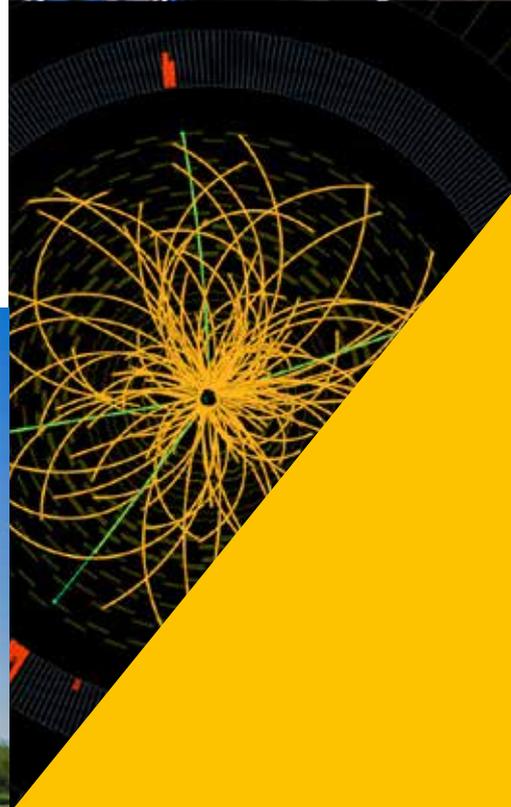




Science and
Technology
Facilities Council

Benefits of the UK-CERN Partnership



A world-class particle physics facility

The UK reaps many rewards from CERN membership

World-class research

3
of 8 CERN Nobel Prizes include UK scientists

World-class innovation

30
technological advances including the Web

World-class skills

£489m
salary boost over 10 years

The UK is a founding member of CERN, the world's largest particle physics laboratory. Complex particle accelerators and detectors, as well as computing technology are made available to perform world-class research in fundamental physics. UK scientists and engineers work alongside over 13,000 others from more than 75 countries, aiming to answer fundamental questions about the Universe.

More than 1,000 researchers from UK universities and institutes contribute to and influence CERN's research and engineering programme.

This summary of the report *Evaluation of the Benefits that the UK has derived from CERN*, by independent consultants Technopolis, showcases the positive impact international collaboration can have on UK achievement and development.

UK participation in CERN science pays dividends, with financial return close to investment complemented by exceptional benefit to society, science and innovation. It is a prime example of how, through international collaboration, the UK inspires and leads the world in research and innovation excellence to deliver global impacts.

Credit CERN

“ Working for CERN has enhanced our reputation in the international field of scientific research, and has led to contracts from other institutes in Europe and further afield ”

UK engineering firm

“ There is no question that the CERN laboratory has, during the past half-century, been one of the top institutions in its field ”

OECD Global Science Forum, 2014



World-Class Research

UK scientists and engineers build on their world-leading research capabilities through unique opportunities to access knowledge, collaborations and expertise at CERN

The home of landmark discoveries such as the Higgs boson, CERN is the UK's national laboratory for particle physics. It boasts nearly three quarters of the world's particle physicists and **97% of UK researchers involved with CERN say it has a positive impact of their research.**

Research at CERN spans over 100 scientific fields including particle physics, nuclear physics, astrophysics, accelerator physics, computing, engineering and beyond, connecting UK researchers and innovators to collaborators worldwide. This enables the UK to lead research and innovation collaborations to solve global challenges that require coordinated expertise, facilities and resources from many nations.

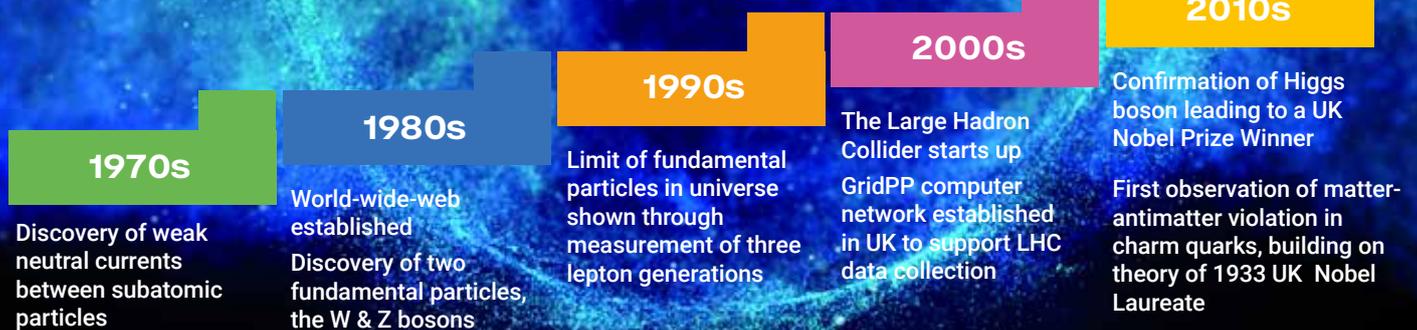
“ The field of particle physics has reached a point where no single country alone can provide the necessary infrastructure and community for the fields to flourish. CERN is about the only organisation left in the world that is able to provide the required expertise and facilities ”

