



# ELI's experience in the ex-ante evaluation of socio-economic impact

Franck Brottier & Florian Gliksohn

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- ELI will be the **first international laser research infrastructure**. It consists of four pillars of science and research applications of ultra-intense and ultra-short laser pulses
- ELI will be implemented as a **distributed research infrastructure** based initially on 3 specialised facilities in the Czech Republic, Hungary and Romania operated under single governance
- ELI is key for Europe's competitiveness, but also for its cohesion and for regional development: it is the first ESFRI project to be fully implemented in new Member States and is a pilot project for the use of **structural funds** (ERDF)

- EU Cohesion Policy regulations require a **cost-benefit analysis** for all major investment projects (over €50M or €25M) applying for assistance from the funds (including ERDF)
- The EC provides capital grants (not loans) and takes substantial risks on behalf of the EU citizens: **it needs reliable evaluation tools** to take transparent investment decisions
- The CBA represents a standard tool which allows the EC services to evaluate all projects beyond their own specific features
- It is a **well-established economic tool** which is commonly used in the public and sector
- As the name indicates, a CBA allows to assess the relevance on an investment (and to compare it with other investment options) by **computing the *net present value* of its financial and economic costs and benefits over a certain reference period** (i.e. weighing them over time)



# Objectives of the presentation

- Explain what are the objective and the structure of a CBA
- Go through the main steps required for the assessment of the socio-economic rate of return of a research infrastructure like ELI
- Present the socio-economic benefits considered in the CBA and how they are quantified and monetised
- Assess the relevance of a tool like the CBA in the case of a research infrastructure, in particular when a strong objective of regional development is pursued
- Suggest solutions to the limitations of the CBA approach



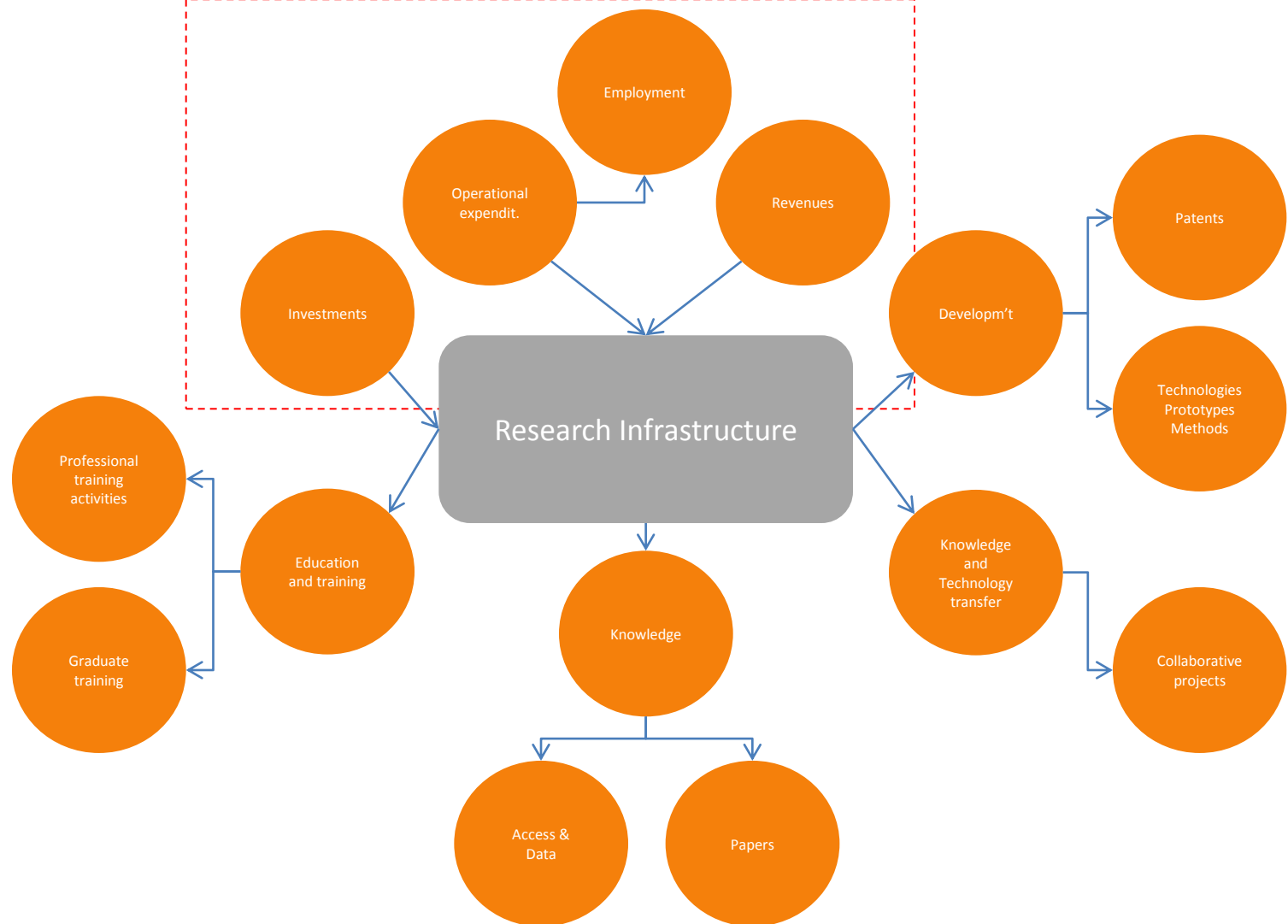
- The CBA consists of two interconnected parts: financial analysis + A socio-economic analysis
- In the context of a grant application, the objective of the CBA is not to provide an all-inclusive evaluation of the socio-economic impacts, but to demonstrate that:
  - The economic net present value is positive
  - The economic rate of return is higher than the socio-economic discount rate
- A socio-economic impact is a measure of the variation in the level of welfare among a population of reference, generated in and out of markets (i.e. with or without price mechanism)
- The benefits and costs that should be taken into account in a socio-economic analysis are those that are generated directly by the project (need for a stakeholders' analysis)



