

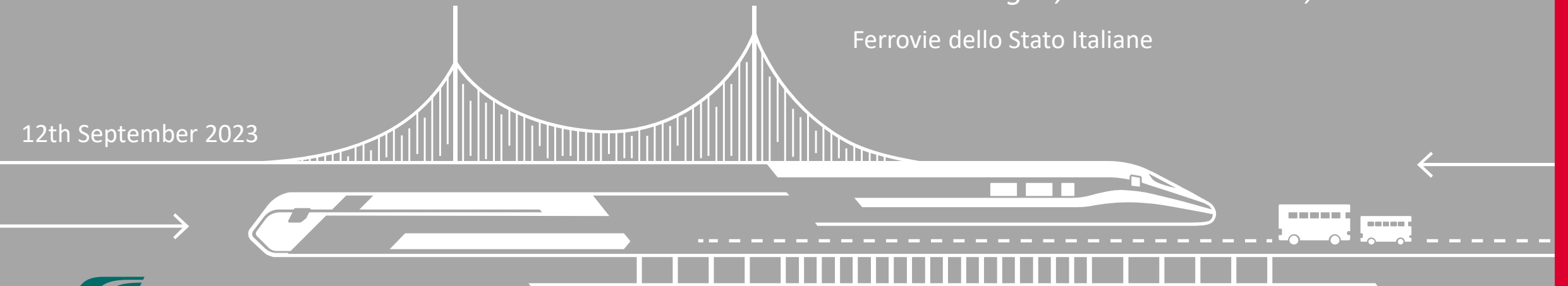
External Costs

Evaluation of external costs change due to High Speed Rail in Italy

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Ferrovie dello Stato Italiane

12th September 2023



The external costs of transport: the UIC definition

External costs are **costs generated by transport users** and **not paid by them but by the society** as a whole

such as congestion, air pollution, climate change, accidents, noise but also up- and down-stream processes, costs for nature and landscape or additional costs in urban areas.

There is a **market failure** because transport prices are not reflecting their costs and transport users are **choosing their transport mode with a wrong price signal**.

EU developed a specific calculation guidelines included in **Handbook on the External Costs of Transport**.

UIC recommends internalization of these external costs to allow transport users to take the right decisions and the polluter pays principle to optimize the transport sector.

