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Evaluation of the UK Research Partnership Investment Fund

Interim report

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Preface

This report provides a comprehensive interim analysis of the UK Research Partnership Investment Fund (UKRPIF) programme as part of a multi-year evaluation concluding in 2027/28. The report examines UKRPIF's impacts, processes and progress toward achieving its objectives.

Chapter 1 outlines the evaluation's context, purpose and methods, including data analysis, interviews and site visits.

Chapter 2 examines how UKRPIF has helped enhance research facilities across awarded institutions. This chapter discusses the adaptability and flexibility of upgraded or created physical spaces, explores issues related to these facilities' financial maintenance and evaluates their environmental sustainability.

Chapter 3 explores how UKRPIF has enhanced UK capability and capacity for world-class research. Factors discussed include attracting and upskilling staff and students, and the impact of UKRPIF on research quality.

Chapter 4 discusses how UKRPIF supports the long-term creation and maintenance of partnerships, co-location of partners into shared facilities and knowledge exchange between HEPs, their partners and the wider world.

Chapter 5 discusses the research income generated, and additional investment leveraged as a result of UKRPIF funding. It discusses the programme's commercial outputs and broader economic impacts, illustrating how the fund has catalysed growth and development beyond the higher-education sector, in addition to its impacts and alignment with government strategies and priorities.

Chapter 6 provides a counterfactual scenario, assessing which of the outcomes reported by UKRPIF recipients could still have been achieved without UKRPIF funding.

Chapter 7 identifies aspects of UKRPIF processes that have worked well, such as the funding model's flexibility and Research England's (RE's) support. It also highlights areas that may improve fund processes and accessibility, focusing on institutional size and location barriers.

Chapter 8 concludes the report with interim learnings derived from the analysis and stakeholder feedback. It provides recommendations for enhancing the effectiveness and inclusivity of the UKRPIF programme and outlines the evaluation's next steps, including annual data collection and the final evaluation phase. The goal is to ensure the ongoing success and impact of the UKRPIF programme as it evolves and adapts to the changing needs of the UK's research and innovation landscape.

Summary

The UK Research Partnership Investment Fund (UKRPIF) aims to address the need for support and investment at the mid-range scale for higher education (HE) capital projects while promoting collaboration with industry and increasing private-sector investment in higher education providers (HEPs) research. A total of £1bn has now been awarded to 59 projects over seven funding rounds. The fund's objectives are to:

a. Enhance the research facilities of HEPs undertaking world-leading research
b. Encourage strategic partnerships between HEPs and other organisations active in research
c. Stimulate additional investment in HE research
d. Strengthen the contribution of the research base to economic growth.

This interim report focuses on the emerging impacts of rounds 1–6 of UKRPIF. It reviews its processes, aiming to assess the extent to which investment in HEPs through the UKRPIF has helped deliver the programme objectives (shown above).

Overall, UKRPIF is a long-standing scheme that is in good health. It has enabled HEPs across all four nations of the UK to establish high-quality research infrastructure, enabling high-quality research. It is a popular programme, with proponents keen to emphasise its strengths, only highlighting minor limitations.

The UKRPIF programme has positively contributed to enhancing research infrastructure and facilities at awarded HEPs, which are recognised as centres of research excellence by academic and industrial collaborators. The infrastructure and facilities are generally sustainable and adaptable, enhancing their sustainability beyond the initial public funding.

UKRPIF has helped to create and support partnerships between HEPs, industry, the third sector, public institutions and the public who access the facilities. It has provided a springboard for multiple kinds of further investment, including grants, philanthropic donations and industrial partner investment. Awards have also helped enhance working cultures at HEPs, influence research and innovation (R&I) strategies and green energy plans at HEPs and meet the sector's infrastructure needs.

Ultimately, UKRPIF projects have yielded outputs and outcomes with the potential to catalyse local, regional and national economic growth, leading to early socio-economic benefits. For most HEPs consulted so far, the facilities, current research quality and academic partnerships would not have been delivered or accessed to the same extent (if at all) without the UKRPIF.

We provide interim fund recommendations for the RE and UKRPIF Programme Board to consider based on the evidence-gathering activities we have conducted so far. RAND Europe and RE will continue to explore and develop them throughout the evaluation.

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Abbreviations

AH	Alternative Hypothesis
AMBS	Alliance Manchester Business School
BBSRC	Biotechnology and Biological Sciences Research Council
BRC	Biomedical Research Centre
CA	Contribution Analysis
CCF	Connecting Capability Fund
DfENI	Department for the Economy - Northern Ireland
DOI	Digital Object Identifier
DSIT	Department of Science, Industry and Technology
EOI	Expression of Interest
EQ	Evaluation Question
FB	Funded Bids
FY	Financial Year
HE	Higher Education
HEFCE	Higher Education Funding Council England
HEFCW	Higher Education Funding Council Wales
HEI	Higher Education Institution
HEP	Higher Education Provider
HEIF	Higher Education Innovation Funding
HMT	His Majesty's Treasury
IP	Intellectual Property
ITT	Invitation to Tender
KCL	King's College London
KPI	Key Performance Indicator
MRC	Medical Research Council
NERC	Natural Environment Research Council

NHS	National Health Service
NIHR	National Institute of Health Research
PH	Programme Hypothesis
PT	Process Tracing
QR	Quality-Related
R&I	Research and Innovation
RCIF	Research Capital Investment Fund
RE	Research England
REF	Research Excellence Framework
RI	Research Infrastructure
ROI	Return on Investment
SFC	Scottish Funding Council
SME	Small/Medium Enterprise
STEM	Science, Technology, Engineering and Mathematics
STFC	Science and Technology Facilities Council
ToC	Theory of Change
UG	Undergraduate
UK	United Kingdom
UKRI	UK Research and Innovation
UKRPIF	UK Research Partnership Investment Fund

Acknowledgements

We would like to thank all the UKRPIF awardees for their invaluable contribution to this report. Their engagement and willingness to share their experiences have been instrumental in shaping our understanding of the UKRPIF funding model and its impact on the UK's research and innovation landscape.

We are grateful for the time awardees took to participate in interviews and discussions, providing detailed insights into the challenges and opportunities they experienced in the application process and implementing their projects. Their feedback has allowed us to identify areas for improvement and propose recommendations designed to enhance the effectiveness and inclusivity of the UKRPIF programme.

We would also like to thank the institutions that welcomed us for site visits, giving us the unique opportunity to witness first-hand the transformative impact of the UKRPIF funding on research facilities and infrastructure. They also allowed us to engage directly with project leads, researchers and other stakeholders, deepening our understanding of the funded projects' practical realities and outcomes.

We are very grateful for the support and collaboration of Rebecca McCutcheon at RE during our regular calls and for their hard work in championing this evaluation exercise.

Finally, we thank our quality assurers at RAND Europe, Dr Susan Guthrie and Dr Daniela Rodriguez-Rincon, for reviewing this report.

1. Introduction

This chapter outlines this report's context and purpose and summarises the methods used.

1.1. Context

The UK Research Partnership Investment Fund (UKRPIF) was created to address a need to support and invest in the mid-range scale for Higher Education Provider (HEP) capital projects, whilst promoting strategic partnerships between HEPs and other research organisations and increasing private sector investment in research. The fund offers between £10m and £50m per project for HEPs, provided they leverage double that investment in matched funding from non-public sector sources (termed 'double-match' funding). An in-depth overview of the policy context in which UKRPIF operates and its funding processes can be found in the evaluation plan.[1]

The fund's objectives are fourfold and remain unchanged since the programme's inception:

a. Enhance the research facilities of HEPs undertaking world-leading research
b. Encourage strategic partnerships between HEPs and other organisations active in research
c. Stimulate additional investment in HE research
d. Strengthen the contribution of the research base to economic growth.

UKRPIF was set up by the Higher Education Funding Council for England (HEFCE) in 2012 and is now managed by Research England (RE) on behalf of UK Research and Innovation (UKRI) and the devolved funding bodies, which include the Scottish Funding Council (SFC), Medr (previously the Higher Education Funding Council for Wales) and the Department for the Economy - Northern Ireland (DfENI). On 1 April 2018, HEFCE ceased to exist, and the research and knowledge exchange functions, along with the responsibility for the UKRPIF, were transferred to the newly created RE. Currently, the UKRPIF is the largest competitive grant funding scheme managed by RE: since 2012, it has awarded approximately £1bn of capital funding to 59 research centres and facilities over seven rounds, with over three-quarters of the projects now operational, providing a collaborative space for academics, industry and charity partners and SMEs to drive research excellence. The timing of each funding round is based on the allocation of funds to RE. Rounds typically operate via a two-stage application process whereby HEPs submit an initial expression of interest application for assessment, after which they may be invited to prepare their full proposal for capital funding. Institutions are awarded funding on the basis that the UKRPIF will develop their research infrastructure and,

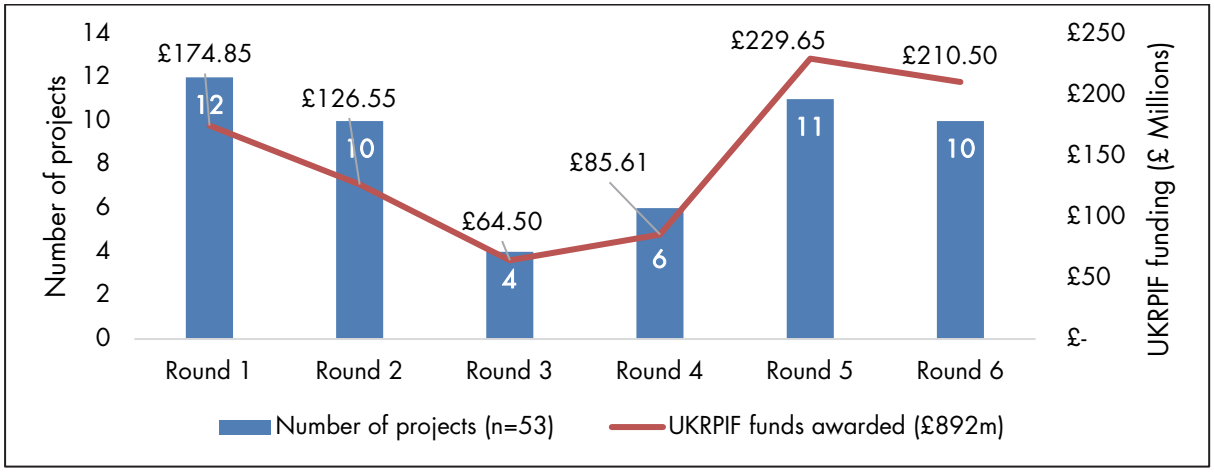
[1] Bryan et al. (2024).

in turn, increase their institutional capability to deliver research excellence, contribute to national Research and Innovation (R&I) ambitions, drive research partnerships and attract further investment.

1.2. Overview of the UKRPIF Portfolio

A complete overview of the UKRPIF portfolio and leveraged co-investment can be found in the evaluation plan.[1] Given its relevance to this report's findings, we will revisit a subset of this data regarding the disciplinary and geographical profile of the awardees and bidders. Figure 1 shows 53 UKRPIF projects across the first six rounds, with 44 at practical completion. UKRPIF funding totalled £892m, with the most funding awarded in Rounds 5 and 6 and the least in Round 3 (£230m, £210m, and £65m, respectively). Round 3 also had the least number of projects (see Figure 1). The average UKRPIF project value was highest in Round 6 and lowest in Round 2 (£21m and £13m, respectively). The higher average awards in Rounds 5 and 6 correspond with the increased upper award threshold for those rounds from £35m to £50m.

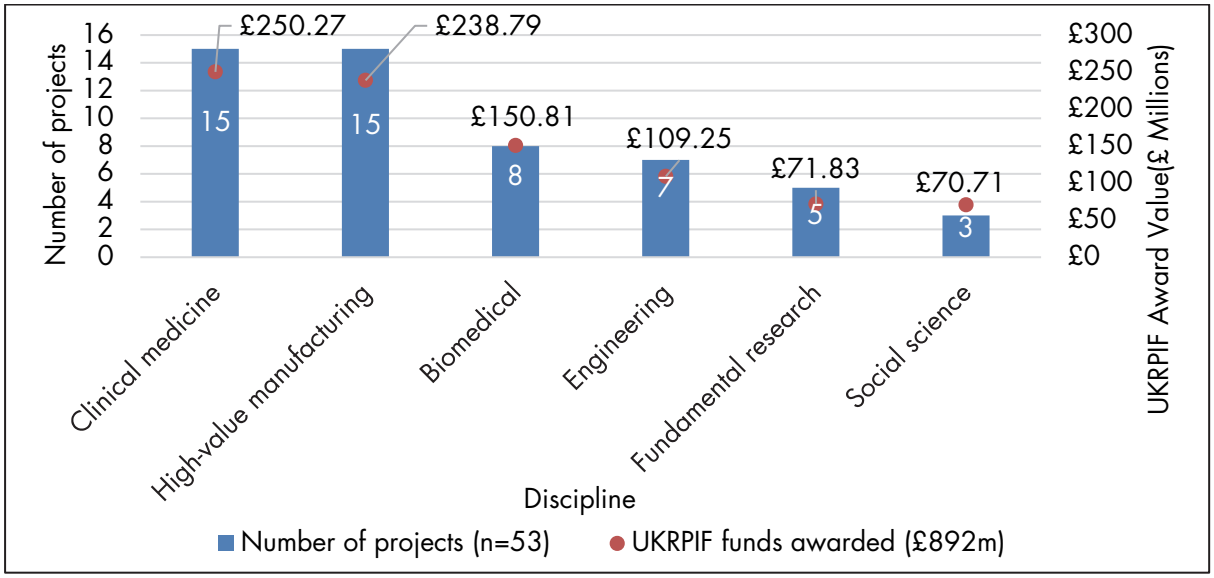
Figure 1: Number of projects and total value of UKRPIF awarded per round



Source: RAND Europe analysis of UKRPIF portfolio data.

As Figure 2 shows, clinical medicine and high-value manufacturing were the disciplinary groups with the highest number of UKRPIF projects and awarded funding (55% of the total funds when combined). Social science and fundamental research had the lowest number of UKRPIF projects and UKRPIF funds awarded (8% of the total funds each). Many projects currently or will comprise activities that cross disciplinary boundaries rather than the single designation they receive in this data.

Figure 2: Number of UKRPIF projects per disciplinary group and value of UKRPIF awarded



Source: RAND analysis of UKRPIF data. Note: Disciplinary groups were derived from the Belmana Report groupings.

As Table 1 shows below, the 'Golden Triangle' regions, including London, the East and the South East of England, received over half of the total value of UKRPIF (£447.45m). England received more UKRPIF investment than all the devolved nations (85.6%, £763.31m versus 14.4%, £128.35m).

Table 1: UKRPIF investment by region

Region	UKRPIF investment/ funding (£)	UKRPIF funding awarded (%)
North (total = £122,734,266)		
North East	£2,050,000	0.2%
North West	£91,483,810	10.3%
Yorkshire and the Humber	£29,200,456	3.3%
Midlands (total = £124,870,000)		
East Midlands	£58,965,000	6.6%
West Midlands	£65,905,000	7.4%
The 'Golden triangle' (total = £447,445,189)		
East of England	£125,604,500	14.1%
London	£279,295,689	31.3%
South East	£42,545,000	4.8%
Other (total = £68,259,000)		
South West	£68,259,000	7.7%
Devolved nations (total = £128,354,500)		
Scotland	£58,982,500	6.6%
Wales	£58,870,000	6.6%
Northern Ireland	£10,502,000	1.2%

Source: RAND analysis of UKRPIF data.

However, it is important to consider each region's number of eligible institutions, application number and application success rate when drawing conclusions, as presented in Table 2. An analysis of this is presented in Section 7.2.1.

Table 2: Number of UKRPIF-eligible HEPs, Expressions of Interest (EOIs) submitted, successful bids and bid success rate by region

Region	Number of eligible HEPs in the region	Number of HEPs in the region that have submitted a bid for UKRPIF	Number of EOIs submitted by HEPs in each region	Number of successful bids submitted by HEPs in each region	Application rate for each region (number of EOIs/number of eligible HEPs)	(%) of successful bids for each region
East Midlands	9	3	11	3	1.2	27
East of England	9	5	22	7	2.4	32
London	38	10	39	15	1.0	38
Northern Ireland	3	1	1	1	0.3	100
North East	5	2	6	0	1.2	0
North West	14	6	17	6	1.2	35
Scotland	18	5	16	5	0.9	31
South East	17	4	20	4	1.2	20
South West	14	4	8	3	0.6	38
Wales	8	2	4	3	0.5	75
West Midlands	11	5	16	4	1.5	25
Yorkshire and the Humber	11	3	13	2	1.2	15

Source: Research England. RAND Europe analysis.

1.3. Purpose of the report

This report aims to provide a comprehensive interim evaluation of Rounds 1–6 of the UKRPIF. RE commissioned RAND Europe and Frontier Economics to assess how investment in HEPs through UKRPIF has supported the programme's goals of enhancing research facilities, encouraging strategic partnerships, stimulating additional investment in HEPs and contributing to economic growth.

Previous evaluation activities have included the following:

1. An independent interim evaluation in 2017[2] by Belmana and the Centre for Enterprise and Economic Development Research at Middlesex University.
2. A long-term evaluation framework developed in 2018 by Technopolis.[3]

[2] Hall et al. (2018).

[3] Farla et al. (2019).

3. A pilot evaluation by RE over the 2019–2020 period on a diverse sample of UKRPIF projects, with feedback incorporated into the current evaluation design.

As UKRPIF is funded from public budgets, evaluating the investment's effectiveness, including progress towards the key programme objectives and understanding broader R&I impacts and the wider societal and economic benefits of this extensive programme, is essential. Thus, this evaluation will report the return on investment in the final 2028 report. The primary audiences for this report are UKRI (and RE, DfENI, Medr and SFC), other funders, and government stakeholders, including the Department of Science, Industry and Technology (DSIT).

For this interim process and impact evaluation, the evaluation team and RE worked together to build a robust view of metrics for each project based on feedback from the pilot evaluation. We collected quantitative data at three critical time points: the point of award, project completion (i.e. when the facility became operational), and the present day for projects in Rounds 1-6. We also conducted surveys and interviews, prompting consideration of the present day and the point of the award and exploring what might have been achieved without UKRPIF. This approach enabled us to present the progress of individual projects' objectives.

1.3.1. Structure of the report

The report is structured as follows:

- **Chapter 1 – Introduction**: This chapter overviews the report, context and methodologies used.
- **Chapter 2 – Enhanced research facilities**: This chapter assesses the UKRPIF's contributions to enhancing research facilities, discussing their adaptability, financial sustainability and environmental considerations.
- **Chapter 3 – Capability and capacity for world-class research:** This chapter explores the programme's interim impacts and benefits on research capabilities, including staff and student development.
- **Chapter 4 – Partnerships, co-location and knowledge exchange**: This chapter explores the programme's interim impact and benefits on the long-term creation and maintenance of partnerships, co-location of partners into shared facilities and knowledge exchange between HEPs, their partners and the wider world.
- **Chapter 5 – Leveraged research income, investment and economic impact**: This chapter explores the interim impacts and benefits of broader investments and economic impacts catalysed by UKRPIF, in addition to research income, impacts and alignment with government strategies.
- **Chapter 6 – What would have happened without the UKRPIF?** This chapter presents a counterfactual scenario assessing what might have been achieved without UKRPIF funding.
- **Chapter 7 – How UKRPIF meets the HE sector's needs**: This chapter identifies aspects of UKRPIF processes that have worked well and areas for change and improvement, highlighting successes and potential enhancements.
- **Chapter 8 – Interim learnings and next steps for the evaluation**: This chapter concludes the report with interim learnings, recommendations and next steps.

1.4. Methodological overview

This section summarises the evaluation methodology, with an in-depth discussion available in the evaluation plan.[4]

Table 3: Evaluation and study matrix

Evaluation questions (EQs), simplified from the Invitation to Tender (ITT)		Process eval	Impact eval	Economic evaluation	Interviews	Case studies	Secondary data	Survey
1. Programme objectives	EQ1. To what extent is the programme achieving its original objectives? If it is not, why not?		xxx	xx	xxx	xxx	xx	xxx
	EQ2. To what extent do the programme objectives remain appropriate and relevant?	xxx	xxx		xxx			xxx
2. Impact and socio-economic evaluation	EQ3. What are the research impacts and benefits of the programme?		xxx		xxx	xxx	xxx	x
	EQ4. What are the socio-economic impacts and benefits of the programme?		xxx		xxx	xxx	xx	xx
	EQ5. What is the impact of the UKRPIF on the higher education (HE) sector?		xxx	xx	xxx	xx	xxx	xx
	EQ6. How have the anticipated impacts of the UKRPIF evolved?	xxx	xxx		xxx	x	xxx	xxx
	EQ7. What might have been expected to happen without the UKRPIF investment? (Counterfactual)		xxx	xxx	xxx	xxx	xxx	xx
3. Funding model	EQ8. How effective is the UKRPIF funding model?	xxx	xxx	xxx	xxx	x	xx	xxx
	EQ9. What is the value for money of the UKRPIF?		x	xxx	xx	x	x	x
	EQ10. How has the programme evolved since its launch in 2012?	xxx	xxx		xxx			xxx
4. Disbenefits – EQ11. Have there been any disbenefits of the UKRPIF investment?		x	xx	xxx	xxx	xxx		xxx

Note: xxx = Highly aligned, xx = Medium alignment, x = Some alignment. Source: RAND Europe.