UK scientist

“ The top scientific talent in particle physics wants, generally, to work on the questions that are at the cutting edge of particle physics. That physics is being done, almost entirely uniquely, at CERN. If the UK wishes to continue to attract such talent, membership in CERN is necessary ”

UK scientist

Notable Scientific Advancements



CERN supports the strength of the UK research community and contributes to the UK's international presence, visibility and reputation

The UK is a world-leading research nation, especially in **Nuclear and Particle Physics**, as demonstrated and enabled through international programmes like CERN. The UK has a key role influencing decision making at CERN, promoting UK research interests and participating in ground-breaking, world-changing science. The UK has been involved in all of the major experiments and discoveries at CERN, with many UK researchers holding crucial positions.

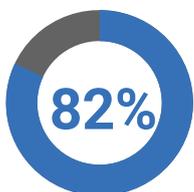
The international standing of UK science publications is supported by CERN research

20,275
UK papers citing CERN (2009–2018)

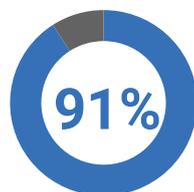


25% in top 10%
most-cited in their field globally

Papers published by UK scientists with a CERN affiliation are cited by more papers than those published without a connection. **The Higgs boson publication, with over 8,000 citations, is not only one of the most highly cited papers in particle physics, but of all subjects.**



82% of survey respondents reported that involvement with CERN has a significant effect on their own national and international reputation



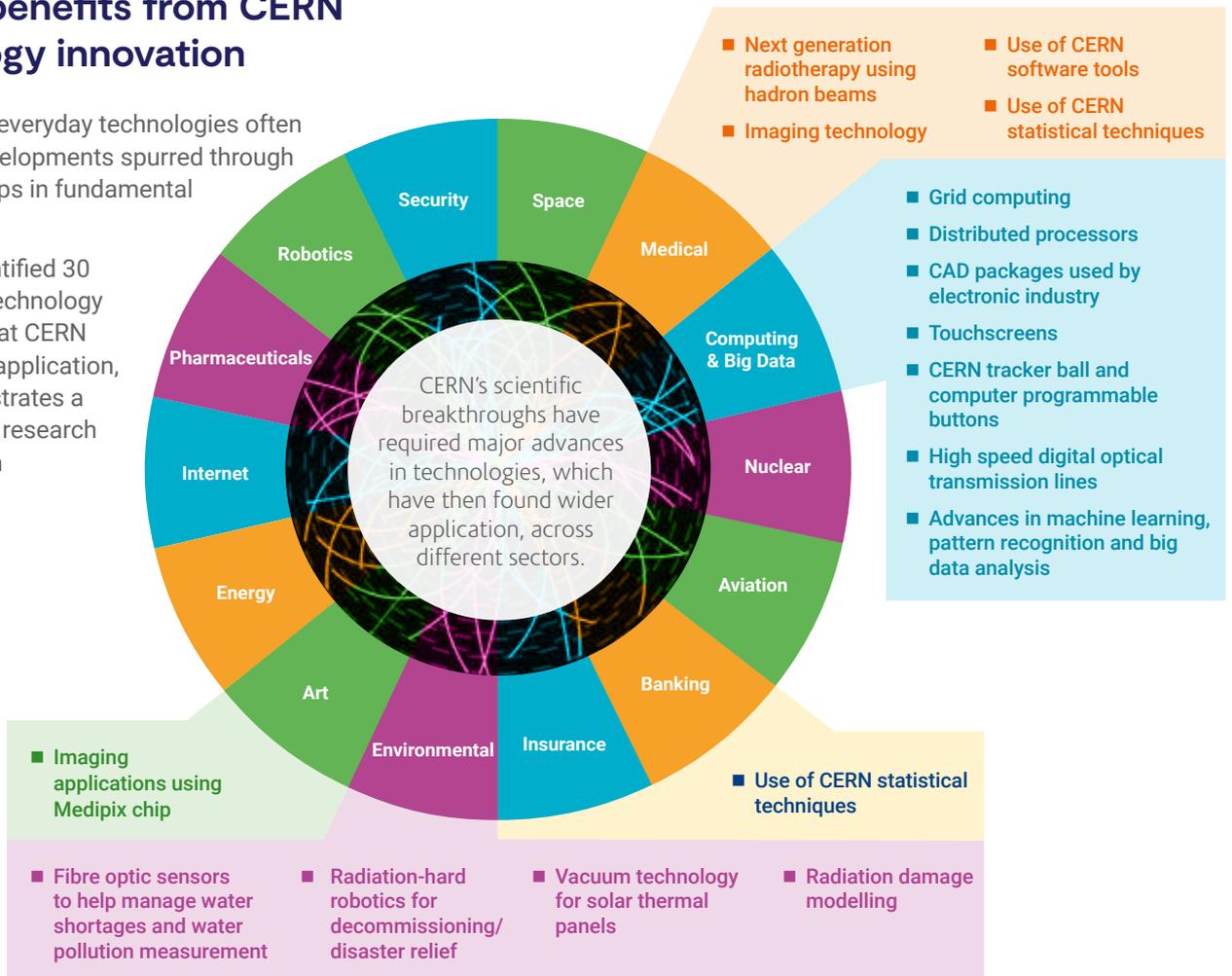
91% of survey respondents believe CERN has been critical to advancing knowledge in the field of fundamental physics

