



Science and
Technology
Facilities Council

Hartree Centre

Commercial Beneficiary Outcomes Report

Public Summary | January 2022

Hartree Centre Commercial Projects – Beneficiary Survey

The STFC Hartree Centre

The STFC Hartree Centre is a high performance computing, data analytics and artificial intelligence research facility focused on tackling industry-led challenges through innovative advanced digital technologies. Backed by significant government funding and significant strategic partnerships with organisations such as IBM and Atos, the Hartree Centre is home to some of the most advanced computing, data and AI technologies in the UK.

The Hartree Centre works with the research community and industry (from early stage SMEs to international operations, across a wide variety of sectors) to address real life challenges and accelerate the adoption of high-performance technologies, delivering transformative gains in performance, productivity and time to market. It provides businesses with access to emerging technologies, expertise, training and skills programmes and consultancy services.

Survey of past commercial users

The Hartree Centre commissioned Technopolis to help establish a beneficiary outcome survey for its commercial projects. This was to capture data and evidence on the outcomes and benefits that the Hartree Centre has produced, helping to understand the value it contributes to the organisations that it collaborates with, as well as to the wider economy and society.

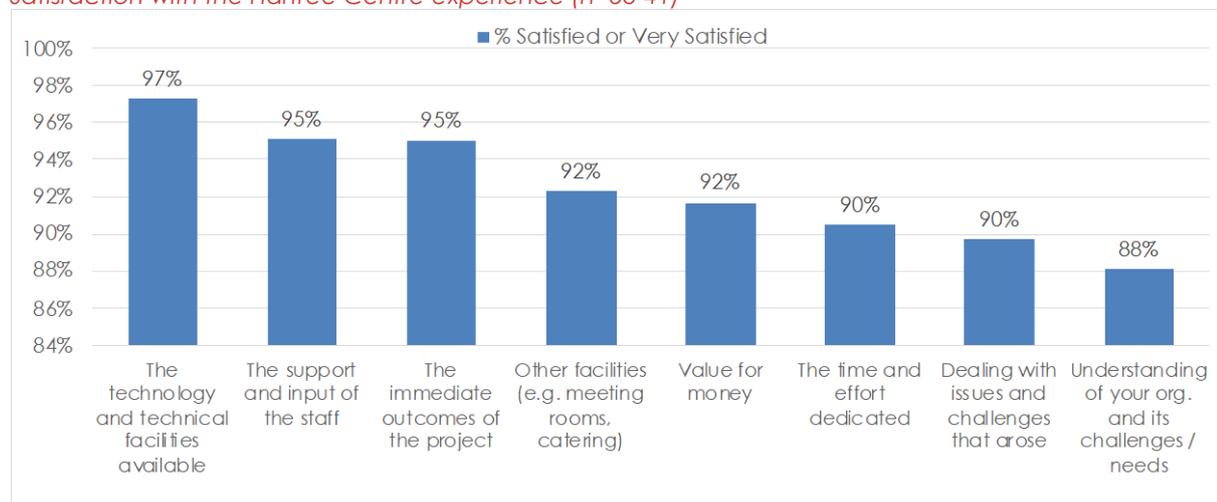
Technopolis were tasked with designing the new survey and validating the approach, as well as implementing a first iteration with past commercial users to provide additional data to supplement the evaluation study of the Hartree Centre's Phases 1 and 2. This has provided useful insight into previous activities and experiences, as well as the (ongoing) realisation of benefits from engagement with the Hartree Centre. The Centre has since implemented these surveys with new projects.

Key findings from the initial survey (based on 31% of past user organisations, with commercial projects completed from 2013 up to the end of January 2021) are set out below. The total number of responses to the questionnaire was 43, although this varies slightly by question (as indicated).

Satisfaction with the Hartree Centre

The great majority of past users were satisfied or very satisfied with various aspects of the facilities and services provided through the Hartree Centre, particularly with the support and input of staff and the immediate outcomes of their project.

Satisfaction with the Hartree Centre experience (n=36-41)



Nearly all past users (88% of 32) thought it likely or very likely that they would engage again with the Hartree Centre in future (or were already doing so). Similarly, 94% thought it likely or very likely that they would recommend the Hartree Centre to others (or had already done so).

If the Hartree Centre had not existed, most users would have turned to alternative providers (academic or commercial) to address their needs, or implemented something internally. However, respondents stated that these **alternative routes would likely come with negative implications** in terms of the speed, quality, cost or scope of work and the likely outcomes. One-third of respondents could not identify any alternative route at all for their project.