1.4.1. Impact evaluation

This evaluation uses a theory-based approach, tracing the programme's contributions by reconstructing the causal pathways from UKRPIF inputs to intended outputs and early outcomes and producing rigorous accounts of the UKRPIF's additionality. His Majesty's Treasury's (HMT's) Magenta Book advises utilising theory-based approaches to assess complex interventions' contribution to observed results. In line with this, we assessed the UKRPIF's contribution to the results using a pragmatic theory-based approach involving contribution analysis and process tracing. This report briefly overviews this approach while we present a detailed explanation of these methods and associated claims in the evaluation framework report.

Contribution analysis (CA) is a six-stage process for assessing causal claims. CA seeks to explore attribution by assessing the programme's contribution to observed results and outcomes and develop pathways through which ultimate impacts can be plausibly achieved (or not) following these initial results. As with most R&I

[4] Bryan et al. (2024).

programmes, ultimate impacts can take some time to emerge, and CA offers a means to capture progress relatively early, providing a guiding framework for testing programme hypotheses (PH) and establishing a well-reasoned case to explain the UKRPIF's relative contribution, over and above alternative hypotheses (AH).

We used Process Tracing (PT) within our CA framework to test hypotheses against evidence collected in the evaluation. PT is a qualitative method for assessing causal inference using four tests to determine the necessity and sufficiency of evidence to prove/disprove a hypothesis.

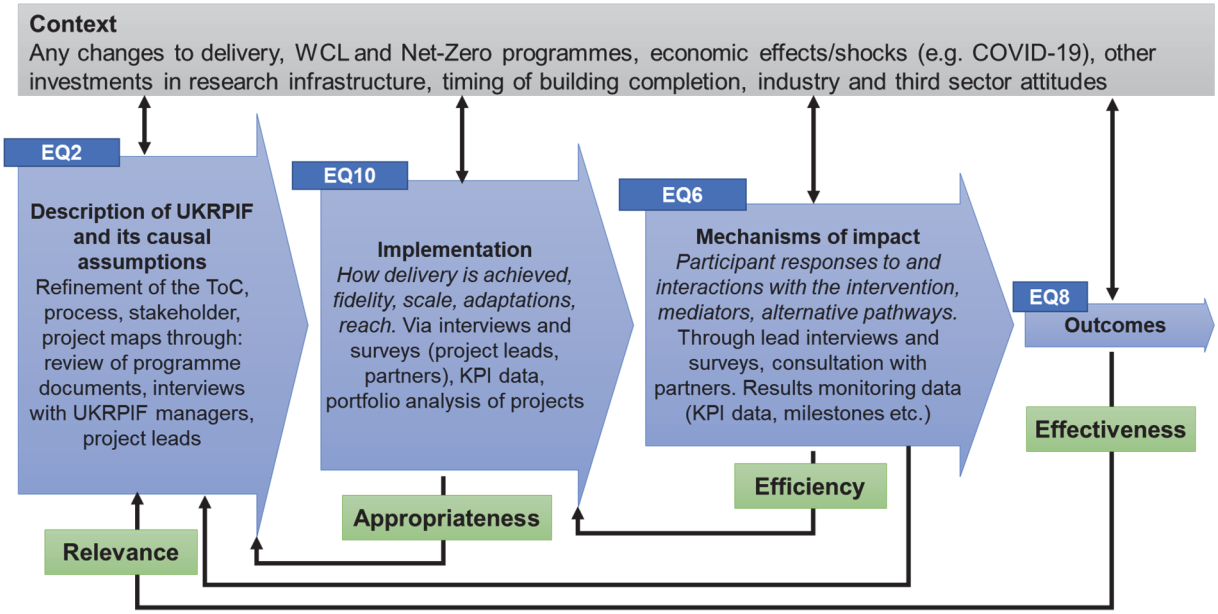
Ten contribution claims were developed for this evaluation, of which we explore eight in this report. The remaining two concern the economic analysis to be conducted in 2027/2028 (see Annex A). These claims relate to the central underlying logic of how UKRPIF is intended to work, e.g. not only if facilities improve due to funding, but how/why the UKRPIF specifically enabled that result. We developed a PT testing framework linking each claim to the evaluation questions and Theory of Change (ToC; see the Annex A supplement), weighing the evidence against each claim.

We summarise the results of this process in each chapter marked with 'Evidence strength test' and a search icon, along with a small table giving the overall confidence judgements as to whether the central claims of how the UKRPIF brings about benefits are valid based on the available evidence.

1.4.2. Process evaluation methodology

The process evaluation (Chapter 4) followed best practice Medical Research Council (MRC) process evaluation guidance, focusing on how design, implementation and contextual strengths and weaknesses affect delivery. The evaluations considered **relevance** (did UKRPIF's aims meet target groups' needs?), **appropriateness** (was the funding model appropriate to achieve aims?), **effectiveness** (were intended results achieved?) and **efficiency** (to what extent was delivery on time and budget?). This approach aimed to understand what worked well and what did not work so well in order to inform future UKRPIF rounds. Process-related questions based on the framework below and Evaluation Questions (EQs) 2, 6, 8 and 10 were woven into all aspects of primary data collection and document review to provide an ongoing assessment of UKRPIF delivery.

Figure 3: Process evaluation framework



Source: RAND Europe.

1.4.3. Specific methods

The evaluation team conducted the following activities to inform this report:

- **Survey**: We sent an online survey to all 53 UKRPIF project leads in September 2023, open until November 2023. The survey primarily used Likert scales to collect information on key evaluation questions at baseline and the interim evaluation stage from all UKRPIF awards. Questions related to facility enhancement, collaborations, investment, research and broader outputs. We also included a set of process questions to assess award holders' experiences and satisfaction with their engagement with UKRPIF. We received 44 responses (an 83% response rate). We did not survey unsuccessful applicants due to the likelihood of a poor response rate and poor legacy contact details.
- **Interviews:** We conducted a total of 31 interviews with UKRPIF project leads (n=20), unsuccessful applicants (n=4), representatives of funders in the devolved nations (n=4) and three additional interviews with high-level policy stakeholders within RE. Interviews were conducted online and semi-structured, and we chose project-lead interviews to represent HEPs ranging in size, funding round, geography, research intensity, disciplinary area and funding amount as far as possible.

Table 4: Meanings of interview codes

Interview code/ identifier	Meaning
PL	Project Lead interviewee
R1, R2, R3, R4, R5, R6	The UKRPIF funding round the interviewee came from
UNS	Unsuccessful UKRPIF applicant
FUND	Funding and programme management interviewee
OTH	Another beneficiary of the UKRPIF funding
01, 02, 03, etc.	The interviewee number

Source: RAND Europe.

- **Site visits**: We conducted site visits with five UKRPIF facilities across four HEPs: The University of Manchester, The University of Surrey, The University of Cambridge (two separate centres and visits) and King's College London (three separate centres). We chose sites to target projects across varied disciplines, institution sizes and geographical locations as much as possible within our resource limits and proximity to certain sites. Although site visits were not part of the original proposal, we included them to provide a more ethnographic view of the facilities' research infrastructures and meet the individuals using them, including academics, technicians, health professionals and business people.
- **Review of documentation and data:** We conducted a document review of UKRPIF business cases, project applications, portfolio data and previous UKRPIF evaluations.
- **Annual data returns**: To monitor and evaluate the impact of the UKRPIF programme, we implemented a methodical annual reporting system for award holders. Each year, recipients are required to submit data on ten core performance indicators using a standardised Excel template. These indicators include:

o	Improved quality of research	o	Investment by partners
o	PhD students	o	Income from research grants
o	Staff levels	o	Economic growth
o	Co-location	o	Equality, diversity, and inclusion
o	Strategic partnerships	o	Sustainability.

To ensure accuracy and completeness in reporting, we provided details on completing the data return as accurately as possible. We also held a workshop to address any queries regarding the reporting process and clarify the requirements and expectations. To add depth to the quantitative data, we requested supporting statements for the metrics recorded in the Excel template to provide contextual insights.

Data collection occurred at three timepoints:

- **Baseline:** Data from the academic year the institution received the award.
- **Project Completion (cumulative):** Data from the academic year following the baseline year up to and including the academic year in which the completion report was submitted.
- **Evaluation Launch:** Data from the academic year following the submission of the completion report up to and including the 2022–2023 academic year when the evaluation launched.

Projects are expected to continue providing yearly data returns for at least ten years post-project completion or until the end of the RAND Europe evaluation in November 2027, whichever occurs later. Our current evaluation phase achieved a 51% response rate, with 27 returns, of which the geographical and disciplinary representation was proportional to the overall portfolio. To address potential data skewness due to one institution reporting significantly higher numbers across many metrics, we applied a confidence level of 0.95. This adjustment ensures that the analysis remains representative by mitigating the influence of outliers.

1.4.4. Methodological limitations

This study's methodological limitations include the following:

- **Regional biases**: Due to resource constraints, interviews were not equally split across regions and devolved nations, although we sought a sample that was as representative as possible. Therefore, drawing more robust conclusions or identifying differences between geographies is challenging with low qualitative sample sizes per area. Mitigation: The evaluation analysed documentation (e.g. applications) and quantitative data (e.g. annual data return and portfolio data) that includes information across all regions. Where possible, we made comparisons to explore any regional biases.
- **The limited number of site visits**: We used site visits to better understand a sample of facilities. However, it was impossible to cover a larger geographical area due to resource and time constraints. Mitigation: The evaluation used evidence from various sources across all participating UKRPIF HEPs, never relying on a single site visit or source to draw fund-level conclusions.
- **Incomplete returns of the annual data collection template**: This could lead to an uneven focus on some projects over others and more detailed knowledge of the impacts of some than others. Additionally, self-reported data introduces the possibility of self-reporting biases. Mitigation: The evaluation used multivarious data sources alongside the annual data collection method, ensuring all projects were covered by several evidence sources, e.g. interviews, documentation, portfolio data or template data. We identified no significant project/impact data gaps crucial for this evaluation stage.
- **Time lag and timepoint variety in arising impacts**: The benefits generated by UKRPIF investment may manifest considerably later than setting up the facility or purchasing equipment. Similarly, the broader social and economic impacts on the region and community may emerge late in the operational phase or at varied timepoints during the lifecycle. Mitigation: We developed the evaluation approach to cater to time lags and capture a complete picture of the numerous potential impacts arising at various time points during the facilities' lifecycles by implementing a monitoring exercise that tracks impacts over time.

We have now concluded the introductory chapter. The next chapter begins to examine the results.

2. Enhanced research facilities

This chapter examines the UKRPIF's impact on HEPs' research facilities. It highlights the enhancements made possible by UKRPIF investments, such as acquiring advanced research equipment and constructing modern, adaptable research spaces. These enhancements have upgraded physical infrastructures and broadened and enhanced the scope and capabilities of research activities within these institutions. Additionally, the chapter discusses the sustainability of these improvements, focusing on their adaptability, financial maintenance and environmental impact.

KEY FINDINGS

Extensive facility enhancements: All HEPs with completed UKRPIF-funded facilities reported significant enhancements, including investments in high-end research equipment and modernised research spaces. The remaining HEPs felt it was too early since receiving the award to comment on facility enhancement.

Increased national and international recognition: Upgraded facilities have helped HEPs enhance their reputation and visibility in the global research community.

Adaptability and futureproofing: Some 59% of HEPs report being able to adapt their new facilities to meet changing research demands and growth, ensuring long-term relevance and utility.

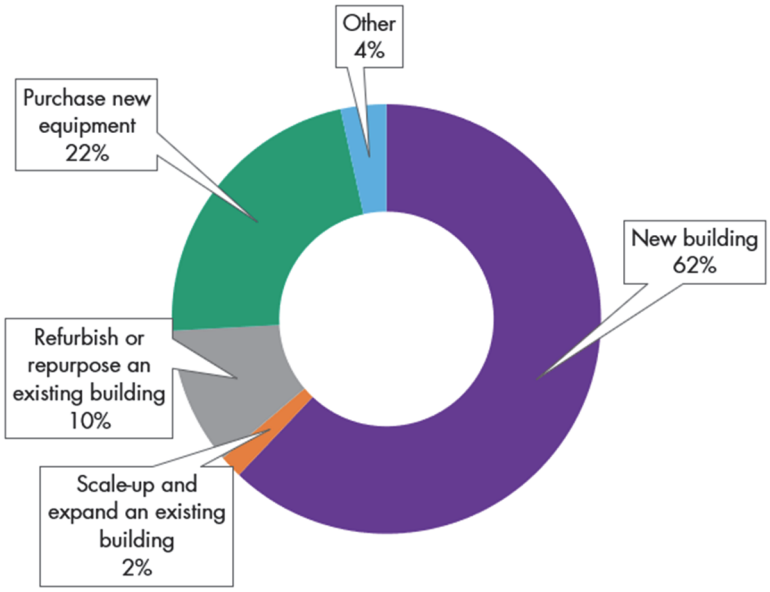
Financial sustainability: Some 95% of HEPs can financially maintain their facilities. Some HEPs face challenges in maintaining their facilities due to ongoing costs, but have developed strategies to sustain these investments, including financial support from industrial partners.

Environmental sustainability: Efforts to construct and manage facilities in an environmentally sustainable manner have been prioritised.

2.1. Facility enhancement

The UKRPIF has enhanced HEPs' research facilities by enabling them to construct new facilities, refurbish and upgrade existing physical spaces and invest in high-end research equipment. According to our survey findings, nine in ten (91%) UKRPIF-funded facilities have seen enhancements (82% 'to a large extent' and 9% 'to a moderate extent'). The remaining respondents felt it was too soon after the award to comment on facility enhancement. As Figure 5 shows below, project leads self-reported that facilities were enhanced in several ways, including providing the means for constructing a new building, refurbishing or repurposing an existing building, scaling up and expanding an existing building or purchasing new equipment. Other responses here reflect upgrades to existing equipment.

Figure 4: How HEPs utilised the UKRPIF award



Examples include an ambient cluster tool and spectroscopy suite,[5] an x-ray diffractometer,[6] a clean room laboratory,[7] high-end microscopy equipment, a human PET imaging facility and a larger PET scanner,[8] advanced process technologies and analytical technologies (fraction small-angle X-ray scattering).[9] UKRPIF facilities are often state-of-the-art buildings providing modern architectural solutions to house bespoke research equipment, offering a custom-built space for research needs. One project lead reported that the UKRPIF funding was instrumental in bringing together existing research centres under one newly built institute, now the largest institute in their research domain worldwide. The institute has large open spaces to house academics from multiple fields alongside tenant organisations and commercial partners.[10]

[5] OTH-R2-INT-01.

[6] PL-R1-INT-08.

[7] PL-R6-INT-10.

[8] PL-RMIX-INT-19.

[9] PL-R2-INT-09.

[10] PL-R4-INT-05.

Box 1: Alliance Manchester Business School case study

Alliance Manchester Business School (AMBS) is a UKRPIF-funded project at the University of Manchester that focuses on 'all areas of business and management – from accounting and health management to big data and human rights'.[11] AMBS received funding from Round 5 of the UKRPIF and is a compelling case study due to the dual nature of its facility transformation: a combination of new construction and refurbishment, incorporating advanced technical equipment into an existing building.[12]

Through the UKRPIF funding, the facility has been changed by gaining **more technological equipment**; for example, AMBS now has expansive digital suites, including eye-tracking technology and large computer labs. There is also increased physical space to host more staff and students and hold events. The increased physical space and cutting-edge technology have not only supported the business school's growth but also interdisciplinary work and the formation of internal partnerships with other faculties, demonstrating that UKRPIF-supported infrastructure has university-wide impacts.

UKRPIF funding has increased AMBS's ability to attract key research talent and capacity, partly attributed to the new high-quality facilities and ability to collect large amounts of data, which has attracted top scholars. They were also able to successfully launch a global executive MBA.

AMBS evidences the fulfilment of the UKRPIF objective of strengthening contribution to economic growth. One aspiration was for the business school to enable commercialisation, since achieved through its entrepreneurship centre. The centre has supported approximately 35 student start-ups, generating approximately 1,000 jobs and £50m in turnover over three years. These start-ups are cross-disciplinary, spanning areas such as biology, health and engineering.

AMBS has more **knowledge transfer partnerships (KTPs)** than any other UK business school, stimulating co-production and international collaborations – including with a research institute in China and a technology company in Japan. UKRPIF funding has also enabled the university to undertake **more world-leading research** and build its international reputation.

UKRPIF has helped upgrade HEPs' physical spaces to facilitate new working methods. For instance, one project lead described how UKRPIF funding enabled the university to construct a new facility that complements several industry-owned buildings already in place, thus integrating more on-site laboratory spaces and offices and facilitating a collaborative research delivery that was not previously possible.[13] Another project lead reported that the new advanced process technologies enabled their HEP to conduct more on-site multidisciplinary research in their bespoke facilities.[9]

UKRPIF has helped HEPs to build their national and international reputations. UKRPIF has enabled HEPs to enhance their reputations by helping them to build a more distinct and recognisable brand. Although self-reported, project leads at UKRPIF-awarded HEPs report seeing the benefits of their enhanced reputation for those interacting with their facilities. For instance, one project lead explained how their UKRPIF-funded centre now has its own branding, which their industry partners recognise.[5] Another project lead described how the UKRPIF funding led to higher expectations of regional universities not typically among the highest-ranked universities in the UK.[7]

[11] Alliance Manchester Business School (2024).

[12] PL-R5-INT-15.

[13] PL-R5-INT-14.

2.2. Adaptability, financial maintenance and environmental sustainability

UKRPIF-funded research facilities' sustainability is paramount for HEPs to achieve long-term gains in their research capacity and capabilities. This section collates evidence on the longevity of UKRPIF-funded facilities, including the ability of HEPs to adapt their physical space to changing research needs and working methods (thereby future-proofing the facilities' utilisation), to financially maintain the new infrastructure, including equipment and building maintenance) and to run their facility in an environmentally sustainable way, given that awardees were required to outline their plan for this in their bid.

2.2.1. Adaptability and flexibility of physical space

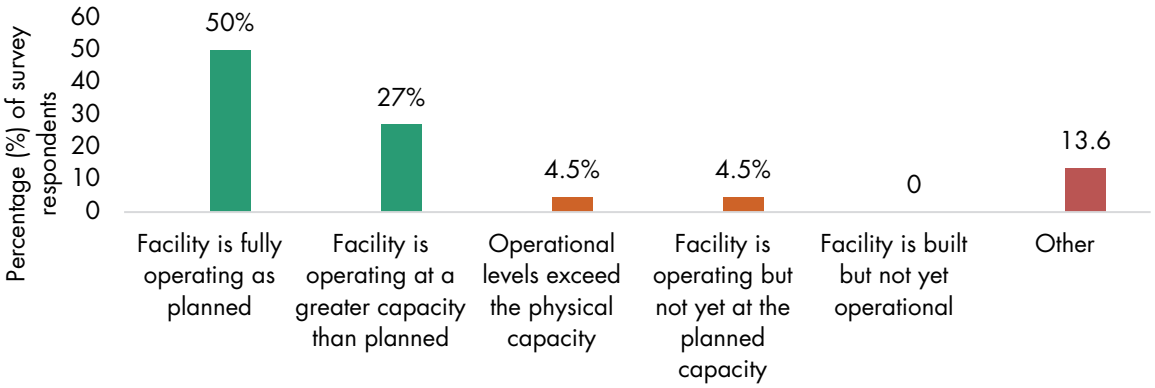
Some 59% of HEPs report being able to adapt their facilities to new research demands due to flexible design choices during the building phase. One project lead explained that it was easy for their HEP to adapt to new research or collaborative developments due to their ability to flexibly reconfigure their space as needed. For example, they could expand their lab to twice the size with minimal downtime by knocking through lab walls to create more space.[13] Similarly, another project lead explained that their UKRPIF-funded facility's physical space could be modified to adapt to changing working methods, including installing new equipment or reconfiguring the size of laboratories and meeting rooms.[14] Another project lead reported the significant emphasis placed on the space's flexible use during their building's design stage for the same reasons.[15] High adaptability allows HEPs to future-proof their physical space's use in line with shifting priorities and further research equipment needs, ensuring UKRPIF-funded infrastructure's long-term usability.

Several UKRPIF-funded buildings have exceeded their capacity (Figure 5). A quarter (27%) of the UKRPIF-funded facilities operate at a greater capacity than planned, and a small number (5%) exceed their physical capacity. Those reporting 'other' stated that, as their facility had not been completed, they could not yet comment on capacity. One interviewed project lead explained that they have '[g]one from [having] nobody in the building to overcapacity; [we have] not had a problem recruiting'.[13]

[14] OTH-R5-INT-03.

