



# What is impact?

Introduction to impact analysis and FOT examples

Eline Jonkers





## What is impact?

**im-pact** (*noun*)



1. The striking of one body, object against another; collision.
2. The force or impetus transmitted by a collision.
3. The effect or impression of one thing on another: *still gauging the impact of automation on the lives of factory workers.*
4. The power of making a strong, immediate impression: *a speech that lacked impact.*

Source: [www.thefreedictionary.com](http://www.thefreedictionary.com)



## What do we mean with impact?

- › The impact of an ITS is the effect that the ITS has on...
  - › drivers
  - › travellers
  - › society as a whole
  - › transport network
  - › transport operations
  - › ...
  
- › ITS (Intelligent Transport System) is a very broad term and can be a driver assistance system, warning system, travel information system, traffic management, etc.



## Why do an impact analysis?

- › To answer certain (research) questions
- › To validate the potential benefits of ITS
- › Because the customer asks for it
- › As a step towards decision making and deployment
  
- › It's like buying a car...
  - › The brochure promises a lot
  - › You want to make a test drive to see whether the car lives up to the described potential
  - › Weigh the benefits against the costs
  - › Buy it (deployment)!





## Goal impact analysis

- › Draw conclusions about what the effect of the tested system, measure or technology is on
  - › Safety
  - › Traffic efficiency
  - › Environment
  - › User acceptance
  - › Personal Mobility
  - › Policy
  - › Business models
  - › Etc.





## Process of impact analysis

- › Starting point:
  - › The ITS works (technical tests were carried out successfully)
- › Steps:
  - › Definition of research questions and hypotheses
  - › Definition of performance indicators, measures and situational variables
  - › Collecting data (objective and subjective)
  - › Analysing data
  - › Testing hypotheses
- › From analysed data and tested hypotheses:
  - › Impact analysis and answering research questions
  - › Scaling up to calculate impacts on a large scale
  - › Possibly cost benefit analysis (CBA)



## Examples and experiences in FOTs

**SeMiFOT**  
A SAFER PROJECT

**eur  
FOT**

Bringing intelligent vehicles to the road

**simTD** Sichere Intelligente Mobilität  
Testfeld Deutschland



**SISCOGA**  
SISTEMAS COOPERATIVOS GALICIA





## Focus past and current FOTs

- › Most of them test or tested ADAS (e.g. FCW, ISA), nomadic devices (e.g. navigation systems) or cooperative systems
- › Calculation of impact of systems on:
  - › Traffic efficiency (travel times, speeds)
  - › Safety (surrogate safety measures, where possible translation to accidents)
  - › Environment (CO<sub>2</sub> emissions)
  - › Driver behaviour, acceptance and workload
- › Some FOTs scaled up the impacts (or tried to...)





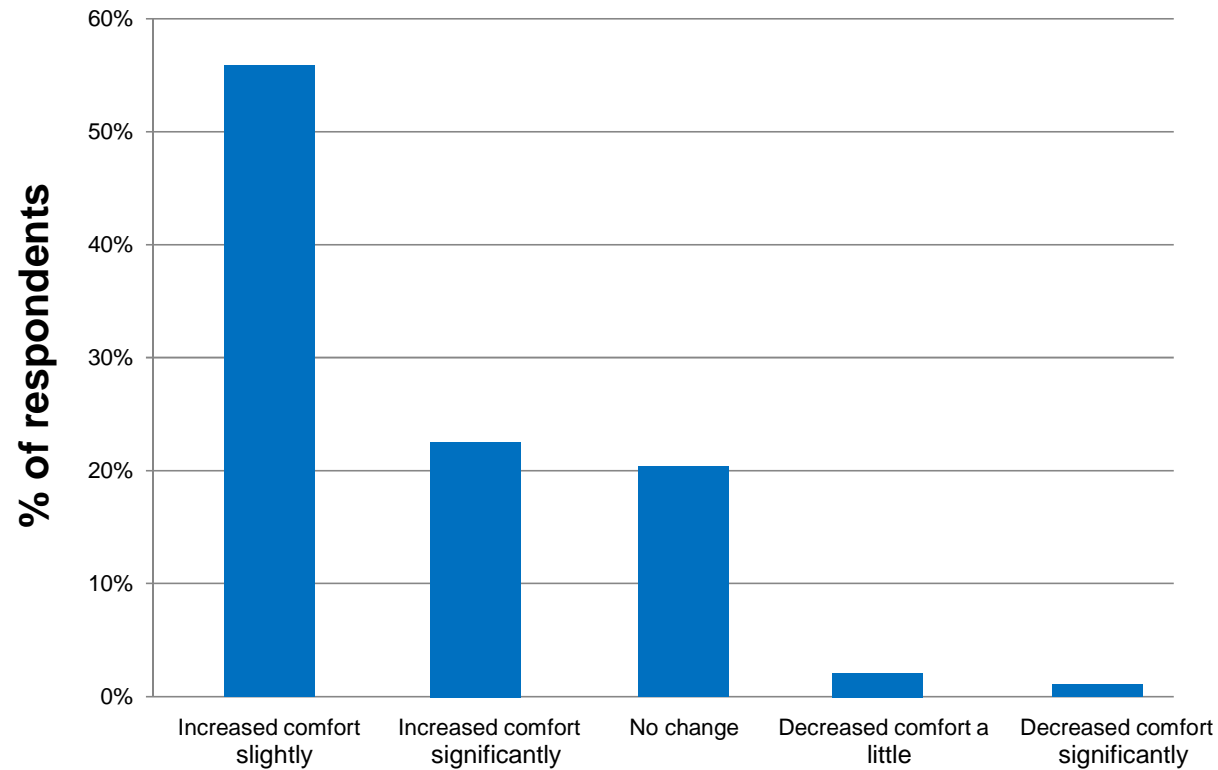
## Results euroFOT (impression)





