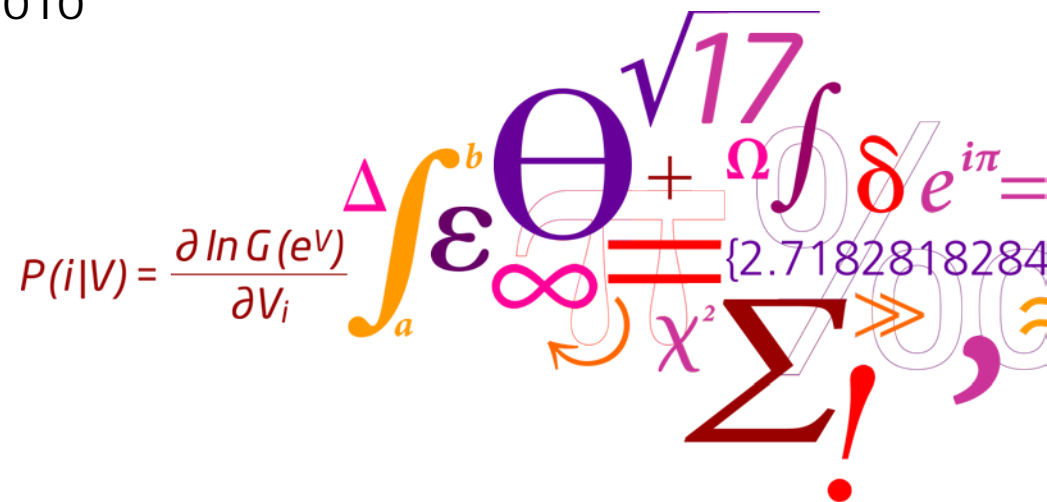


# Sustainability Indicators

– Success and failure in the transport sector

Henrik Gudmundsson

Guideline for Sustainable Mobility & Transport,  
 Potsdam1st External Stakeholder Workshop, UIC Declaration  
 and Reporting, 14. -15. October 2010

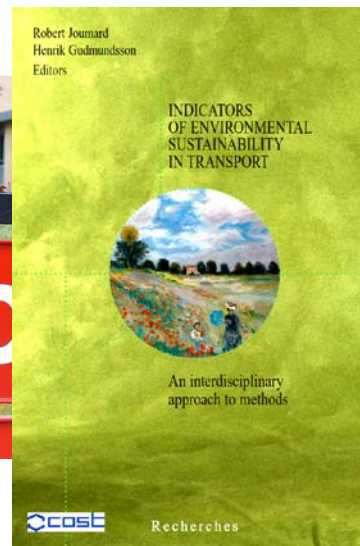


# Introduction

- Environmental planner, PhD in Business economics
- Transport Economics Group at Technical University of Denmark, since 2006



- Working with transport and sustainability indicators since 1990, as
  - Indicator user
  - Indicator developer
  - Indicator researcher
- COST 356 (2010)
- "indicators of Environmental Sustainability in Transport"



- Identification of environmental impacts of transport
- Cause-effect chains
- Methods to select indicators using criteria
- Methods to aggregate across impacts

# Overview

1. Why sustainability indicators for transport?
2. Functions and applications of indicators
3. Approach in COST 356
4. Challenges for developing useful indicators
5. An example of indicator use: Stockholm trial
6. Key points for indicator use

# Why sustainability indicators for transport?

- Massive *environmental* impacts from transport, some growing, some unknown, some ignored
  - *Social and economic* impacts also need operationalisation
  - A *comprehensive* view is required
  - A need for *continued attention* and feed-back to policy and public debate;
  - A need to *reduce complexity* of information
- > indicators are in demand
- "*Goals without indicators cannot credibly be achieved*"  
(John Dembash, 2002)

# What are indicators...?

- *Variables*, that
  - represent a phenomenon of interest as accurately as possible and necessary,
  - can be measured and populated with data,
  - can inform assessment or evaluation, ex ante and/or ex post,
  - allows repeatable and recurring reporting,
  - are always construed and selected!