[15] PL-R6-INT-18.

Figure 5: The extent to which UKRPIF-funded facilities are operating as planned



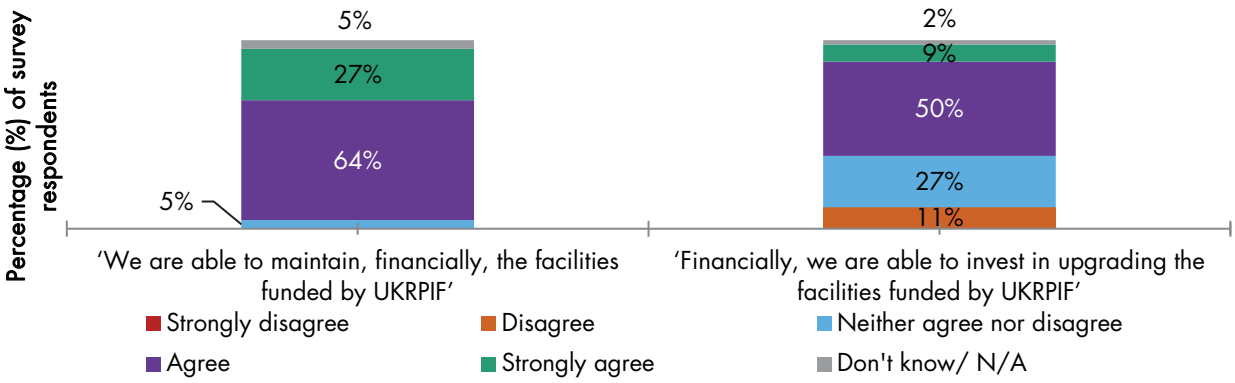
Source: RAND analysis of survey data.

The main reason some UKRPIF-funded facilities operate over capacity in a relatively short time is the collaborative and co-located working methods, whereby efforts to accommodate individuals yield space constraints. The capacity strain is especially difficult for projects with inflexible facilities to cater to their physical space demands: '[w]e're at the moment constrained by capacity, particularly accommodate[ing] people…we've outgrown the space.' [16]

2.2.2. Financial maintenance

The majority of awarded HEPs can financially maintain their facilities beyond the initial funding, with 27% of the project leads 'strongly agreeing' and another 64% 'agreeing' with this statement (Figure 6).

Figure 6: UKRPIF and facilities' finances



Source: RAND analysis of survey data.

Several HEPs are sustaining their facilities by leveraging alternative resources. For example, some benefit from having industry partners who own the building[17] or possess specialised expertise unavailable within the university to maintain the UKRPIF-funded facilities.[16] Some HEPs can effectively generate

[16] PL-R1-INT-01.

[17] PL-R1-INT-07.

consistent revenue to cover maintenance costs by charging businesses for access.[18] For others, the enhanced reputation of their UKRPIF-funded research infrastructure has helped secure funding for refurbishment. Having attained national significance in their respective research domains, some UKRPIF-funded facilities have secured additional funding to sustain ongoing refurbishments and procure new equipment. As articulated by a project leader, '[t]he fact that this is a national facility will help facilitate this continuous refurbishment and future investment to enable this [continuous refurbishment].'[5]

Some HEPs have difficulties sustaining their equipment and/or building, especially over the long term. Six interviewed project leads highlighted challenges in maintaining their UKRPIF-awarded facilities, as UKRPIF does not cover maintenance costs. We include a selection of interviewee accounts here, using bold text to illustrate specific issues:

- One interviewee noted that they have expensive labs and rooms to maintain, alongside **energy-demanding equipment**, which has been challenging, especially given the 2022–2023 **energy crisis**.[14]
- Another noted that maintaining facilities and equipment has been difficult due to **inflationary pressures**, the high cost of their **higher-end equipment** and annual maintenance.[9]
- Another respondent reported struggling to maintain their new building since their **annual equipment budget is too small** for the size of their UKRPIF-funded infrastructure, forcing them to raise the money elsewhere.[19]
- One interviewee reported issues maintaining and sustaining their building and equipment, which must be **kept up to date and continuously refreshed**.[20] In their words, '[p]art of problem always has [been], you create a new shiny thing, but maintaining and sustaining [it] long term is a challenge.'[20]

While a core aim of the UKRPIF's design is to support HE research facilities in attracting non-public investment, the above examples demonstrate that some awarded HEPs have not, or have not yet, been able to establish ongoing revenue streams or cost models that could help them sustain their facilities. As demonstrated above, some HEPs struggle to generate sufficient revenue to cover maintenance costs without dedicated funding, self-generated profits or cyclical research grants. Maintenance costs can be especially high for those facilities or equipment requiring specialised technical expertise.[8] As some project leads mentioned,[21] HEPs would benefit from capital investments considering ongoing costs, as all UKRPIF-funded projects have ongoing expenses. However, plans for ongoing running costs form part of the UKRPIF application, and RE ensures such plans are costed and financially sustainable.

The multidisciplinary and co-located nature of UKRPIF-funded projects may present additional financial hurdles for HEPs in meeting maintenance costs. When the UKRPIF-funded building is not owned by a specific department within the HEP but instead utilised by various academic and industrial

[18] PL-R1-INT-02.

[19] PL-R3-INT-13.

[20] PL-R1-INT-03.

[21] PL-R2-INT-04; PL-R2-INT-09.

sub-disciplines internal and external to the university, challenges arise in maintaining a space not exclusively dedicated to any one group.[22] According to one project leader, their building's design was explicitly conceived as an optimal environment for members of other HEPs or commercial partners to collaborate on an ad-hoc basis rather than via permanent residence.[10] Since not all individuals are present at all times, overhead income is not always generated to fund the building.[10]

2.2.3. Environmental sustainability

Some UKRPIF-funded projects at HEPs have been built with longer-term environmental sustainability in mind, facilitating more manageable financial maintenance. For instance, some UKRPIF-funded buildings have minimal practical running costs (i.e. energy), as highlighted by the project lead of an award-winning UKRPIF-funded building nominated for five architectural awards, including the Green Building award, and securing second place in two: 'With the building, if it wasn't for the fume hoods, it would be an almost zero energy building. On a practical basis, the grant ensured that the ongoing maintenance cost of the building was lower than any other campus building.'[18]

Another project lead reported striving for sustainability by using low-carbon technologies, reducing energy emissions, decreasing water consumption and employing sustainable waste management.[23] Similarly, another UKRPIF-funded building was constructed as an 'intelligent building' focused on energy efficiency.[24] Moreover, many supporting statements confirm that UKRPIF-funded facilities at HEPs align with sustainability goals. Upon completion, several buildings have received 'Good' or 'Excellent' BREEAM (Building Research Establishment Environmental Assessment Methodology) ratings, reflecting their adherence to sustainability standards.[25] Others have been built with sustainable materials and sustainably constructed to improve energy efficiency.[26]

[22] PL-R4-INT-05.

[23] PM-R6-QUAL-27.

[24] PL-R1-INT-06.

[25] PM-R1-QUAL-03; PM-R2-QUAL-06; PM-R2-QUAL-13; PM-R3-QUAL-12; PM-R4-QUAL-04; PM-R5-QUAL-01; PM-R5-QUAL-01; PM-R5-QUAL-10; PM-R6-QUAL-19; PM-R6-QUAL-21; PM-R6-QUAL-27.

[26] PM-R2-QUAL-06; PM-R1-QUAL-09; PM-R2-QUAL-07; PM-R5-QUAL-01; PM-R6-QUAL-16; PM-R6-QUAL-17; PM-R6-QUAL-18; PM-R6-QUAL-21; PM-R6-QUAL-22.

3. Capability and capacity for world-class research

This chapter explores the UKRPIF's role in enhancing HEPs' capacity and capabilities to conduct world-class research. By providing funding to improve research facilities, UKRPIF has enabled HEPs to expand their physical spaces, acquire advanced research equipment and significantly increase their staff and students. These enhancements have increased research productivity and facilitated the exploration of new, advanced research areas.

KEY FINDINGS

Expansion of research facilities: HEPs have significantly expanded their physical research spaces, accommodating more advanced equipment and more researchers.

Growth in research staff: The enhanced facilities have supported a substantial percentage increase in the number of new PhD students (79%), postdoctoral (48%) and senior researchers (68%), effectively doubling some HEPs' research capacity.

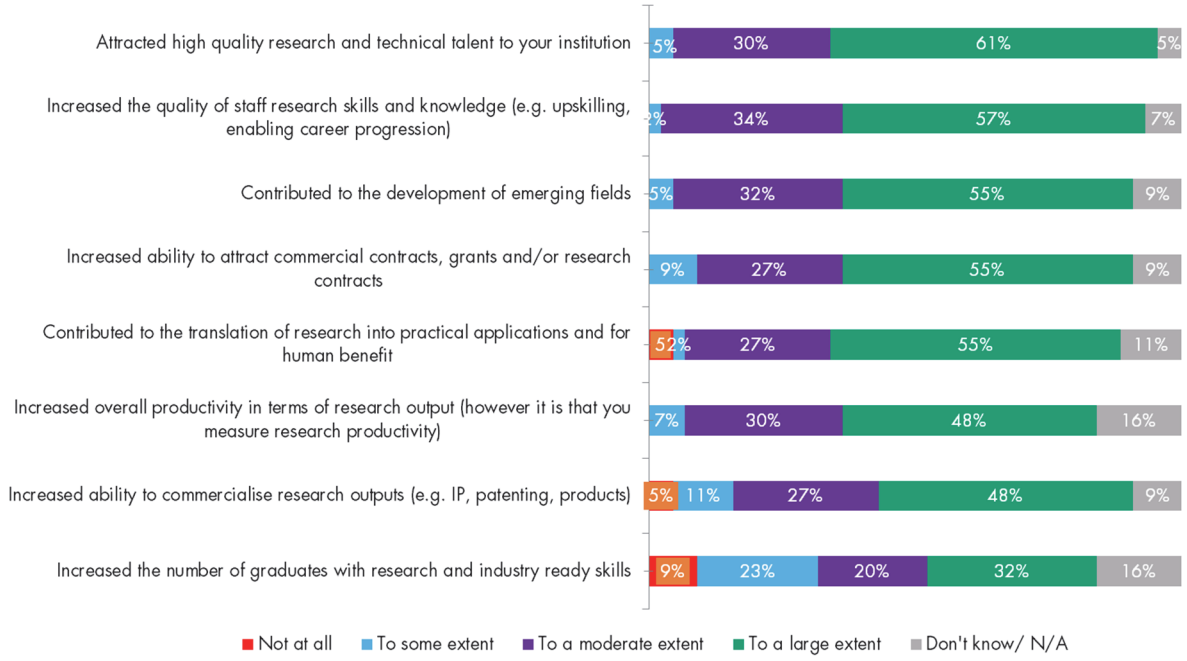
Increase in research productivity: Enhanced facilities and the increased quantity and quality of staff have directly contributed to higher research productivity levels for 84% of HEPS, enabling them to undertake more extensive and varied research projects.

Development of new research areas: Some 92% of awarded projects report that UKRPIF funding has facilitated the development of new and emerging research fields, significantly broadening the institutions' academic and scientific scope.

Subjective improvement in research quality: The availability of state-of-the-art facilities and equipment, recruitment of skilled staff and developed collaborative networks have increased the research quantity and subjective quality, with many HEPs reporting improvements in the calibre of their research outputs.

Expanded physical spaces at awarded HEPs have enabled them to host more equipment and researchers, increasing research productivity. The impacts of investing in high-end research equipment and bespoke, state-of-the-art research facilities are complex and far-reaching, ultimately catalysing numerous capacity and capability-increasing processes in a chain reaction. As Figure 7 shows below, modern research equipment has enabled HEPs to scale up their research and move into more advanced research areas they did not previously have the capacity and capability to enter. Survey data demonstrates that nine in ten (92%) awarded projects report that UKRPIF contributed to developing emerging fields at their institution.

Figure 7: How UKRPIF supports world-class research



Source: RAND analysis of survey data.

The new facilities have allowed HEPs to establish a critical mass of PhD students, postdoctoral researchers, senior researchers, fellows and technical staff.[27] Some awarded HEPs more than doubled their number of scientists,[20] giving them the capacity to conduct an activity volume they could not previously achieve in their disciplinary area.[17] Alongside an increase in research productivity at awarded HEPs, they considered (subjectively) that the quality of their research had also improved. This improvement is partly attributable to access to laboratories and equipment of higher quality than before,[19] and the capacity to undertake multiple programmes, often with the support and prestige of industry partners.

[27] PL-R1-INT-03; PL-R1-INT-08.

Box 2: King's College London (KCL) Advanced Therapies Centre case study

Source: ktsdesign, Adobe Stock

The Advanced Therapies Centre is a UKRPIF (Round 5) project by KCL that transformed capabilities in developing cell and gene therapies. It is operated in partnership with the Guy's & St Thomas' NHS Foundation Trust (GSTT), embedded in NHS space and directly connected to (and contributing to) their leading Clinical Research Facility (which specialises in early-phase advanced therapy trials).[28] The UKRPIF funding helped develop facilities for advanced therapy development, testing and manufacturing, and upgrades to the clinical research capabilities. It creates a complete setting where all activities are within one building.[29] It also usefully demonstrates multiple ways the UKRPIF scheme has helped refurbish existing spaces and upgrade equipment to bring about more collaborations, research opportunities and economic growth.

The KCL facility **expanded and professionalised capabilities** in cell and gene therapy (for patients fighting diseases like cancer and diabetes).[29] For instance, the funding has enabled the expansion of cell sorting and genomics, and there is now a large cell therapy suite facilitating a range of research from upstream mechanisms and gene production to gene therapy research where advanced therapies can be tested for the first time. This has enabled King's secure funding for an MRC/ Biotechnology and Biological Sciences Research Council (BBSRC)/LifeArc Gene Therapy Innovation Hub (part of a national network), supporting technology development and training programmes that will build capacity and fill critical skills gaps in the gene therapy sector.[30] Capacity has now grown to three cell therapy suites. The trust is spending more money on expanding this cell capacity to add two further suites.

The changes in the facility through UKRPIF have led to **new spinouts**. Quell Therapeutics,[31] for example, recently signed an agreement with AstraZeneca to develop, manufacture, and commercialise engineered Treg cell therapies for autoimmune diseases.[32] Leucid Bio is also making significant advancements, having recently gained clinical trial approval for a new CAR-T cell therapy.[33] Through the facility's UKRPIF-funded changes, King's also aims to catalyse their 'capabilities and outputs in the area of Advanced Therapies' by fostering collaborative work, facilitating commercial partnerships and creating a microclimate for innovation.[28]

This has supported the co-location of gene therapy companies such as Orchard Therapeutics. It was also an important foundation in creating the Research England-funded London Advanced Therapies network, which 'brings together the London scientific community working in the field of cell and gene-based therapies' – now expanded into UK Advanced Therapies. The UKRPIF has enabled collaborative working and wider usage of the facilities, bringing together world-leading academics and clinicians to produce high-impact clinically translatable research.[29]

[28] Kings College London (2024a).

[29] PL-RMIX-INT-19; Guy's and St Thomas' (2017).

[30] Kings College London (2024b).

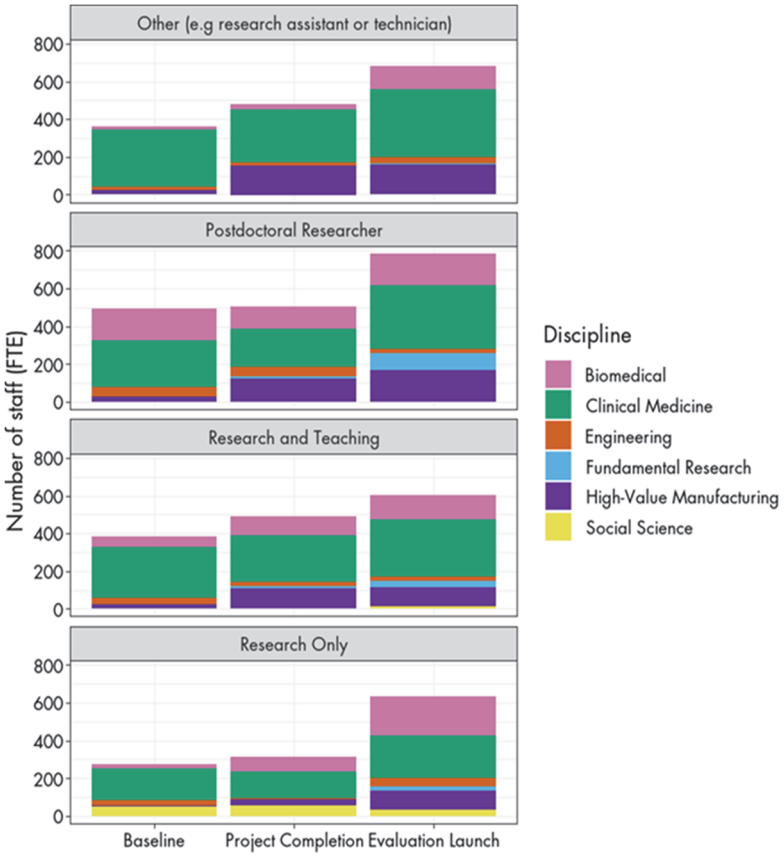
[31] Kings College London (2019).

[32] QuellTX (2023).

[33] Kings College London (2023).

3.1. Attracting and upskilling staff and students

Figure 8: Staff levels over time by type and discipline



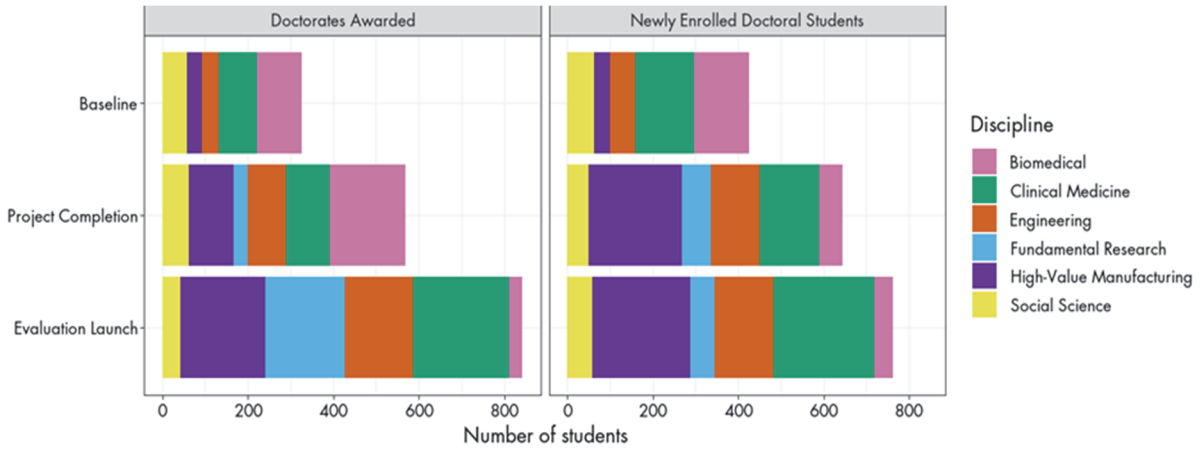
High-end research equipment and bespoke facilities have increased the quantity and quality of researchers by attracting talent, further amplifying research productivity. Survey data demonstrates that nine in ten (91%) awarded HEPs report that UKRPIF funding allowed them to attract high-quality research and technical talent, at least to a moderate extent. As an interviewee explained, their 'shiny new institution' has 'massively helped' recruit high-quality people, which was very difficult in a post-Brexit climate of financial constraint.[19] This is reflected in the staff levels at HEPs who responded to our data request, illustrating a continued increase in staff levels from the facilities' completion to the evaluation launch, as Figure 8 shows. This figure categorises staff numbers by type across various disciplines that received awards. While there has been an increase across all staff categories, growth was particularly pronounced among postdoctoral researchers (a 48% increase) and research-only staff (69%) at the time of the evaluation launch.

This trend suggests a strategic enhancement in research capacity at HEPs, likely due to targeted investments in these roles. The significant rise in postdoctoral and research-only positions indicates a focused effort to boost research outputs and expertise, aligning with the award's objectives. The overall increase in staff levels, controlling for the round the project was funded in and discipline, was statistically significant ($F(7, 265)=9.375$, $p=0.0088$) and most pronounced for the biomedical and clinical medicine disciplines. The funding round did not affect staff levels over time, suggesting projects from all rounds experienced significant increases in staff levels by the evaluation's launch.

The new infrastructure has helped support the upskilling of staff, enabling them to receive training using the UKRPIF-funded equipment and facilities.[34] This is also reflected in the survey data, with 9 in 10 (91%) projects reporting that the UKRPIF helped increase the quality of staff research skills and knowledge due to the upskilling and career progression it enabled. Furthermore, HEPs' new facilities increased staff satisfaction compared to the previous ones. One project lead remarked that the transformation was so significant that staff now preferred working from the new building rather than home, a stark contrast to their old facility.[15] Staff were eager to return to the new facility after the COVID-19 pandemic, in this case, unlike other departments in the university. This emphasises that thoughtful building design and advanced research facilities support a more productive and engaged research environment, increasing the capacity to conduct research and yielding a more positive work atmosphere.

