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Extending Cost-Benefits Analysis to a wider impact appraisal

Current state and perspectives for the transportation sector in Italy

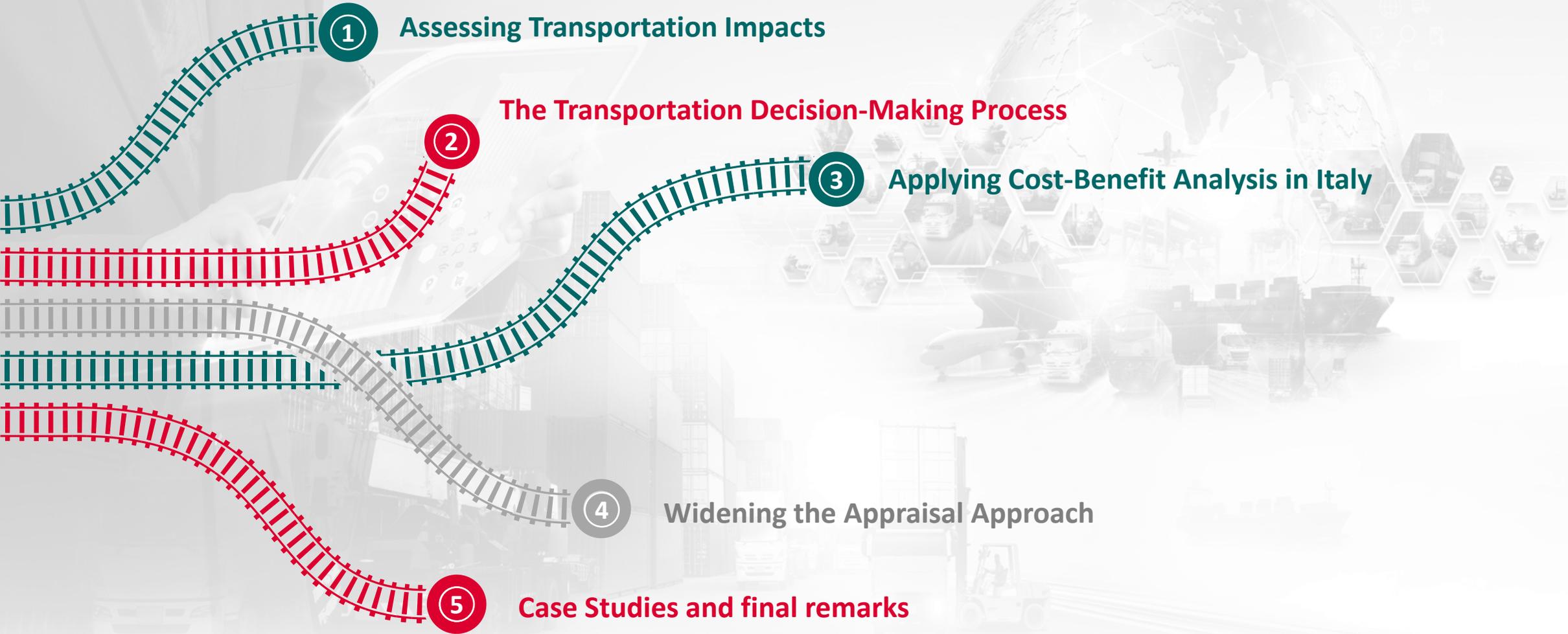
Mario Tartaglia
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January 7, 2024