World-Class Innovation

The UK benefits from CERN technology innovation

Life-changing everyday technologies often arise from developments spurred through addressing gaps in fundamental science.

The study identified 30 examples of technology advancement at CERN serving wider application, which demonstrates a thriving global research and innovation environment.



UK supplier productivity is increased by CERN

UK membership of CERN supports UK businesses to 'Go Global' as UK companies have access to a steady stream of contract opportunities for the supply of goods and services to CERN.

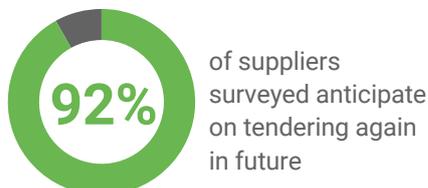
In the past 10 years:



The study estimates that:



“Improvements to our knowledge and expertise have allowed us to develop products for other larger markets. We now manufacture 1,000 units a year and generate £20m revenue, supporting 100 jobs”
magnet supplier



World-Class Skills

UK workforce skills and capabilities are enhanced by CERN

In the past 10 years around **1,000 individuals** from the UK have participated in specific training programmes and schemes coming away with skills in scientific, technical and digital sectors as well as international team-work, problem solving and project management.

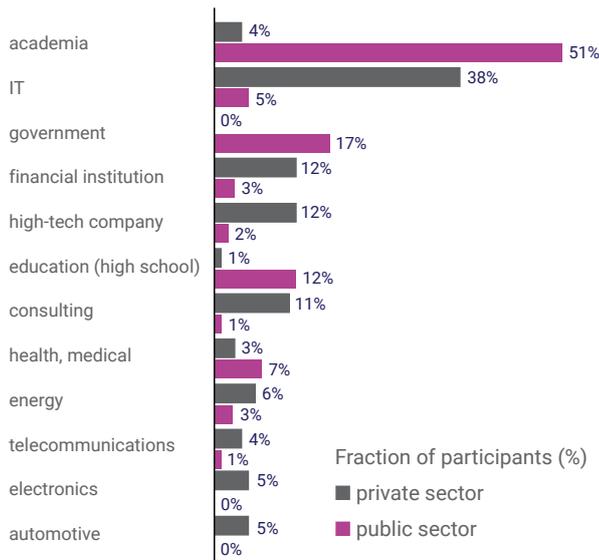
There is also on-the-job training of **1,000 researchers, 300 CERN staff, 40 fellows and hundreds of suppliers.**

In the past 10 years:

£4.9m

Value of UK involvement in CERN's free student, doctoral and technical programmes

CERN's impact on careers



Young UK researchers earn more across their careers after they have engaged with CERN, with an extra £489m in additional wages realised in the past ten years alone



Credit CERN

“ The skills young researchers are getting through their connection with CERN (especially experience with large data volumes) is in high demand and makes these graduates very desirable on the job market ”

Director of a UK Centre for Doctoral Training in Data Intensive Science

Sectors in which former CERN researchers continue their career; CERN Courier volume 59 issue 2 (2019); not UK specific

The UK public's appreciation of science and the number of students studying STEM subjects in the UK is boosted by CERN

CERN has a wide reach to promote particle physics to the UK public and worldwide, it helps foster the development of a culture valuing science.

On average, each year from the UK:

- 12,000 members of the public visit CERN in person
- 220,000 visit CERN's website
- 40,000 interact with its social media channels
- CERN is mentioned ~2,000 times in the UK media plus various TV/radio broadcasts

The UK has the most teachers attending the CERN National Teaching Programme (over 1,000 in the past decade), who go on to include CERN science in their teaching to an estimated **175,000 school students within 3 months of the visit**



of physics undergraduates in eight UK universities were attracted to study science because of activities in particle physics (such as CERN), with half specifically saying they were inspired by the search for the Higgs boson

IOP Case for CERN Membership



Credit STFC

Nearly 2,300 UK school groups visited CERN in the past five years, with 54,500 teachers and students visiting in total. **The number of schools and students taking up this opportunity from the UK is more than from any other country**