In addition to increasing the number of skilled staff, the facilities have helped increase the number of graduates with research and industry-ready skills, as reported by three of four (75%) awarded projects surveyed. As one interviewee explained, the UKRPIF funding allowed them to improve their research equipment, thus enhancing the experience of their students, who can now acquire crucial knowledge and industry-ready skills for current and future projects.[13] This is reflected in the number of PhD students graduating and enrolling at HEPs that responded to our data request, illustrating a continued increase in the number of PhD students enrolling (79% increase) and graduating (158% increase) across the three data collection periods, as Figure 9 shows below.

Figure 9: Number of PhD students enrolling and graduating over time by discipline



In contrast to the patterns observed in staff numbers, where there were particular increases in biomedical and clinical science disciplines, PhD student numbers increased particularly in high-value manufacturing disciplines, possibly driven by more industry-aligned research agendas, with universities entering into collaborative partnerships with industry to co-develop curricula and research projects to provide students with valuable industry exposure. There was a statistically significant overall increase in PhD students enrolling and graduating, controlling for the project's funding round and discipline ($F(7,134) = 2.986$, $p < 0.001$). The analysis also showed the funding round's effect on this trend ($p=0.018$). Projects that received

[34] PL-R1-INT-08; PL-R2-INT-09.

funding in earlier rounds had more PhD students by the evaluation's launch. This pattern could indicate a 'maturation effect', whereby earlier-funded projects have had more time to establish their programmes, recruit students and see them through to graduation. It may also reflect the cumulative benefits of sustained funding, allowing more developed resources and support systems that contribute to higher graduation rates. The significant growth in PhD numbers could also be influenced by several other factors, including increased funding availability, enhanced programme visibility and potentially evolving academic and industry demands that necessitate higher qualifications. The implication is that sustained and early funding boosts a programme's immediate capacity and may have long-term benefits to output and productivity. It is important to note that this analysis represents the institutions that returned the requested data and may not reflect the overall UKRPIF portfolio.

3.2. Impacts on quality of research

Strategic UKRPIF investment has enabled HEPs to engage in more complex and ambitious research projects,[35] creating an environment conducive to enhanced research quality. Examples of improved quality of research include one HEP that was ranked first for high-quality research, for which UKRPIF funding was vital, and another where UKRPIF funding helped broaden its research area, giving it prominence in a field in a way it previously was not known for.[13] Establishing over 50 cutting-edge facilities has helped raise the UK's capability for conducting research, with 78% of survey respondents reporting that UKRPIF increased overall research productivity to a 'moderate extent' at least.

Importantly, the final 2027 evaluation phase will employ more direct and objective measures to assess research quality, as evidence collection in this area is ongoing. This assessment will collect case studies and conduct bibliometric analysis focused on citation-impact indicators based on research outputs collected over the monitoring period. Furthermore, we will endeavour to account for attribution, acknowledging that some departments had a history of producing high-quality research before receiving UKRPIF awards. To this end, we will explore variations in research impact among HEPs with different baseline research intensity levels. This nuanced approach will ensure a more accurate assessment of UKRPIF funding's influence on research quality across various institutions.

[35] PL-R2-INT-09; PL-R1-INT-08; PL-R6-INT-10; PM-R5-QUAL-01.

Evidence strength test: Does UKRPIF improve research quality?

Claim	Strength of evidence supporting the claim
Improved research facilities ***lead to*** improved research quality ***because*** world-class research is more likely in state-of-the-art facilities, increasing capability and stemming from the quality requirements set out for projects by UKRPIF.	Mixed/weak support – longer-term evidence needed

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support to mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

We examined whether and how much research quality improved at awarded HEPs, including the number of outputs produced and degrees awarded attributable to the UKRPIF award and qualitative data on staff and student skills. These are pivotal in increasing HEPs' capability and capacity to conduct world-class research.

Regarding capability and capacity increases, our quantitative survey data and data requests from HEPs demonstrate increased staff levels since awarded facilities were completed. This indicates that the award contributed to the HEPs' ability to attract high-quality research and technical talent (see more in Section 3.1). Qualitative data from interviews with HEPs also suggests improvements in research capacity and capability since receiving awards. However, minimal direct evidence connects the causal chain between enhanced research facilities and improved research quality, and what little evidence *is* available is primarily self-reported. While there is robust evidence for a causal relationship between UKRPIF funding and improvements in research infrastructure and between improved research facilities and enhanced research capacity and capability, attributing long-term gains in research quality to UKRPIF remains challenging. Despite the absence of a counterfactual, more evidence is needed to demonstrate if and how research quality has improved in awarded HEPs and how much is attributable to UKRPIF.

4. Partnerships, co-location and knowledge exchange

This chapter explores the UKRPIF's role in enhancing partnerships, facilitating collaborative research and supporting the co-location of staff. By funding state-of-the-art research facilities and expanding research capacity, UKRPIF has enabled considerable further collaboration with industry and academic partners, facilitating interdisciplinary research and emerging fields. The co-location of academic researchers and industry professionals within these facilities has enabled real-time collaboration, enhanced communication, accelerated research translation into practical applications and promoted knowledge exchange.

KEY FINDINGS

Incentivising collaboration: The UKRPIF's 2:1 matched funding model actively encourages academia and industry to engage, yielding mutually beneficial outcomes: 91% of institutions reported stronger ties with the private sector due to UKRPIF.

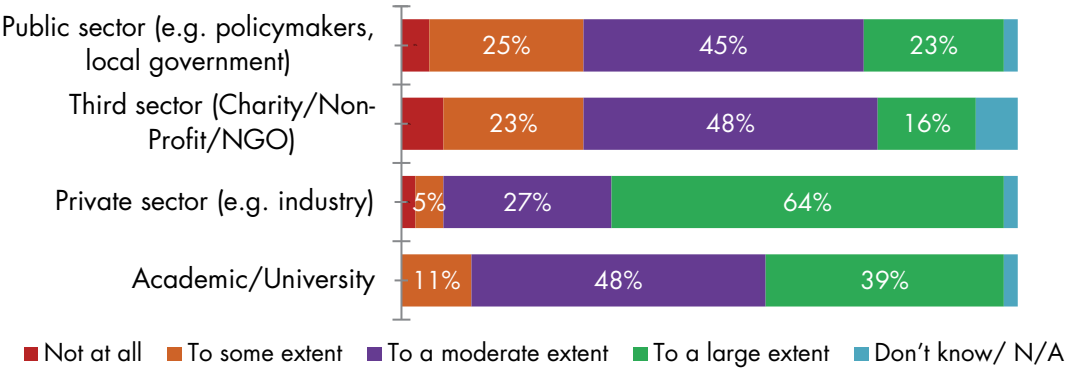
Building new relationships: UKRPIF has been instrumental in fostering new strategic partnerships. According to survey data, 86% of institutions reported enhanced partnerships with other universities, and 64% and 68% noted improvements in relationships with the third and public sectors, respectively. There was a 216% increase in private sector partnerships between facilities' completion and the evaluation launch year.

Boosting co-location: UKRPIF has enhanced staff co-location by supporting the creation of shared research facilities, thus creating a collaborative environment. This physical proximity enables spontaneous interactions, shared resources and a stronger sense of community. Private-sector co-location was most pronounced after facility completion, while academic co-location increased continuously.

Promoting knowledge exchange: UKRPIF recipients have enhanced knowledge exchange by hosting events, working with new collaborators and sharing equipment. These state-of-the-art facilities serve as hubs for diverse programmes and activities, bringing together academics, industry partners and the public to exchange and share knowledge.

UKRPIF's funding model actively encourages new partnerships and strengthens its recipients' existing partnerships.[9] The 2:1 matched-funding model incentivises academia and industry partners to actively engage in collaborative research efforts, ultimately leading to mutually beneficial outcomes that help meet stakeholder and UKRPIF-recipient needs. Project leads found the requirements around double-match funding reasonable and well-aligned with internal objectives and philosophy around stimulating partnerships with industry. Exemplifying partnerships generated via the UKRPIF, one project lead noted the establishment of partnerships with 25–30 academic institutions globally.[18] For one HEP, the strategic partnerships the UKRPIF facilitated enabled culturally significant impacts, jointly launching the first Masters programme in the largest Saudi Arabian women-only university, which holds considerable socio-cultural significance there.[18]

Figure 10: The extent to which UKRPIF supports partnerships between HEPs and different sectors



Source: RAND analysis of survey data.

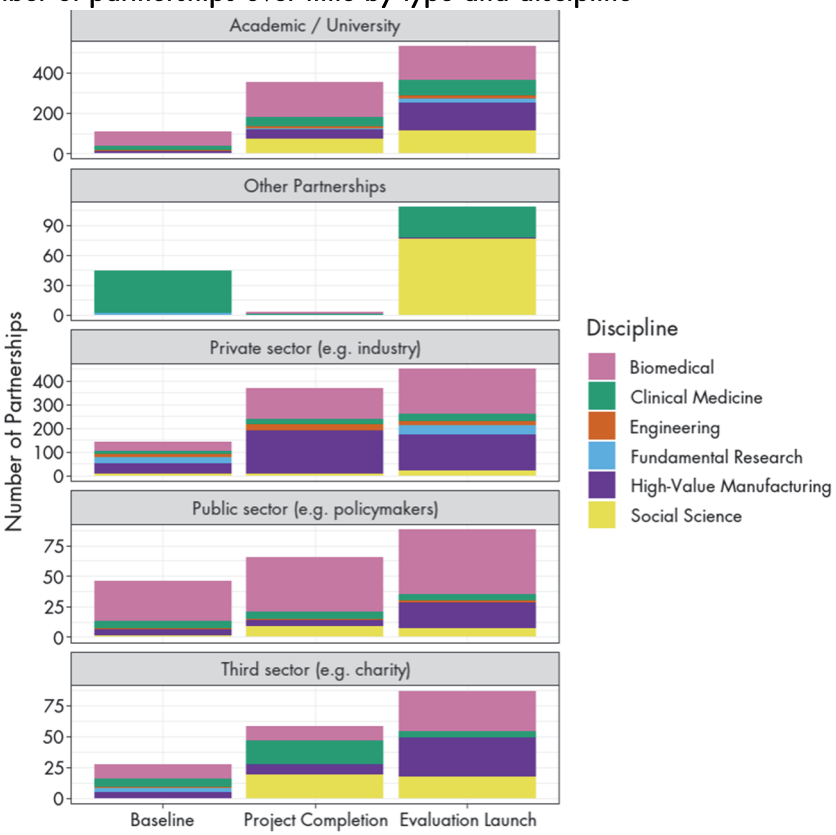
Figure 11 shows that 86% of surveyed institutions reported enhanced partnerships with academia[36] or universities, while 91% noted stronger ties with the private sector.[37] Additionally, 64% and 68% of institutions saw improvements in their relationships with the third[38] and public sectors, respectively. Encouragingly, projects see these new partnerships as only likely to grow; new branding is created as their reputation builds, enhancing awareness and visibility.[10] These findings are reflected in the number of partnerships at HEPs who responded to our data request, illustrating an increase in partnerships across a range of sectors over the three data collection points[37] (Figure 11). A minority only sustained existing partnerships between the award and the facility's completion since they were focused on delivering the facility.[39] However, most of their partnerships were strengthened by UKRPIF as their project continued,[40] alongside a cumulative increase in the scale of their strategic partnerships.[41] The UKRPIF has evidently successfully reinforced the relationships between research institutions and various sectors, particularly with

[36] PM-R5-QUAL-01.
[37] PM-R6-QUAL-16.
[38] PM-R1-QUAL-09.
[39] PM-R1-QUAL-03; PM-R6-QUAL-20.
[40] PM-R6-QUAL-16.
[41] PM-R6-QUAL-19.

the private and third sectors, more than doubling between baseline and evaluation launch. This aligns with a core UKRPIF objective: strengthening ties to industry. In addition, the marked increase in academic partnerships highlights the fund's role in supporting collaboration within the academic community, further enhancing these institutions' research capabilities and outputs. The data shows that different disciplines typically form distinct partnership types according to individual needs. For example, biomedical sciences demonstrate strong relationships across multiple sectors. This discipline stands out in its strong connections with the public sector, likely driven by the direct implications of biomedical research for public health policies and services. In contrast, high-value manufacturing disciplines have created strong partnerships with the private sector. This is likely due to the direct applicability of manufacturing research in industrial processes and product development, making partnerships with industry partners beneficial and often essential for practical implementation and innovation.

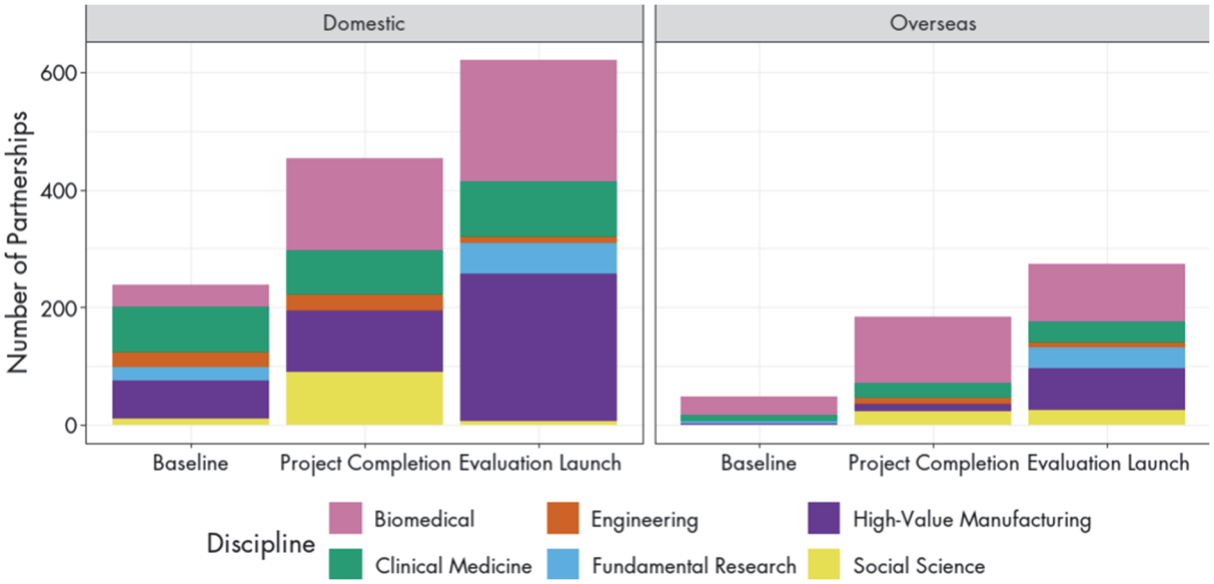
On the other hand, social sciences have a unique network of partnerships, primarily with philanthropic individuals and business leaders. The observed increase in partnerships over time was found to be statistically significant ($F(10, 339) = 10.59$, $p < 0.001$) after accounting for the funding round and the discipline involved. This analysis revealed that all disciplines, except for the social sciences, demonstrated a significant increase in partnerships, but the funding round had no effect. The relatively lower occurrence of 'other partnerships' in the dataset may have obscured any potential effects within the social sciences. We employed a model incorporating an interaction effect between discipline and type of partnership to investigate this further. The model indicated a statistically significant increase in 'other partnerships' within the social sciences ($p = 0.012$). However, this finding is based on only two social science projects in the dataset, necessitating a cautious interpretation of these results.

Figure 11: Number of partnerships over time by type and discipline



UKRPIF-funded projects' collaborative nature has contributed to enhancing global partnerships. The international partnerships supported by UKRPIF have created global research networks and collaborations, with 80% of survey respondents stating that UKRPIF funding has also allowed recipients to establish, strengthen and leverage strategic partnerships enhancing knowledge exchange internationally. One university mentioned that its strategic partnerships were extended nationally and internationally at the point of award, developing European collaborations with research institutions and industrial partners through its networks and internationally collaborating with multiple other HEPs.[42] Another HEP developed national and international academic partnerships at baseline as a strategy for being an international centre of excellence in its area, both before and since the UKRPIF award.[41] These survey findings are reflected in the number of overseas partnerships at HEPs that responded to our data request, illustrating increased overseas and domestic partnerships over the three data collection points (Figure 12).

Figure 12: Number and location of partnerships over time by discipline



Although the data is incomplete (due to some respondents not classifying their partnerships as domestic or overseas), the number of overseas partnerships has noticeably grown over time. This growth is particularly evident in the high-value manufacturing sector, which saw a significant increase in such partnerships at the evaluation's launch – when such partnerships were almost non-existent. However, this analysis represents the institutions that returned the requested data and may not represent the overall UKRPIF portfolio.

Interviewees suggested that the UKRPIF successfully encourages new strategic partnerships and offers considerable benefits for strengthening pre-existing partnerships and collaborations.[17] For example:

- One project lead explained that, although they had been collaborating with a partner for a considerable period (e.g. sharing staff), the UKRPIF funding enabled them to expand this strategic partnership, facilitating a step-change in the relationship.[17] This expansion was enabled because a)

[42] PM-R5-QUAL-10.

their partner received local government funding to build a new building on the one hand, while b) the HEP used its UKRPIF award to provide equipment to outfit the building, substantially expanding the industrial work volume.[17]

- Although another project had collaborated with an automotive company for a few decades, UKRPIF helped this collaboration continue and strengthen, as the HEP gave the automotive company access to the technological advancements they were developing.[16]

Evidence strength test: Does UKRPIF create facilities for increased collaboration?

Claim	Strength of evidence supporting the claim
The UKRPIF ***leads to*** facilities that increase collaboration ***because*** it aids partnerships between HEPs and other research organisations, building on collective research strengths to build a joint venture for working within the same research infrastructure.	**Mixed/weak support – longer-term evidence needed**

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support, mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

We examined whether and how strategic partnerships have been developed between UKRPIF-funded HEPs and other private, public or third-sector organisations. Significant evidence supports the causal relationship between HEPs receiving UKRPIF funding and developing strategic partnerships, including qualitative and quantitative data from various sources. Several interviewed project leads explicitly stated that their HEPs formed strategic partnerships with other organisations after receiving a UKRPIF award. Most survey respondents also indicated that UKRPIF supports partnerships across the public, third, private and academic sectors. The survey also shows evidence of cross-discipline partnerships. Therefore, the evidence strongly supports the programme theory that the UKRPIF played a significant role in the observed outcomes.

However, our evidence also shows that while strategic partnerships developed, the extent is inconsistent across all awarded HEPs, partly dependent on the disciplinary focus (e.g. social-science-focused HEPs developed fewer strategic partnerships than science, technology, engineering and mathematics-focused [STEM-focused] HEPs).

Nevertheless, our evidence is strong overall and triangulated across data sources, including survey, interview and project-monitoring data. These all indicate the development of strategic partnerships with different organisation types due to UKRPIF funding.

4.1.1. How UKRPIF supports co-location

One way such collaborations are fostered is by the UKRPIF facilitating new buildings for HEPs, helping co-location and shared working modalities.[43] The UKRPIF contributed to co-locating more researchers and businesses within the same building, shifting the working culture towards a more collaborative and interactive working approach. This physical co-location is crucial in facilitating collaboration, enabling more spontaneous interactions, shared resource use and a stronger sense of

[43] PM-R2-QUAL-07; PM-R2-QUAL-13; PM-R5-QUAL-10; PM-R6-QUAL-16; PM-R6-QUAL-21.

community among collaborators. Furthermore, the shift in work culture may catalyse concomitant changes in the R&I strategy at awarded HEPs, enabling even more co-location and collaborative work.