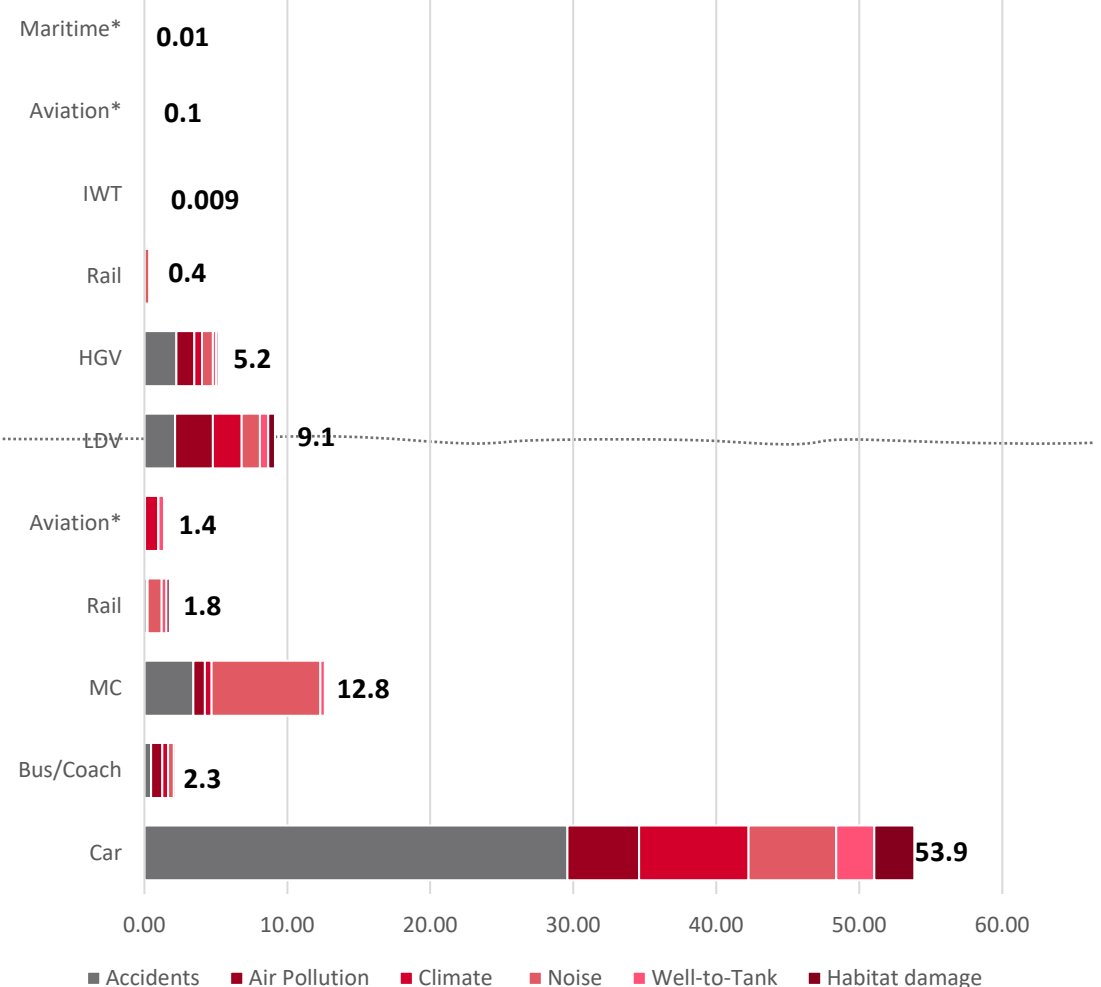
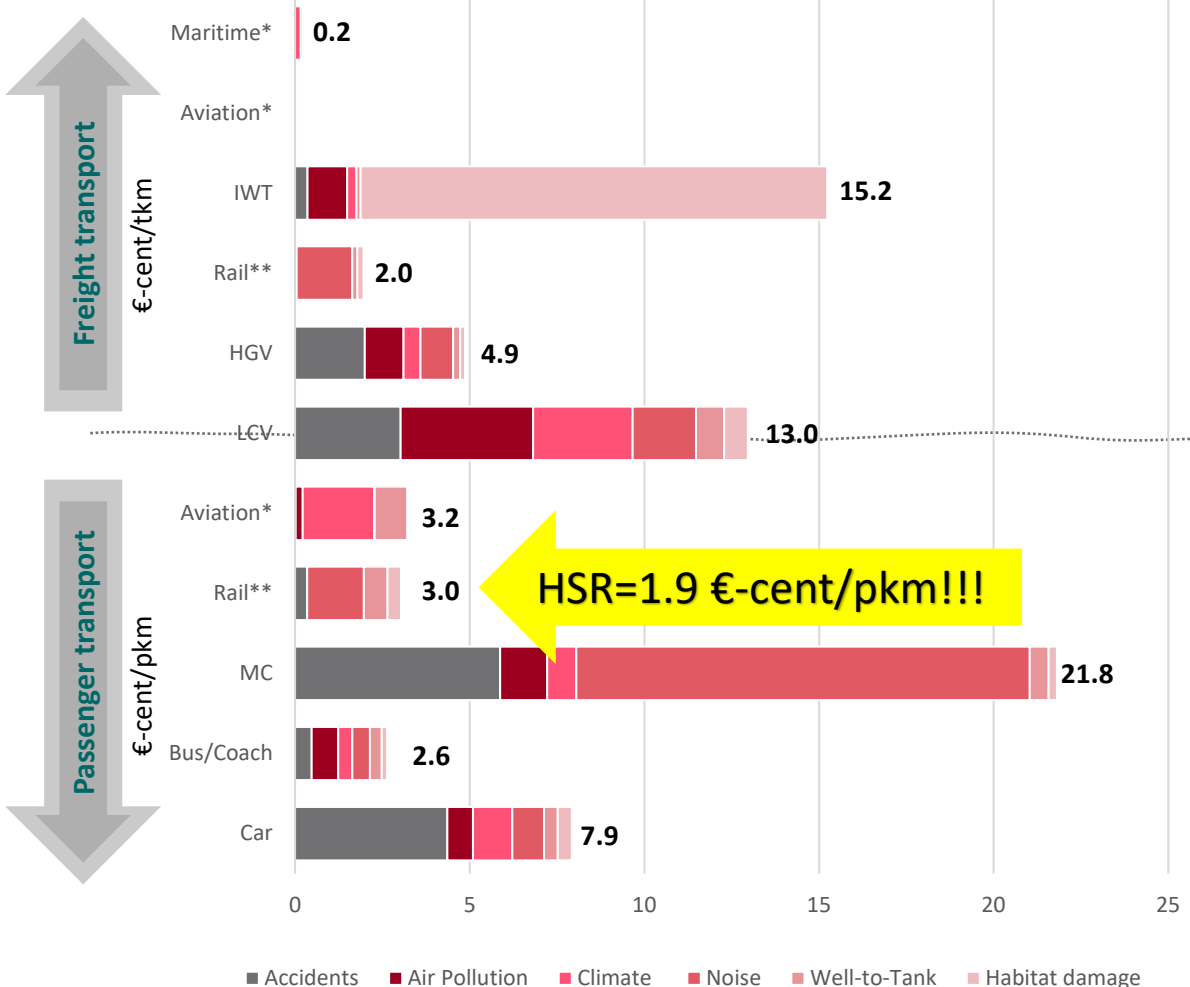
Italy - Figures from the Handbook

