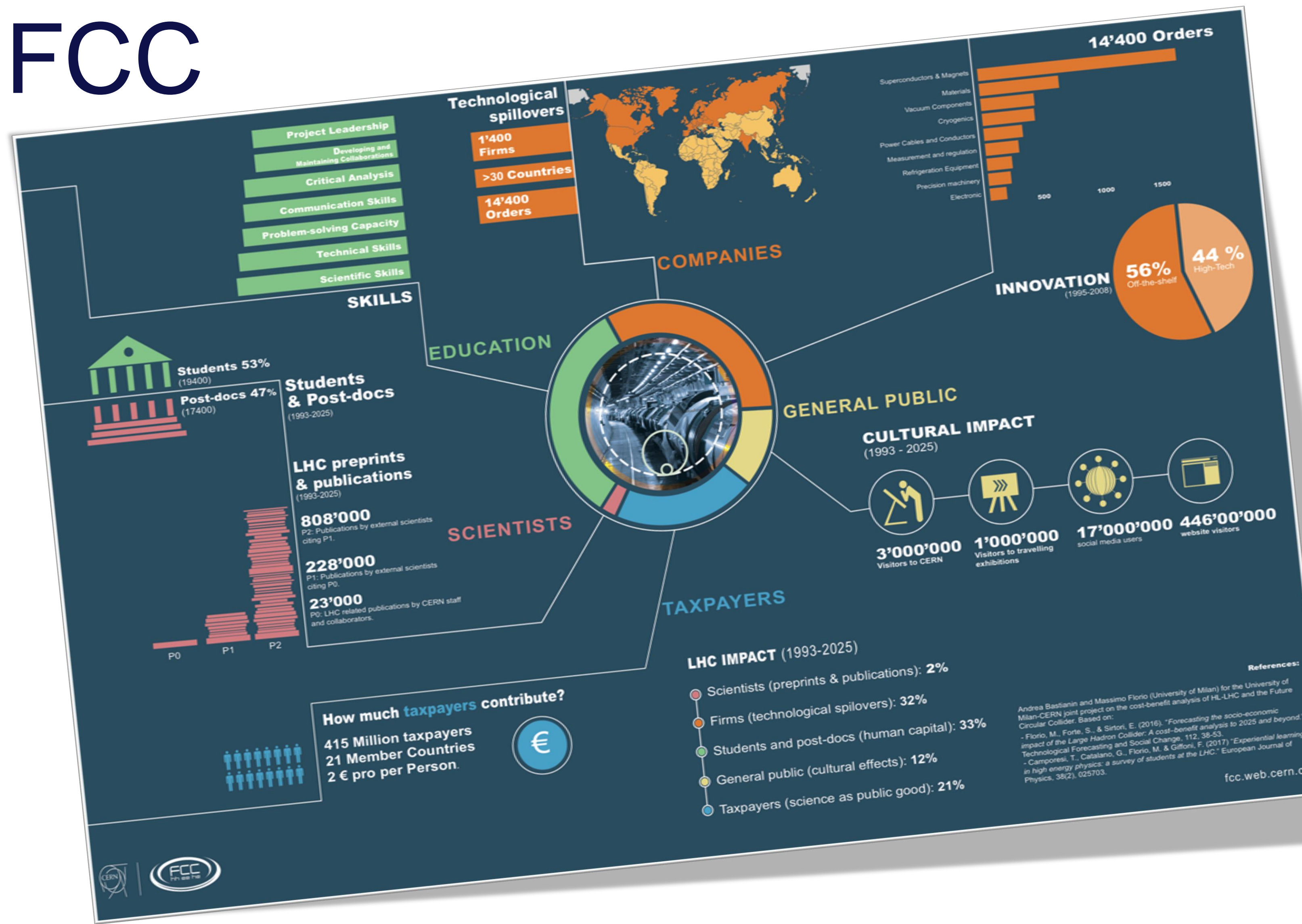


# SOCIO-ECONOMIC ANALYSIS FOR FCC CONCEPT AND METHOD

J. Gutleber (CERN)  
Tuesday, 10 November 2020, 13:30-13:40



# What is the value of science?





# Demonstrate the capabilities of FCC for the society

*Undoubtedly, the source of economic value generation is public investment in fundamental research.*

