



**Gruppo FS**

The Mobility Leader

# To Predict or to Build the Future?

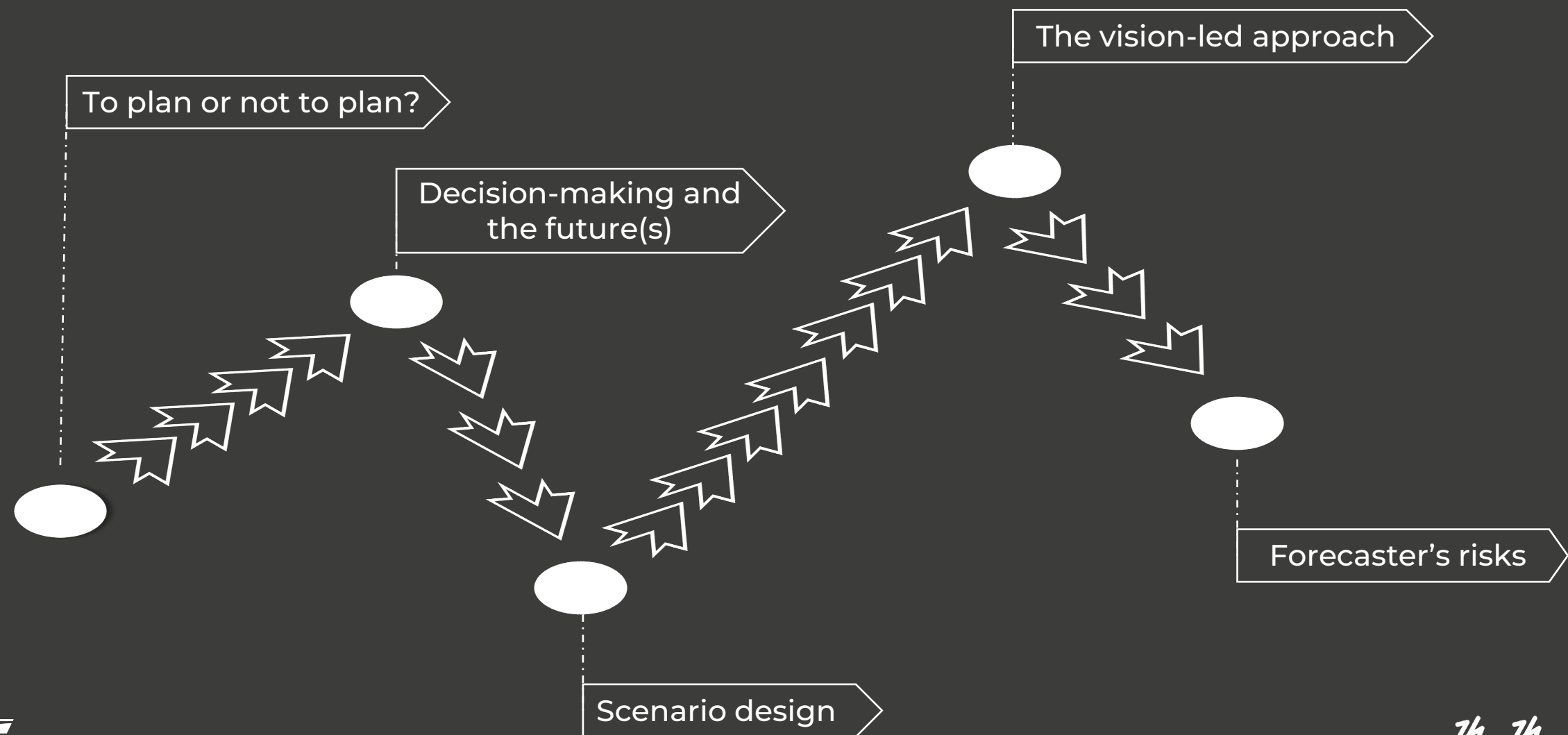
## Planning Tomorrow's Transport with the Vision-Lead Approach

Mario Tartaglia

Leader of FS Research Centre



# Contents





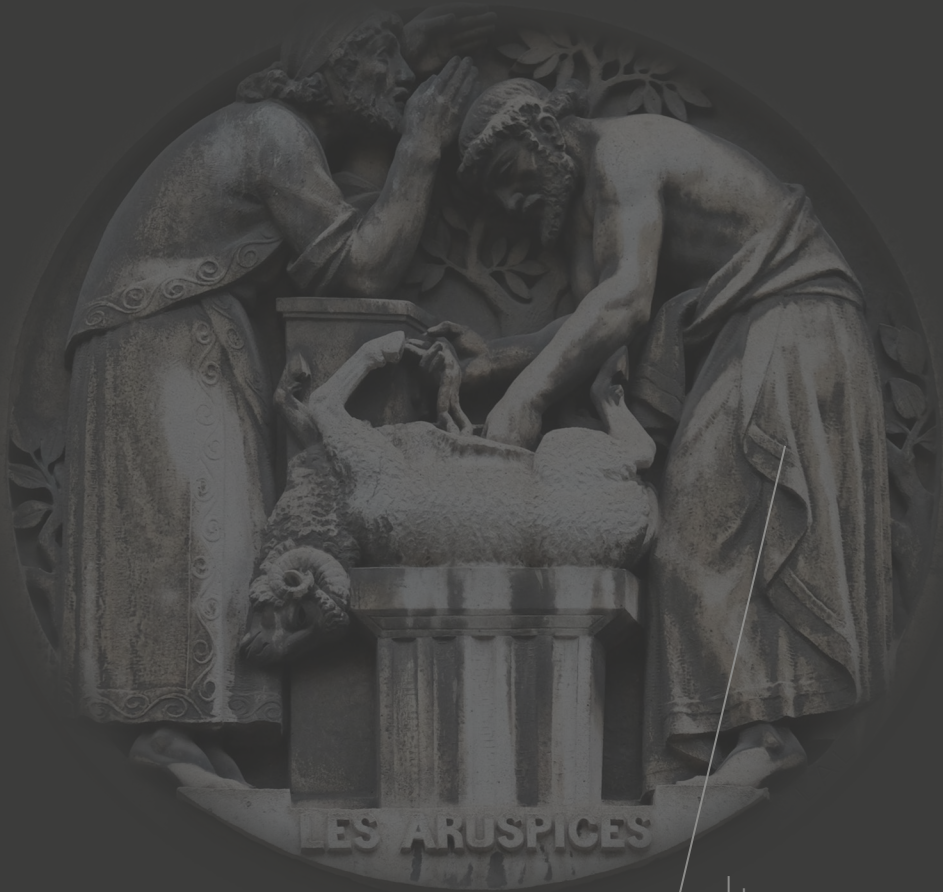
**Gruppo FS**

The Mobility Leader

To plan or not to plan?