FS Research Centre
Il Centro Studi di Ferrovie dello Stato Italiane

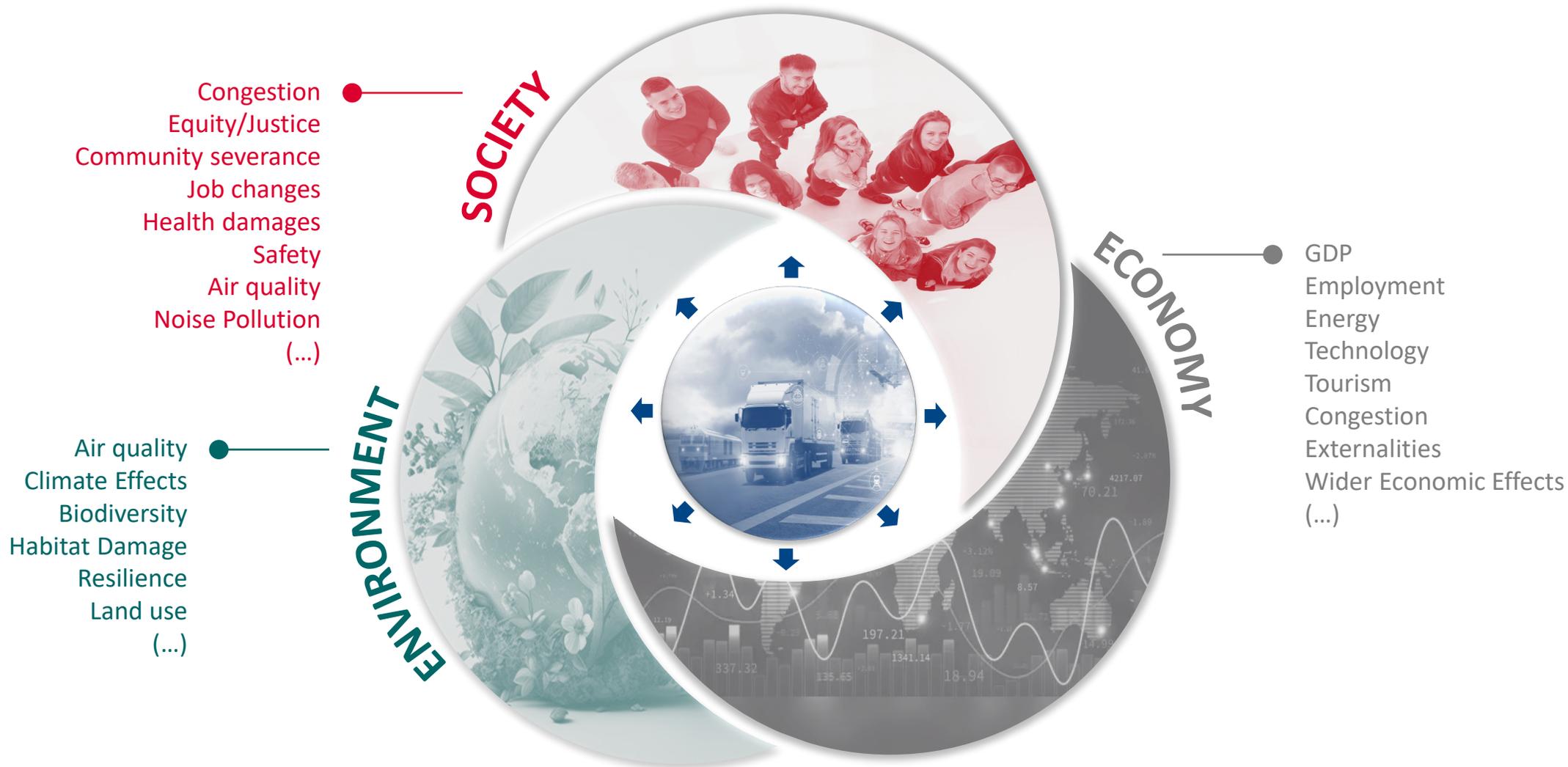
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Assessing Transportation Impacts

