Evaluation Methodology

Methodology for Impact Assessment on Traffic Efficiency and Environment

Freek Faber
TNO

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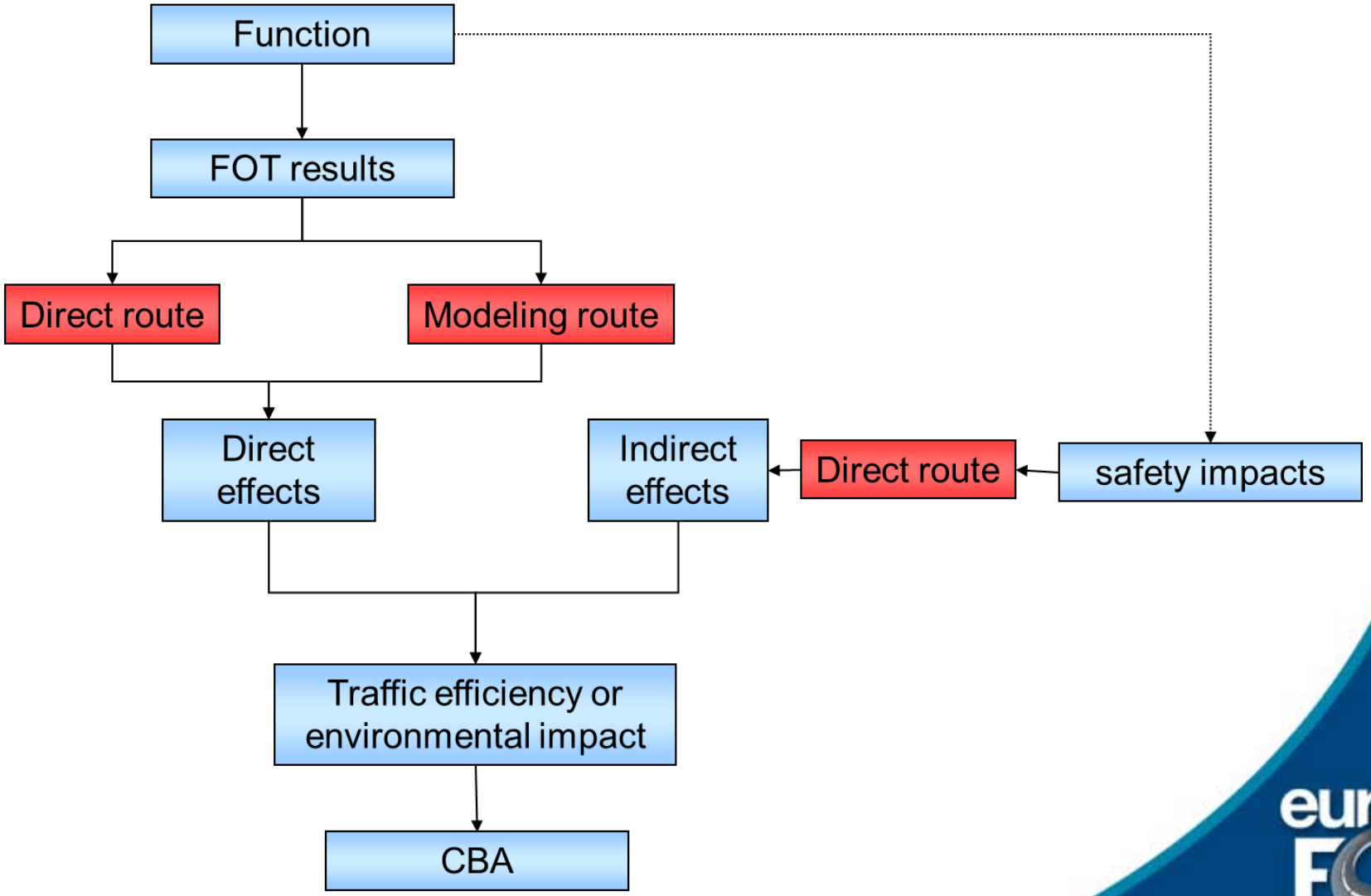
www.eurofot-ip.eu

Bringing intelligent vehicles to the road

Impact assessment challenges

- Scaling to EU level impacts
- Scaling to higher penetrations
- Impacts per bundle or per function
- Required data not always available