# Forecasters vs improvisers

*Human beings always tried to forecast their future .....*



*..... oops ..... not always .....*

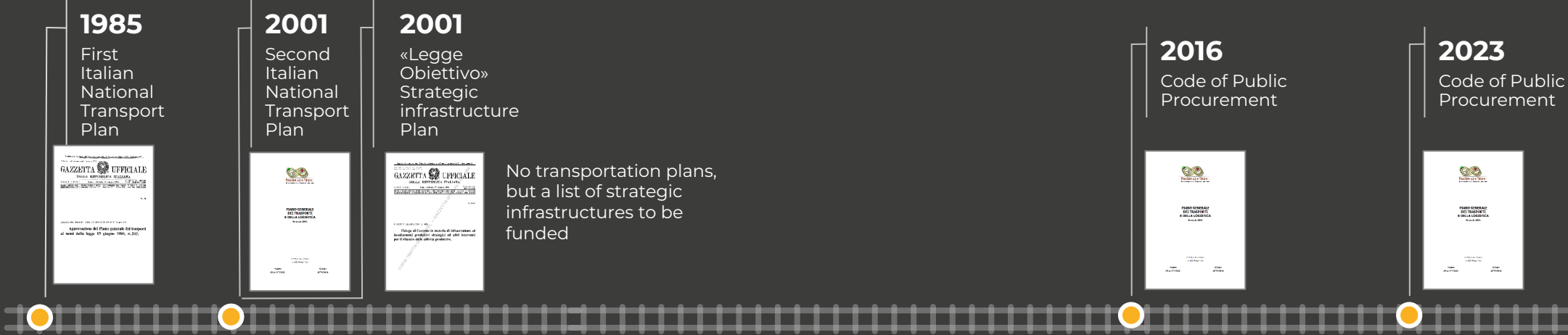
*When you got a trouble, don't worry: if you can solve it there's no need to worry, if you can't solve it there's no point in worrying (老子 Lao-Tsu, VI B.C. )*

haruspex was a person trained to practise a form of divination called haruspicy, the inspection of the entrails



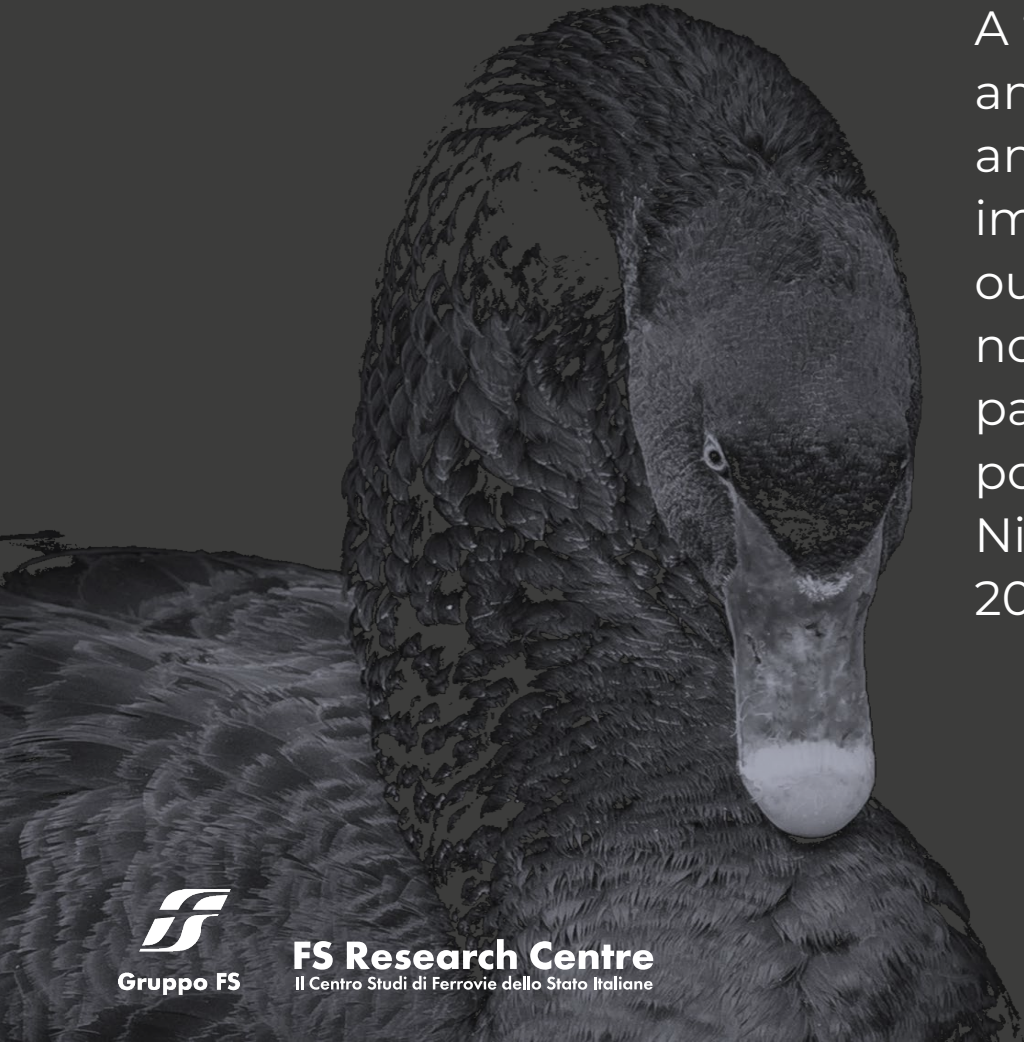
# Changes of plan in the Italian transportation policy approach