Awarded HEPs' enhanced research infrastructures have had community-building impacts by helping to develop strong research communities. As one HEP project lead explained, 'You generate a community by generating a building specifically designed for cross-fertilisation of scientific ideas.'[10]

The design of open-plan workspaces has reduced the siloing of people in different places, fostering a more collaborative environment, sense of belonging and shared purpose among researchers.[22] Several project leads reported that UKRPIF funding has been instrumental in achieving their current partnership level, co-locating industry actors and researchers from different academic sub-fields in the same building and facilitating idea exchange[22]: 'We were able to design wide open spaces so that you had all the facilities in one place, which meant you had our tenant organisations, our commercial partners, using that space in the same location as all of our academics, students altogether; you've got that cross-fertilisation of ideas in one large facility, and there's no siloing of people in different places.'[22]

Since remote working has become prevalent due to the COVID-19 pandemic, the importance of a shared physical space where people are motivated to work and collaborate cannot be overstated. While remote work has many benefits and supports staff work-life balance, it cannot often replicate the benefits of in-person collaborations in a shared physical space. The spontaneous exchanges of ideas, sense of community and mutual understanding fostered by a shared physical space are crucial for effective collaboration and innovation.[44] We found many examples of co-location benefitting project collaborations in various contexts:

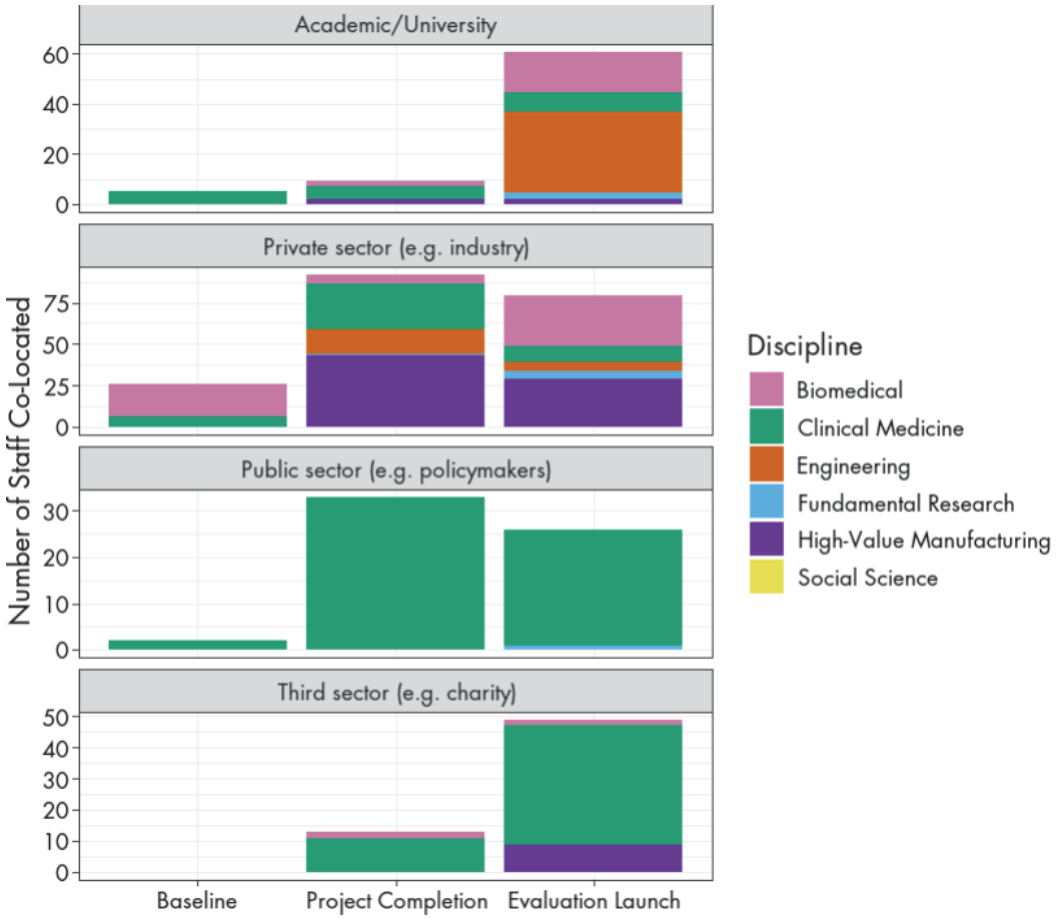
- One interviewee explained that their shared building facilitated partnership and collaboration because it helped create a dynamic environment where people have a shared space to meet each other regularly.[14]
- Another interviewee noted that their UKRPIF funding enabled them to design open spaces that provided all facilities in one place such that tenant organisations and their commercial partners could share the same space as academics and students.[22]
- Another project noted new industry engagement because of their shared open-access lab space funded through UKRPIF.[6]
- Another explained that their new building has a 'knock-on effect', supporting collaborations by attracting people in.[18] They mentioned that it provides excellent (and often unique) laboratory space facilities alongside expanded office space, such that people want to be there.
- Similarly, the UKRPIF enabled a new science centre (with offices, research labs and core infrastructure) for another HEP, an alliance between the university and an industry partner.[13]
- One interviewee noted that new partners are attracted by visiting each other's facilities.[9] Another has spaces that can be used by different people at different times, meaning that industry partners can co-locate staff and 'become part of the fabric of the building'.[7]

[44]Aczel et al. (2021).

- Finally, one interviewee suggested that their UKRPIF funding stimulated a strategic partnership between their HEP and the NHS as they can physically house staff in the same place.[15]

Based on data returns provided by HEPs, several institutions reported challenges in accurately quantifying co-location headcounts due to the complexity of their partnership networks. These networks often involve transient co-location activities, such as clinical academics utilising hospital laboratory spaces. Despite these challenges, the data available from institutions that could provide specific figures show various patterns in the co-location of staff at different time points, as illustrated in Figure 13, with the number of co-located staff increasing from 33 to 215. The data indicates that private sector co-location was most pronounced upon the facilities' completion. The immediate co-location of the private sector may indicate a proactive approach to capitalise on new facilities, suggesting that infrastructure development was a key driver of industry collaboration.

Figure 13: Co-location headcounts



In contrast, academic co-location showed a significant increase by the time of the evaluation launch. This delay suggests that establishing academic co-location arrangements took more time to materialise, possibly due to this being aligned with the award of research grants and evolving research focus in the new facilities. Furthermore, co-location involving the public and third sectors was most observed in clinical medicine. This prevalence aligns with the nature of the discipline, which often requires close collaboration between academic researchers, healthcare providers and charitable organisations to conduct clinically relevant

research and trials effectively. However, this analysis represents the institutions that returned the requested data and may not represent the overall UKRPIF portfolio.

Box 3: Enablers of partnership working

The UKRPIF award allowed sufficient flexibility and adaptability in realising facilities, directly influencing the awarded HEPs' R&I strategy to be more collaborative. Some HEPs' research infrastructure strategy evolved from the application stage to the facilities' completion and operationalisation. Once UKRPIF-funded facilities became operational, some HEPs reported their further influence on future recruitment and scientific development strategies:

'Our strategy as it was when we put in the original application was very different by the time we came to the end of the project in terms of completing the building (e.g. changes in building design, but also scientific strategy, recruitment, etc.). It was pre-pandemic when we put the initial plans through, so there's been many changes since we finished the building.'[10]

The UKRPIF shifted the working culture towards a more collaborative and interactive approach, influencing the facilities' design, running and future R&I strategy to embed joint work further. This is relevant for the co-location benefits of awarded HEPs that house researchers and businesses under the same building and those collaborating with UKRPIF-awarded HEPs to access equipment.[24] The purpose-built buildings enable more frequent, closer interactions that shift the awarded HEPs' and their collaborators' preferred working culture, influencing their respective R&I strategies to embed joint working.[45]

'The new building was deliberately designed to be somewhere where people could come in and network, where another university or commercial partners from elsewhere could come and collaborate. If you have an institute where everyone is in it 100%, then you've got overhead generation; you can fund that building. If you charge people to come to your building, they won't come (a barrier to collective working), so working out the means by which to generate money to maintain space has unique challenges; collaborative space is a different way of running the building.'[10]

In summary, UKRPIF funding has helped strengthen and accelerate collaborations for its recipients. The UKRPIF has encouraged HEPs and their partners to collaborate more effectively and efficiently by providing financial support and incentives through fund design. These increased and strengthened collaborations can be attributed to several factors:

- First, UKRPIF funding enables HEPs and their partners to invest in shared resources, infrastructure and research initiatives. These lower the barriers for institutions and their partners to collaborate and might have been challenging to achieve independently.
- Furthermore, the UKRPIF funding model's 2:1 matched-funding requirement encourages academia and industry partners to actively engage in collaborative research efforts. This ensures all

[45] OTH-R5-INT-03; PL-R5-INT-05; PL-R4-INT-05.

parties are vested in the partnership's success, leading to a more committed and productive collaboration.

- The UKRPIF also creates an environment conducive to collaboration by supporting the development of state-of-the-art facilities and infrastructure. These shared spaces enable co-location and shared working modalities, fostering a sense of community and the exchange of ideas and expertise among partners.
- Finally, the prestige and recognition associated with receiving UKRPIF funding can also help accelerate partnership formation. Receiving UKRPIF funding signals a research initiative's quality and potential, making such projects more attractive for potential partners to collaborate and invest in.

4.1.2. Knowledge exchange between HEPs and the wider world

UKRPIF projects have contributed to knowledge exchange in several ways, including hosting events and conferences, attracting new collaborators through joint interests, sharing equipment and creating a sense of community. These efforts help to promote knowledge exchange between the HEPs and the broader community, including industry partners, other national and international HEPs and the general public. UKRPIF-funded facilities often act as interfaces for various programmes hosted by the HEP or its partners. These programmes encompass the building's long-term and opportunistic use for events and conferences that bring together academics and other research user groups and engage interested industry actors and the general public.[46] This approach is vital for promoting knowledge exchange between the HEP and the wider community.

The state-of-the-art facilities and equipment attract researchers and industry actors to visit UKRPIF-funded facilities, often to build future partnerships. The UKRPIF funding has opened doors to collaborations with industry partners or other national or international HEPs that may not otherwise have happened.[47] Some HEPs have primarily formed new working relationships with industry actors,[17] while others predominantly with other HEPs.[15] Such collaborations are diverse in nature, including sharing equipment, facilitating collaboration between other HEPs and providing a platform for other HEPs to link up.[48] One example is a project that houses biomaterials related to a particular cancer type that provided tissue samples to support research at 61 HEPs nationally and internationally.[15] Therefore, alongside enhancing research excellence in the HEPs directly awarded, the UKRPIF funding also supports considerable research at other universities and the creation of large partnerships that have benefited from this funding.

UKRPIF-funded facilities have a community-shaping impact, often becoming a physical focal space where researchers and the general public can interact. For instance, one project lead described having a thriving postdoctoral community that organises various on-site seminar series and socials, helping to build

[46] OTH-R2-INT-01; OTH-R2-INT-02; PL-RMIX-INT-19; PL-R1-INT-08.

[47] PL-R5-INT-15; OTH-R2-INT-01; PL-R1-INT-01; PL-R1-INT-02; PL-R1-INT-03; PL-R3-INT-13; PL-R5-INT-14.

[48] PL-R3-INT-13; PL-R4-INT-05; PL-R5-INT-14; PL-R2-INT-12; PL-R5-INT-15.

a sense of community among researchers within and around the facilities.[19] The same project lead mentioned that the building has a café just outside the security entrance, providing a physical space where researchers and the general public can co-mingle.[19]

5. Leveraged research income, investment and socio-economic impacts

This chapter explores the UKRPIF's role in supporting HEPs to leverage further research income and investments and generate economic impacts. It focuses on how investments in state-of-the-art facilities have increased income and direct industry investment, attracting various additional investment sources. By examining these investments' outcomes, the chapter assesses their effectiveness in catalysing economic growth and supporting these facilities' long-term financial sustainability. This chapter quantifies financial benefits and explores the broader economic implications, such as stimulating commercial outputs, creating new revenue streams and contributing to government strategies and priorities.

KEY FINDINGS

Direct increase in research income: UKRPIF has significantly enhanced the research income of HEPs. Nine in ten (91%) projects reported increased ability to attract commercial contracts, grants, and further research funding. UK industry research income doubled over the evaluation period to £68m, and overseas research income increased almost five-fold to £139m.

Increased and diverse investment sources: UKRPIF-supported projects have seen a marked increase in industry investment. This trend spans various disciplines, with significant growth in sectors like manufacturing and biomedical sciences, as well as a range of investment sources, including government grants, philanthropic contributions and further partner investments.

Economic growth and commercial outputs: The enhanced facilities have enabled HEPs to commercialise research outputs more effectively, reporting an almost ten-fold increase in research outputs such as patents, leading to the creation of spinouts and start-ups and contributing to local and regional economic growth.

Sustained investment beyond initial funding: The initial investments by UKRPIF have led to ongoing industry engagement and further investments, highlighting the fund's role in establishing long-term economic benefits and partnerships.

Contributing to Government strategies and priorities: The UKRPIF has enabled HEPs to contribute to government strategies and national priorities, with 51% of HEPs reporting this had occurred. HEPs have influenced key areas such as the Rail Technical Strategy, Life Sciences Industrial Strategy and net zero goals.

5.1. Research income generated

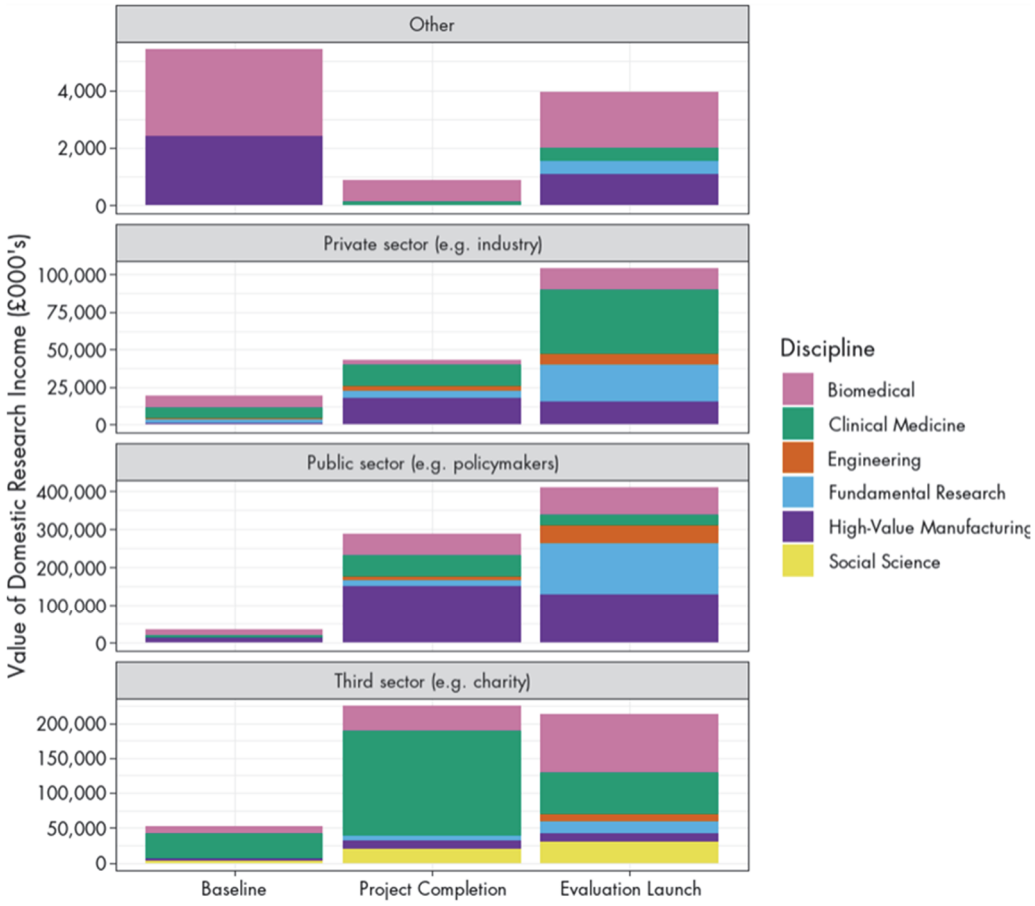
By enhancing the capabilities and reputation of HEPs, the UKRPIF has increased the research income generated, further amplifying HEPs' ability to undertake more ambitious and high-quality research.[49]

Across all funding contexts, nine in ten (91%) surveyed projects reported an increased ability to attract commercial contracts, grants and further research contracts since their UKRPIF award. For example, one institution leveraged its initial UKRPIF award to secure a new research hub[9] – a multi-year programme involving all original partners – alongside a robust portfolio of research grants with other universities and additional funding-council support for upgrades and maintenance. The project lead stated that this would not have been possible without the initial UKRPIF investment. Another institution acquired a further multi-million-pound award, which they attributed to the initial UKRPIF investment, which academics and spinouts can potentially extend to enable specific products.[8]

As shown below in Figure 14, domestic research income experienced substantial growth from the point of award to the evaluation launch. The observed increase in research income was statistically significant ($F(7, 271) = 2.436$, $p < 0.001$), controlling for the funding round and discipline, neither of which were significant contributors. By the time facilities were completed, HEPs had already established robust research income streams, indicating possible pre-planning and capitalisation on new capabilities provided by the updated facilities. In clinical medicine, significant funding from the third sector was secured by the point of facility completion. This success could be partially attributed to the fact that many clinical medicine facilities were refurbishments equipped with new, advanced equipment rather than new constructions, allowing them to transition rapidly to active research phases. Being able to commence research activities quickly likely made these facilities particularly attractive to third-sector funders, often keen to support projects that can swiftly move to implementation and generate a timely impact.

[49] PM-R2-QUAL-13; PM-R1-QUAL-03; PM-R1-QUAL-03; PM-R1-QUAL-03; PM-R4-QUAL-05; PM-R5-QUAL-08; PM-R6-QUAL-11.

Figure 14: Value of domestic research income by sector and discipline



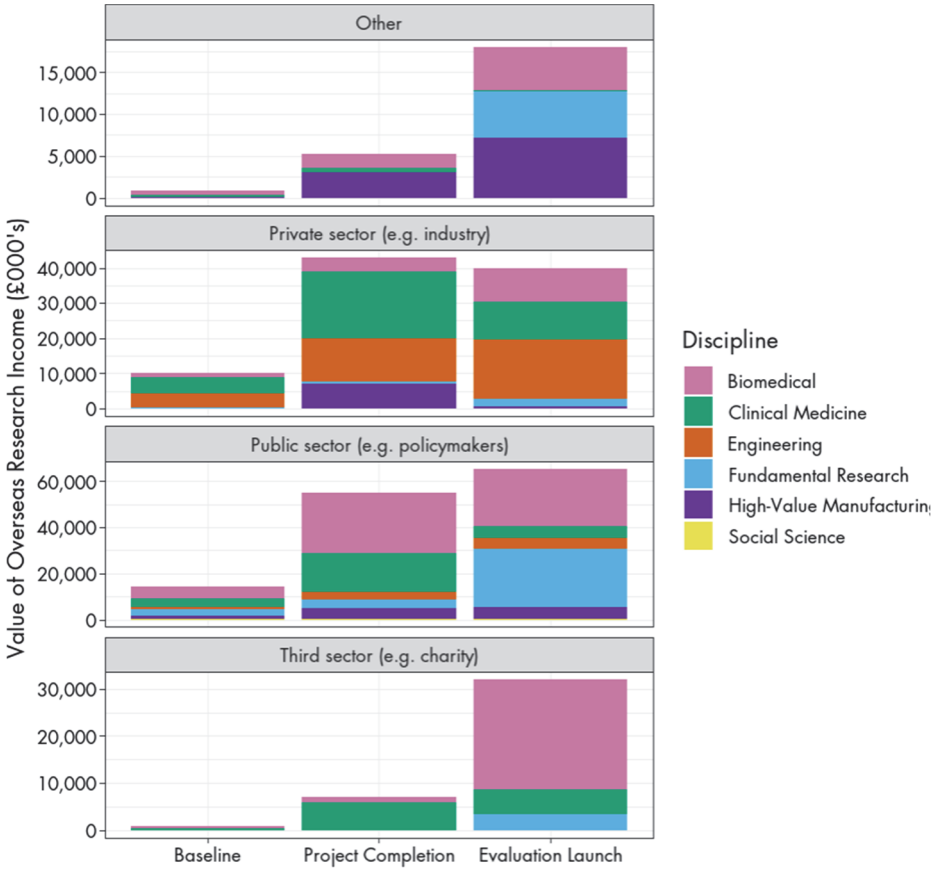
High-value manufacturing primarily attracted public sector funding, establishing these streams early on, likely due to its alignment with national priorities such as enhancing domestic manufacturing capabilities and advancing critical technological innovations. Meanwhile, fundamental research noted a significant rise in public sector income by the evaluation launch. This reflects its requirement of initial, smaller foundational funding for early-stage, exploratory research before scaling up activities. Conversely, social sciences predominantly generated income from the third sector, influenced by operational models like those of business schools, which often sustain financially through investments and philanthropy. Other sources of research income, such as funding brought in by new staff, were highest at baseline, declined upon the facility's completion and then grew again at the evaluation launch. This trend suggests strong recruitment of talented researchers when the facility was approved, with a resurgence in attracting staff with existing funding after the facility became operational. The initial high funding levels likely reflect an influx of researchers motivated by the facility's potential. The decline upon completion may indicate a transitional phase focusing on operationalisation. The subsequent growth at the evaluation launch suggests renewed success in attracting experienced researchers with existing grants, highlighting the importance of continuous strategic recruitment for sustained research income.

UKRPIF funding's ability to enhance HEPs' capacity to attract additional academic income is evident via several mechanisms. By supporting the acquisition of advanced equipment and the development of state-

of-the-art facilities, UKRPIF enables HEPs to undertake more complex and ambitious research projects that may previously have been unfeasible. Additionally, the UKRPIF has allowed HEPs to scale up their research activities, making them more attractive for larger grants and funding opportunities. It also fosters the development of collaborations with an increased likelihood of securing funding due to the broader pool of knowledge and expertise, both in strategic partnerships formed and in attracting talent that brings existing grants or wins new ones, supporting the delivery of high-quality research outputs.