*Such undertakings “make” rather than “take”.*

Mariana Mazzucato (2019)

# Objectives for Socio-economic analysis

Include the analysis of added societal benefits from the very early concept stage onwards **based on a defined working framework and accredited methods.**

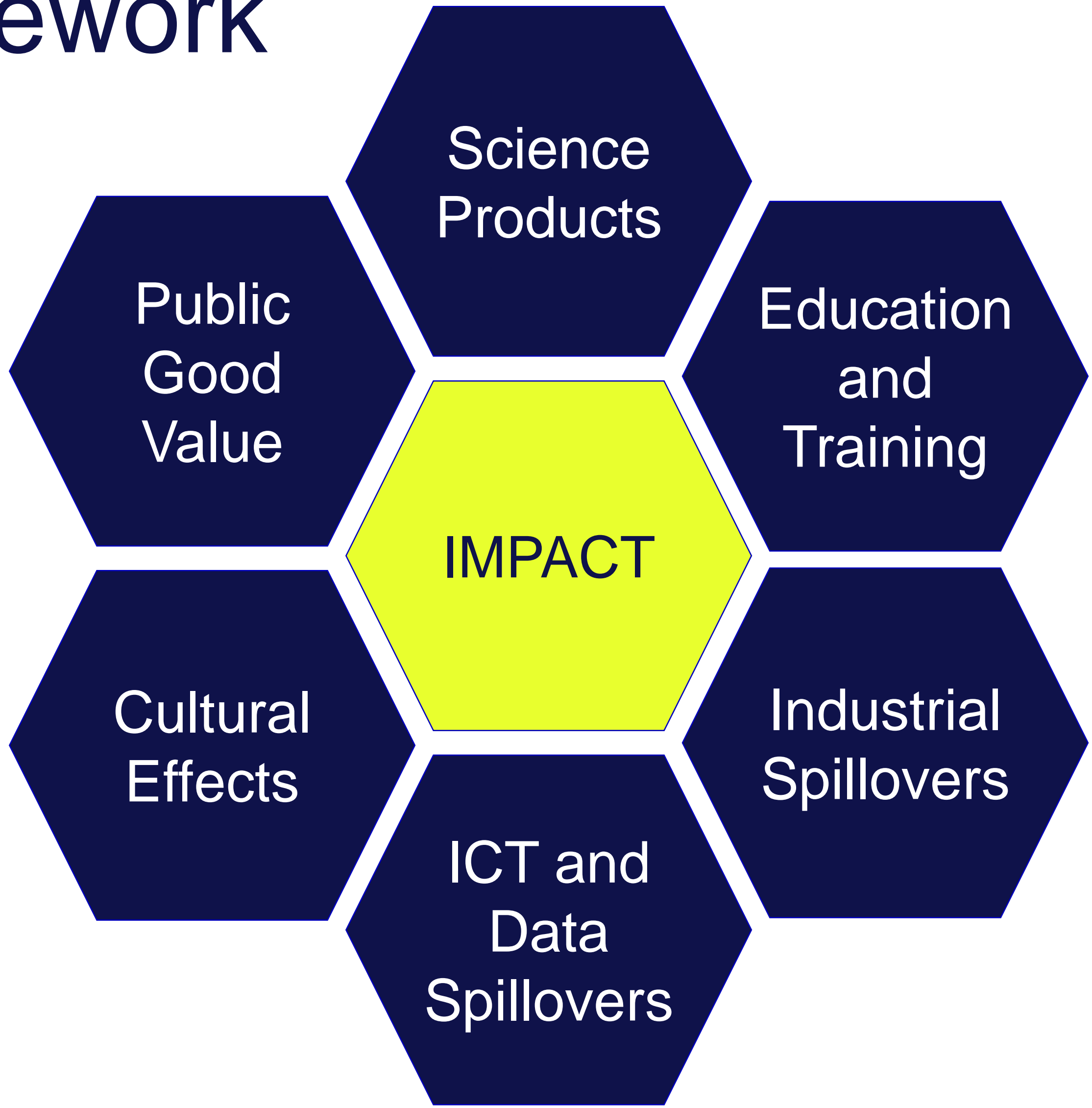
Engage the different members of the society in order to **have an additional channel to communicate** the core activity in an accessible fashion.