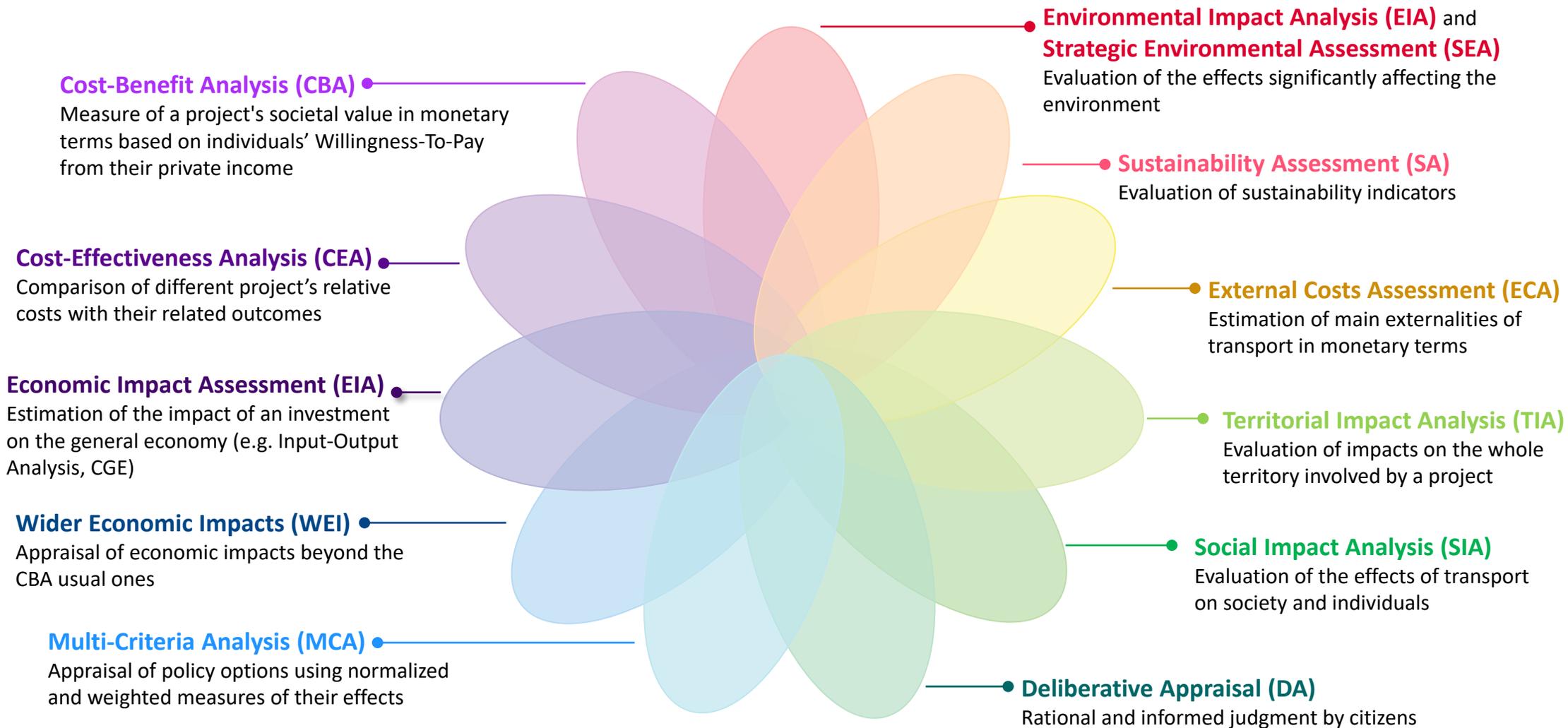
The impacts of transportation

Transportation systems have effect on the whole ecosystem and its components



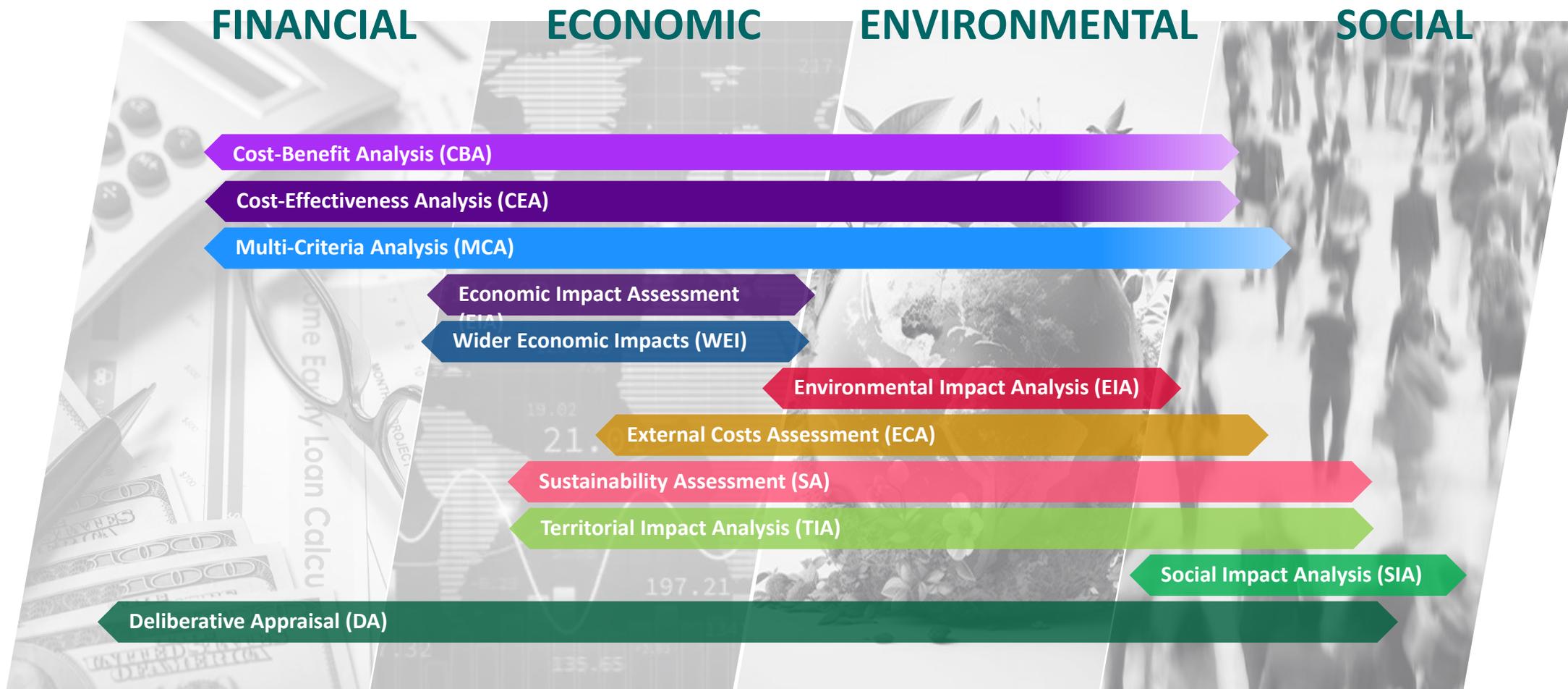
Main methods for assessing transportation impacts