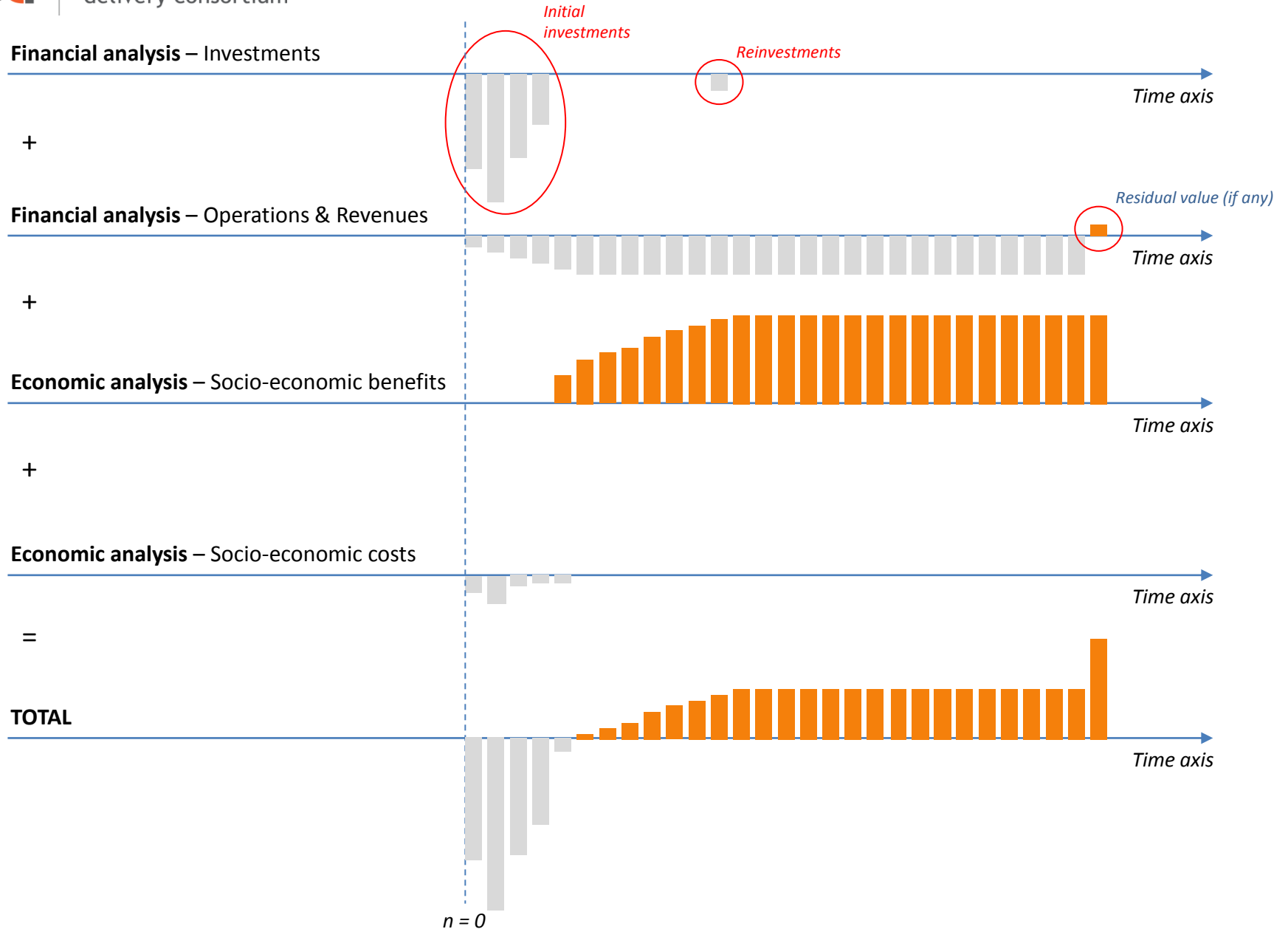
# Perimeter of the CBA

Financial + socio-economic analysis → socio-economic discount rate

Financial analysis → financial discount rate



# Simplified CBA profile



# Typical indicators used for ELI

**Knowledge** – Typical benefit indicators: Number of Publications in Impact factor journals, Number of Publications in other journals, Value of the access granted to external researchers through an open access policy