Create an **environment of transparency with stakeholders.**

Facilitate **Technological Competence Leveraging** with industry in a frame of “**Open Innovation**” to **increase the likelihood of knowledge transfer from industry to the project as an exemplary case (“insource”)** and from fundamental science projects to economy and society (“**spillover**”).

**Identify areas for regional development opportunities** in a global project.

# Socio-economic impact pathway Framework



# Adopted approach

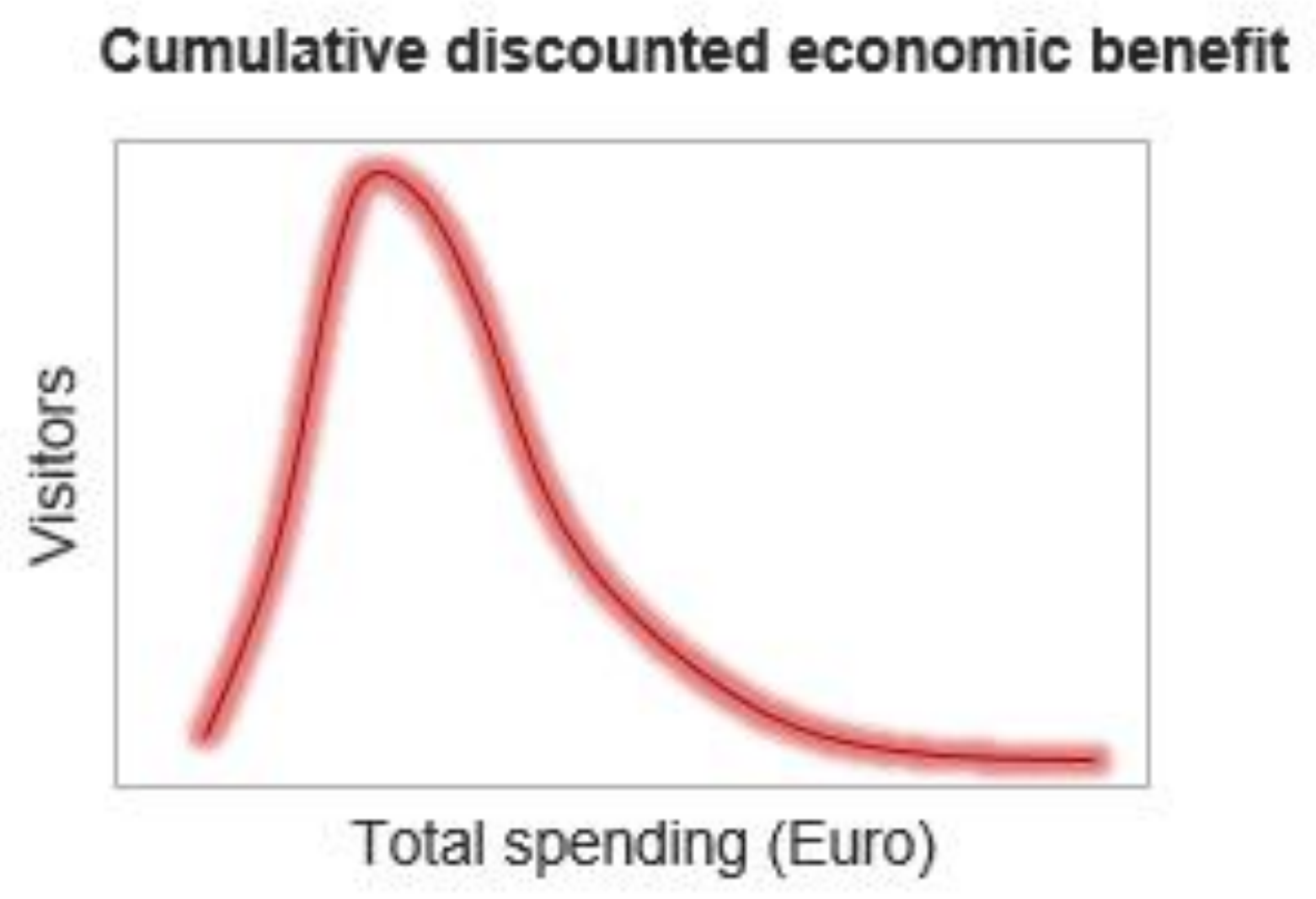