Adoption of digital technologies

Most organisations reported positive changes regarding their adoption of digital technologies¹ as a result of their engagement with the Hartree Centre. Of particular note, 91% had seen an increase in knowledge and understanding of digital technologies, while 89% had seen an increase in their in-house digital technologies technical expertise and capabilities. A selection of examples from users of particularly significant improvements in these areas are shown in the table below.

Improvements in the adoption of digital technologies

In-house knowledge and understanding of digital technologies	91%	<i>Understanding of data science techniques and how this works in the development of the technology has helped significantly in designing the back end of our platform. (Analysis for Innovators / A4i user)</i> <i>We have improved our understanding of what is feasible with Quantum Computing on today's hardware platforms. (Bridging for Innovators / B4i user)</i>
In-house technical expertise and capabilities relating to digital technologies	89%	<i>We didn't have any technical knowledge within our company. Alongside the Hartree Centre project we also attracted someone who could support us internally, to be able to carry on the project afterwards. (B4i user)</i>
Perceptions of the potential of digital technologies to support the organisation	87%	<i>We have worked with Hartree on a number of areas. It has shown our organisation the "art of the possible". (Phase 1&2 user)</i> <i>We gained a better appreciation of the potential interplay and value of simulation and machine learning. (Innovation Return on Research / IROR user)</i>
Extent to which the organisation uses / exploits data available to it	84%	<i>The outputs, with some modification by us to make them product-ready, have significantly advanced our ability to use our data and derive insights for clients. (A4i user)</i> <i>The quality of the new database has made a quantum improvement in the accessible storage of data (key to the product's success). (B4i user)</i>
Use of external digital technologies expertise / capabilities	84%	<i>Following on from the project, we are now funding a fellow, initially for 2 years, at the Hartree Centre to develop approaches for problems/systems of interest to us. (IROR user)</i>
The strategic importance attached to digital technologies	76%	<i>Working with the Hartree Centre allowed our leadership team to agree on embedding AI into our product as a strategic imperative - we believe this will give us a strategic advantage moving forward. (LCR 4.0 user)</i>

% of respondents reporting some improvement in each area (n=38).

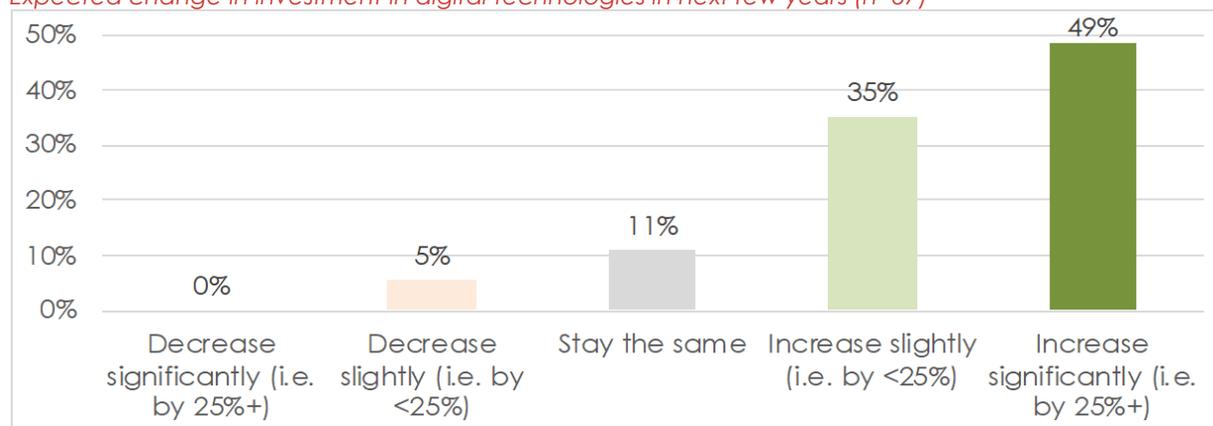
¹ Encompassing high performance computing, data analytics, artificial intelligence, machine learning, lab automation, robotics, cloud data management, virtual/ augmented reality, modelling and simulation

Since the start of their project with the Hartree Centre, past users have seen (on average):

- A 12% increase in staff with technical expertise in digital technologies
- A 12% increase in the value of their digital technologies infrastructure and equipment
- A 15% increase in annual capital investment in digital technologies
- A 6% increase in their expenditure on digital technologies services

Half of past users also expect to see a further significant increase in their investment in the use and adoption of digital technologies within the next few years (see below).