*Forty years of inconsistency*

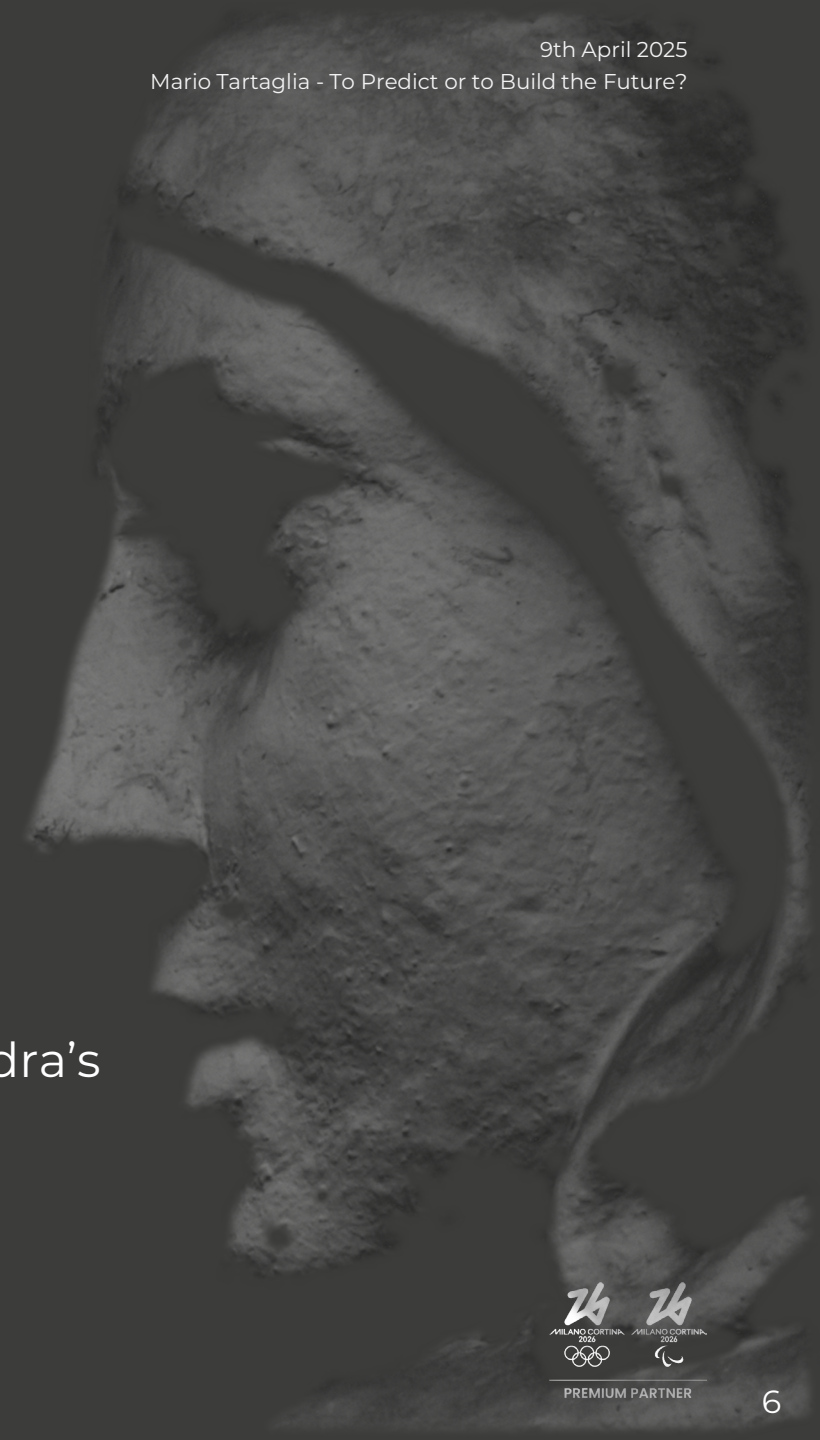


# Black swans and Cassandra prophecies

*Can a black swan forgive lack of planning?*

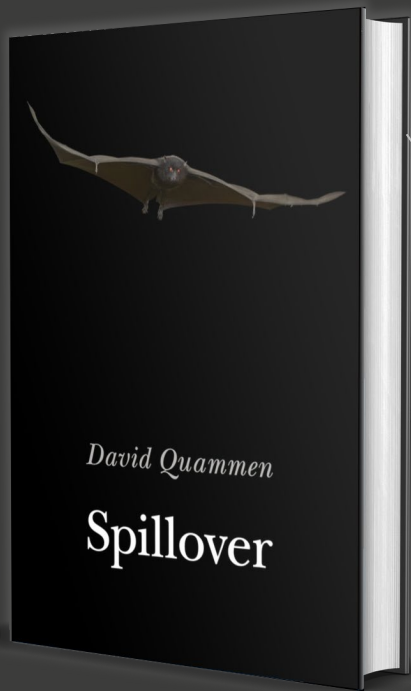


A “Black Swan” is an event carrying an extreme impact, it is an outlier and nothing in the past suggests its possibility (Nassim Nicholas Taleb, 2020) ..... nothing but possibly Cassandra’s prophecies.



# In search of the black swan: fail #1

*Do you still believe in black swans?*



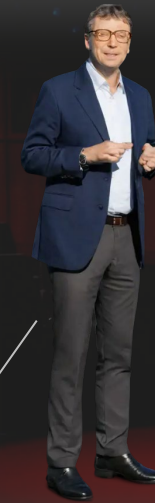
"When The Next Big One comes, we can guess, it will likely conform to the same perverse pattern, high infectivity preceding notable symptoms. That will help it to move through cities and airports like an angel of death." (David Quammen, 2012)

The world is "not ready for the next epidemic" and viruses pose the "greatest risk of global catastrophe" compared to other threats to humanity. " (Bill Gates TED Talk, 2015)



A "Black Swan" is an event carrying an extreme impact, it is an outlier and nothing in the past suggests its possibility.

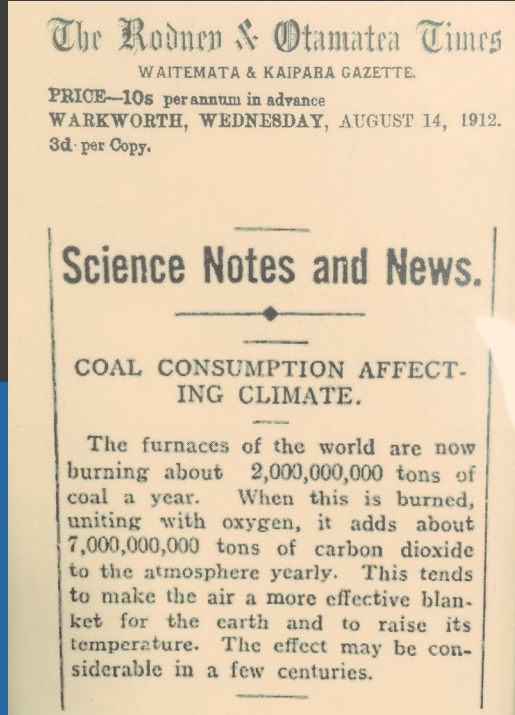
Covid was not a black swan (Nassim Nicholas Taleb, 2020)