Methodology overview



Research questions, indicators, hypothesis and situational variables

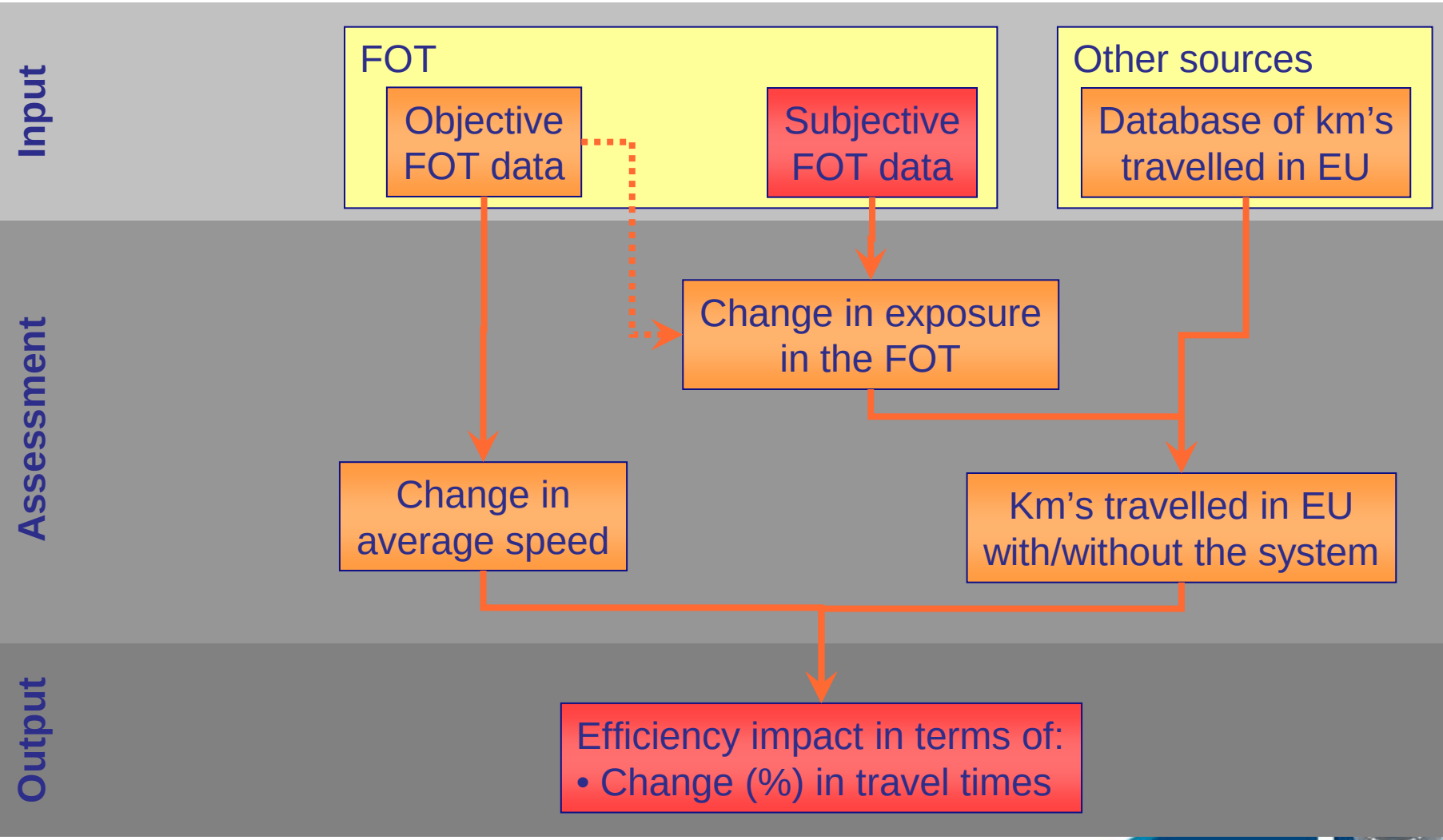
What is the impact of the euroFOT function on…

- travel time
- fuel consumption
- CO2 and regulated emissions
- journey speed
- delay
- variation in speed
- network performance

Hypotheses

No.	Hypothesis	ACC and FCW	SRS	Navigation	FEA
1	The average speed will decrease	✓	✓	✓	
2	The number of vehicle km travelled will increase	✓	✓	✓	
3	Fuel consumption will decrease	✓	✓	✓	✓
4	Navigation systems increase the number of vehicle km travelled			✓	
5	Navigation systems increase journey efficiency based on surrogate measures			✓	

