



Summary of the methodological approach to intermodal cost calculation

- ⇒ Structure of a typical transport process in intermodal relations
- ⇒ Methodology used to assess the real costs of transport activities
- ⇒ internal costs of transport activities
- ⇒ external costs of transport activities



Definition of intermodal transport:

The movement of goods in one loading unit, which uses successively several modes of transport without handling the goods themselves in transshipment between the modes. (TRILOG / IQ)

In RECORDIT:

Pre- and Post haulage: - Road

Main Haulage:

- Rail
- IWW (inland waterway shipping)
- SSS (short sea shipping)
- Road



Principles of cost - benefit analysis (CBA)

$$\text{Net present value} = \sum_t \frac{b_t}{(1+r)^t} - \sum_t \frac{c_t}{(1+r)^t}$$

- ⇒ Classification due to:
 - internal Vs. external
 - fixed Vs. variable
- ⇒ all costs and benefits should be expressed in one common unit:
→ a conversion is needed
- ⇒ all costs and benefits have to be discounted to the same period
- ⇒ in RECORDIT:
 - monetary unit: EURO/LU
 - discount rate: $r = 3\%$

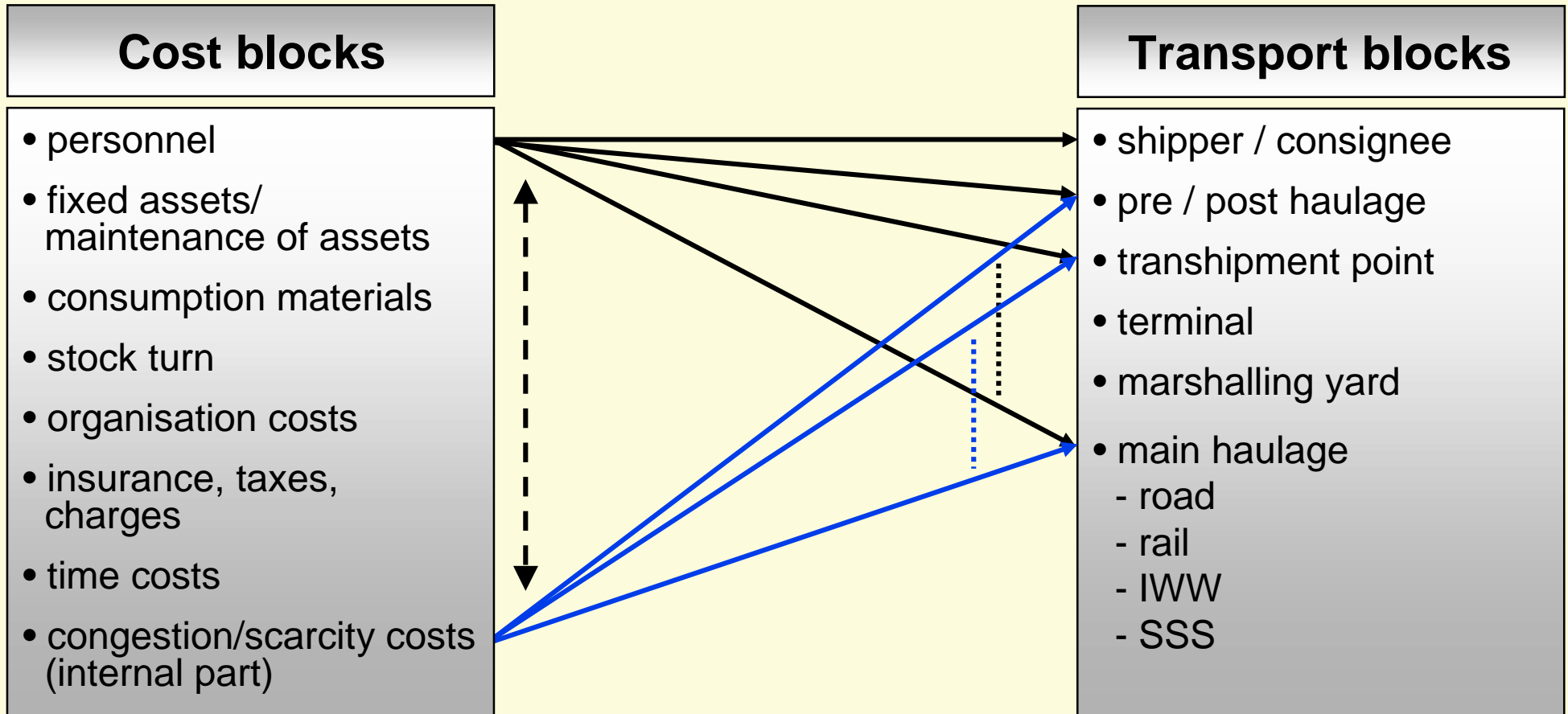


Calculation of costs and benefits

- ⇒ In absence of market prices the economic value is calculated due to:
 - Willingness to Pay (WTP)
 - in case of external costs following the damage cost approach
- ⇒ RECORDIT aims to calculate **marginal** costs and benefits
 - the calculation is based on a **bottom-up approach**
(based on micro data)
- ⇒ Pricing Rule
 - price = **social marginal costs** (SMC)
 - SMC = internal marginal costs + external marginal costs
- ⇒ Sensitivity analysis
 - because of uncertainty of the figures



Internal costs





Externalities

Externalities are changes of welfare which are caused by economic activities without being reflected in market prices.

- ⇒ **Externalities due to**
 - infrastructure provision
 - use of the infrastructure
- ⇒ **Type of externality**
 - positive (external benefit)
 - negative (external costs)

In RECORDIT: the focus is on the use of existing infrastructure

- external benefits are reflected in market prices.
- calculation: marginal external costs



External cost categories

- ⇒ **Air pollution**
 - impacts on human health, crop yields, buildings and materials
- ⇒ **noise**
 - impacts on human health of the residents
- ⇒ **accident**
 - impacts on human health, on society
- ⇒ **congestion / slot scarcity**
 - impacts on other persons in the traffic jam
- ⇒ **climate change**
 - impacts on society



Climate change

- ⇒ **Transportation is unsustainable because of:**
 - using non renewable resources
 - is responsible of 25% of global CO₂ emission
- ⇒ **Reduction target applied in RECORDIT:**
 - an EU wide target with 8% as lower bound
- ⇒ **Climate change is calculated with the cost-effectiveness analysis**
 - emissions are reduced in the way or in the sector, where reduction costs are cheapest.
- ⇒ **damage cost approach varies by orders of magnitude**
 - reason: theoretical problems (equity, irreversibility, uncertainty)
- ⇒ **avoidance cost approach**
 - weak sustainability: 37 Euro/t CO₂, strong sustainability: 135 Euro/t CO₂



Summary of cost calculation

Internal costs

- personnel
- investment / depreciation
- maintenance and repair
- organisational
- insurance
- taxes
- charges
- time

External costs

⇒ direct

- accident
- noise
- congestion
- air pollution
- fuel consumption
- climate change

⇒ indirect

- **due to fuel generation, exploitation,**
 - climate change
 - air pollution
- **due to production and disposal of LU and vehicles**
 - climate change
 - air pollution