# In search of the black swan: fail #2

*Do you still believe in black swans?*



Actually, we already knew it over a century ago

Globe average temperature 1850-2023



**Gruppo FS**

The Mobility Leader

# Decision-making and the future(s)





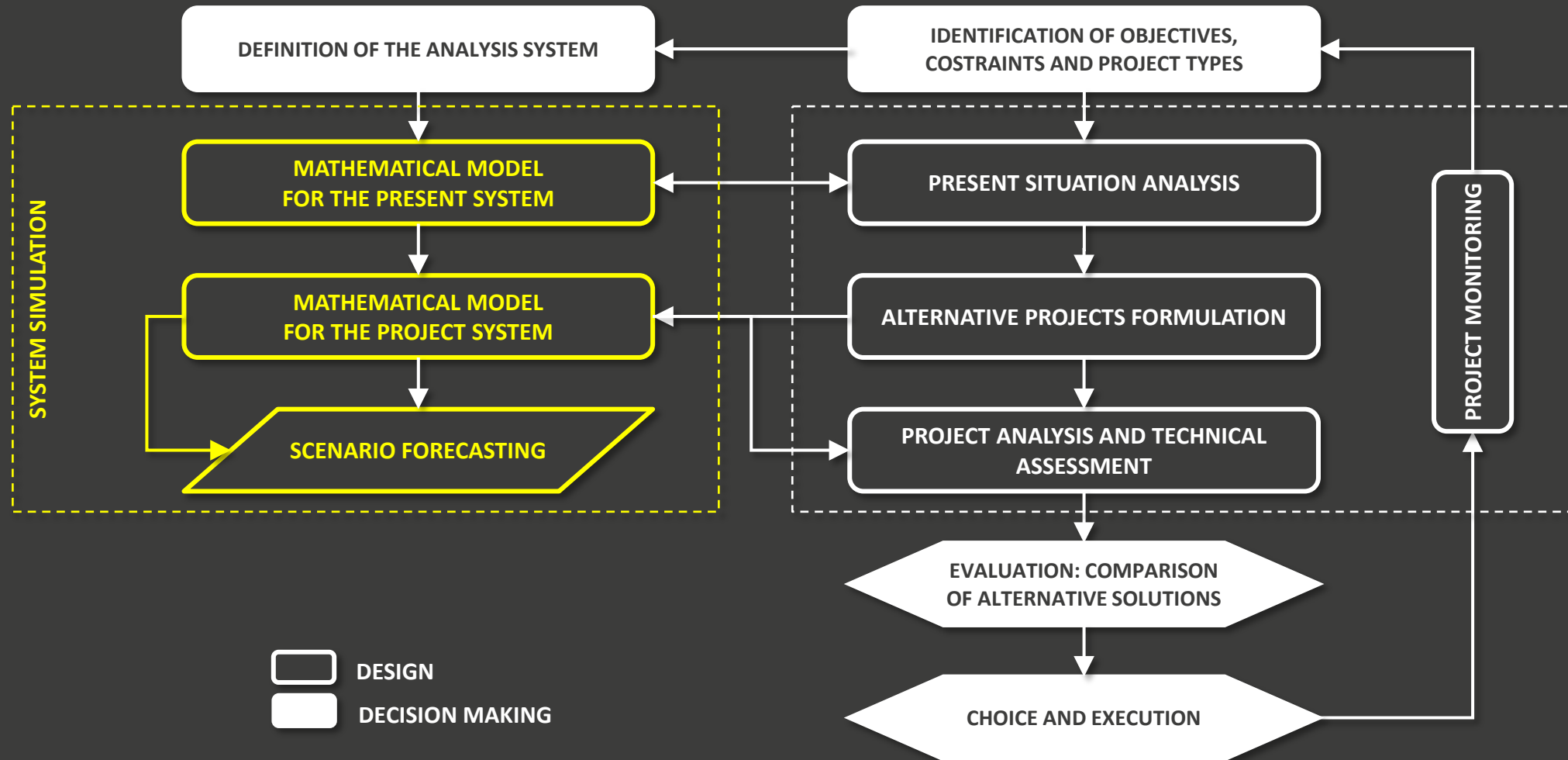
# Decision-making approaches

Decision making refers to **making choices among alternative courses of action** which may also include inaction (Ireland & Miller, 2004).

Four main decision-making models can be highlighted:

- ✓ **Rational**: information on alternatives can be gathered and quantified in the order to maximize decision outcome.
- ✓ **Bounded Rationality**: only minimum criteria are clear and there is little time to decide, so the outcome maximization is not a goal.
- ✓ **Intuitive**: the decision-maker have experience with the problem, but goals are unclear, there is time pressure and analysis paralysis would be costly.
- ✓ **Creative**: time for thinking is available, solutions to the problem are not clear and new solutions need to be generated.

# Example: the planning process according to the rational actor approach



# Who's the decision-maker?

3

Stakeholders



Public administrators  
and policy-makers

1



**FS Research Centre**  
Il Centro Studi di Ferrovie dello Stato Italiane



2

Public and private  
company managers



# Need for future

A decision maker (either a private agent or a public policy maker) must inevitably consider the future, and this requires forecasts of certain important variables (Granger and Machina, 2006)