*Data for aviation and maritime: rough estimations for *Italy* based on selected ports/airports (Ports: Genova, Trieste, Venice – Airports: Rome Fiumicino)

** Only electric train are considered

Average external costs

Total external costs (billion € per year)



Case Study

HSR evolution for the case study

In the meantime in the Italian HSR market...

Milan - Rome

1992

Firenze - Roma

2008 Dec

Milano - Bologna

2009 Dec

Bologna - Firenze

2013

HS Station: Reggio Emilia, Bologna



FRECCIAROSSA

FRECCIARGENTO

FRECCIABIANCA

February 2009: launch of the Trenitalia 'Freccie' brands

.italo

April 2012: NTV Italo starts operating

FRECCIAROSSA 1000

June 2015: launch of Frecciarossa Mille



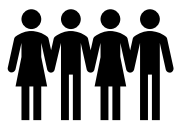
December 2017: Italo ETR 675 starts operating

Case study

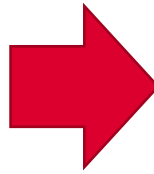
Methodology and data

Known data

Trenitalia **Passengers** on studied HS relation 2008/2019



Modal share on HS relation 2008/2019 by Trenitalia surveys



What we evaluated

Total **Passengers** for each mode on studied HS relation 2008/2019



Passengers - km on studied HS relation 2008/2019

Milan – Rome distance [km]

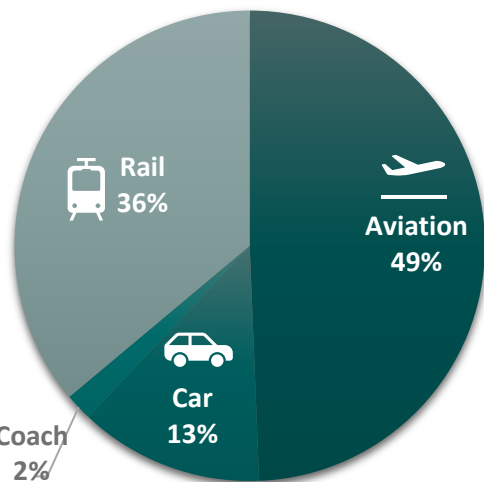
2008	471*	574	518	-
2019	471*	571	518	496