We suggest that the slight decline in *some* funding streams for *some* disciplines by the evaluation launch may be due to factors such as research funding's cyclical nature, shifts in research priorities, internal resource reallocation, saturation and dependency on outcomes. These declines often reflect normal fluctuations in the research funding landscape, where proactive planning, alignment with emerging priorities and diversification of funding sources are crucial.

Figure 15: Value of overseas research income by sector and discipline



In addition to attracting domestic research income, the UKRPIF was also instrumental in attracting overseas research income. While the overall value of overseas research income was lower than domestic research income, it showed a general upward trend across the three time points, mirroring the increase observed in domestic research income. Public sector research income grew continuously, with biomedical science and fundamental research experiencing the most notable increases. This growth suggests a strong alignment of these disciplines with global research priorities and international funding agendas.

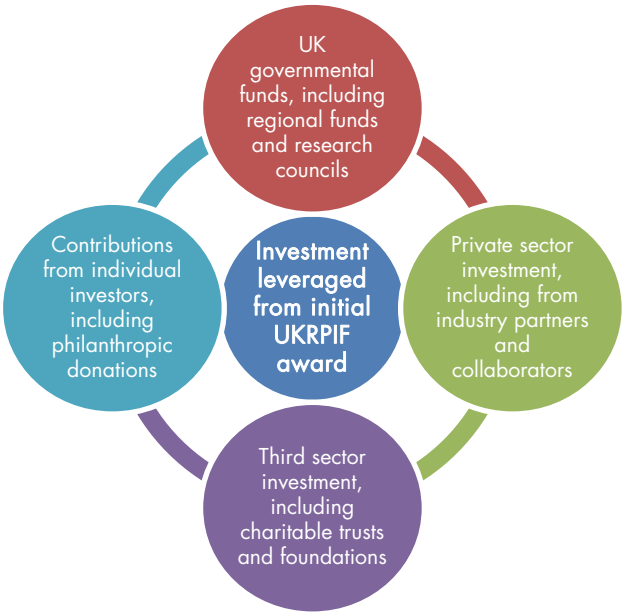
In contrast, private-sector research income was primarily directed towards the engineering and clinical medicine disciplines. However, growth in this area seemed to plateau by the evaluation launch, contrasting

with domestic trends where private sector funding might continue growing due to stronger industry ties or strategic priorities. Third-sector funding also emerged as a significant source of research income, particularly for biomedical sciences, with healthcare research often aligning with the goals of charitable organisations. It is important to note that this analysis represents the institutions that returned the requested data and may not represent the overall UKRPIF portfolio.

5.2. Investment leveraged as a result of UKRPIF

UKRPIF-funded facilities have attracted further investment, including government grants, philanthropic donations, and partner investments beyond the original co-investment. Several institutions have shared compelling outcomes after receiving UKRPIF awards, highlighting the fund's capacity to attract significant additional investments and enable continued growth in research capabilities. One institution noted the development of a 'brand' that now draws millions of pounds in philanthropic funding annually,[14] attributed to the visibility and credibility gained through UKRPIF funding. Furthermore, the UKRPIF funding's impact was illustrated by an institution utilising the initial funds to significantly enhance its infrastructure, creating a 'domino effect' that attracted subsequent partner contributions and philanthropic funding. This early funding commitment triggered interest from other parties, amplifying the institution's financial and research capabilities.[10]

Figure 16: Sources of investment leveraged by UKRPIF recipients

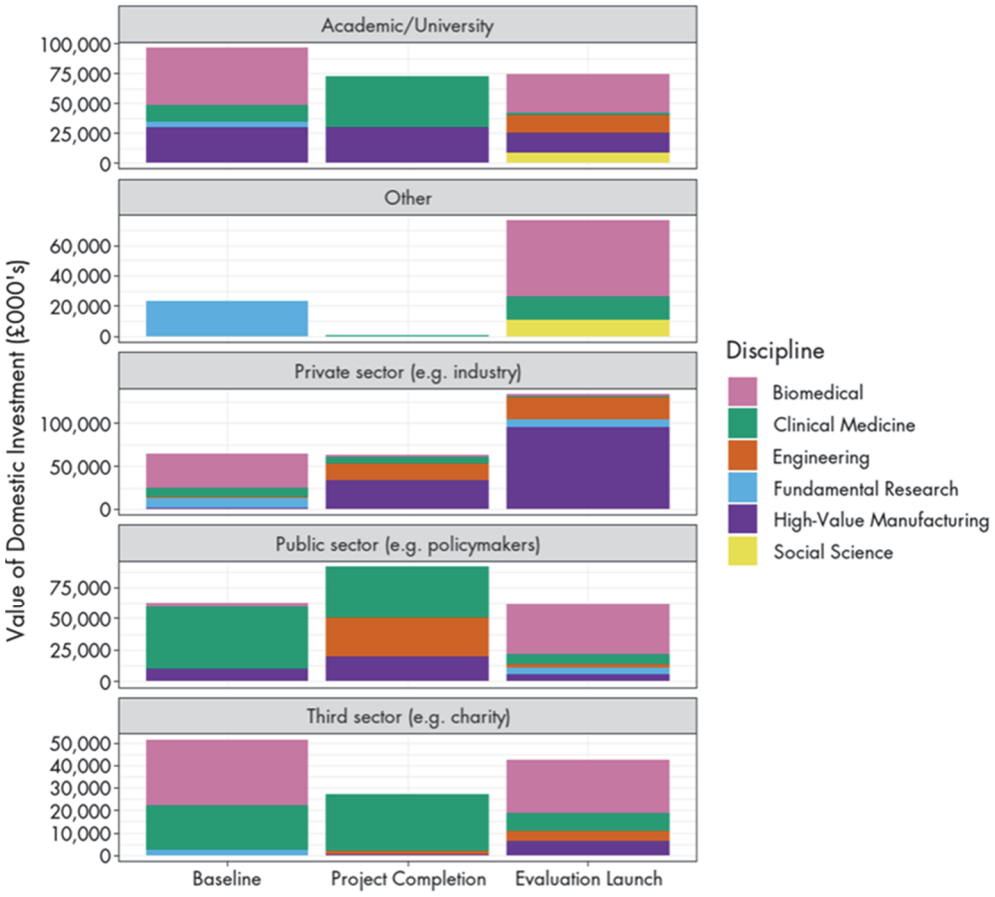


As shown in the figure below, projects secured additional funding from various sources from the point of award, increasing the funding amount past the point of facility completion, primarily in the private sector.[50] The diverse range of funding sources the projects secured emphasises the broad appeal of UKRPIF-supported initiatives. This diversity reflects the projects' multidisciplinarity and ability to resonate with various sectors, ranging from government to industry and charitable organisations. This ability to attract a

[50] PM-R1-QUAL-09; PM-R2-QUAL-07; PM-R6-QUAL-16; PM-R5-QUAL-01; PM-R6-QUAL-17.

wide array of investments enhances these projects' resilience and sustainability, enabling them to navigate potential fluctuations in individual funding streams.

Figure 17: Value of domestic investment by sector and discipline



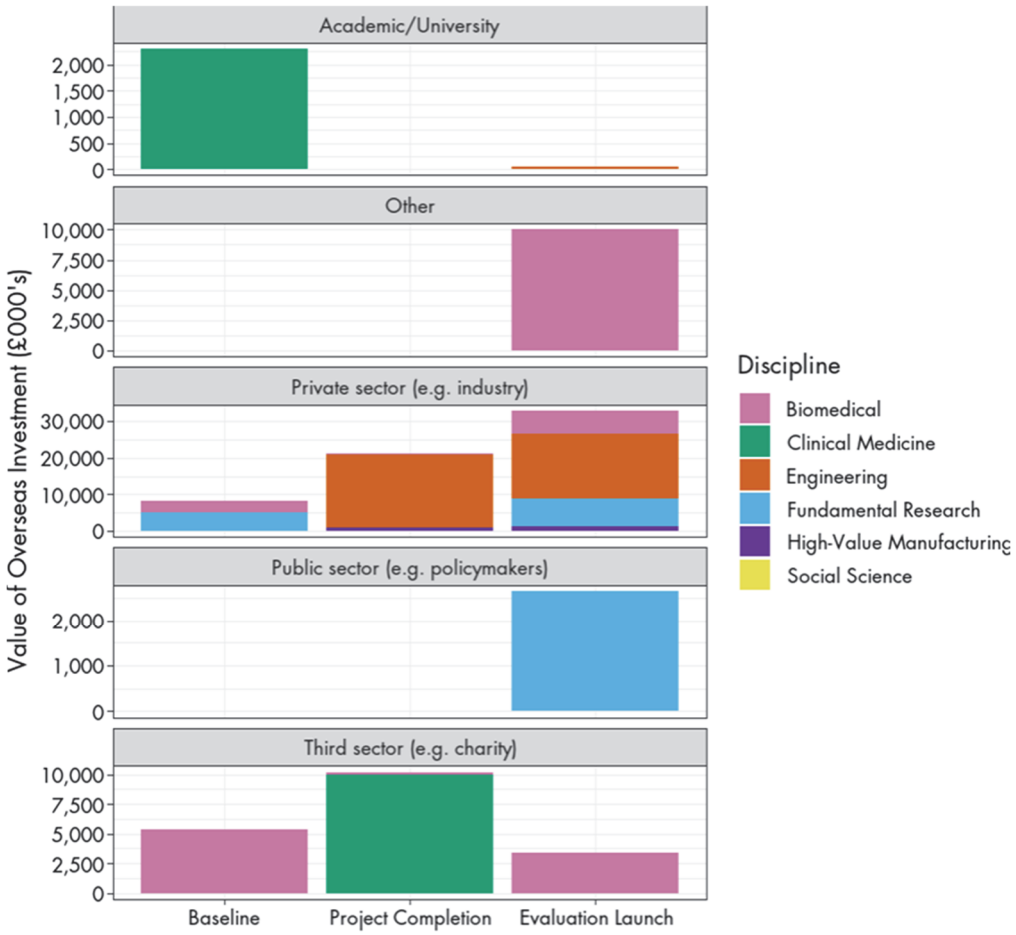
These accounts are supported by data returns from HEPs, which show that private sector (e.g. engineering or biomedical industry) investment grew substantially following operationalisation, as Figure 17 shows above. This is particularly pronounced in disciplines such as high-value manufacturing, where private sector investment grew substantially after facility completion and continued to expand up to the launch of the evaluation. This sustained increase highlights that the engagement with the private sector extends beyond co-investment during the initial phases of facility development, reflecting the development of financially beneficial relationships between universities and industry partners.

The investment landscape has varied in biomedical and clinical medicine disciplines, with different investment levels sourced from distinct sectors over time. While public sector investment in these areas might fluctuate, e.g. decreasing in a particular year, this is often offset by increases in other investment types, including private sector funding, philanthropic contributions or other funding sources such as innovation and research centre investments. One of the UKRPIF's key objectives is to encourage non-public sector investment, which is evidently being met through private sector investment, as these ongoing investments are part of a broader pattern of continuous engagement rather than isolated incidents. However, this contrasts with investments from academic, public and third sectors, which did not exhibit the same level of continuous growth over time. This may be because these acted as initial capital injections to catalyse

the development of new research facilities or enhance research capabilities that can attract additional, sustained funding. Importantly, some projects have noted delays in completion and, therefore, only report on their original co-investors.[51]

The pattern observed above is also broadly seen at a lower level in overseas investment, as shown in Figure 18, with private sector investment continuing to grow. Like overseas research income, engineering saw the most notable overseas investment compared to other disciplines.

Figure 18: Value of overseas investment by sector and discipline



In summary, the UKRPIF's funding has contributed to further investment, attracting significant and diverse funding from various sources. This highlights the broad appeal and impact of UKRPIF-supported facilities. The sustained increase in funding beyond facility completion demonstrates these facilities' long-term value and relevance. By providing initial funding, fostering collaboration, enhancing HEPs' reputations, building capacity and creating a leveraging effect, the UKRPIF enables projects to attract continued investment and achieve long-term sustainability, contributing to advancing knowledge in various fields, ultimately benefiting the broader research ecosystem.

[51] PM-R6-QUAL-18.

Evidence strength test: Do dedicated facilities lead to increased investment from industry?

Claim	Strength of evidence supporting the claim
Dedicated facilities for industry engagement and collaboration ***lead to*** increased investment from industry ***because*** large-scale, successful partnerships generate their own momentum (critical mass) and attract additional funding over time. The challenge of information asymmetry and competition is reduced as the initial fixed cost and risk exposure for industry partners is lessened.	Strong support

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support to mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

We first examined evidence showing that dedicated facilities for industry engagement and collaboration increase investment from industry. Project monitoring feedback showed that a significant proportion of recipients noted increased industry investment in their HEP due to their UKRPIF-funded facility. This included projects securing additional funding from the point of award to facility completion, with the private sector (e.g. industry) being most prominent. Data returns also indicated that these dedicated facilities generated increased investment following operationalisation, although the extent of funding varied by discipline (e.g. STEM, especially manufacturing, received more than social science). However, it is challenging to attribute specific UKRPIF design features exclusively to creating facilities for industry engagement, resulting in collaborations that increase industry investment. Despite this, strong evidence supports the UKRPIFs dedicated facilities yielding increased investment from industry from triangulated sources (e.g. project monitoring and data returns).

Despite the absence of a counterfactual, the evidence for a causal relationship between UKRPIF-dedicated facilities for industry engagement and collaboration and increased investment from industry is robust, supported by project monitoring and quantitative data returns. The evidence demonstrates the direct benefits of the funding in generating facilities for industry engagement and collaboration and the 'domino effect' of this causing increased investment from industry.

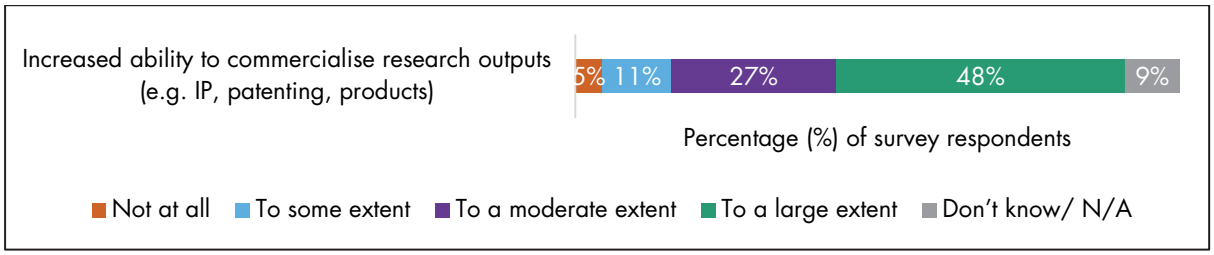
5.3. Commercial outputs and economic impacts

The expanded research capacity and capability enabled by the enhanced facilities ultimately increase HEPs' ability to commercialise research outputs and establish revenue streams. The scaling-up of capabilities allows researchers to test and develop their innovations on a larger scale, increasing the potential for successful commercialisation and societal impact. According to our survey data, 86% of awarded projects report that the UKRPIF increased their ability to commercialise research outputs. One example is a facility with a laboratory spanning 1,000 square meters,[7] making it one of the largest facilities of its kind in the UK. This has drastically increased the capacity to conduct experiments in a quality-controlled environment towards a more industrial equipment scale, thereby supporting commercialisation

efforts. Several projects report generating extensive commercial and industrial interest from their UKRPIF award,[36] leading to commercial partnerships with pharmaceutical and biotech companies in one case[52] and a biomedical research centre in another.[53]

Project leads frequently attribute stimulated commercial activities,[37] expansion in industrial work[17] and the creation of spin-out companies and start-ups[54] to their UKRPIF funding. They also credit this funding for supporting innovation outputs, such as patents, assets licensed for development and the provision of business services.[55] Furthermore, UKRPIF funding has helped catalyse commercialisation efforts,[56] facilitated the formation of new companies and subsidiaries[57] and supported SMEs and other commercial and non-commercial organisations.[37] Overall, the most common outcome related to commercial growth appears to be new spin-outs, demonstrating UKRPIF-funded projects' potential to drive entrepreneurship and innovation, addressing UK academics' previously expressed concerns about their perceived limitations in these areas.[58]

Figure 19: The extent to which UKRPIF funding increased the ability to commercialise research outputs



Source: RAND analysis of survey data.

[52] PM-R2-QUAL-13.

[53] PM-R4-QUAL-05.

[54] PM-R6-QUAL-16; PM-R6-QUAL-22; PM-R6-QUAL-24; PM-R6-QUAL-16; OTH-R2-INT-01; OTH-R2-INT-02; PL-R4-INT-05; PL-R5-INT-15; PL-R6-INT-18; PL-RMIX-INT-19; PM-R4-QUAL-04; PM-R6-QUAL-14.

[55] PM-R6-QUAL-16; PM-R6-QUAL-21; PM-R6-QUAL-22; PM-R6-QUAL-23; PM-R6-QUAL-24; PM-R6-QUAL-19.

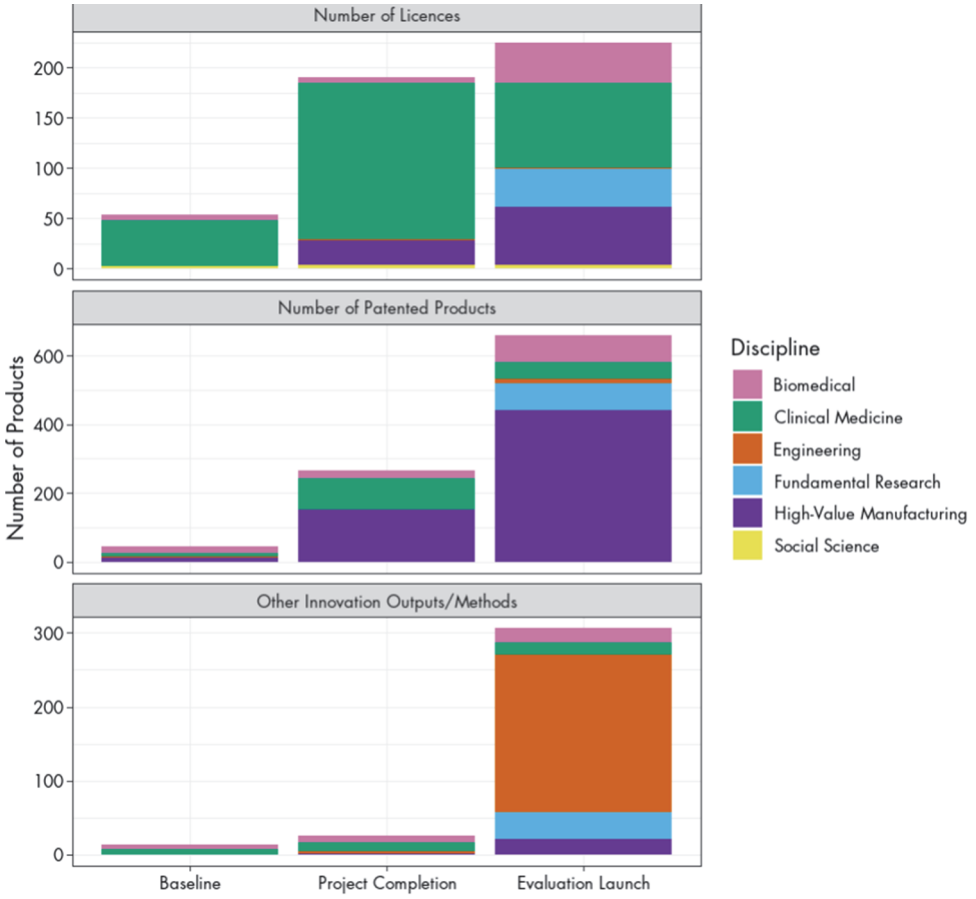
[56] PM-R6-QUAL-27.

[57] PM-R6-QUAL-27; PM-R6-QUAL-16; PM-R6-QUAL-20; PM-R6-QUAL-26.

[58] PL-R1-INT-20.

Our survey findings are broadly reflected by HEPs' commercial outputs reported via the data returns shown in Figure 20 below. The number of licences grew across three periods, with the most significant increase for clinical medicine disciplines observed between the point of award and the facilities' completion. This can be attributed to the licencing of cell lines, which saw some commercial activity before the UKRPIF investment but considerable commercialisation growth after this point. There was little to no commercial activity at the point of award for patented products but substantial growth at the point of the evaluation launch, particularly for high-value manufacturing. This suggests that the facilities created by UKRPIF were instrumental in supporting the development and subsequent patenting of these products.

