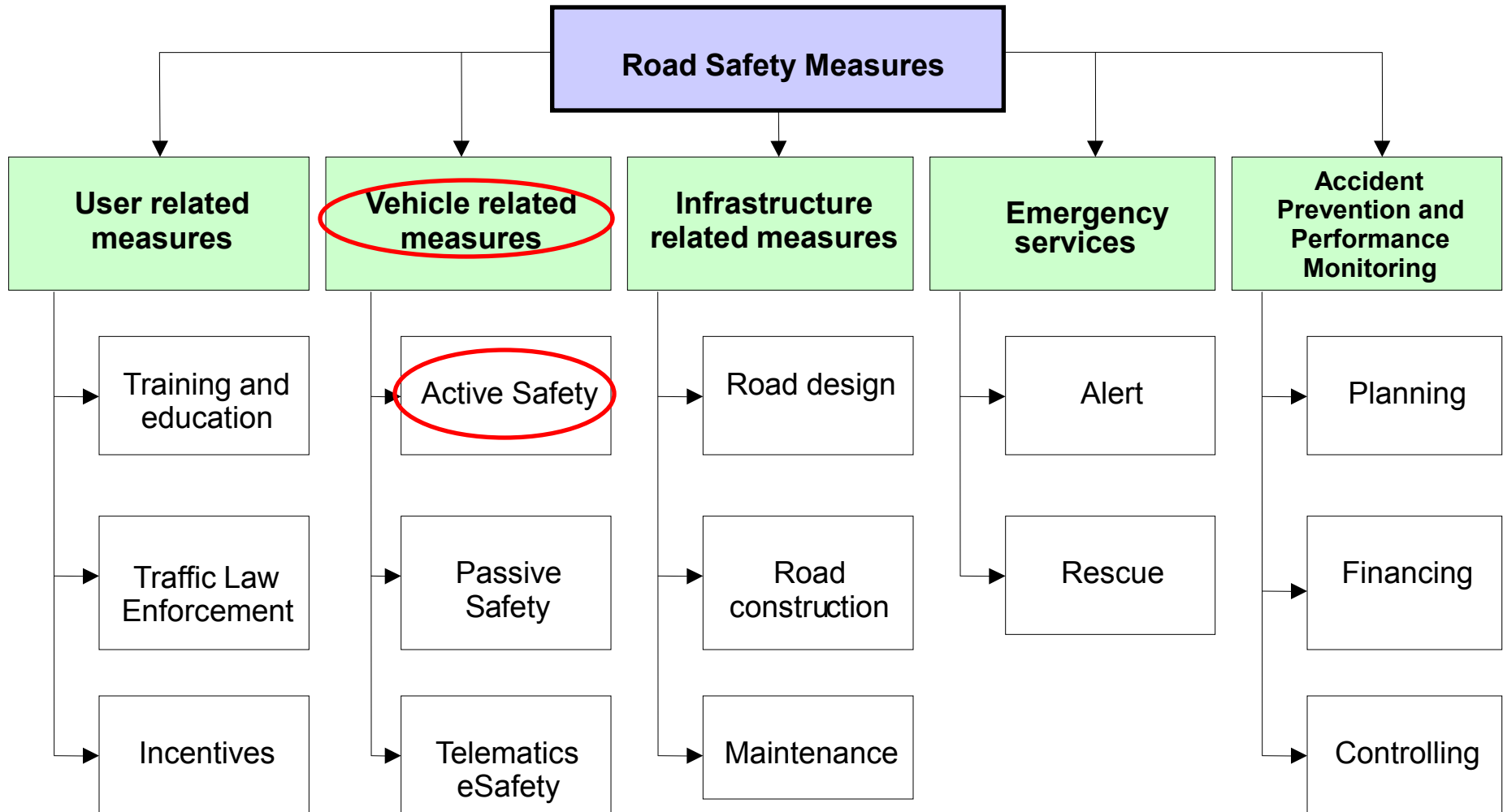
- **Identifying benefits, costs and impacts**
- **Comparing alternatives**
- **Assisting in prioritizing of projects**

- **The aim of the assessment is to identify the most efficient measures.**
- **This will enable the society to allocate the resources to the most beneficial use.**

Main elements of efficiency assessment

- A list of road safety measures
- An estimate of the impact of these measures on accidents or injuries
- An estimate of the costs of the measures
- For cost-benefit analysis, monetary valuation of impacts is needed.

Road safety measures



Efficiency assessment can help

- Efficiency assessment = a systematic assessment of the improvement in road safety that can be realised by means of various road safety measures
- Two main forms of efficiency assessment:
 - Cost-effectiveness analysis (CEA)
 - Cost-benefit analysis (CBA)

$$\text{Cost Effectiveness} = \frac{\text{Costs of safety measure}}{\text{Number of fatalities prevented}}$$

Necessary data

- **Safety measure costs**
- **Estimate of the number of fatalities/ injuries/ accidents prevented**

- Safety measure costs, e.g. vehicle safety:
 - Production costs
 - Implementation costs
 - Operating and Maintenance costs
- Cost calculation
 - Converting to annual values by using Service life/ Depreciation rate
 - Cost elements have to be accounted for without taxes (e.g. VAT).