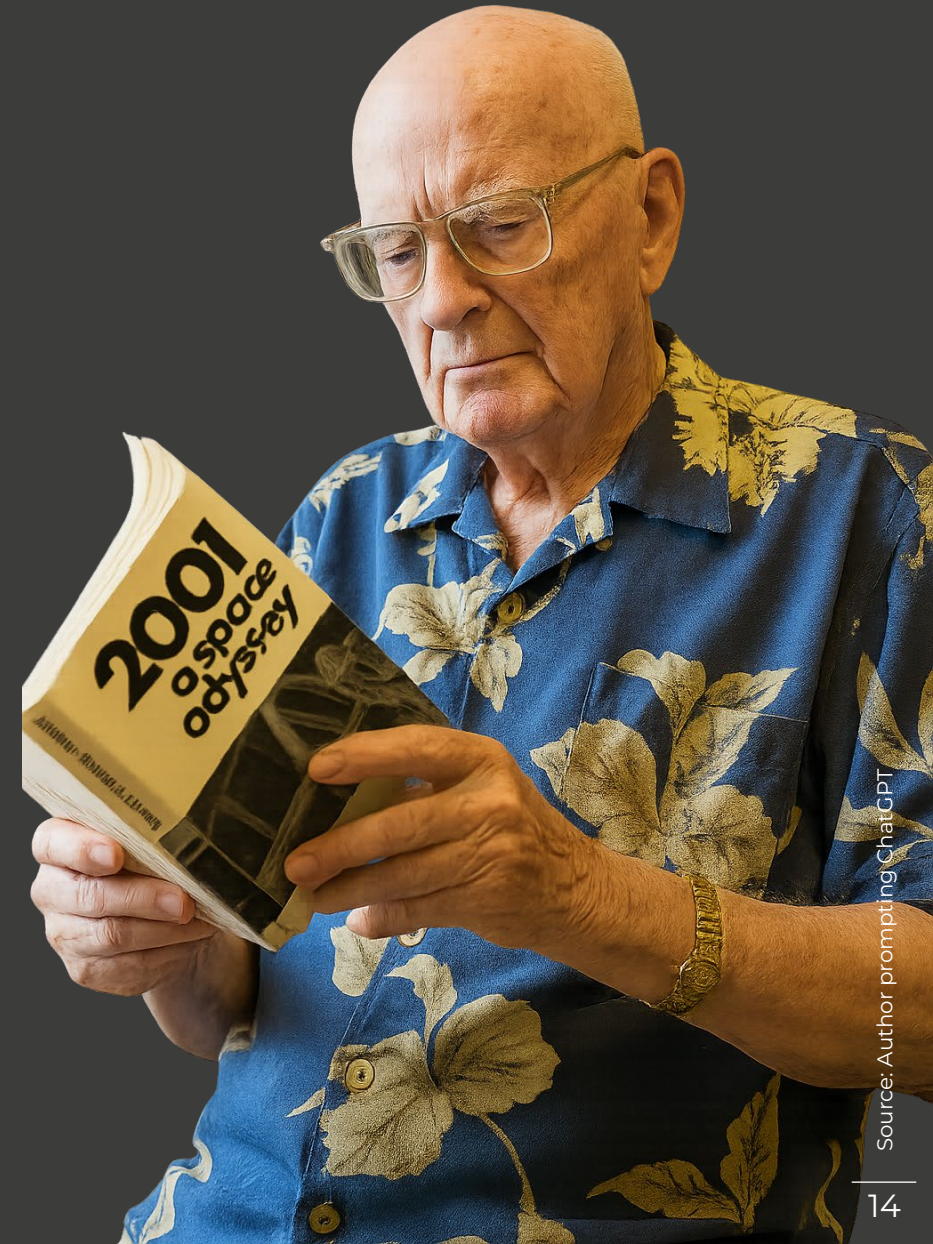




## *... but future is so hard to predict*

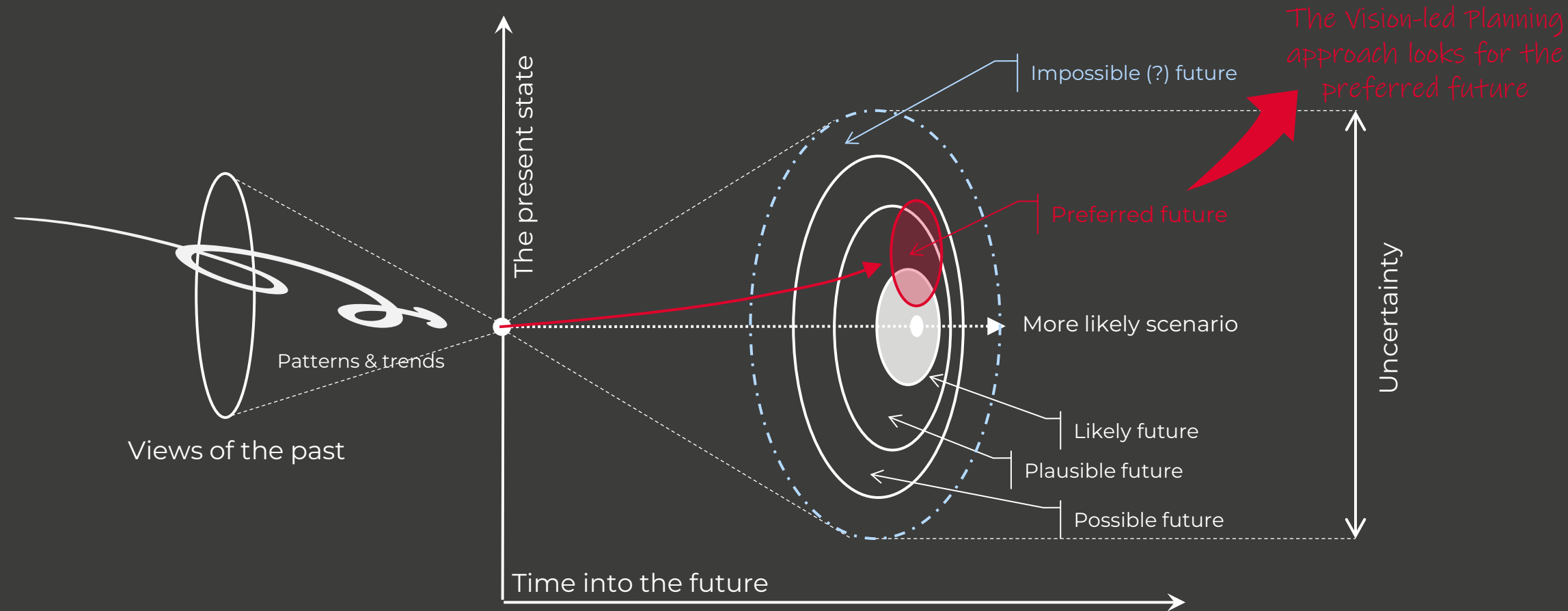
*Dealing with the future: the A. C. Clarke's three laws*

1. When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong.
2. The only way of discovering the limits of the possible is to venture a little way past them into the impossible.
3. Any sufficiently advanced technology is indistinguishable from magic.





# The futures cone: maps of potential futures





**Gruppo FS**

The Mobility Leader

# Towards a vision-led approach



# From the 'Predict-and-Provide' to the Vision-Led approach

1. The **Forecast-led planning** approach, aka '**Predict-and-Provide**' (P&P) is a planning paradigm where future demand is predicted, and supply system is developed to accommodate the predicted demand [1]. However, this approach is subjected to some issues [2]:
  - ✓ it is impossible to (confidently) predict future,
  - ✓ planning has a significant effect on outcomes (e.g. building roads usually lead to more road traffic),
  - ✓ to be based on forecast, doesn't allow to change the current system trajectory.
2. The **Vision-led** approach, aka "**Decide and Provide**" (D&P) is a planning paradigm aimed at deciding on a preferred future (**the vision**) and providing a development path best suited to achieving it [3].
  - ✓ Some other variations of the Vision-led approach are: **Backcasting** (forecasting backward in time), **Vision and Validate** (test the ability of policies to achieve a long-term vision), **Monitor and Manage** (continuously monitoring and adjusting strategies to ensure to achieve the vision).