## Perceived driving comfort Adaptive Cruise Control (ACC)

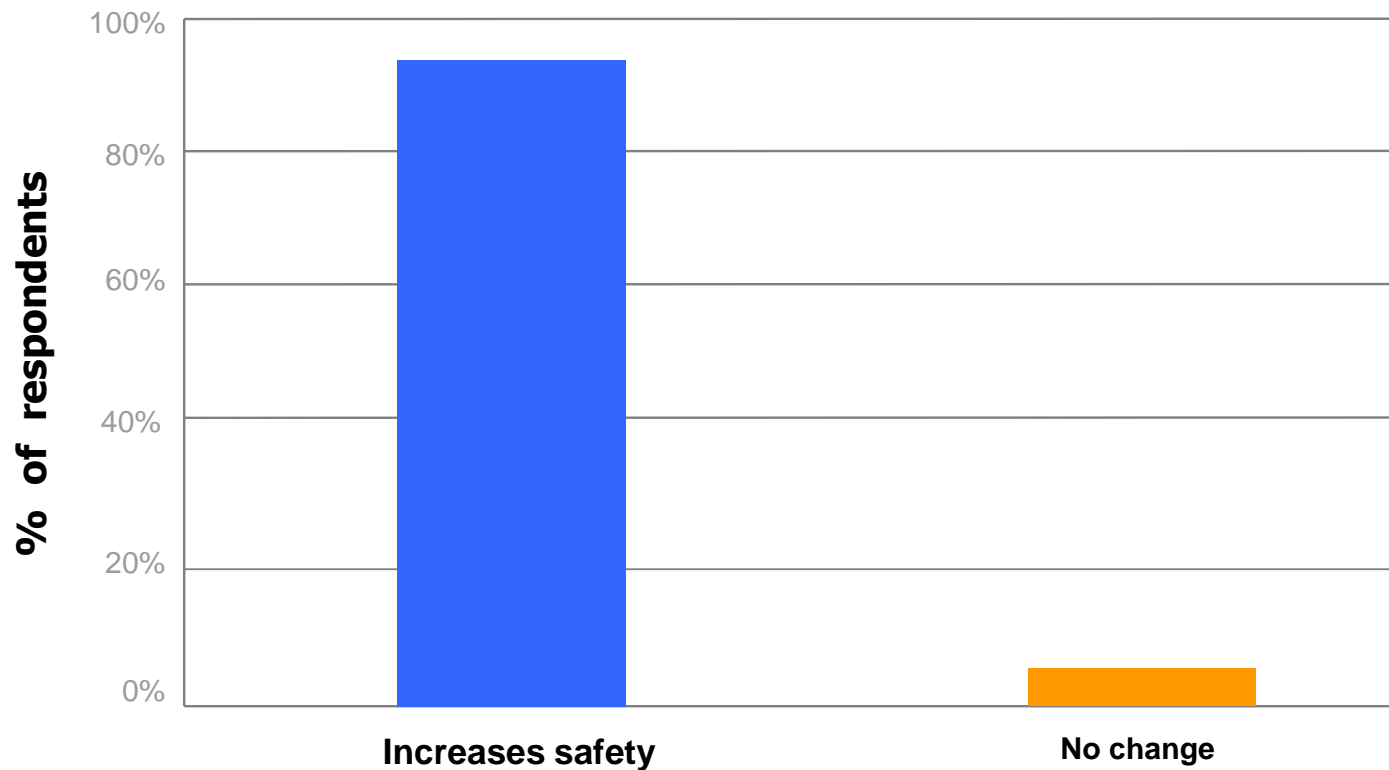
- › ACC leads to an increase of perceived driving comfort: 77% of drivers feel that ACC increases comfort