**Development** – Typical benefit indicators: Number of National patents granted, National patents operated in practice, International patents (Europe, USA, Japan) granted, Number of Technologies developed in-house and transferred, Number of Prototypes developed, and Number of methodologies/industrial designs transferred.

**Education and training** – Typical benefit indicators: Number of graduates (M.A. level) trained in the infrastructure, Number of graduates (PhD level) trained in the infrastructure, Number of students (MA, Ph.D.) using the infrastructure.

**Employment** – Typical benefit indicators: Number of newly created jobs (non-research staff), Number of newly created jobs (researchers), Number of newly created jobs (researchers under 35 years).

**Knowledge transfer and collaborations** – Typical benefit indicators: Number of collaborative projects with application sphere, Volume of contract research, Volume of competitive funding (national), Volume of international grants.



Naturally, evaluating quantities is more or less difficult depending on the type of benefit:

- For some benefits, a reasonable estimate can be obtained fairly easily as proportions will depend on the strategy and policies of the research infrastructure (number of jobs created, access policy)
- For other types of benefits – typically those related to the output of the infrastructure (i.e. knowledge creation), the quantification of the benefits is complicated due to natural uncertainty and serendipity
- One possible solution: using the ***track-record of the applicant*** (if relevant) as a basis + a premium reflecting the quality of the RI project



Monetizing benefits ex-ante is difficult:

- The **absence of markets and prices** explains why defining values for articles, patents, and hours of access is difficult: we can't observe a supply and a demand equilibrate on a market
- A **production vs. transfer** issue, as only those outputs (e.g. patents) transferred to the economy generate a socio-economic benefit, and the transfer of technology is induced by a demand on a case-by-case basis
- A **value chain** issue, as there is a long way from research to the final socio-economic benefit, several steps (marketing, industrialization process, etc.) can alter (positively or negatively) the impact of the research work, in such an extent that it is difficult at the end of the process to clearly break down the socio-economic benefit between the different causes
- **Potential solutions:**
  - Adopting a consensual value, accepted by the Managing Authority and JASPERS, and if possible, consistent with the empirical economic literature
  - Using a willingness-to-pay approach



Socio-economic analysis	Year 1	Year 2	...	Year 20
Net Cash Flows (incl. Residual Value)	(5,000,000)	(10,000,000)	...	(28,000,000)
		Net Cash Flows (incl. Residual Value) are the result of the financial analysis, not presented here.		
		Net Cash Flows (incl. Residual Value) integrate negative cash flows due to the payment of taxes, pension benefits, healthcare. Those expenditures benefits the whole society and constitute a benefit: they should be removed from the analysis.		
		Socio-economic benefits are usually low in the implementation phase, higher at the end of the reference period.		
		This presentation was focused on socio-economic benefits. However, socio-economic costs exist: pollution and noise caused by the construction, for instance. Socio-economic costs are usually marginal.		

# Limitations of the CBA for RIs

- Investment funded with ERDF are expected to support territorial cohesion in Europe by promoting the regional socio-economic development of the less-advanced regions
- RIs differ from traditional infrastructures (transport, energy, etc.) because their a large part of the socio-economic benefits they generate is not bound territorially
- How should this be taken into account, when a large portion of the benefits consists of benefits which are not automatically appropriated by the hosting region?
- For RIs, the CBA is not sufficient and has to be complemented by a clear strategy supporting impact delivery and regional appropriation of the results.
- This strategy should be defined at the level of the infrastructure (“intervention logic”) and of the regional and national authorities
- **The issue of the ex-ante evaluation of the socio-economic returns of RIs cannot be disconnected from the investigation of the mechanisms that condition impact delivery.**



- A few elements to keep in mind when performing a socio-economic analysis:
- There is not a single “true” rate of return: economics is a “dismal” science, and the result of a CBA on a given project can be very different from one “expert” to another
- The justification you provide to support your figures are more important than the figures themselves
- A successful socio-economic analysis (i.e. an analysis proving a solid base for investment in your project) can ONLY be derived from an excellent “business case” (how you address an existing demand)
- Consequently, the access policy and the standards of service, in particular, should be defined early in the process
- And don’t wait until the end of the definition of the project to start your CBA, start early, even with preliminary values and budget: the CBA helps you spot inconsistencies in your project definition!