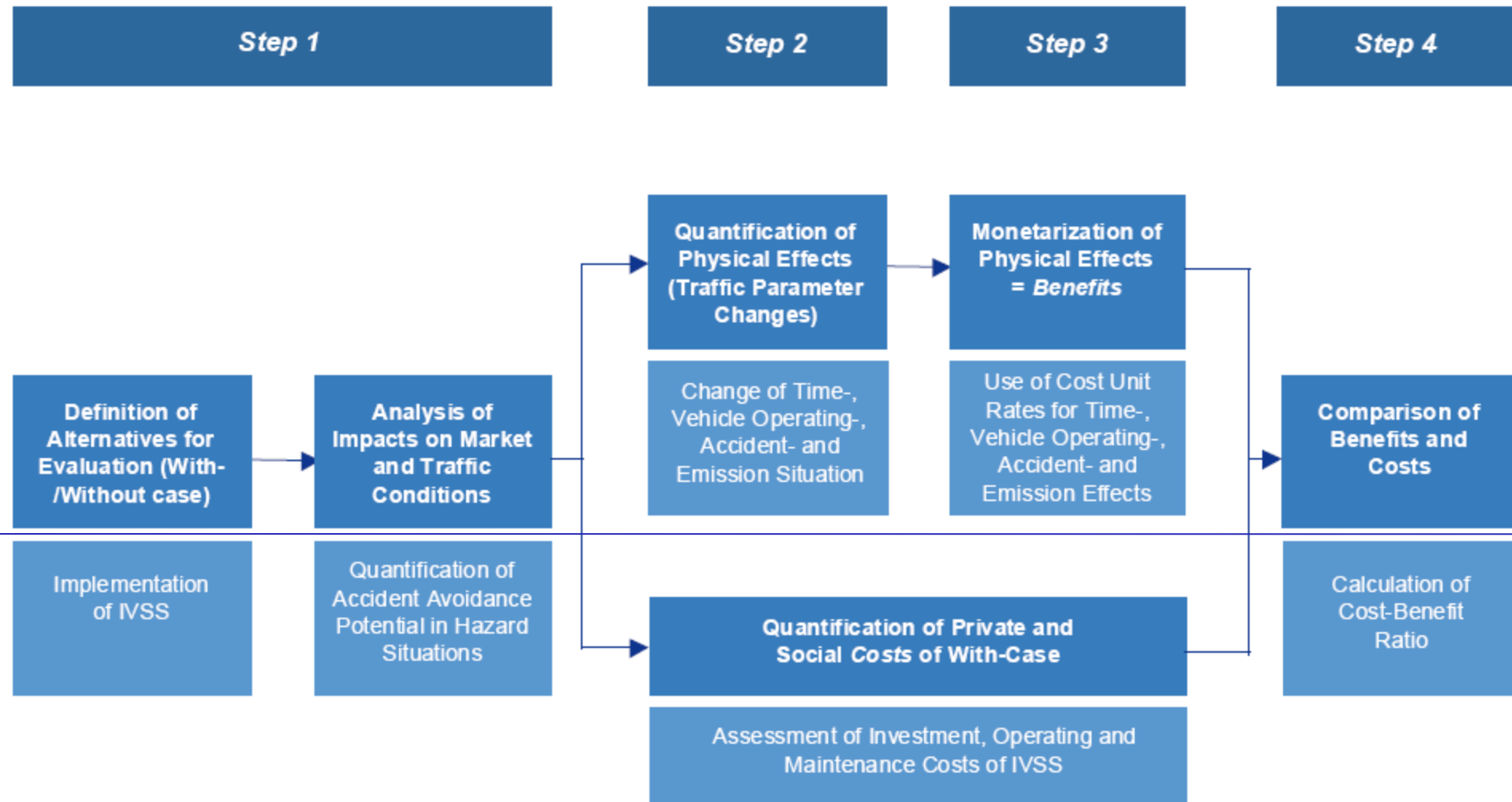
- Pros:
 - A simple technique which focuses on safety effects
 - Does not require monetary valuation of safety
- Cons:
 - Can only be used for ranking measures
 - Does not consider tradeoffs against other policy objectives
 - It is not possible to consider different accidents consequences (severe and slight injuries, property damages)

$$\text{Cost benefit ratio} = \frac{\text{present value of all benefits}}{\text{present value of implementation costs}}$$