## Perceived safety ACC

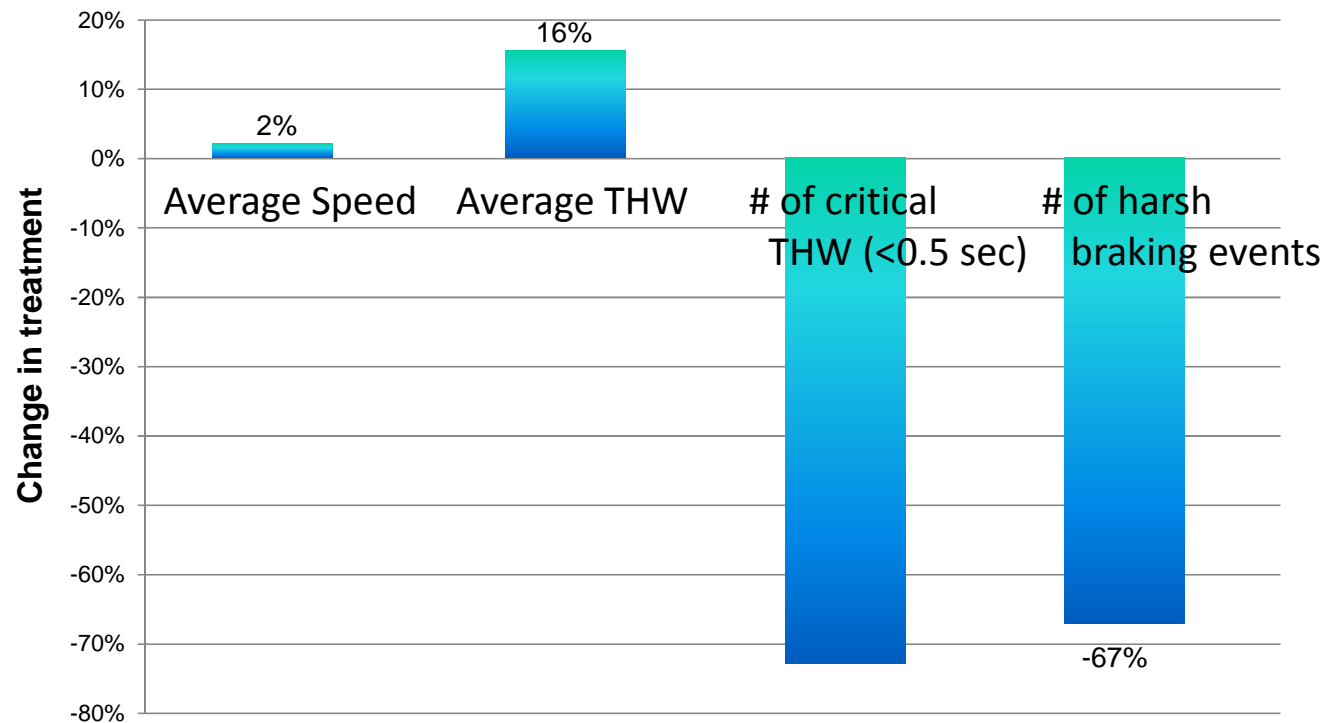
- › ACC leads to an increase of perceived driving safety: 94% of drivers feel that ACC increases safety