*Straight flying distance

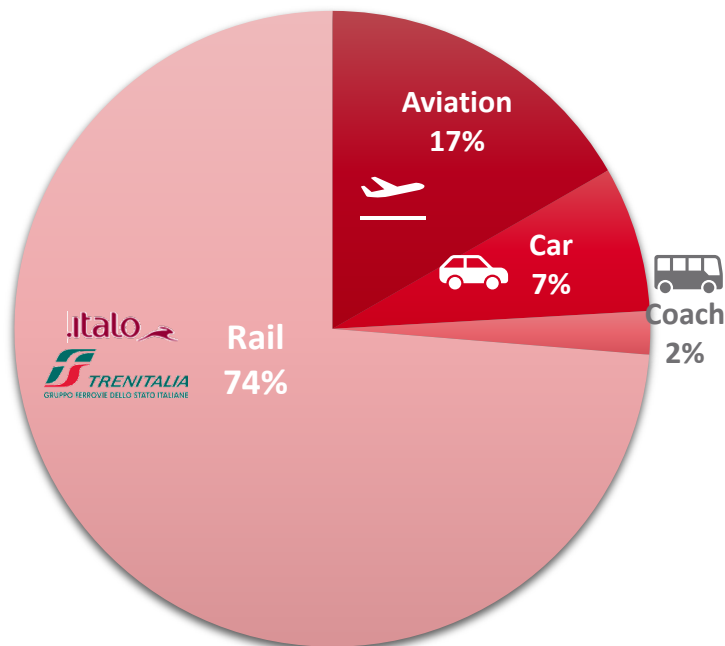
Rome - Milan

Modal share data and estimated absolute passengers

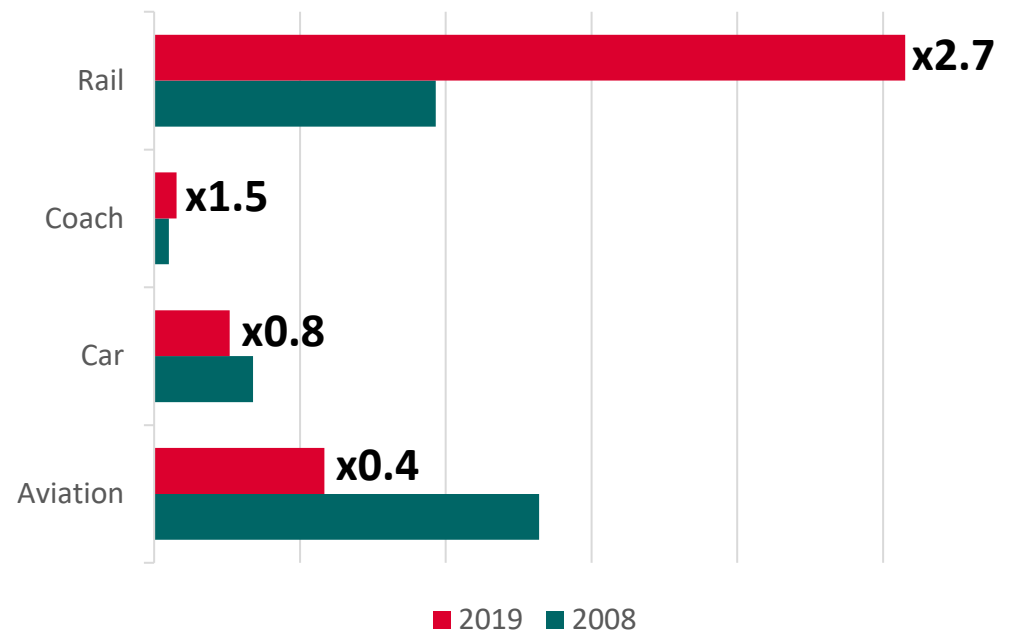
Modal share 2008



Modal share 2019



Estimated absolute passengers