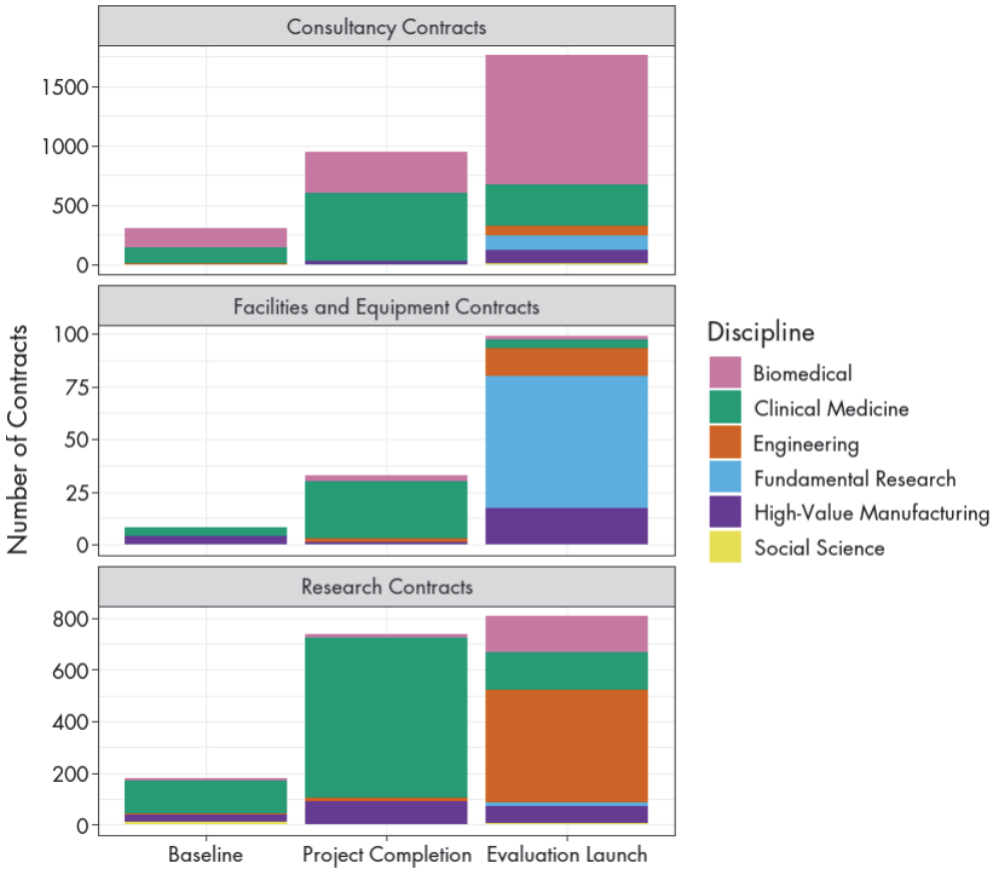
Figure 20: Number of commercial outputs by type and discipline



Moreover, the engineering discipline's substantial growth in innovative outputs and methods by the evaluation launch further exemplifies the broader impact of UKRPIF investments. The advancements reported, e.g. fault-detection methods for energy supply systems and recycling techniques for composite structures, have filled vital technological gaps and led to significant commercial uptake. These innovations address critical industry needs – enhancing operational efficiency and sustainability, respectively – thereby attracting commercial interest and investment. Importantly, although we requested data on the value of these commercial outputs, insufficient data was provided for a large enough sample size to conduct analyses. Reasons cited included commercial sensitivity and delays in obtaining the required information. We hope to provide an analysis of this data at the final evaluation stage.

The UKRPIF supported the creation and commercialisation of innovation outputs and enabled HEPs to establish revenue streams by securing contracts to deliver business services to external organisations. As Figure 21 shows below, consultancy contracts grew substantially from the point of award to the evaluation launch. This type of contract was most common in the biomedical and clinical medicine disciplines. The effect was even more pronounced for facilities and equipment contracts. At the point of project completion, the clinical medicine discipline had the most, which could be attributed to the fact that many of these HEPs invested their UKRPIF funding in refurbishment and purchasing equipment rather than brand-new facilities, allowing them to become operational sooner. This immediate operational capability is a significant advantage in the competitive contract market. The notable rise in equipment contracts for fundamental research by the evaluation launch can be attributed to the increasing demand for advanced and specialised equipment necessary for cutting-edge research, which UKRPIF-funded facilities can provide. Acquiring advanced equipment enhances the research capabilities of these institutions. This makes them attractive partners for external organisations seeking access to these tools, thus contributing to increased equipment contracts. Research contracts increased rapidly by the evaluation launch, with the variation in discipline becoming the most pronounced feature by this point. The number of research contracts dropped for clinical medicine and drastically increased for engineering, possibly associated with the considerable innovation outputs this discipline reported.

Figure 21: The number of contracts generated by type and discipline



Findings from our survey presented in Table 5 below underscore the strong sentiment that the UKRPIF has enabled its recipients to become commercially viable and establish revenue streams. After their facility's completion, around three-quarters (72.7%) of respondents said it established revenue streams (ongoing income, e.g. third parties paying to access/utilise the facility) that support its running costs (beyond the original funding and distinct from further investment); only a minority (13.6%) said it had not.

Table 5: Value of revenue streams that the UKRPIF-funded facility established

Revenue Stream Value (annual)	% of projects reporting a revenue stream
No response or no revenue stream reported	27%
Less than £50,000	2%
£50,000 to £100,000	11%
More than £100,000 and up to £500,000	16%
More than £500,000 and up to £1m	9%
More than £1m and up to £2m	11%
More than £2m and up to £5m	11%
More than £5m and up to £10m	9%
More than £10m	2%

Source: RAND analysis of survey data. Simple 'heat mapping' added.

UKRPIF projects contribute positively to factors that may support economic growth at the local and national levels. Projects reported benefits at the local or regional level, contributing to the creation of high-value jobs[59] and regional prosperity.[7] The receipt of regional development funds by some UKRPIF awardees further underscores these projects' regional impact. The combined funding from UKRPIF and regional development funds may have compounding effects on regional economic growth, enhancing the projects' scale and scope, strengthening local collaborations and attracting further investment.

In conclusion, the UKRPIF has supported commercialisation capabilities across various disciplines within HEPs, each benefiting from tailored approaches to revenue generation. Unsurprisingly, most projects did not report economic growth at the point of award,[60] indicating that the UKRPIF funding's potential economic impact is more pronounced as projects progress and mature. A minority of projects did not report any metrics related to economic growth at the point of facility operationalisation, suggesting that it may be too early to commercialise innovations from these projects. However, such projects anticipate future economic impact through work with industrial partners.[61] The fund's strategic investments, including state-of-the-art facilities and crucial refurbishments, have enabled the early establishment of revenue streams, proving equally impactful in enhancing research commercialisation. Notably, the diverse focus on different types of revenue streams across disciplines underscores the UKRPIF's nuanced impact.

[59] PM-R6-QUAL-26.

[60] PM-R6-QUAL-19; PM-R6-QUAL-18.

[61] PM-R6-QUAL-20.

Evidence strength test: Does collaboration with industry yield a higher sustained level of industry investment?

Claim	Strength of evidence in support of the claim
Successful collaborative projects with industry ***lead to*** a higher sustained level of industry investment ***because*** increasing the total volume of collaborative R&I will, in turn, cause businesses to invest to a greater extent in riskier and potentially higher-value R&I.	Strong support

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support to mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

We examined the evidence to assess whether increased investment from industry compared to the baseline (cross reference Claim 6) and successful collaborative projects with industry generate a higher sustained level of industry investment. Project monitoring data demonstrates that increased investment from industry and successful collaborative projects have led to a high level of sustained industry investment, including stimulating commercial activities, expanding industrial networks, creating spin-out companies and start-ups and supporting innovation and commercialisation outputs. It also evidences that UKRPIF-funded HEPs establish revenue streams by securing contracts to deliver business services to external organisations. Survey data corroborates that the UKRPIF has increased HEPs' ability to commercialise research outputs.

However, the evidence indicates that the extent of sustained levels of industry investment varies across disciplines. High-value manufacturing saw the most significant number of commercial outputs at evaluation compared to baseline, whilst social sciences saw a more marginal increase.

Nevertheless, the fact that evidence is triangulated across sources (including survey and project monitoring data) affirms that UKRPIF demonstrates a sustained investment level at project completion and evaluation launch compared to baseline, especially in some more STEM-focused disciplines.

5.4. Contribution to government strategy and priorities

UKRPIF-funded projects report that their funding has helped produce research that has contributed to UK government strategy and priorities (81.8%), either directly or indirectly.[62] Over half (52.3%) of the projects conduct research directly contributing to government strategies or priorities.[63] This includes contributions to the Net Zero Strategy, as several project leads report that their facility was built with long-term sustainability in mind, designed to be low-emission, environmentally friendly buildings.[64] Contributions to the Welsh Government Net Zero strategic plan have also been highlighted[65] as an example of a UKRPIF-funded project in a devolved nation contributing to government agendas. This can be particularly important for regional developments since the demonstratable success and value of a facility in

[62] RAND Europe survey with UKRPIF project leads.

[63] RAND Europe survey with UKRPIF project leads.

[64] OTH-R2-INT-01; OTH-R5-INT-03; PL-R5-INT-15.

[65] FUND-INT-02.

the region can potentially unlock further funding streams and accelerate socio-economic impacts.[66] Similarly, in Scotland, UKRPIF project leads have identified how their facilities align with Scotland's positioning as a UK research hub.[10]

Figure 22: The influence and contribution of research production from UKRPIF funding to government strategy and priorities (multiple selections were allowed)

Source: RAND analysis of survey data.

Over one in five (22.7%) UKRPIF projects surveyed produced outputs cited in government strategy documents.[67] Their survey responses demonstrate that HEPs have been key in shaping national strategies and policies. Their research has been recognised in the **Rail Technical Strategy**, highlighting advancements in national transportation goals. Contributions to the **Life Sciences Industrial Strategy** have driven medical innovations, particularly in Advanced Therapies. Institutions have also been pivotal in national defence and sustainability strategies through their involvement in the **Tempest defence programme** and pathways to net zero aviation (Flightpath 2050). Furthermore, developing policies around **Unmanned Air Systems Traffic Management** and influencing local economic development policy through briefings and seminars with senior civil servants and policymakers have contributed to the Labour Party's devolution and economic strategies. Projects supporting the **UK space strategy** and environmental initiatives, including novel power sources and greenhouse-gas-emission reductions in farming, demonstrate significant national impact. Furthermore, contributions to strategic HEP priorities often align with governmental priorities, e.g. university-wide **net-zero strategies**. Furthermore, projects reported significant contributions to the **COVID-19 Response** and other health initiatives, accelerating the translation of research into health value.

Lastly, some facilities have attracted interest from politicians, with some visiting and engaging with academics.[68] Some interviewees highlighted that UKRPIF has the potential to facilitate a shift in how the government perceives and values the relationship between universities and industry due to the high-quality

[66] FUND-INT-02; PL-R1-INT-02.

[67] RAND Europe survey with UKRPIF project leads.

[68] PL-R1-INT-08; PL-R2-INT-09.

research carried out by UKRPIF projects in collaboration with businesses.[69] As one interviewee said, '[UKRPIF has] helped push the dial around how the government sees the interactions between universities and businesses. [An] important part of the infrastructure [is that it] supports interaction between universities and businesses.'[70]

Evidence strength test: Does an improved quality of research increase academic leadership and strength in key strategic growth areas?

Claim	Strength of evidence in support of the claim
Improved quality of research ***leads to*** established UK academic leadership and strengths in key strategic growth areas ***because*** UKRPIF projects contribute to the training of researchers and new, improved solutions in strategic areas.	**Mixed/weak support – longer-term evidence needed**

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support to mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

To establish whether and how the UK has established academic leadership and strengths in key growth areas due to the improved quality of research that the UKRPIF has enabled at awarded HEPs, we first examined evidence attributing improved research quality to the UKRPIF. As explained previously, robust evidence supports the claim that UKRPIF funding has led to improvements in research infrastructure, which has enhanced research capacity and capabilities by attracting and upskilling staff and students (see above). However, there is only weak evidence on whether and how the UKRPIF funding led to better quality research, primarily based on qualitative self-reported accounts. Therefore, we cannot know that improved quality of research leads to established UK academic leadership and strengths in key strategic growth areas. We will conduct further work to attribute the increased research quality to the UKRPIF at the evaluation. However, the survey evidence on the contribution to government strategy and priorities across a range of strategic areas suggests that researchers at UKRPIF-awarded HEPs are influential leaders in their field, providing some evidence for a causal chain between research quality, training of researchers and established UK academic leadership and strengths in key strategic growth areas.

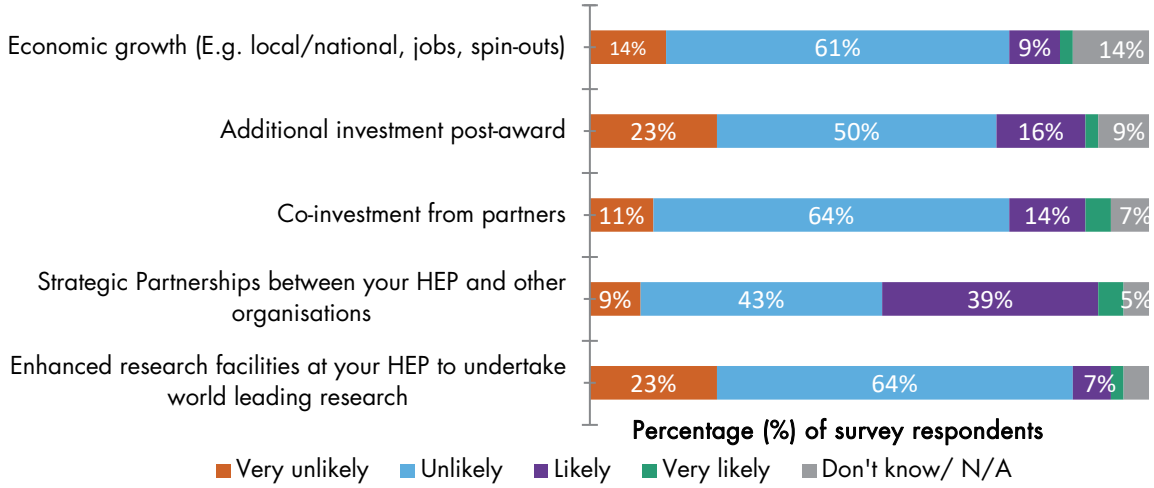
[69] PL-R1-INT-07; PL-R2-INT-09.

[70] PL-R1-INT-07; PL-R2-INT-09.

6. What would have happened in the absence of the UKRPIF?

Most HEPs' facilities, current research quality and partnerships would not have been delivered or accessed to the same extent (if at all) without the UKRPIF. Analysis of our survey data suggests that institutions would have been unlikely to deliver the same facility without UKRPIF funding (91% indicated 'unlikely', of which 46% indicated 'very unlikely'). Many project leads noted that their research capacity, scale and quality would be lower without their UKRPIF funding, as their pre-existing small-scale labs would not support the technological scale they currently utilise across fields, nor would they have had access to the key enabling technologies to conduct their research.[71] This conclusion is supported by our survey findings, shown in Figure 23, with 87% of survey respondents stating that the ability to provide enhanced facilities to undertake world-class research would be 'unlikely' or 'very unlikely' without UKRPIF funding. Only a minority would have achieved a similar quantity and quality of research without the UKRPIF, with one project lead stating that the research group was already on a trajectory of growth prior to receiving the UKRPIF award.

Figure 23: Likelihood of achieving various impacts without UKRPIF funding



Source: RAND analysis of survey data.

Moreover, many project leads reported that they would not have had the same quantity or quality of staff without UKRPIF funding, meaning they would not have been able to attract the talent required to generate the research capacity they currently achieve without the support, space and facilities the funding has

[71] PL-R1-INT-01; PL-R1-INT-01.

provided.[72] One institution suggested that without UKRPIF, HEPs would have recruited fewer students,[73] as the previous, lower-quality facilities would not have attracted them. Moreover, researchers would have remained siloed rather than co-located without UKRPIF funding, impacting the type and quality of research that could be produced.[74] Indeed, one project lead explained that co-location with staff from external organisations was minimal before their UKRPIF award. Where co-location did occur, it was generally on an ad-hoc, short-term, project-specific basis, with only one project reporting a significant level of co-location prior to the award.[75] Another HEP reported that co-location was facilitated by the UKRPIF award, which enabled the creation of a cross-faculty research institute to drive interdisciplinary research[76]: 'The UKRPIF project allowed us to carry out state-of-the-art interdisciplinary work that includes molecular, cellular and anatomical studies. These three research outputs are examples of this; these outputs have provided new key mechanistic insights in neurodegeneration.'

Several project leads stated that, without UKRPIF funding, their partnerships would be less effective, and team culture would not have developed to its present point, impeding the ability to deliver research to the quality it has reached through UKRPIF funding.[77] Interdisciplinary research would also not be possible since the workflows would have had to happen in separate buildings and departments.[5] Our survey findings suggest that forming strategic partnerships would be the least impacted aspect without UKRPIF funding, with 52% of survey respondents indicating it would be 'unlikely' or 'very unlikely'. Without UKRPIF funding, the ability to form strategic partnerships might be the least impacted aspect due to factors such as existing networks, intrinsic motivation for collaboration and institutions' proactive approaches. While UKRPIF funding plays a significant role in fostering partnerships, institutions may still be able to establish collaborations through these other means. However, the absence of UKRPIF funding may still limit these partnerships' scale, scope and effectiveness, potentially reducing their overall impact on research and innovation.

Investment would also be limited or non-existent for most HEPs without UKRPIF funding, with industry investment conditional on securing the UKRPIF funding across the portfolio.[16] This is supported by our survey findings, with 75% of survey respondents stating that co-investment would be 'unlikely' or 'very unlikely' without the funding. UKRPIF funding has also proven to be an attractive catalyst for additional investment, which is less possible without it.[10] This is supported by our survey findings, with 73% of survey respondents stating this would be 'unlikely' or 'very unlikely' without funding. For example, one HEP would have found it difficult to attract investments into their sector without the initial investment the UKRPIF provided.[13] Another HEP expanded its range of industrial partners involved in collaborative translational R&D and secured additional funding from industry and government schemes thanks to UKRPIF support.[38]

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[72] PL-R5-INT-15; PM-R2-QUAL-13; PM-R5-QUAL-01; PL-R6-INT-18.

[73] PM-R1-QUAL-03.

[74] PL-R6-INT-18; PM-R1-QUAL-03; PM-R2-QUAL-06.

[75] PM-R5-QUAL-08.

[76] PM-R6-QUAL-22.

[77] OTH-R5-INT-03; PL-R1-INT-01.

For one HEP that received multiple awards, the UKRPIF funding appears to have been critical in integrating clinical and research activities that would not otherwise exist. They noted that whilst clinical activities in cancer and mental health would still have occurred, the UKRPIF helped integrate research into these areas.[8] This integration has had several benefits, as integrating research into clinical environments can help bridge the gap between research and practice. Ensuring that the latest research findings and evidence-based practices are more swiftly incorporated into clinical care leads to more effective treatments and interventions, improving patient care and outcomes. These benefits would have been achieved to a lesser extent, if at all, without the UKRPIF.

UKRPIF funding has also facilitated the transformation of ongoing relationships with industry partners into more programmatic relationships,[78] with one stating that their income is because the UKRPIF funds their facility.[79] Without UKRPIF support, they would not have had the industrial-scale equipment or capacity for servicing people, nor as large a cleanroom for supporting and working with the industries around them to generate income.[7] One unsuccessful applicant noted that the UKRPIF funding would have allowed them to be leaders in research excellence in their topic area and leverage the long-term benefits of the infrastructure funding, attracting further investment compared to their progress without the UKRPIF.[80] Again, only a minority would still have achieved their current partnerships and investments. For example, one HEP reported that prior to UKRPIF investment, uptake of innovation and business activities was achieved through collaborative R&D projects, knowledge transfer projects and consultancy. At that time, 90% of their funding and 25% of research outputs were in collaboration with industry, highlighting the level of interaction with industrial players.

Generally, economic growth would be more limited without the UKRPIF, with 75% of survey respondents stating this would be 'unlikely' or 'very unlikely' without its funding. Conversely, only 5% said that the UKRPIF had not supported the commercialisation of research outputs, which would have contributed to economic growth. However, these individuals stated that their facility was not yet operational. In terms of supporting economic growth, one HEP reported that no spin-out companies were established prior to receiving UKRPIF investment, with another HEP stating that operations would not have been established without UKRPIF.

In conclusion, the evidence suggests that UKRPIF plays a significant role in providing tools to enhance research quality and quantity, attracting additional investment, fostering partnerships and promoting innovation that may support economic growth. For most recipients, the facilities established through UKRPIF funding were fundamental for generating further impacts, e.g. their research growth and reputation),[18] and the building(s) and associated impacts would not have happened without UKRPIF.[81] Some would not otherwise have received financial support from their university and, hence, would not have created the impact they did without the UKRPIF.[19]

[78] PM-R6-QUAL-11.

[79] PM-R6-QUAL-23.