Particularly useful if

- multiple policy objectives exist (safety, environment, mobility)
- policy objectives are conflicting (e.g. safety vs. environment)
- CBA is necessary if different levels of injury severity are to be considered.
- objectives refer to goods without market prices (safety, environment)

Methodological steps of CBA*

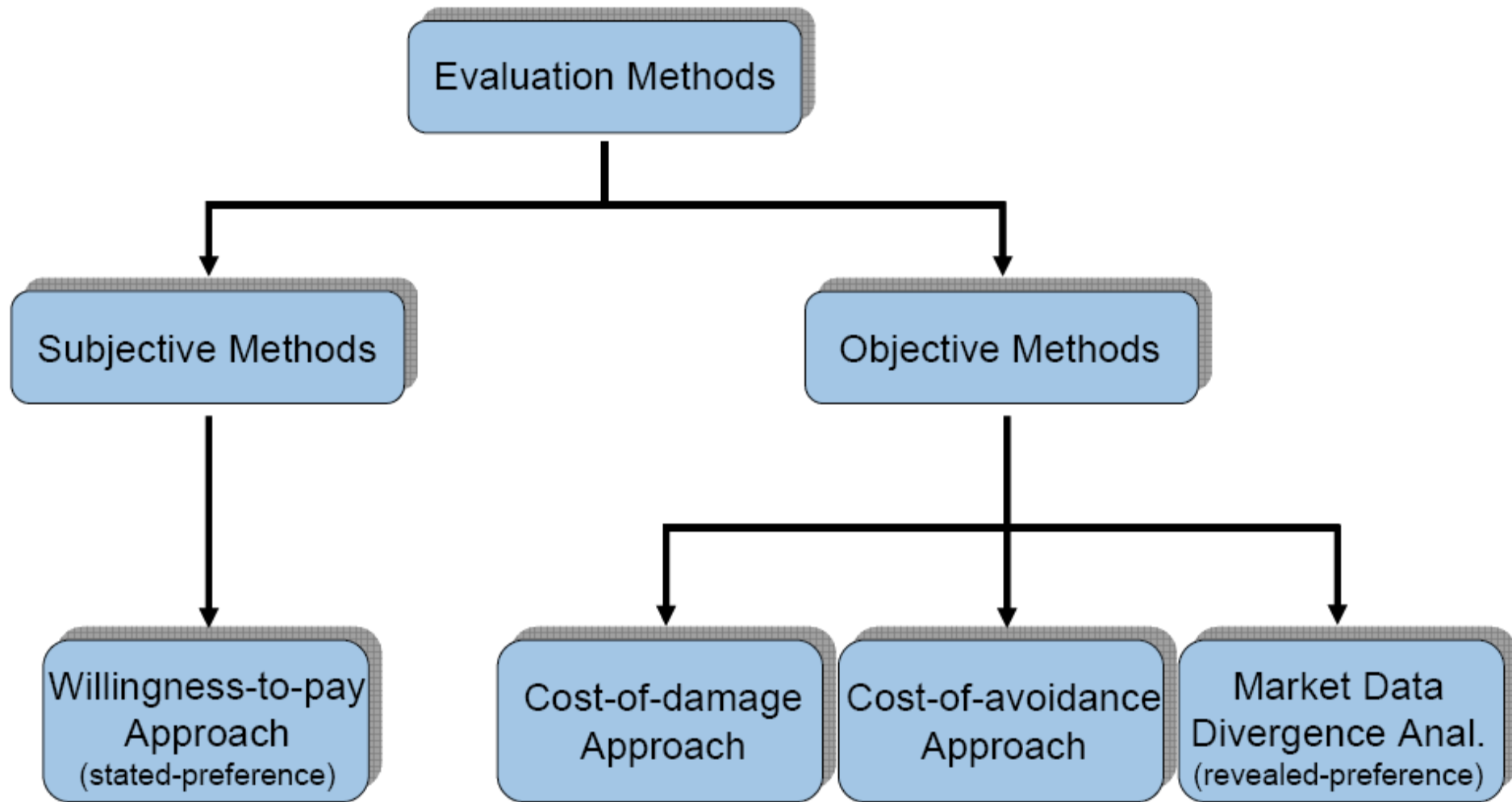


*eIMPACT, D3, 2008

- **Step 1 + 2: Identification and quantification of effects:**
 - Estimate of the number of fatalities/ injuries prevented (safety impacts)
 - Other quantified effects (environmental, travel time, vehicle operation etc.)
 - Costs of safety measures

- **Step 3: Monetary values (benefits)**
 - Changes of accident costs
 - Environmental/emission costs (noise, air pollution)
 - Mobility costs (travel time consumption)
 - Travel costs (vehicle operating)
 - Congestion costs

- **Step 3: Elements of accident costs**
 - Medical and healthcare costs,
 - Costs of property damage,
 - Administrative and legal/court costs,
 - Costs of lost productive capacity (lost output),
 - Human cost (pain, grief and suffering) valuation.