Beyond simple business plans, there are several other appraisal methods



Thematic scopes of appraisal methods

Each appraisal technique is oriented to specific application scopes

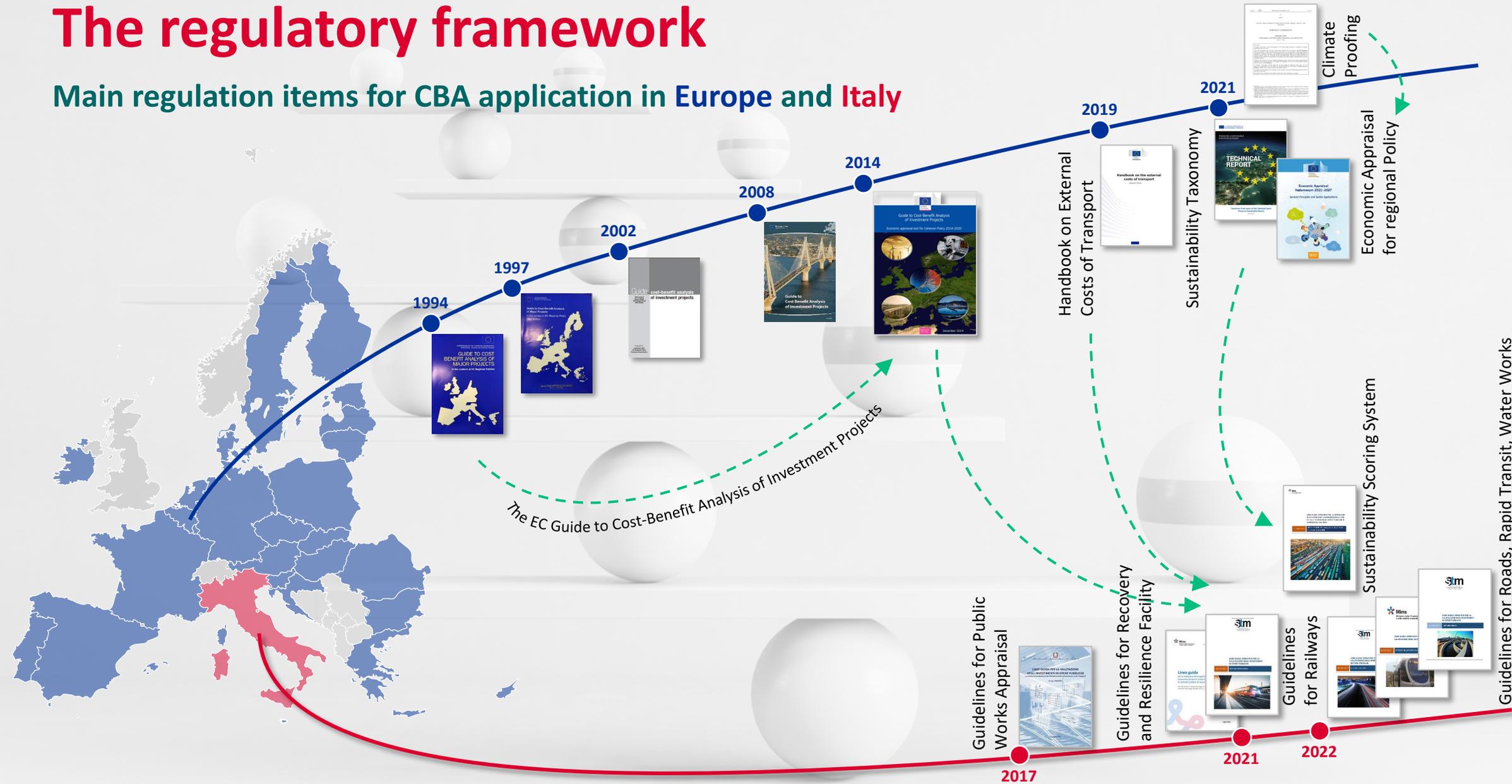


The transportation Decision-Making process in Italy

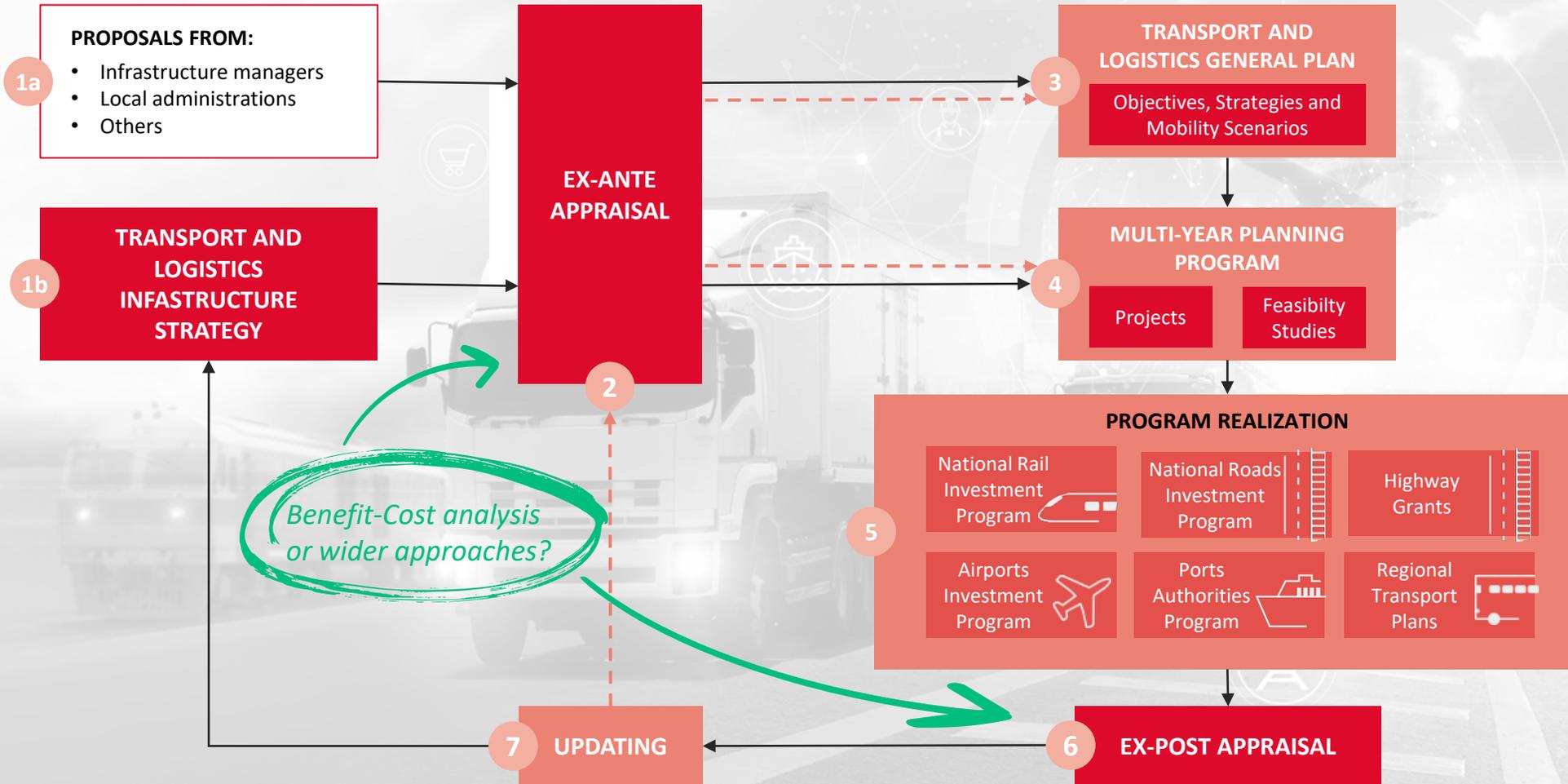


The regulatory framework

Main regulation items for CBA application in Europe and Italy



The transport planning process in Italy



Source: Italian Ministry of Infrastructure and Transport, Guide lines for the evaluation of investments in public works in the sectors of competence of the (Decree No. 300, 16 June 2017)

Applying Cost-Benefit Analysis in Italy

Project appraisal application scope

According to Italian regulation



Sector	Type	Cost	Assessment
 Railway	All types	< 10 Mln€	Cost-Effectiveness Analysis (CEA)
	All types	> 10 Mln€	Cost-Benefits Analysis (CBA)
	Relevant demand captured	>>>	Local Economy Assessment
 Road	Renewals	Any	Cost-Effectiveness Analysis (CEA)
	Punctual, no service revenues	< 10 Mln€	Cost-Effectiveness Analysis (CEA)
	No service revenues	> 10 Mln€	Cost-Benefits Analysis (CBA) with risk and sensitivity analysis
	With service revenues	Any	Cost-Benefits Analysis (CBA) with risk and sensitivity analysis
 Rapid Transit	New lines or enhancements	< 10 Mln€	Cost-Effectiveness Analysis (CEA)
	New lines or enhancements	> 10 Mln€	Cost-Benefits Analysis (CBA)

Costs-Benefit Analysis according to Italian regulation

Costs and benefits to be taken into account for railway projects analysis



	Item	<u>Investor's point of view</u>	Financial Analysis	Cost-Benefit Analysis
Internalities	Investment costs		✓	✓
	Operation costs		✓	✓
	Maintenance costs		✓	✓
	Avoided costs		✓	✓
	Residual value		✓	✓
	Infrastructure revenues		✓	✗
	New operation railway costs due to the project		✗	✓
	Operation cost savings due to mode share change		✗	✓
	User time savings		✗	✓
Externalities	Road congestion change due to new modal share		✗	✓
	Accidents change due to new modal share		✗	✓
	Air pollution change due to new modal share		✗	✓
	Noise pollution change due to new modal share		✗	✓
	Greenhouse gases emission change due to new modal share		✗	✓