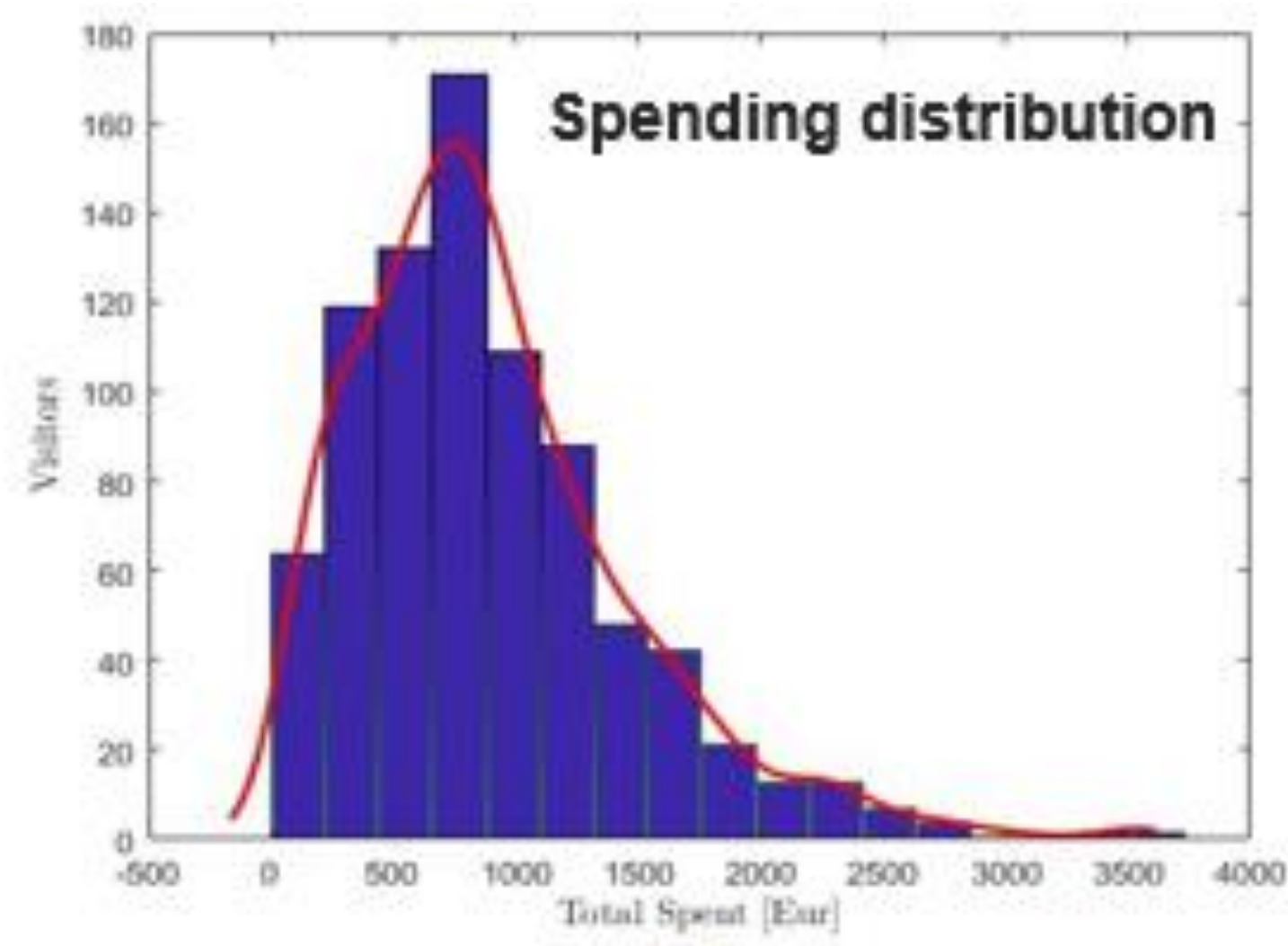
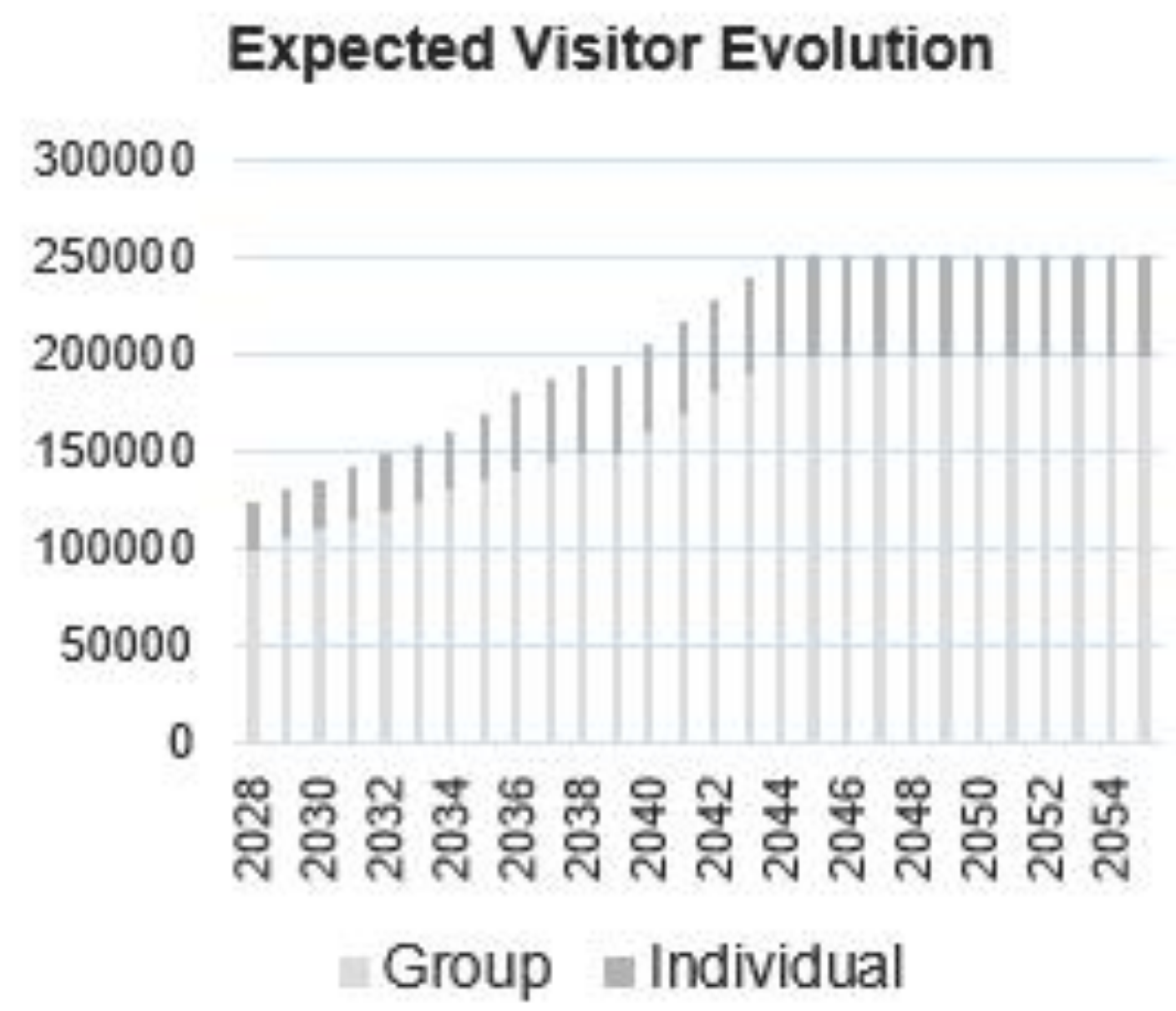
- **Quantitative approach** to estimate the socio-economic impacts along the chosen pathways (impact potentials)
- Based on best practices & **internationally recognized methods**
- **Based on factual observations**
  - historic data from the LHC programme gathered in the time period 2012 – 2019
- **Conservative estimates**
  - Where unsure, assume a lower bound
  - Choose only specific impacts for which an estimate with causal relationship to the project can be demonstrated (leads to underestimation of the overall impacts)
  - Yearly depreciation of benefits expressed in monetary values with a social discount rate (SDR) agreed by a committee of economics experts
- The impact analysis will be carried out for the FCC-ee construction and operation phases only since estimates become less reliable with even longer time scales