Effect on travel time



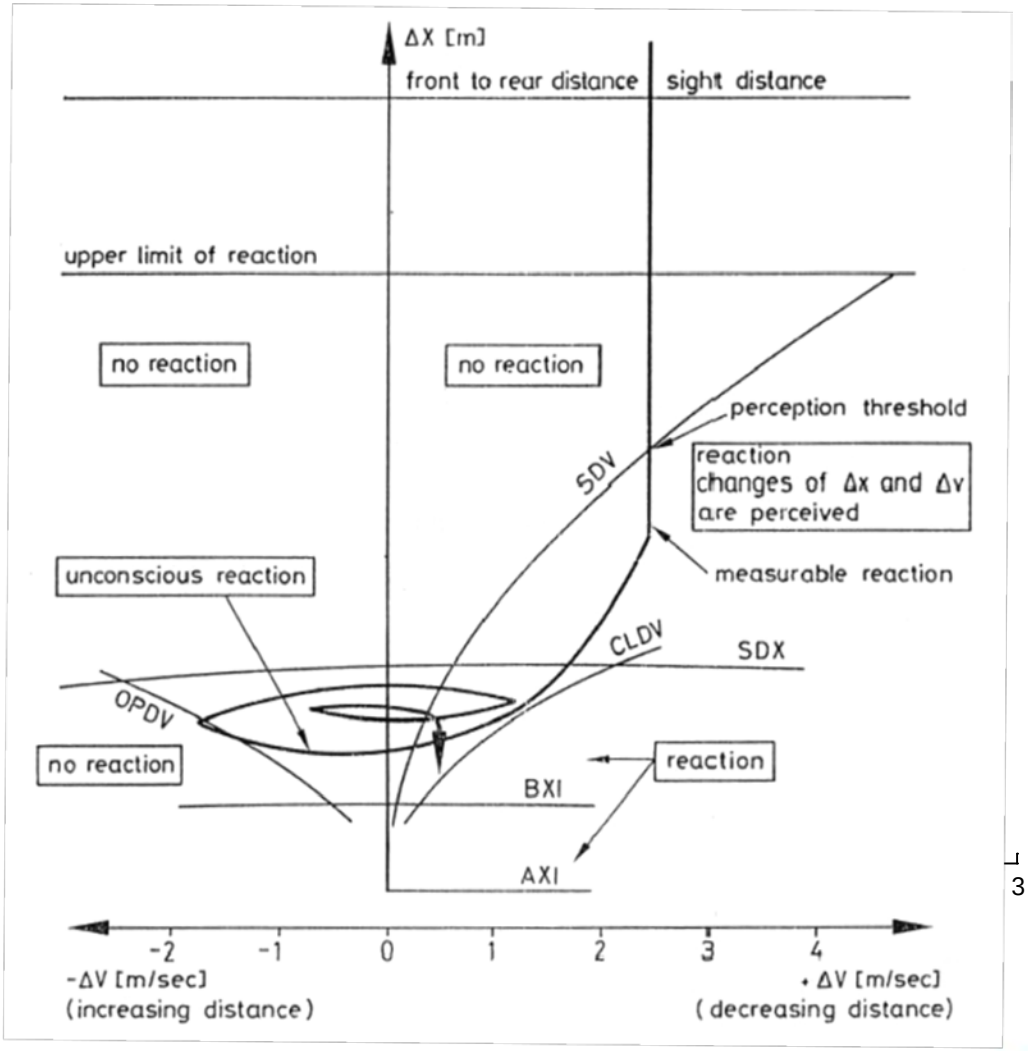
Situational variables

- Function state (on, off, stand by)
- Road type (Motorway, Rural, Urban)
- Traffic state on motorway (Free flow, Congestion)
- Weather (Rain, No rain)
- Lighting (Daylight, Dark)
- Truck load (Empty, Loaded)
- Speed limit (30, 50, 90, 110, 130)
- Familiarity of route (Familiar, Unfamiliar)