# The transport “Predict and Provide” approach and its vicious cycle

Sustainable transport is provided by active and collective modes, while non-sustainable transport includes individual motorised transport





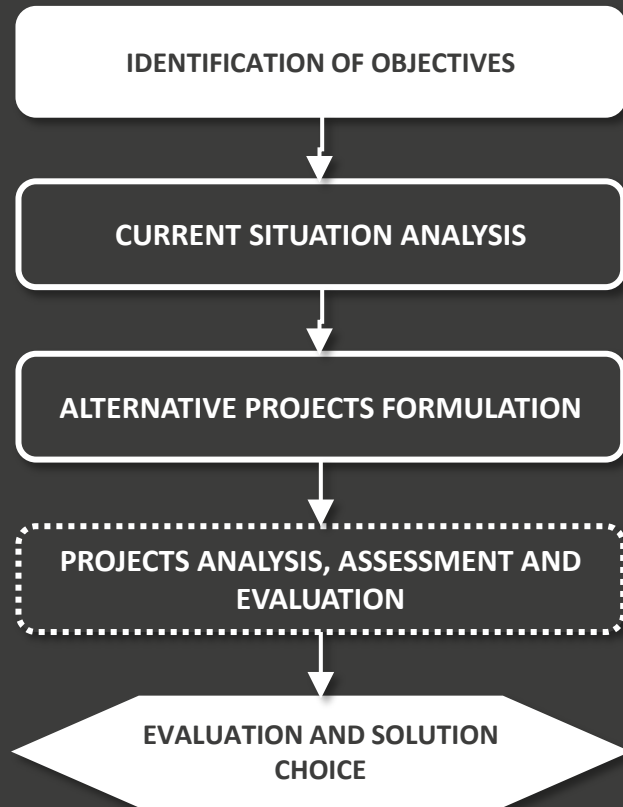
# The vicious cycle outcome



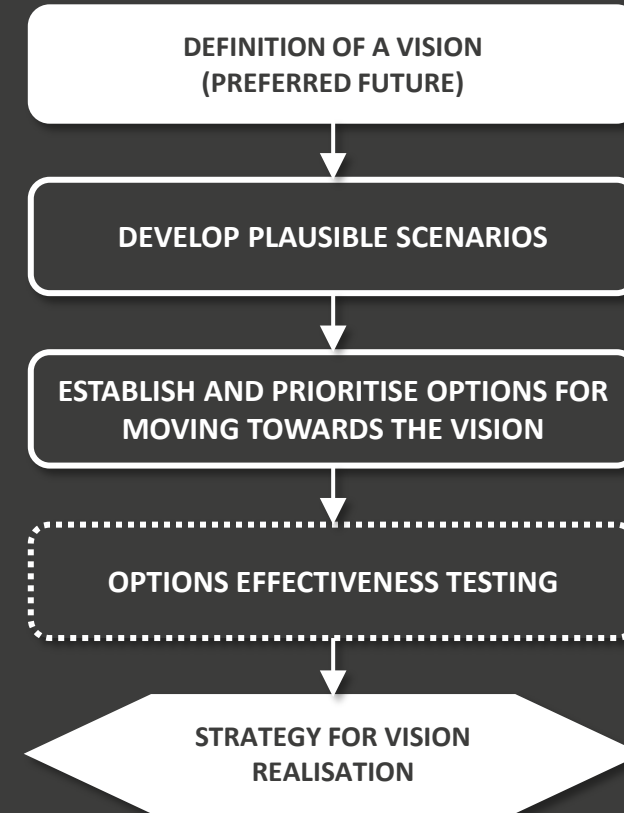


# Flowcharts

## Predict-and-Provide



## Decide-and-Provide



# Dystopian vs Utopic future

## Forecast-led 'Predict and Provide'



- ✓ Focuses the most likely future
- ✓ Forecast-led
- ✓ Hidden uncertainty
- ✓ Demand-led supply
- ✓ Reactive

## Vision-led 'Decide and Provide'



- ✓ Focuses the preferred future
- ✓ Supply-led
- ✓ Managed uncertainty
- ✓ Supply-led demand
- ✓ Proactive

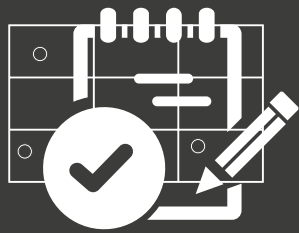


**Gruppo FS**

The Mobility Leader

# Forecaster's risks

# The threat of variability



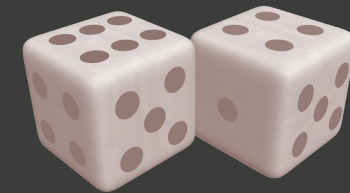
**DATA**



**MODEL**



**RESULTS**





# The correct use of data

*“if you torture the data  
long enough, it will  
confess to anything”.*

Ronald H. Coase





# Be careful with measurements

*Can't see the wood for the trees*

One hundred thousand sixteen men! That was the size of the enemy army according to Julius Caesar's scouts.

To the consul's amazement at such precision, they explained their measurement technique:

*we reached the enemy's camp. The camp is square, in each corner there is a watchtower and in each one there are 4 men, so we counted  $4 \times 4 = 16$  of them. Then, we had a quick look into the camp: a big mess, more or less one hundred thousand people to add to the former 16.*