# How it works

- **For each impact potential** establish a **mathematical model** for the estimation of the impact
- The models are **developed by observing actual outcomes from the past**
- The **input** parameters for each model are **probability distributions** derived from the actual historic observations.
  - These distributions are estimated for the FCC-ee based on the LHC programme
- The **output** of the models are **probability distributions for potential economic impacts** for each individual impact potential
- The **cumulative output** of all impact estimates are summed and **compared to the cost estimates** of the construction and operation of the FCC-ee.

# The method in a nutshell





# Example – The value of science tourism

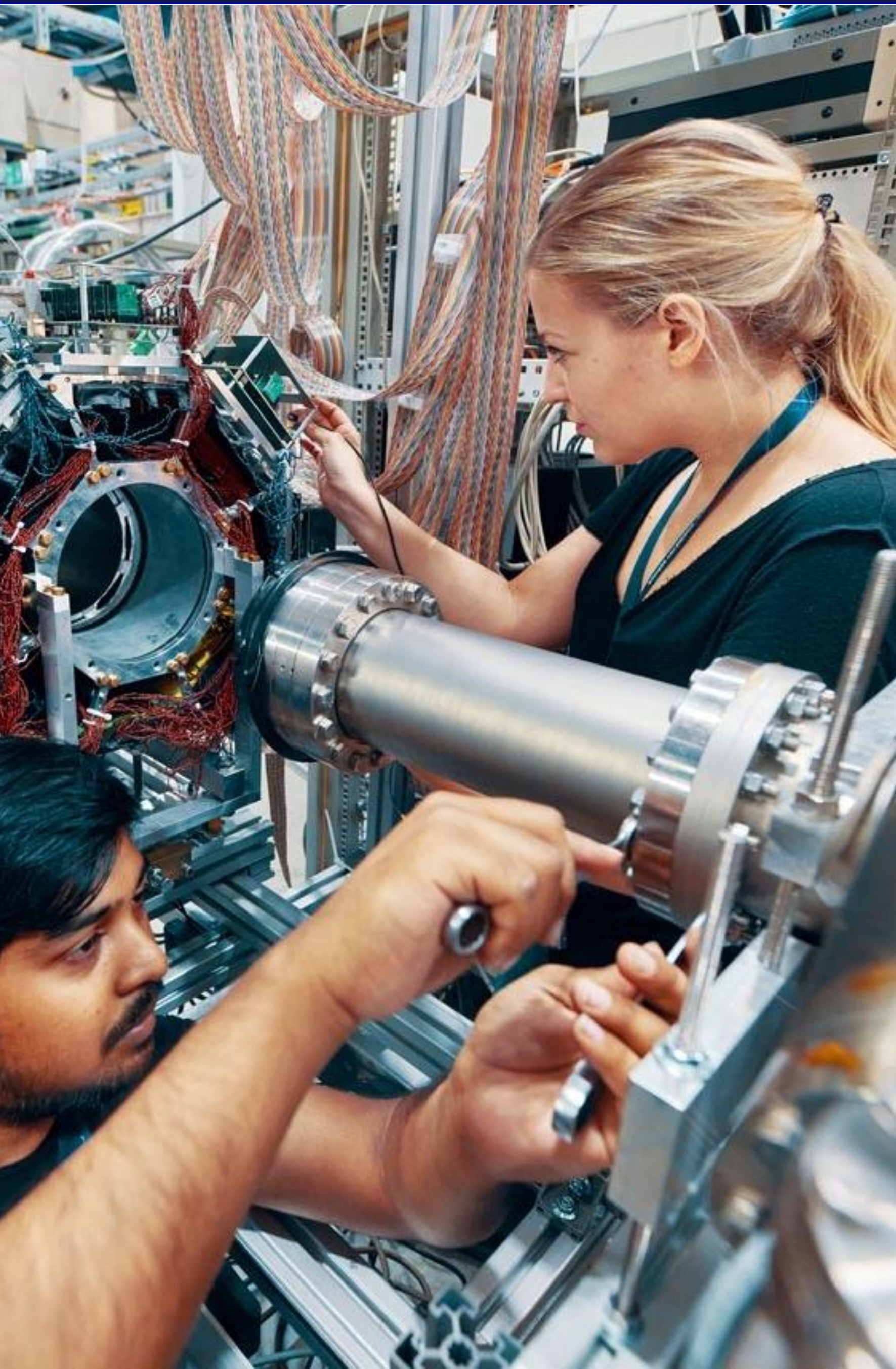
## Known:

- **Number of persons visiting** CERN every year to learn about the LHC programme and the scientific research performed in this programme
- Through a one-year long survey at CERN, the **spending distribution** of CERN visitors has been recorded
- Through a one-year long survey, the **causal relationship of spendings** for the travels with the CERN visit has been elucidated

## Estimated:

- **Timeline** of the FCC-ee programme (construction, commissioning, operation, maintenance and upgrade phases)
- **Yearly number of visitors** that are expected during the construction and operation phases of FCC to see the construction sites and to learn about the scientific research of the FCC programme





# Socio-economic impact analysis as design tool

Our studies so far have shown that the **socio-economic impact potentials relate to the degree of scientific excellence and the level of technological advancement that a new research infrastructure can create.**

## Scientific excellence:

- Attracts world-class researchers and leads to a large user community (quality leads to quantity)
- Attracts high number of early stage researchers and generates training effects, the largest single impact of an RI
- Results in high scientific dissemination and thus a creation of widely visible and referenced science products
- Lays the foundation for the cultural goods that non-science citizens will consume
- Creates the narrative that leads to high public good value, which is ultimately the “value of FCC for every person”

## Technological advancement:

- Stimulates co-development with industrial partners of any size, creating learning effects and qualitative growth
- Stimulates Open Innovation, i.e. new products, services, processes also in the periphery of the core mission or not at all connected to it
- Stimulates IP creation of any kind, including open access software and data
- Increases the public good value due to benefits for every person

# An approach for the value of science