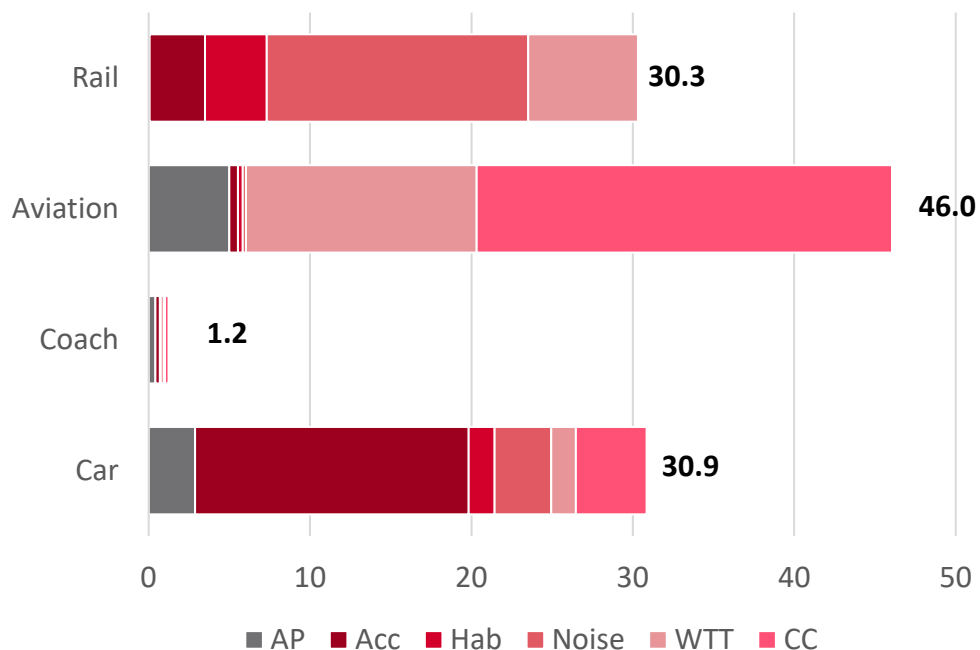
Demand 2019 \cong 1,3 \times Demand 2008

Rome - Milan

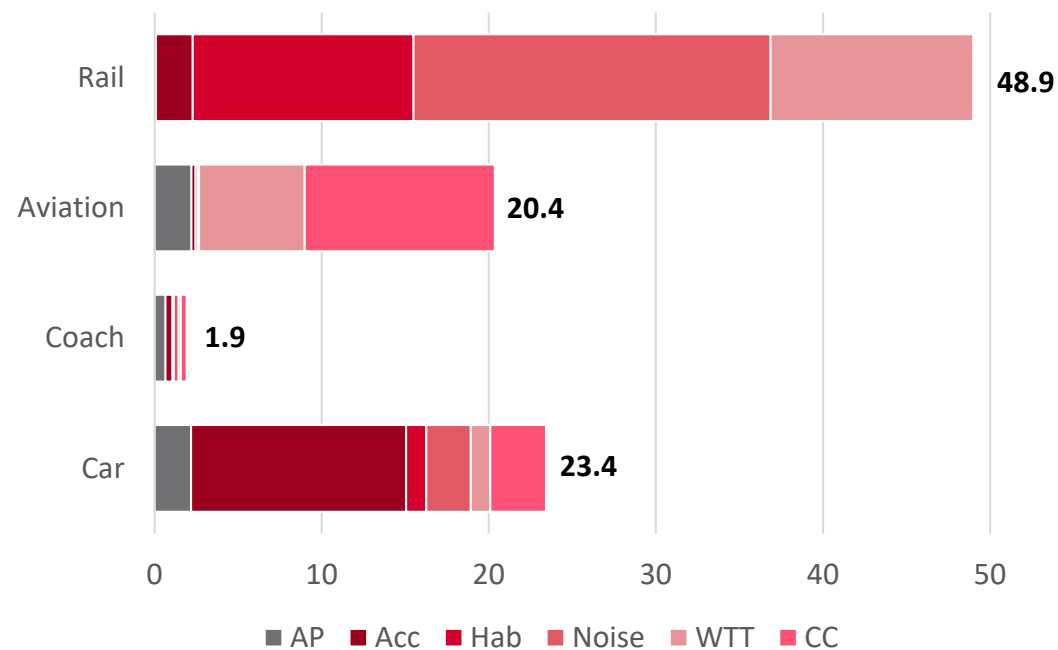
Evaluation of external costs

$$Total\ external\ cost_m = Average\ cost_m \cdot Pax - km_m$$

External costs 2008 (million €)