# The reliability of models

*"All models are wrong,  
but some are useful".*

George E. P. Box

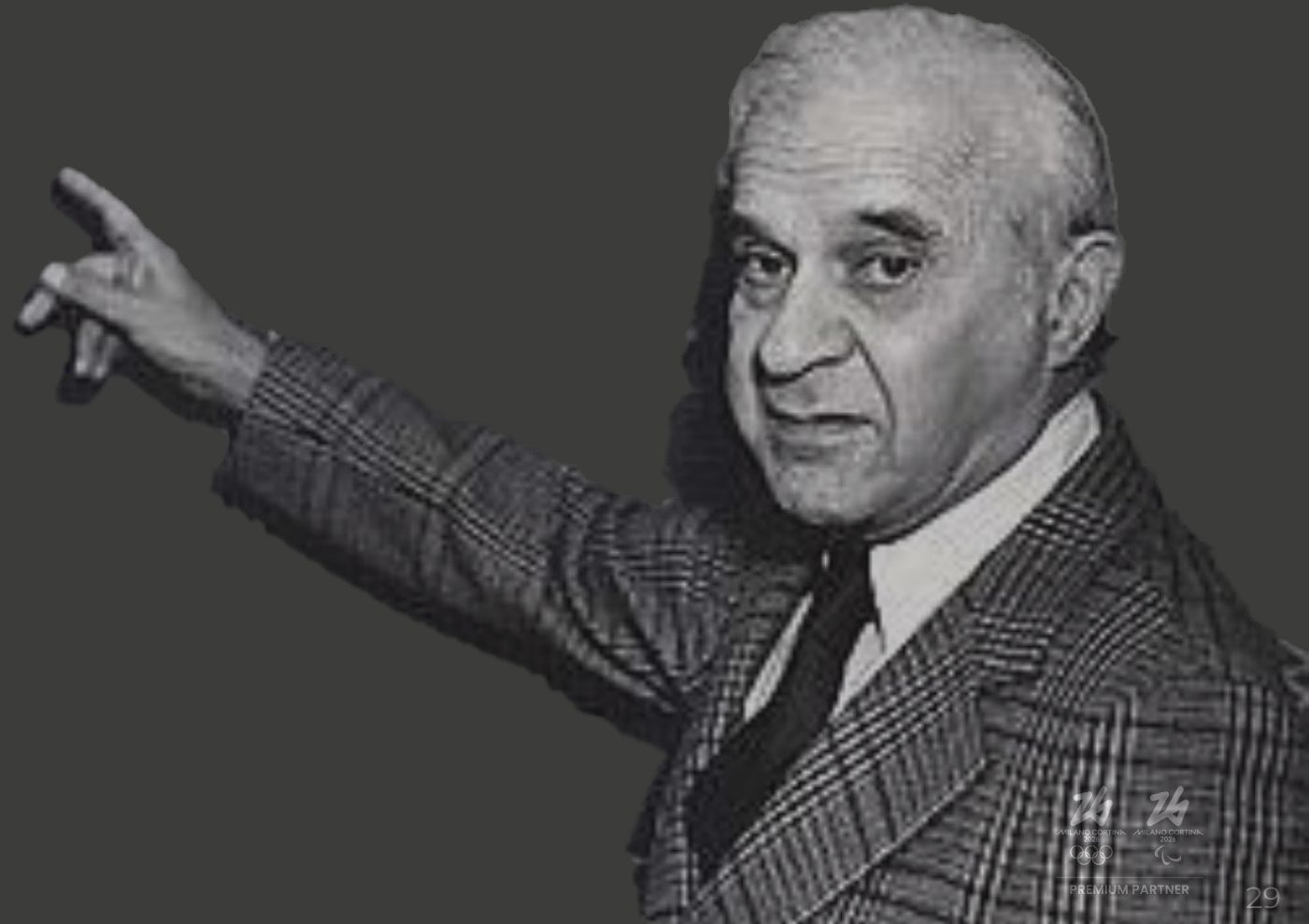




# The awareness of models

*"By the time it comes to interpretation of the substantive conclusions, the assumptions on which the model has been based are easily forgotten."*

Wassily Wassilyevich Leontief



# The suitability of models

*Will your model be usable?*





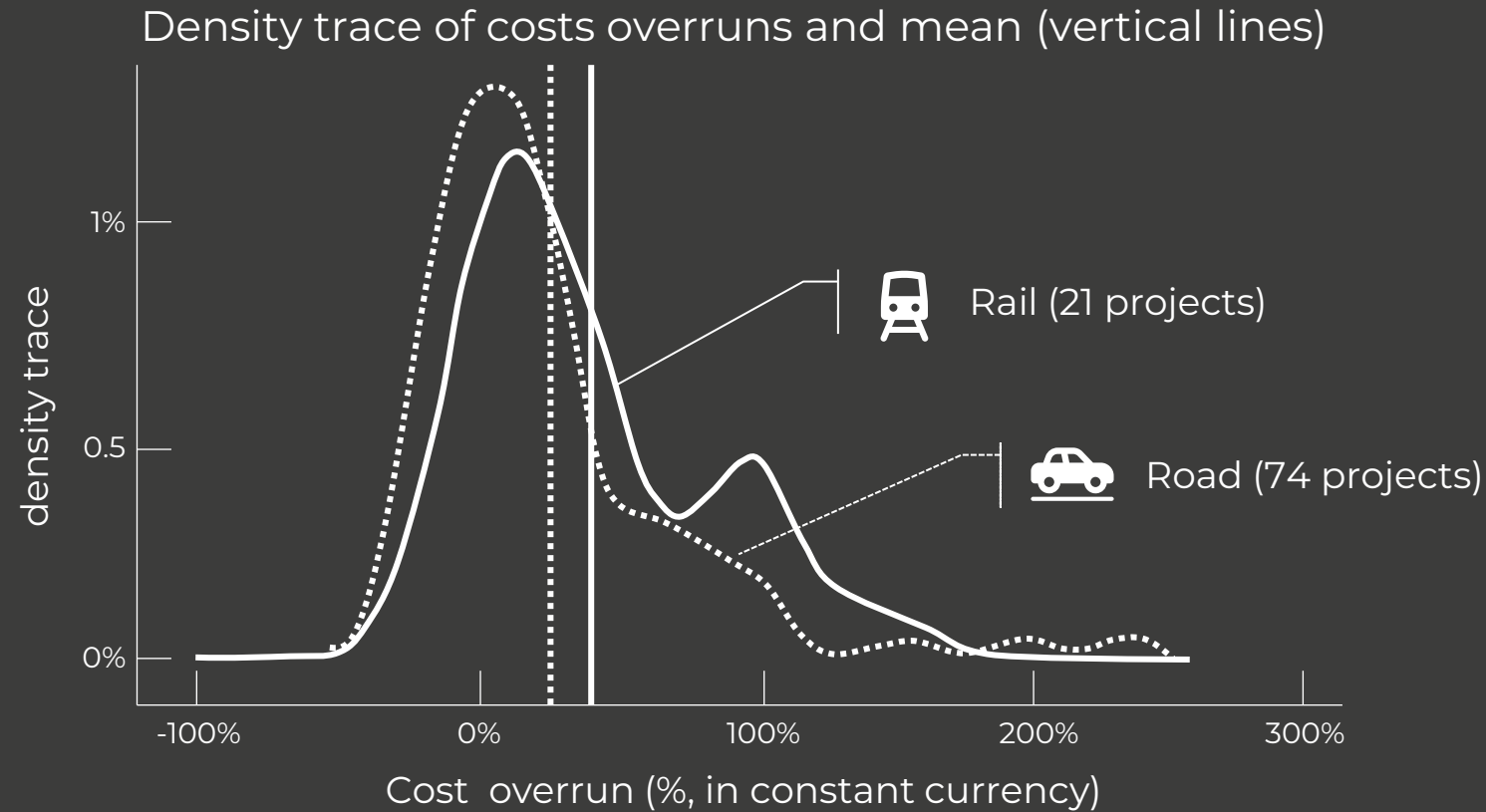
# Political or organizational pressure could influence decisions