Society's point of view (points to the Cost-Benefit Analysis column)

Net zero (points to the Infrastructure revenues row)

Cost-Benefit Analysis: some limitations

- ✓ The standard application of Cost-Benefit Analysis (CBA) to an intervention on the transportation system involves the evaluation of **direct benefits to transport users**, plus some **direct external impacts** (externalities).
- ✓ However, usually CBA **does not capture all the impacts** of an intervention (OCDE/ITF, 2017), for instance:
 - ✓ missing some additional **wider economic impacts** (mainly benefits, e.g, on productivity, connection, labour market);
 - ✓ **overlooking the intangible and non-financial outcomes** associated with transport investments or changes;
 - ✓ **disregarding individual diversity** and needs; it thus tend to favor persons who are already mobile and participating in the market (Hananeland Berechman, 2016);
 - ✓ missing to **identify and respond to the social implications** (Cavallaro et al. 2022);
 - ✓ **hindering authorities' ability to adequately assess social implications**, impeding a fully informed decision-making and the development of effective side policies (Bruzzone et al., 2023);
 - ✓ missing to incorporate transportation performance reliability (OCDE/ITF, 2017).

Widening the Appraisal Approach

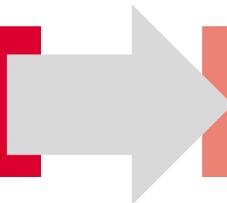
Issues in improving Cost-Benefit Analysis

- ✓ A first approach for overcoming the limitations the traditional Cost Benefit Analysis (CBA) could be aimed to **extend its scope**. However, some issues should be taken into account:
 - ✓ **Methodological inconsistency** could emerge if using different social or economic theories when considering additional impacts
 - ✓ Some **intangible impacts**, such as the social ones, could not be easily quantified in monetary measures
 - ✓ Including wider economic impacts could result in **double counting** some contributions to the overall economic effect
- ✓ An alternative approach is to **apply complementary appraisal frameworks**. In such case, CBA should be considered only one of several evaluation tools, and it could not be easy to build a comprehensive picture for the assessment.