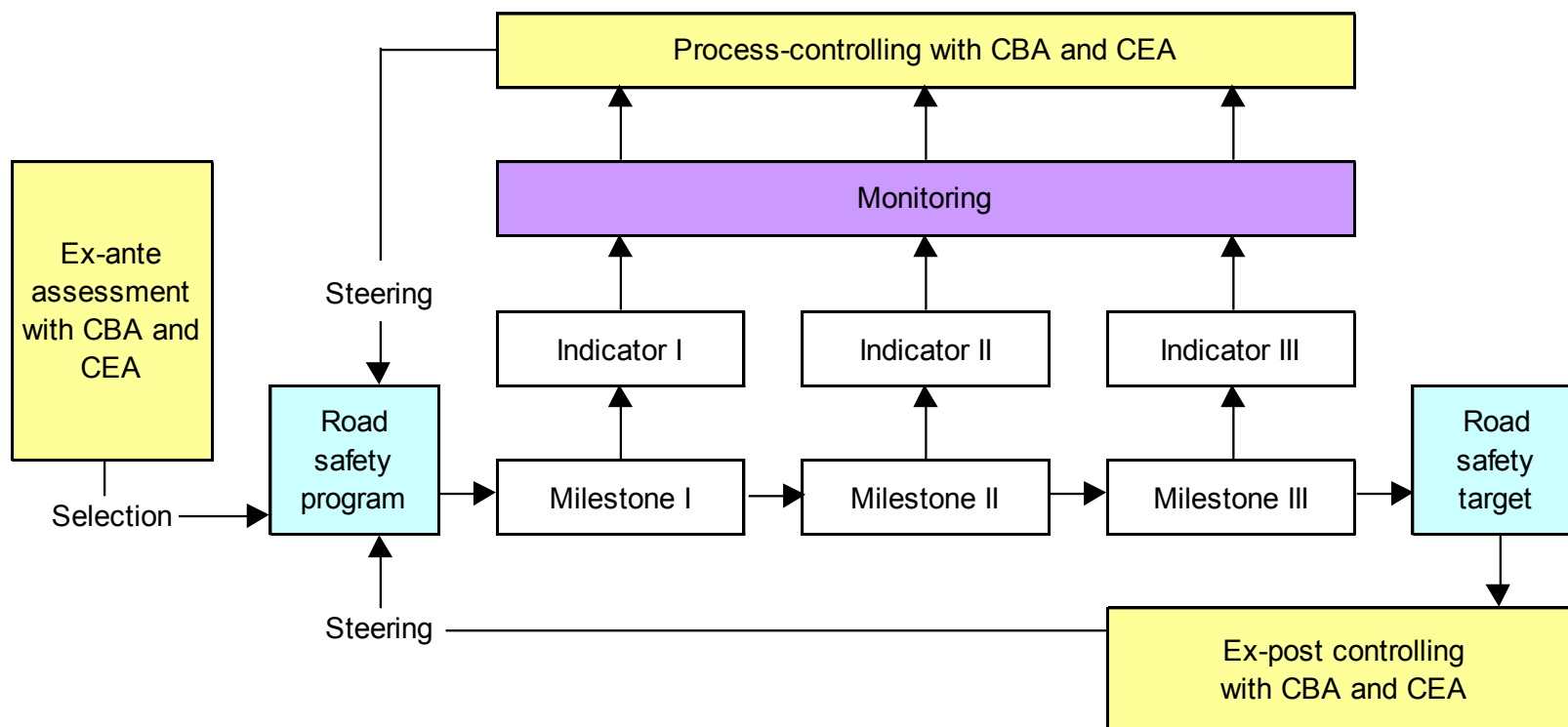


- **Step 4: Calculation of Benefit-Cost Ratio (BCR)**

Ranges of BCR (eIMPACT, D3, 2006):

1. $0 < \text{BCR} < 1$: BCR is rated “poor” (socio-economic inefficiency).
2. $1 < \text{BCR} < 3$: BCR is rated “acceptable”.
3. $\text{BCR} \geq 3$: BCR is rated “excellent”.

- Pros:
 - Considers all relevant policy impacts
 - Enables a direct comparison of costs and benefits
- Cons:
 - Monetary valuation e.g. of human life is controversial and difficult, but inevitable
 - Not all effects can be assessed (e.g. human grief and suffering, distributional effects/ fairness)



Possible scheme of a systematic evaluation of road safety activities

Final results of the ROSEBUD project

- Efficiency analysis should be part of any road safety programme
- In many countries efficiency analyses are not used to their full potential
- More efficient policy priorities will improve road safety
- Having the European reduction target in mind, the benefits of reducing road accident fatalities by at least 50% exceed the costs
- Efficiency assessment can help bringing better results in road safety policy