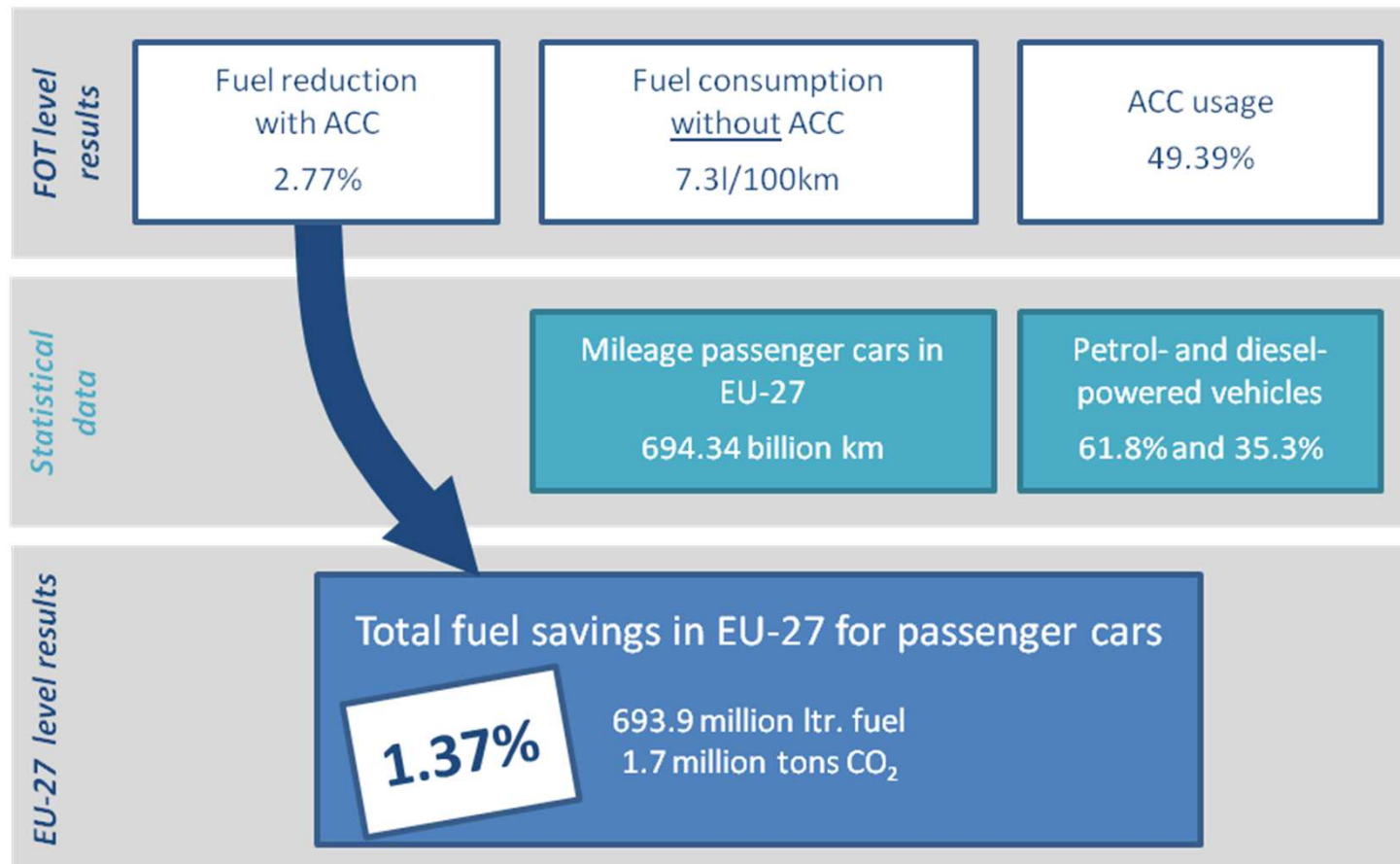
## Effects ACC on motorways

- › Changes from baseline to treatment phase for cars
- › Time Headway (THW) = time to leading vehicle