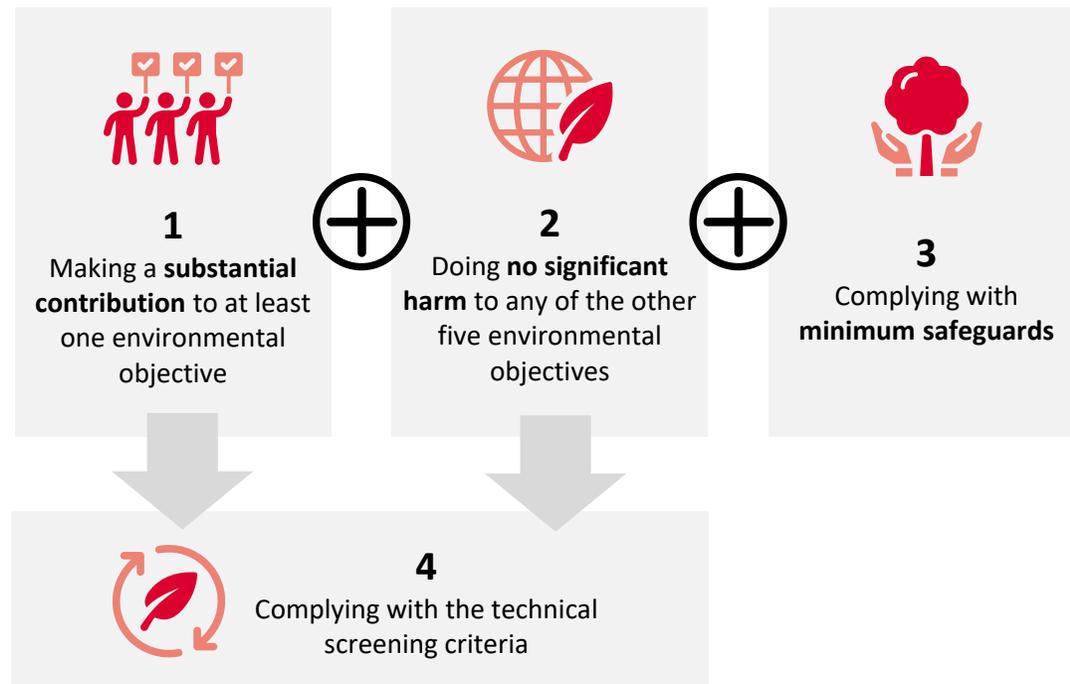
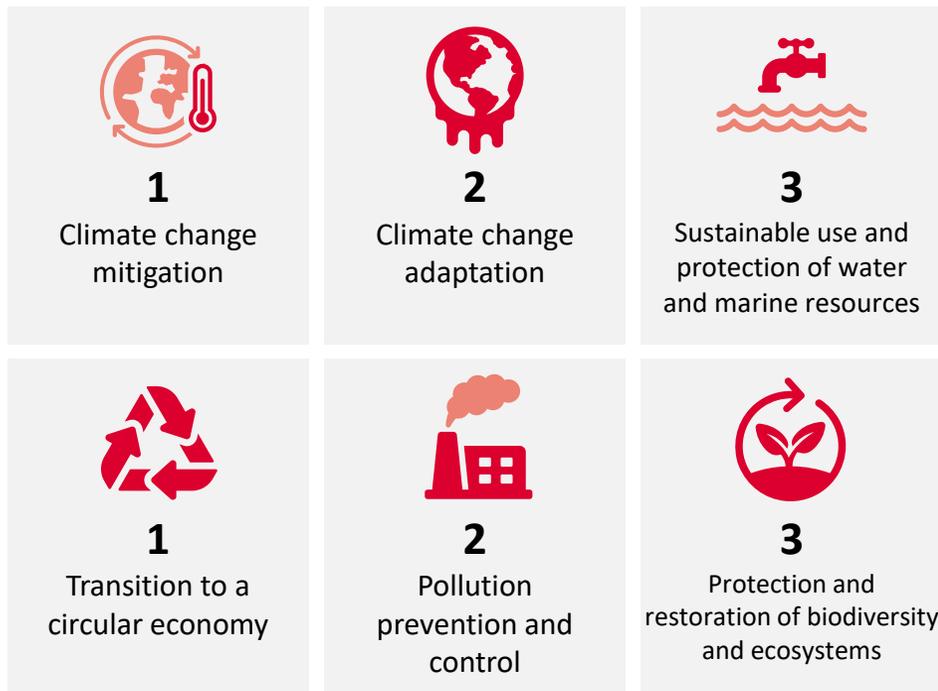
Assessing environmentally sustainable investments in EU

Regulation (EU) 2020/852 sets a framework aimed to decide whether an economic activity is environmentally sustainable