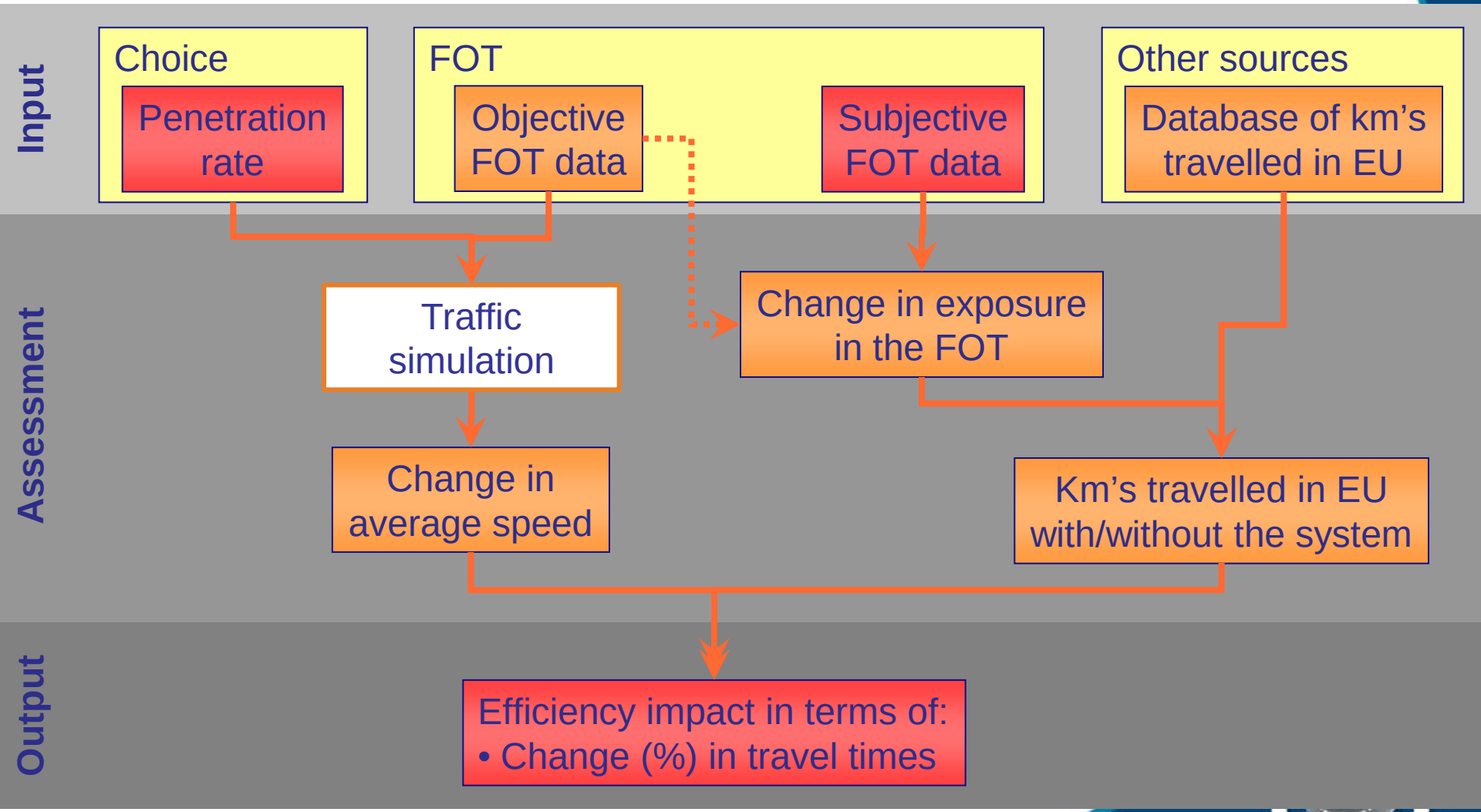
Simulation modeling

- To determine interaction when a large share of the vehicles is equipped
- Based on driving behaviour and usage observed in the FOT
- Emission modelling to determine other indicators than CO2
- For ACC+FCW and for SRS because for these systems interaction effects are expected