*Two wrong planning approaches*



# Forecasting inaccuracy: the Bent Flyvbjerg's evidence

Tendency to underestimate realization costs and times, and to overestimate benefits



# Forecasting inaccuracy: the Copenhagen-Malmö Øresund Bridge

## 2000 → Overestimation

During the first operating year, traffic was 50% lower than forecasted value

## 2008 → Underestimation

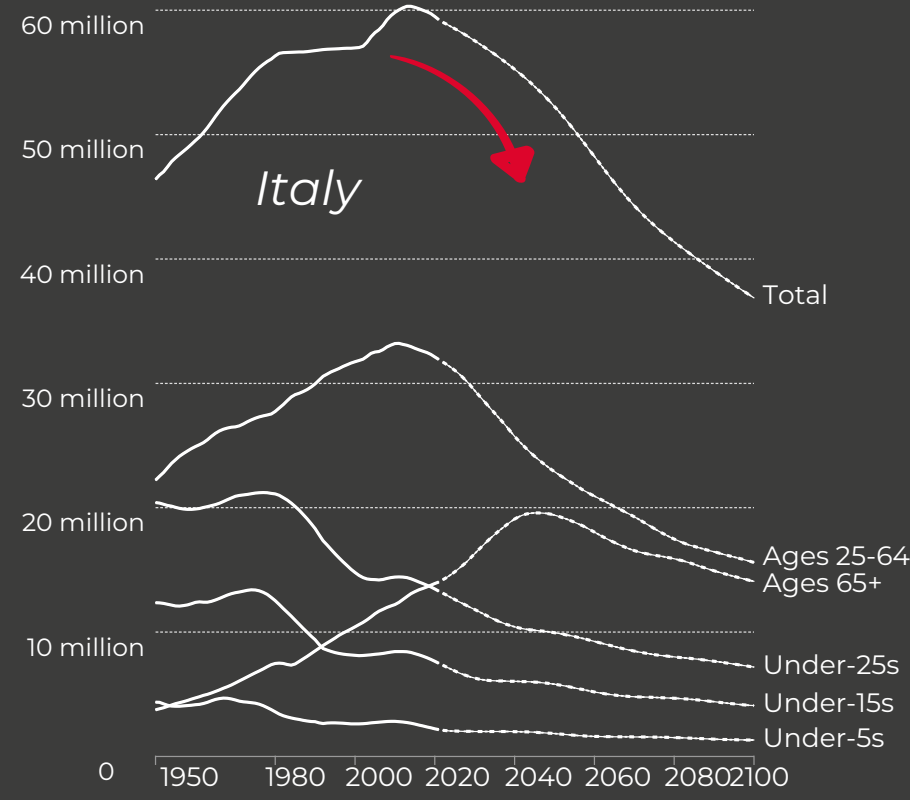
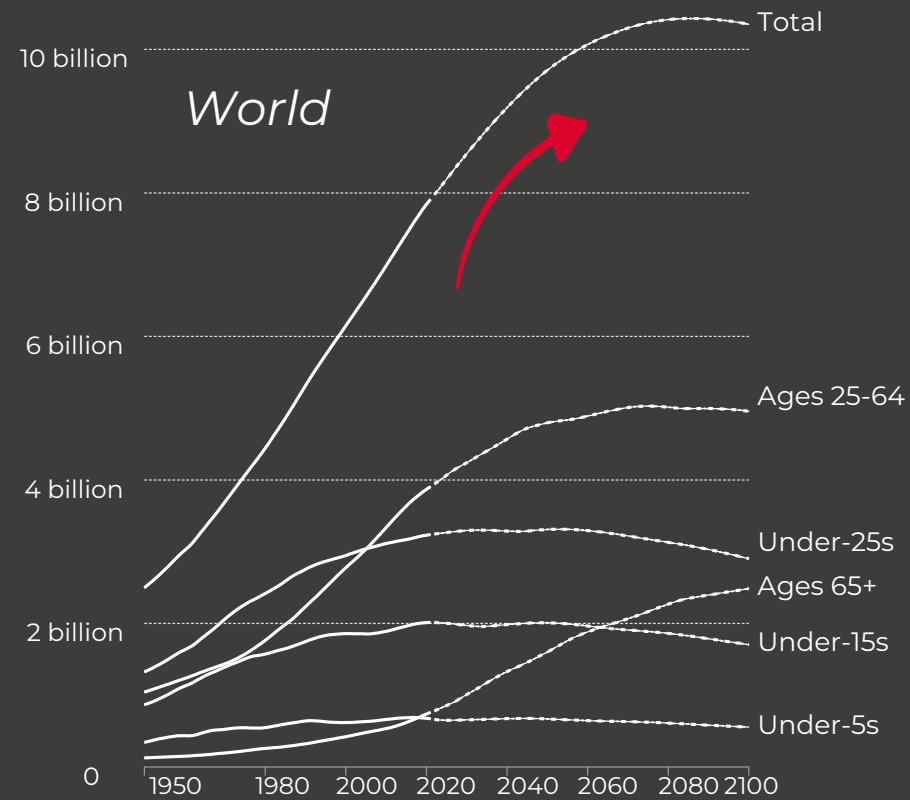
After seven years, traffic was 30% greater than forecasted value



By Amjad Sheikh - Own work, CC BY-SA 4.0

# Example of generalization mistake: population by age group

Demographic change: it's all about points of view





# The Paris Vision-Led approach







**Gruppo FS**

The Mobility Leader

Thanks for your attention!

#FSResearchCentre

<https://www.fsitaliane.it/content/fsitaliane/en/fs-research-centre.html>