1 – definition of six climate and environmental objectives

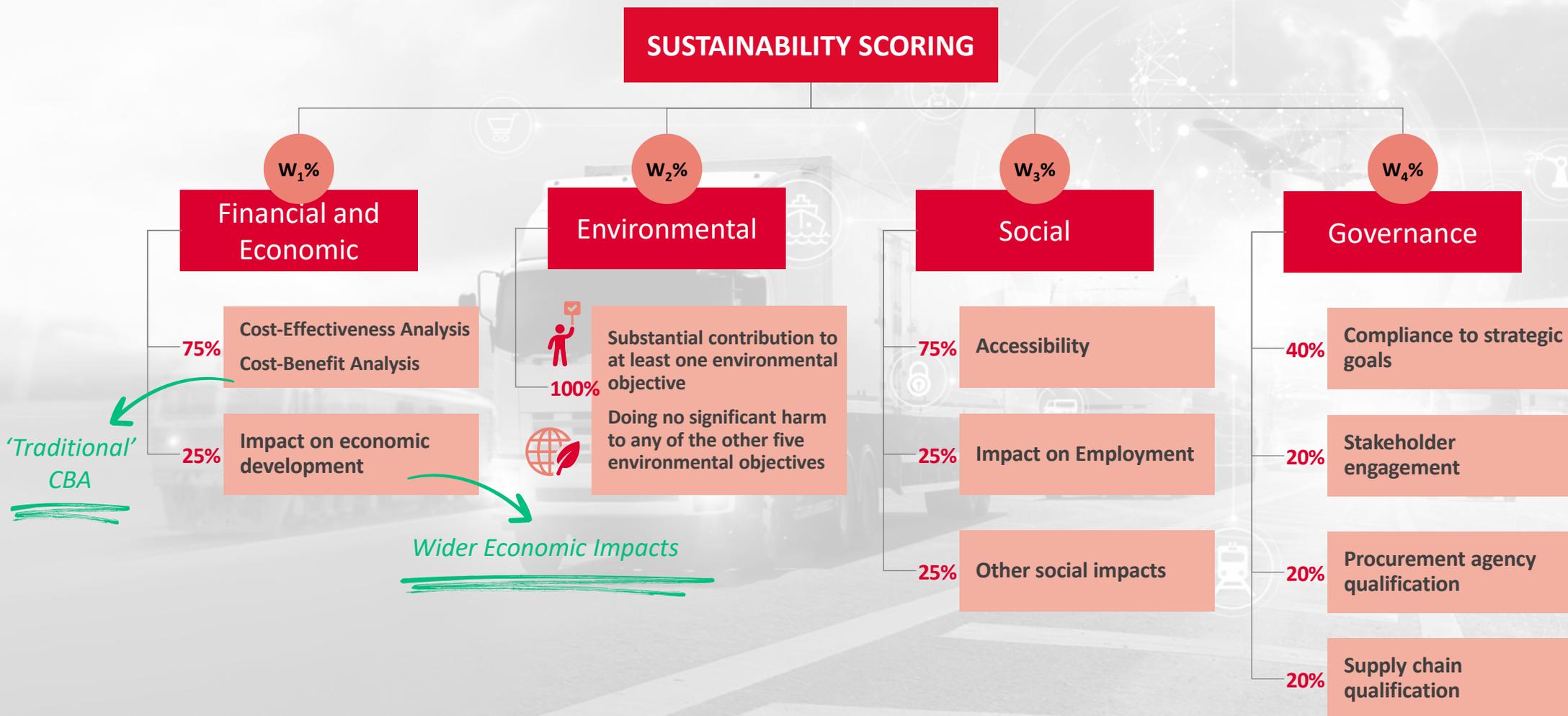


2 - conditions that an economic activity must meet in order to qualify as environmentally sustainable



Sustainability assessment for infrastructures and mobility

The Scoring System included in the Italian regulation



Social impact KPIs according to Italian regulation

Indicator			
	Rail	Road	MRT
Project beneficiaries by socio-demographic composition (No.)	✓	✓	✗
People declaring issues in accessing railway infrastructure (%) in the project area	✓	✗	✗
Commuters for work reason using only private transport (%)	✓	✓	✗
Change in accessibility levels	✓	✓	✗
Removals of physical barriers for accessing infrastructure	✓	✗	✗
Equity in access rules to transport services	✓	✓	✗
Employment generated during the building phase	✓	✓	✗
Employment generated during the operating phase	✓	✓	✗
Initiatives for fostering young and female employment during the building phase	✓	✓	✗
Initiatives for safeguarding worker rights in the whole supply chain during the building phase	✓	✓	✗
Initiatives for workers safety	✓	✓	✗
Measures for mitigating negative impacts on citizens life quality during the building phase	✓	✓	✗
Measures for safeguarding and enhancing public spaces close to building sites	✓	✓	✗
Other social benefits produced by the interventions (on territorial attractiveness, social capital)	✓	✓	✗

Case Studies



Evaluating wider impacts of transportation

Some case studies recently developed by FS Research Centre

Check them out at:
<https://www.fsitaliane.it/content/fsitaliane/en/fs-research-centre/studies-and-research.html>

3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

Can HSR services increase regional economic integration? Evidences from the Italian case

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12th September 2023

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3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

Wider Effects of Railways
The Palermo-Catania High-Speed line, Italy

Chiara Chinazzi^[1], Enrico Cierfi^[2], Mara Radicioni^[3], Sarah Rava^[4], Mario Tartaglia^[5]