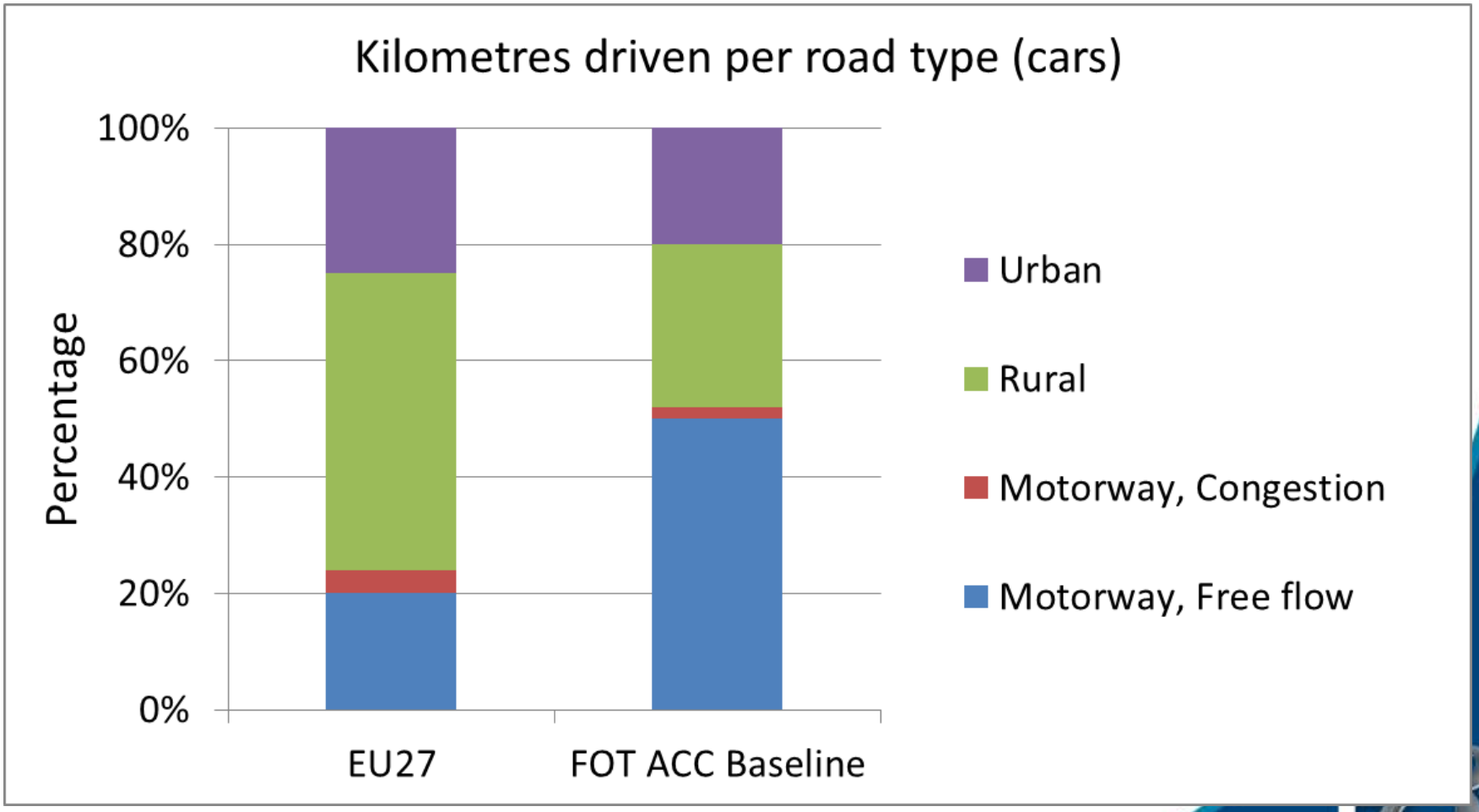
Traffic efficiency – driver behaviour model in simulation



Effect on travel time



Scaling to EU level impacts



Summary

- Direct and simulation route to determine direct effects
- Indirect effects based on safety effects
- Impact assessed for most common situations
- Complex experimental setup resulted in methodological challenges
  - Debundling of functions only partly possible
  - Good harmonisation of results from different VMCs
- Scaling to EU level was not always possible

8 Functionalities, 28 Partners, 1000 Vehicles

1 Field Operational Test, **8 Functionalities**

28 Partners, 1000 Vehicles, 1 Field Operational Test

8 Functionalities, **28 Partners**, 1000 Vehicles

1 Field Operational Test, 8 Functionalities

28 Partners, **1000 Vehicles**, 1 Field Operational Test

8 Functionalities, 28 Partners, 1000 Vehicles

1 Field Operational Test