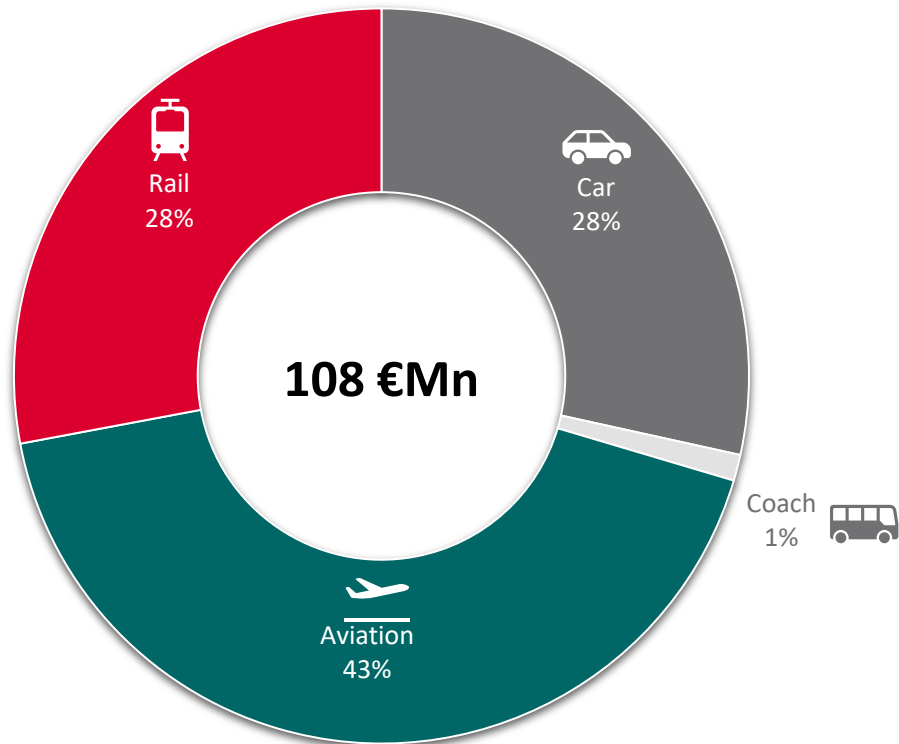
External costs 2019 (million €)