^[1] Banca Ferrovie dello Stato Italiane; ^[2] Ferrovie dello Stato Italiane; ^[3] Banca Ferrovie dello Stato Italiane; ^[4] Banca Ferrovie dello Stato Italiane; ^[5] Banca Ferrovie dello Stato Italiane

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3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

The Relationship between High-Speed Rail Accessibility and Tourism Demand
The Case Study of Italy

Mario Tartaglia^[1], Ilaria Lopresti^[2]

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13th September 2023

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3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

How competition on HSR services could generate social and economic benefits: the case of Italy

Dr. Mauro Capurso^[1], Dr. Mario Tartaglia^[2]

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12th September 2023

FERROVIE ITALIANE TRENITALIA

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The accessibility impact of High Speed Rail in Italy
A user-based approach

Mario Tartaglia, Lorenzo Vannacci, Martina Farsi

14th September 2022

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Transport accessibility and demographic vibrancy:
Evidence from the high-speed railways in Italy

Mario Tartaglia^[1], Andrea Fiducio^[2], Gianluigi Caspi^[3]

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13th September 2023

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3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

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

Mario Tartaglia, Lorenzo Vannacci, Martina Farsi

Ferrovie dello Stato Italiane

12th September 2023

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3RD INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

An integrated approach for the territorial impact assessment of high-speed railways

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2ND INTERNATIONAL WORKSHOP ON HIGH-SPEED RAIL SOCIOECONOMIC IMPACTS

Evaluation of the economic effects of High Speed Rail on the Italian economy
A wider Input-Output approach

Mario Tartaglia^[1], Michele Cerulli^[2], Tommaso Ferraresi^[3], Renato Panici^[4], Mara Radicioni^[5], Enrico Cierfi^[6]

^[1] Ferrovie dello Stato Italiane; ^[2] Ferrovie dello Stato Italiane; ^[3] Ferrovie dello Stato Italiane; ^[4] Ferrovie dello Stato Italiane; ^[5] Banca Ferrovie dello Stato Italiane; ^[6] Banca Ferrovie dello Stato Italiane

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Wider effects of railway projects: example

The Palermo-Catania High Speed Railway, Italy: some project's effects compared to the baseline scenario

Building Phase (short term)

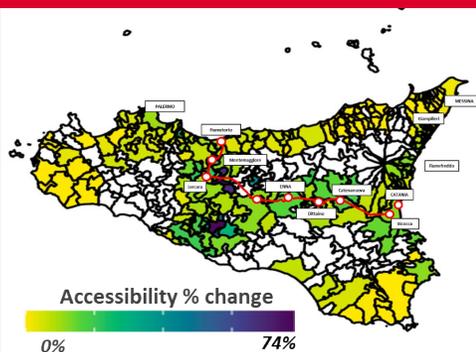
Operation Phase (medium /long term)

ECONOMIC IMPACT



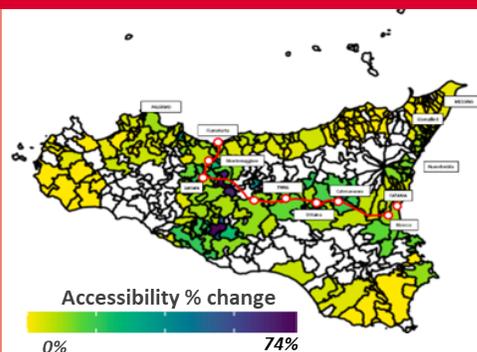
- Value Added: 6,083 Mln€
- Employment: 83,000 FTE

ACCESSIBILITY OF BASIC SERVICES



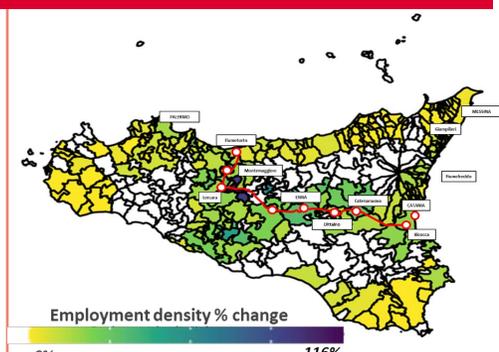
Gini Index reduced by 0.3%

ACCESSIBILITY TO EDUCATION AND CULTURE



Gini Index reduced by 0.5%

AGGLOMERATIVE EFFECTS



Productivity increased by 5%

Wider Economic effect

Inequality reduction

Wider Economic effect

Conclusions



Final remarks

- ✓ There is a general **need for extending** the traditional Cost Benefit Analysis (CBA) approach in the order to take into account some additional impacts of transportation on environment, economy, policy, and society.
- ✓ A large literature debate exists about **methodological issues** in extending CBA to some impact categories. It mainly concerns both double counting risks and reliability of intangible effect economic evaluation.
- ✓ Such issues are faced differently in **different countries**, with varying willingness to accept the inclusion of wider impacts inclusion.
- ✓ In Italy, following the European Union guidelines, the current regulatory approach is to apply **complementary appraisal** frameworks.
- ✓ Nevertheless, there is room for **methodological progress** about extending the traditional CBA range for including broader impacts.

Thanks for your attention!

Any questions?

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