Expected change in investment in digital technologies in next few years (n=37)



Innovation-related benefits

A majority of past users have already seen innovation-related benefits as a result of their engagement with the Hartree Centre. For example, of the 37 respondents to this question:

- 76% reported an increased potential to innovate
- 73% reported improved confidence in their products and services
- 73% reported improved effectiveness of their product development
- 57% reported optimised processes (speed, cost, resource efficiency)
- 51% reported reduced costs of product development
- 51% reported reduced time to market

Engagement with **the Hartree Centre has also resulted in large numbers of specific innovation outputs already**. Extrapolating from survey responses to the full portfolio of approximately 213 past projects suggests that this could include 163 proofs of concept, 157 new or improved codes / software, 75 new products / services, 100 new processes, 25 start-ups / spin-offs and 13 licence agreements.

Examples of innovation-related benefits

Optimised processes	<i>The project's achievement in 6 months has allowed us to pre-screen candidate materials which would have taken several years by more traditional approaches. We are exploring the market potential with clients. (B4i user)</i>
Improved confidence in products and services	<i>Being able to use large scale HPC on demand at a fixed price means we can offer reliable HPC to our customers giving them confidence to adopt new simulation practices. (Phase 1 & 2 user)</i>
Increased innovative capacity	<i>The key innovation-related benefit has been to acquire a greater depth of understanding of our system and software processes. This has allowed us to roadmap a new direction for our technology supporting new disruptive innovations. (B4i user)</i>

Commercial benefits of project

Although the full benefits of engagement with the Hartree Centre are still working their way through the system in many cases (i.e. contributing to wider development work that may come to market in several years), many respondents reported some level of improvement to:

- Their reputation and global brand value (71% of 34)
- Their level of investment in R&D (65% of 34)
- Operational efficiency (52% of 33)
- Productivity (52% of 33)

The survey has shown that it can take a number of years for the benefits of engagement with the Hartree Centre to flow through to new or improved products on the market and commercial impact. Nevertheless, around one-third of the organisations surveyed could already report that their work with the Hartree Centre had translated into **increased sales or profitability**. The work that the Hartree Centre is now doing through its newly funded HNCDI programme seeks to speed up this process.

Most respondents (79%) reported that there were **commercial benefits still to be seen** from their Hartree Centre project. These were usually expected in the next 1-3 years, following further R&D and the incorporation of project results into wider developments. As such, continuing to track benefits over time, well after the end of the Hartree Centre project, is essential to capture the full impact of this intervention on the organisations concerned.

Overall experience of past users

Respondents were asked if they could provide a **brief statement about their overall experience** of engaging with the Hartree Centre and the difference that this has made to their organisation. A selection of the testimonials provided are shown below.

- *Working with Hartree significantly advanced our analytics so we could create time savings and quality insights for clients, that they can trust. We also learned our R&D and data analytics needs for the next 2 years which has underpinned our strategic plans. (A4i user)*
- *We have found collaborating with the Hartree Centre a valuable experience. By combining our complementary expertise of Materials Science with Computational Analysis we have gained great insight into an exciting family of innovative materials. (B4i user)*
- *We have benefitted greatly from our collaboration with the Hartree Centre. We found the staff knowledgeable, helpful and supportive. Digital technologies is a relatively new area for us and we hope to continue to develop what has been initiated with the project under discussion going forward, as well as consider opportunities for alternative collaborations. (IROR user)*
- *Fantastic team, with superb support. A trusted advisor that was fundamental to the successful conclusion of the project. (Phase 1&2 user)*
- *Engaging with the Hartree Centre has been a very good experience for us. It has been a pleasure to work with the team and having access to a world class HPC resource gives us a great commercial advantage. (Phase 1&2 user)*
- *We had excellent support from the Hartree centre and were pleased with the approach and findings from the project. Although the project findings weren't strong enough for us to implement commercially it helped develop our understanding of data science and the opportunity that machine learning presents to our business. (B4i)*
- *The Hartree Centre provided invaluable expertise on the testing, development and deployment of data science techniques on complex data sets. Without this project, we would not have had the expertise to carry out an equivalent project and it is likely that any internal projects would have been less efficient and produced weaker outcomes. (A4i user)*
- *This particular project was very useful. We had the opportunity to work with excellent experts who did a great job. We learnt about new methodologies and are looking to implement them in our procedures. (IROR user)*