Rome - Milan

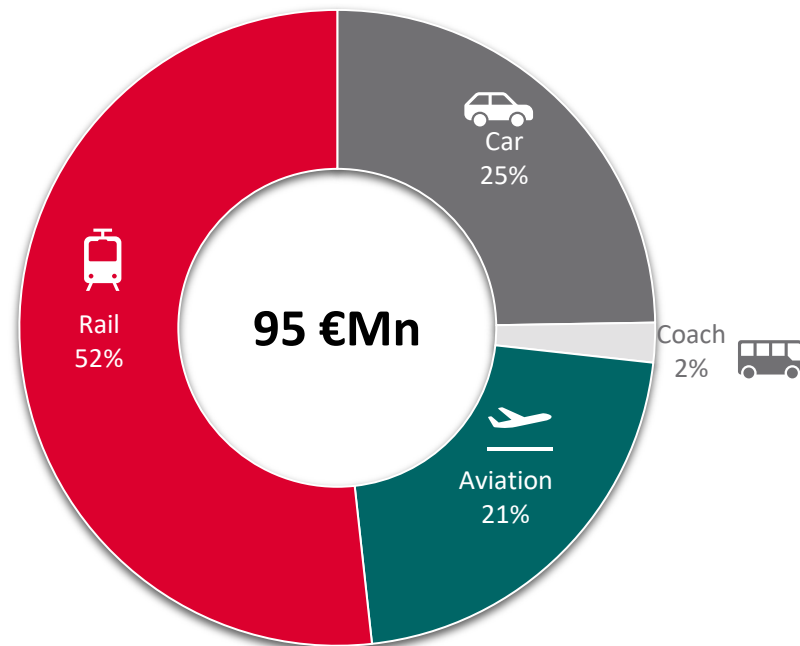
Evaluation of external costs

External costs 2008



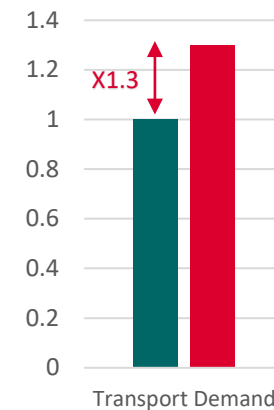
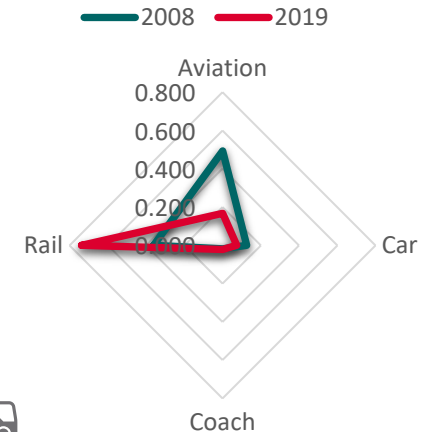
Total external costs/pax
= 20.3 euro/pax