# Functions of indicators

**Focus function – What is important?**



**Describing the situation – What is going on ?**



**Assessing the situation – How are we doing?**



**Diagnosing the situation – Why are we here?**



**Prioritizing – What should we do?**



**Accountability function – Who is responsible?**



**Improving – How can we do better?**



**Communicating – How can we show it?**



# What do you want your indicators to do?

Examples of applications	Special needs/concerns
System analysis	Validity; Causality
System operation	Precision; Timeliness
Policy evaluation	Goal oriented, Actionability
Ranking	Aggregatability; Robustness
Benchmarking	Focus on practices; Users
Performance management	Target link, Attribution
Sustainability assessment	Multi-dimensionality, Thresholds
Public information	Relevance; Communication

# Indicator frameworks

## Institutional framework

- Company internal
- Inter-organisational
- Independent auditing
- Governmental
- Statistical agencies
- etc

## Application framework

- System analysis
- Conceptual framework
- Forecasting
- Strategy reporting
- Benchmarking



# What are 'sustainable mobility indicators'?

- Multiple 'paradigms' for sustainability
- Multiple dimensions of sustainability
- Multiple aspects of mobility
- Multiple contexts of application

## Definition in COST 356

“An indicator of environmental sustainability in transport is a variable, based on measurements, which represents potential or actual impacts on the environment - or factors that may cause such impacts - due to transport, as accurately as possible and necessary “

COST 356 IMPACT AREAS		
<b>Nature</b>	<b>Resources</b> Minerals, fossils	<b>"Earth"</b> (unity of all areas )
	<b>Ecosystems</b> Living and abiotic elements	
<b>Humans</b>	<b>Health</b> Acute and chronic damage	
	<b>Quality of Life</b>	
<b>Cultural Heritage</b> Buildings, monuments and surroundings		

# Key transport impact areas

- Noise and vibrations
- Accidents
- Air quality
- Soil and water pollution
- Landscape and nature intrusion
- Non-renewable resources and waste
- Climate change
- Other effects

**Representation**

Validity

Reliability

Sensitivity (to specific factor)

**Operation**

Measurability

Data availability

Ethical concerns

**Application**

Transparency

Interpretability

Target Relevance

Actionability

## A selection procedure - example

1. Determine user needs
2. Develop a list of candidate indicators
3. Determine screening criteria
4. Score indicators against criteria
5. Summarize scoring results
6. Decide how many indicators are needed
7. Make final selection
8. Report on the suite of indicators

*(Rice & Rochet 2005)*

# Challenges for indicators

- Confusion or conflict over what are goals and purpose
- Low representativity of indicator to the issue of interest
- Unfitness of indicator to the context where it is needed
- Lacking, imprecise, or old data
- Lack of comparable data over units/entities
- Too soon or too late delivery for decision needs
- Costly to develop and maintain
- Overemphasis on measurable items - > 'tunnel vision'
- Limited, distorted or misuse of results
  
- ....but most can be dealt with...!

# Stockholm trial (1) Key elements

## Features:

- Trial period January – July 2006
- Charging + Increased Public transport
- Charge 6:30 – 18:30 (workdays)
- Bsais for referendum (Sept 2006)
- Massive monitoring and evaluation

## Objectives:

- Reduce traffic volumes by 10-15% on the most congested roads
- Increase the average speed
- Reduce emissions
- Improve the urban environment as perceived by Stockholm residents





# Stockholm trial (2) Monthly reporting

- Car traffic (flow and travel time)
- Public transport (passengers and loads)
- Bicycle traffic
- Park-and-ride utilization
- Impact on retailing

## Stockholm trial (3) Indicator success factors

<b>Conceptual</b>	Clearly defined measurement program for specified policy issues, targets for key objectives
<b>Operational</b>	Intensive data collection before, during, after trial, high data availability
<b>Communication</b>	Almost instant reporting of key result indicators, extensive communication strategy, involvement of press, reference groups
<b>Institutionalisation</b>	Clear responsibilities, relative independence of monitoring unit, requirement to use results for specified decision

## Key points (1)

- There is a strong need for indicators to guide attention and action towards unsustainable trends in transport...
- ...but there is no generally recognized single indicator or indicator set to measure 'sustainable transport/'sustainable mobility'; since:
- Sustainable mobility is not a well defined concept,
  - No type, form, or mode of mobility is fully sustainable per se
  - Sustainability and mobility each involves numerous dependencies
  - Useful indicators must take into account context and purpose

## Key points (2)

- Indicators are useful for many functions...

.....but are not always used.

- To be accepted indicators typically need to be:
  - Credible (scientifically valid, accurate; precise)
  - Salient (timely reporting on issues considered important)
  - Legitimate (produced in a process that users accept and trust)

## Key points (3)

- Indicators (also for sustainability in transport) should be selected through step-wise processes that involves experts, users and stakeholders;
- Key elements in the processes could include,
  - definition of purpose, application, and framework
  - consideration of context and system boundary;
  - identification of impact chains of relevance;
  - generation of candidate indicators per impact;
  - assessment of indicators using criteria and;
  - joint consideration and aggregation of results.

## Key points (4)

- *More words of caution:*
- Indicators are necessary, but do not become useful by themselves;
- Indicators may be ignored, forgotten or misused;
- When indicators are influential they rarely foster change but confirm an existing policy/situation;
- Indicators cannot stand alone, but need to tagret with planning and decision making processes....