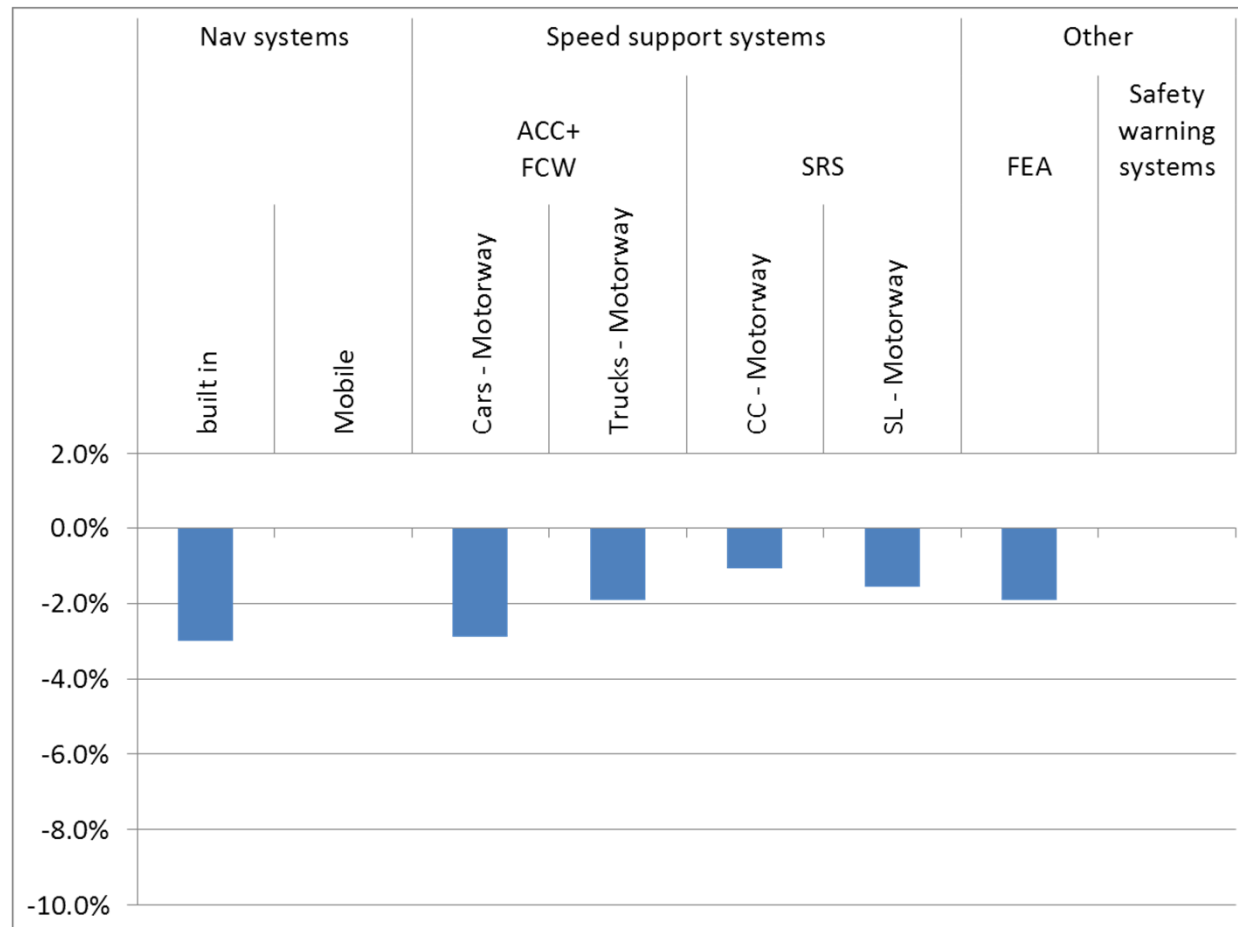


## Fuel reduction ACC





## Summary environmental impacts





## euroFOT challenges

- › Very large, complex project
- › Many (combinations of) systems
- › Many “sites” (Germany 1 & 2, Sweden, France, Italy)
- › Focus on getting the cars & trucks on the road, much effort went to data logging and processing
- › Hypotheses and PI, situational variables, events and measures definition by many different partners
  - › → No clear research questions
  - › → Very long list of (often unsuitable) hypotheses
- › How to manage the huge amount of data and keep it accessible for analysis?



## Experiences ‘Dynamax’

- › Field operational test with dynamic speed limits on Dutch motorways
  - › Various goals (traffic efficiency, safety, environment)
  
- › Several test sites, several algorithms
- › Impact assessment set up almost according to FESTA handbook
  - › Not all steps in right order, some time wasted?
- › Several iterations, intense discussions with client (about research questions, hypotheses) and with algorithm developers
- › Situational variables very important
  - › Weather, congestion, period of the day, ...
  - › Influences negatively comparability between sites and tests





## General observations from FOTs (1)

- › Ideally, one follows the FESTA-V → gives structure to the process
- › What is difficult?
  - › Impact analysis takes place at the end of the project
  - › Setting up the impact analysis needs to be done much earlier – at beginning of project, when focus is on setting up the pilot (equipping vehicles etc.)
- › FOTs generate huge amount of data
- › Focus needed not to get lost in the data → important to formulate clear hypotheses
- › Measured data very interesting, but almost always additional analyses needed



## General observations from FOTs (2)

- › The more (combinations of) systems and “test sites” in a FOT, the more complex the impact analysis
- › Structured approach and lots of communication needed
- › Explanatory data is very important – monitor things like traffic state, holidays, weather, etc.
- › Impact analysis will continue to be at the end of the project → probably always time and budget constraints
- › CBA only possible and/or sensible when previous steps can provide the data needed



## Questions