External costs 2019



Total external costs/pax
= 13.5 euro/pax

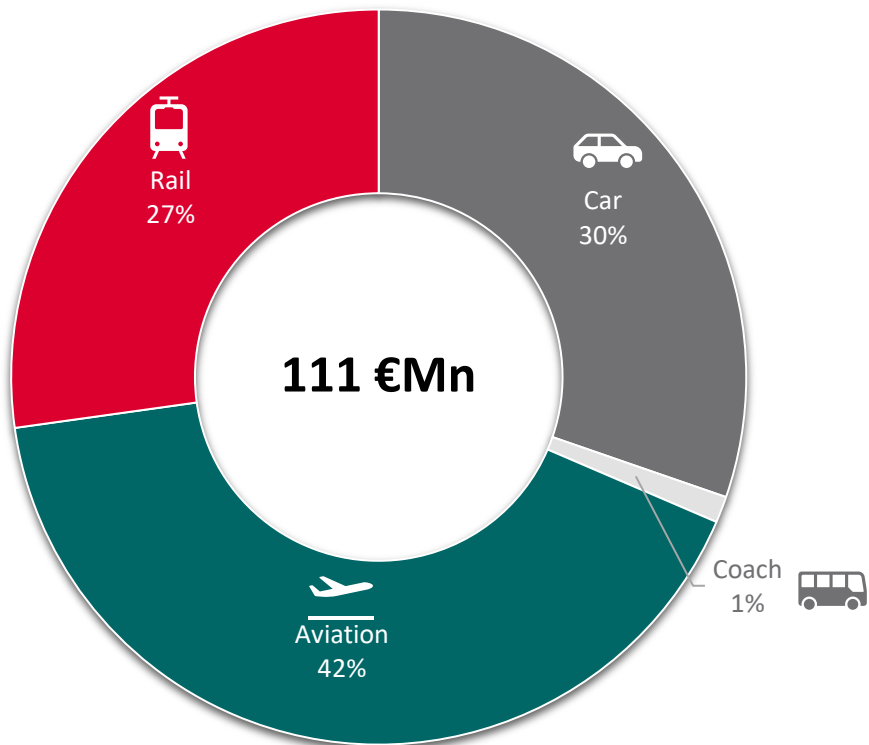
Modal share



Rome - Milan

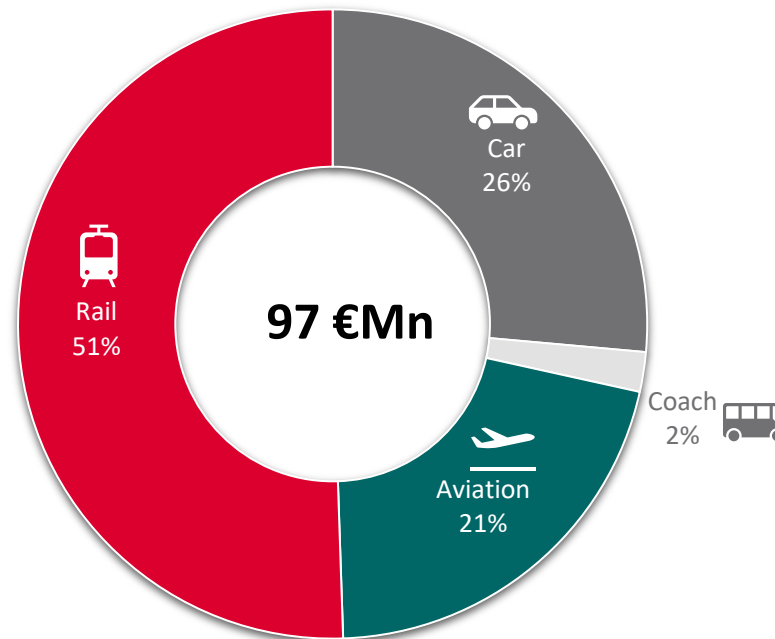
Evaluation of external costs

External costs 2008



Total external costs/pax
= **20.8 euro/pax**

External costs 2019

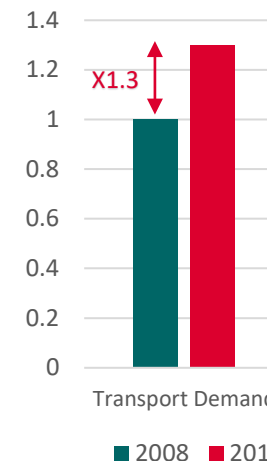
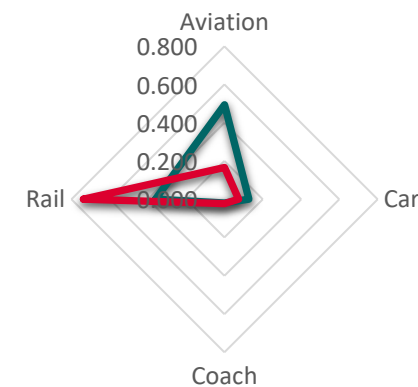


Total external costs/pax
= **13.9 euro/pax**

WITH CONGESTION!!!

Modal share

— 2008 — 2019



Conclusions and further developments

- ✓ Surveys on Rome-Milan relation registered an important modal shift in favour of rail transport after the HSR completion. **Train modal share** passed from **36% in 2008**, before HSR construction, **to 74% in 2019**.
- ✓ Based on available data, modal share data and Trenitalia passengers on Milan-Rome relation, we **estimated an increase of transport demand of 30%** on this relation.
- ✓ **The external costs on Rome-Milan relation**, evaluated by Handbook on the External Costs of Transport methodology, **decreased in 2019 respect to 2008** even if demand transport increased. This result could be explain by these facts:
 - ✓ HSR absorbed a part of plane modal share and a little of private car modal share.
 - ✓ HSR absorbed the most part of the increase of demand transport.
- ✓ The construction of HSR on Rome-Milan relation led out the decreased of total external costs on this relation.
- ✓ In **June 2023** UE released a tender for the **update of the EU Handbook** on the external costs with the aim to support and assess the degree of the implementation of the 'user pays' and the 'polluter pays' principles in the transport field in the EU Member States and in other developed economies.
 - ✓ It could be interesting repeat the evaluation with updated value for other years after 2019.

Thank you for your attention