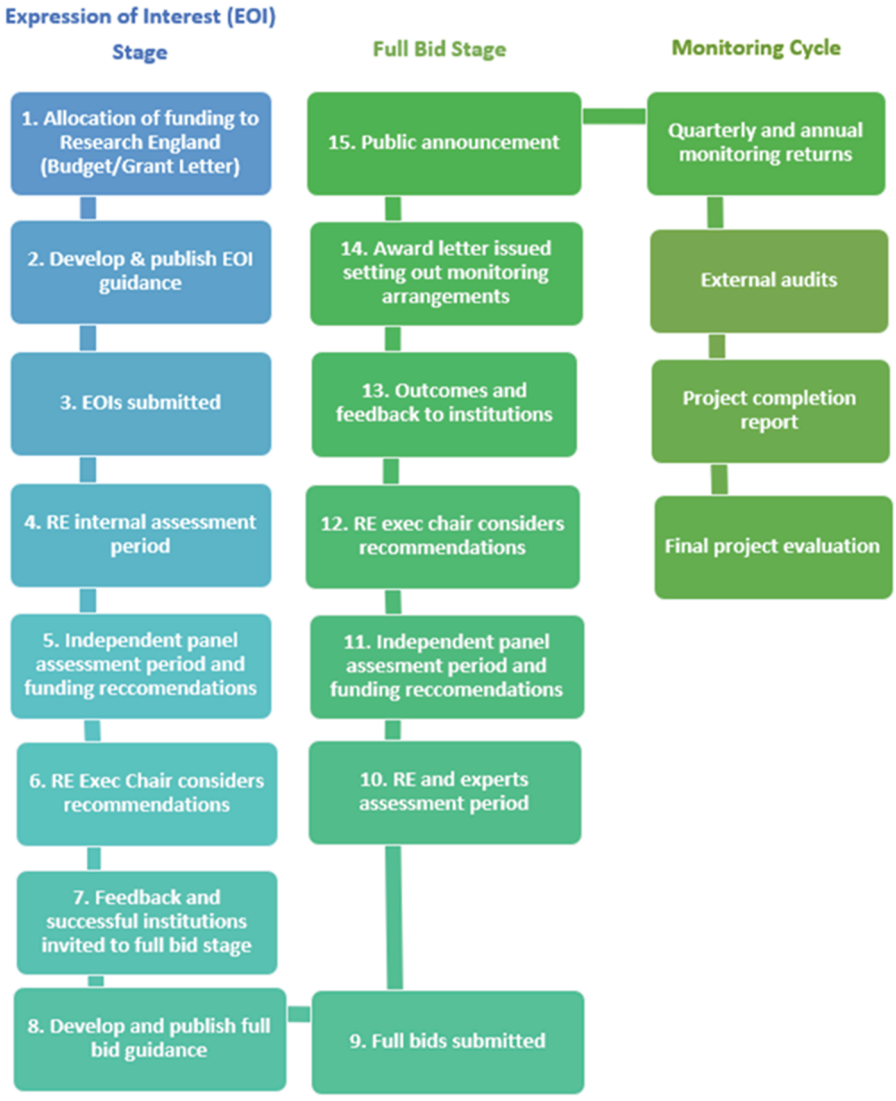
[80] UNS-INT-01.

[81] PL-R2-INT-12; PL-R4-INT-05.

7. How the UKRPIF meets the HE sector's needs

This section summarises the strengths and weaknesses of the UKRPIF processes. We first provide a summary diagram showing the key UKRPIF processes reviewed by the evaluation (Figure 24). Full descriptions of these processes can be found in the evaluation framework document.[1]

Figure 24: UKRPIF process mapping



Source: RAND Europe based on R4 UKRPIF Process ppt prepared by RE (then HEFCE).

7.1. What worked well

HEPs' perceptions and experiences of the UKRPIF model were overwhelmingly positive, with many project leads considering the model as useful for their HEP and finding the application process clear and relatively easy to navigate. The funding body and wider stakeholder interviewees also regarded the UKRPIF funding model highly, stressing that it is a uniquely valuable scheme within the broader RE and UKRI portfolios due to the requirements around double-match funding from private sources and how it fills the gap for large-scale research and funding compared to the typical individual project or disciplinary focus of research councils.[82] The views of project leads and other beneficiaries are summarised in Figure 25 below.

Figure 25: Quotes from interviewees about their perception of and experiences with the UKRPIF model

'Personally, it's been amazing. Transformative, [we have] a lot of pride in the building. Specifically with the funding, this funding model is easy to understand compared to other funding streams.'
(PL-R1-INT-08)

'The actual programme itself was really good in terms of time frame within which they were given the grant. The rest of the administration was easy. In comparison to [some grants], it was a breeze.'
(PL-R1-INT-02)

'They should fund more stuff like this. Funding interdisciplinary centres like this is a big win and is the future in the bio world and physical sciences.'
(OTH-R2-INT-01)

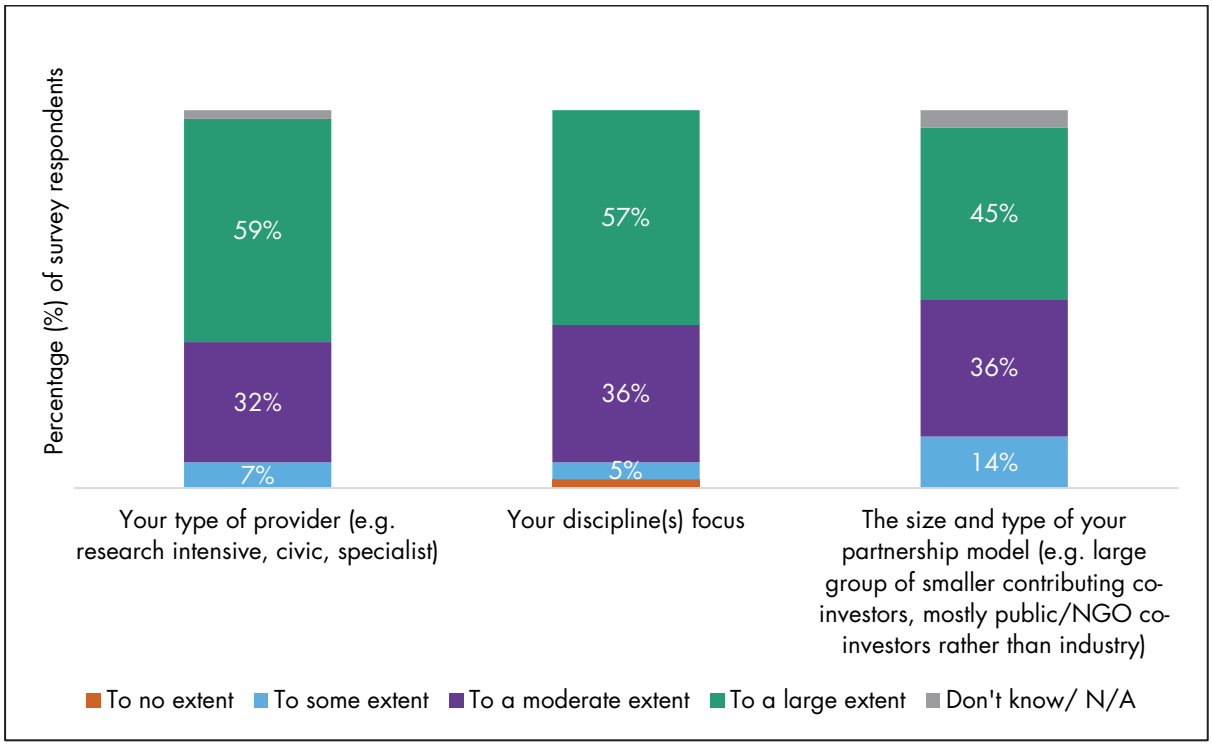
'All people dealt with were professional. Degree of constructive iteration. Could ask questions and get sensible answer. (…) No issues, satisfactory experience.'
(PL-R2-INT-04)

'Incredibly timely, valuable intervention that enabled [us] to achieve 100%.'
(PL-R1-INT-03)

[82] FUND-INT-04.

The eligibility criteria[83] were suitable for most providers, disciplines and sizes/types of partnership models to a moderate extent at least (91%, 93% and 82%, respectively).[84]

Figure 26: The extent to which UKRPIF eligibility criteria are suitable and support the awardees' provider type, discipline and partnership model size/type



Source: RAND analysis of survey data.

The overall application process was found to be easy to navigate, especially compared to experiences with other, more bureaucratic funds.[18] Several project leads highlighted that they found the application development process a useful exercise that forced long-term thinking to be envisaged at their HEPs regarding future research and R&I strategies.[85] One of the unsuccessful applicants interviewed reflected on the application process's added benefits as a learning opportunity about treasury rules, the Green Book, Red Book and Magenta Book, obliging them to develop a business case.[86]

While many project leads found this requirement reasonably easy to meet, some successful and unsuccessful applicants have criticised the model for awarding HEPs likely to be in a good enough financial position and level of institutional maturity to meet their needs from other funding streams without the UKRPIF.

[83] UKRPIF eligibility criteria: Apply for funding of between £10m and £50m (with the exceptions noted in paragraph 14), spend the funding on capital services and goods received by the grant end date, and secure 2:1 double-matched co-investment from private sources. This means applicants must secure £2 of private co-investment for every £1 of UKRPIF funding requested, demonstrate a significant research scale and a track record of research excellence in the disciplines related to the bid, provide evidence of credible plans to implement the project successfully and draw down UKRPIF funding within the funding period (taken from Round 6 documentation).

[84] RAND Europe survey with UKRPIF project leads.

[85] PL-R3-INT-13; UNS-INT-02.

[86] UNS-INT-02.

The credibility of UKRPIF unlocked further investments to awarded HEPs. The prestige of UKRPIF as a large-scale governmental funding programme has helped the awarded HEPs to unlock further investments and donations from sources that would not otherwise have contributed.[87] Awarded HEPs are recognised for their potential to drive research excellence, attracting further investors who would not have been keen without the matched government funding behind the project.

The strict timeframe of spending the award (over two financial years) was suitable for most projects, particularly as it allowed HEPs to be held accountable for seeing through the building phase in a reasonable time.[19] Some project leads appreciated the timeframe compared to their business-as-usual experiences in the academic environment, which are anecdotally lengthy and strenuous administrative processes. As one project lead put it, 'One thing that was enormously useful for us was that the money had to be spent in a certain time. University state management is not always extremely rapid. So, to have this gun to hold to their heads to do it in time and in budget was very helpful. (…) Difficulty to stick to the timeframe of having to spend it within the time, but without that, it would have just dragged on for years because of the committee structure that we'd normally have and the processes.'[19]

Several project leads positively mentioned flexibility and a sense of trust from RE throughout the application process and spending period.[88] The supportive management from RE and the flexibility to utilise the grant to suit each HEP's context allowed the programme to be as successful as it was, leading to the fund's intentional spending on necessary purpose-built facilities and equipment.[18] Some project leaders reported great flexibility and patience from RE to adapt their strategy due to unforeseen roadblocks or changing needs.[10,13]

Furthermore, project leads appreciated the flexibility and support from RE regarding the changing environment and economy, especially amidst the pandemic.[17] One interviewee mentioned the benefits of RE managing the UKRPIF, especially regarding RE's awareness of the UK HE landscape and ability to relate to universities pragmatically.

The UKRPIF's uniqueness and long-term impact underscore its value and importance in the research and innovation landscape. As such, UKRPIF is not just a funding mechanism but also a strategic tool for advancing knowledge and fostering innovation. As one project lead put it, 'UKRPIF was the key single instigator to our success.'[19] UKRPIF appears as one of a kind, with limited alternatives to its specific model: 'There's no other scheme [we are] aware of that would have allowed us to [do] what UKRPIF did for us; it was a step change…[I'm n]ot aware of any other funding mechanism that would allow us to meet the breadth and scope of investment achieved through the UKRPIF funding. The multiplier and not just direct cash is important.'[9] Another stated that 'nothing would have happened without [UK]RPIF. We've been trying for 20 years (seeing that in 1997 it was pitched to co-locate the hospital and the labs) and not found a way of doing this before.'[89]

[87] PL-R6-INT-18; OTH-R5-INT-03; FUND-INT-02.

[88] PL-R1-INT-01; PL-R1-INT-02; PL-R4-INT-05; PL-R5-INT-14.

[89] PL-R6-INT-18.

Evidence strength test: Does within-sector co-investment lead to improved research facilities?

Claim	Strength of evidence supporting the claim
Within-sector co-investment ***leads to*** improved research facilities ***because*** **the** UKRPIF was designed to allow high-quality projects with robust business cases built on research excellence and strong collaborations (with double-match funding).	Strong support

Note: We assessed this claim using our contribution analysis and process tracing methodology (Section 1.4.1), triangulating the evidence discussed in this chapter. The evidence strength scale ranges from no support to mixed/weak support, moderate support and strong support (see Annex A and Annex A supplement).

We first examined the evidence for leveraged co-investment, a key underpinning factor for the UKRPIF's collaborative model. Given that co-investment is a condition for securing UKRPIF funding, achievement in this area was confirmed. Qualitative feedback from surveys and interviews about the improvements in research facilities showed that a significant proportion of respondents noted major enhancements in research facilities and directly attributed this to UKRPIF funding. These enhancements included acquiring advanced research equipment and upgrades to physical infrastructure – improvements that were considered unlikely without UKRPIF's intervention. However, it is challenging to attribute all improvements solely to UKRPIF, especially as the facilities mature and new revenue streams are established in the long term, without a counterfactual. Despite this, strong evidence supports UKRPIF's contribution to the observed improvements in research facilities, which would not have otherwise occurred at the same level as quickly.

The key aspect of the claim that UKRPIF funding is responsible for improved facilities is the necessity and uniqueness of UKRPIF's funding design. Its requirement for double-match funding from private sources attracts additional financial support and helps ensure long-term financial commitment. The eligibility criteria ensure that only well-positioned HEPs (i.e. those capable of developing and maintaining major facilities with established private partnerships) utilise the funding, making the UKRPIF a strategic catalyst for further investment. Stakeholders noted that the UKRPIF is more accessible than other infrastructure funds, with an easier application process to navigate, one deemed less bureaucratic than alternative funding sources. Additionally, RE's flexibility and support during the application and funding phases contributed to the programme's success, allowing projects to adapt effectively to specific needs and challenges. In summary, the evidence strongly supports the UKRPIF's crucial role in enhancing research facilities through its distinct funding design and strategic management, addressing the sector's essential and previously unmet needs. Together, this evidence affirms UKRPIF's essential role in enhancing research facilities.

Despite the absence of a counterfactual, the evidence for a causal relationship between UKRPIF funding and improvements in research infrastructure is robust, corroborated by a mix of qualitative feedback, quantitative data and stakeholder testimonials. The evidence demonstrates the direct benefits of the funding regarding facility upgrades and equipment acquisition and underscores the broader systemic enhancements within the research environment by encouraging long-term financially beneficial partnerships with industry. However, attributing long-term impacts directly to UKRPIF remains challenging due to evolving facility needs and new revenue streams. The final evaluation phase, reporting in 2027/2028, will allow us to better understand these sustained impacts.

7.2. Process challenges that UKRPIF project leads and stakeholders experienced

The UKRPIF has received primarily positive feedback from grant recipients and broader stakeholders. The fund fills a niche in the funding landscape, providing support that few other types of R&I funding can match. However, our consultees raised some challenges that suggest how the programme might be improved.

The process of meeting the double match funding requirement posed a challenge for some awardees and unsuccessful applicants.[13] As one applicant noted, 'The bar is high with 2-to-1 funding. The co-investment is a high bar. You need to have a well-established activity and good partners to make this possible.'[9] Some applicants noted that the promised industry match funding is often speculative and cannot be entirely relied upon due to issues out of the applicants' control (e.g. broader economic uncertainty). These uncertainties may cause the co-investor to change their decision after winning the award. Additionally, obtaining letters of intent from companies to demonstrate evidence of future co-investments can be challenging.[90] The difficulty in securing initial matched funding of the desired magnitude is further exacerbated in cases where the applicant's HEP cannot provide significant early funding into the facility alongside partner investment,[19] making it difficult to determine whether the facility will be economically sustainable in the short term.

The UKRPIF's double-match funding criteria may have led to an overrepresentation of some disciplines, which could limit the programme's ability to meet the HE sector's needs.[91] While some social science research centres are awarded through the UKRPIF (e.g. The London School of Economics and Political Science International Inequalities Institute), the dominant fields are STEM subjects. STEM disciplines generally tend to attract more significant public R&D funding, evidenced by the (albeit crude) measure of total UKRI council R&D budgets for STEM-focused versus SHAPE-focused (social sciences, humanities and the arts for people and the economy) councils, e.g. The Arts and Humanities Research Council (AHRC) and the Equality and Human Rights Commission (EHRC) have by far the lowest budgets.[92] This disciplinary imbalance may be because some disciplines can meet the double-match funding requirement more easily than others. Some believe that more businesses can provide co-investments within the STEM fields,[96,86] whereas co-investments for arts and humanities-related programs are more challenging to secure.[93] To tackle this skew in disciplinary representation, funding stakeholders expressed that a smaller amount of funding may be viable to better cater to the needs of SHAPE programmes.[94]

Some disciplines may be overlooked for their infrastructure requirements. Alongside difficulty obtaining double-match funding, SHAPE disciplines may have traditionally been thought to require less infrastructure and, therefore, have been less competitive or not met the eligibility criteria for UKRPIF, hence their underrepresentation. These disciplines have demonstrated an increasing need for infrastructure and resources in recent years, particularly as interdisciplinary work gains prominence. For example, Alliance

[90] PL-R6-INT-17.

[91] FUND-INT-03; PL-R5-INT-14.

[92] UKRI (2022).

[93] PL-R5-INT-14; FUND-INT-03.

[94] FUND-INT-01.

Manchester Business School uses large computer labs to facilitate large-scale psychometric testing for study participants, when traditionally, it would take months to collect this data with less infrastructure available. Moreover, the UKRPIF does not just support purchasing high-end equipment; it supports the creation of collaboration and networking space, helping develop SHAPE research. This highlights SHAPE research's evolving requirements and the importance of recognising their infrastructure needs, ensuring that the UKRPIF continues supporting diverse research areas and disciplines.

For a minority, the application process timelines were challenging to meet. The UKRPIF application is labour-intensive and requires competency and experience to develop high-quality bids. This is justified due to the high funding sums offered and the complexity of the double-match aspect. However, some applicants had difficulties meeting the timelines, with one bidder noting that they did not complete their full application in time despite progressing past the expression of interest stage.[6] The core application process was thought to be relatively streamlined. However, there was still a large volume of writing to complete, which can be challenging,[8] particularly for smaller, specialised HEPs and hearkens back to the point of UKRPIF being suited to HEPs with highly established research offices with the capacity and experience to support bids of this nature.

The UKRPIF funding model does not account for maintenance costs, which leaves some HEPs struggling financially to meet the maintenance requirements of their facilities. As one applicant noted, 'All of them have an ongoing cost. There could be a more mature reflection that capital investment requires a certain amount of oncost. Capital investments have been made without oncost consideration. Energy cost, ongoing. Not to underestimate support staff.'[95] However, it is important to reiterate that part of the bidding process for HEPs is to outline how they will manage the facility's ongoing running. As the UKRPIF is a capital fund, providing funding for ongoing costs is impossible. This is also part of the rationale for public funding and the double-match requirement, i.e. de-risking initial investment for private industry to take up the mantle. However, non-financial support might be given in the form of advice from Research England to those HEPs struggling to manage maintenance, as well as a strong focus on assessing the sustainability of facilities at the selection stage and during monitoring.

Some applicants felt the monitoring requirements were onerous, labour-intensive and bureaucratic, especially the frequency and level of detail expected in each progress report. The additional information requested in the evaluation data collection and audits[8] further strained project leads.[10] These HEPs would have preferred to be given notice at the start of their project regarding what data they should capture to avoid the challenges of retrospective data reporting. Additionally, in their view, outcome and impact reporting was requested too early after facilities became operational, i.e. before outcomes had been realised.[10] These are common challenges across all types of R&I funding, and monitoring is required to provide transparency in how public funds are used. However, HEPs were asked for a large volume of complex information, sometimes simultaneously. Evaluators and RE can look to better time these requests to avoid such issues in future.

One programme board member noted common issues at the point of application, particularly around the bidders' ability to demonstrate research excellence. Applicants often understand this as

[95] PL-R2-INT-04.

demonstrating evidence for past research excellence, with less attention given to how they will ensure its future delivery.[96] Moreover, it has been noted that applications for UKRPIF often present an imbalance between building and research plans within bids, with the former sometimes outweighing the latter, and that the assessment panel wanted to see more concrete plans for research excellence.

In addition, this programme board member noted that variance in how panel members interpret the UKRPIF funding criteria can be challenging when evaluating the strength of the bids, which warrants good panel chairing and management to ensure internal reliability and consistency. Again, this is a challenge for all types of R&I funding, for which there are multiple solutions with varying effectiveness, e.g. roving panel members and additional review stages. Other actions will help, e.g. continuously reviewing panel guidance and assessment criteria, as will developing and/or refreshing panel membership.

7.2.1. Perceived barriers in accessing UKRPIF relating to institutional size and location

There is a perceived geographic bias in the distribution of UKRPIF awards, with concerns that HEPs from certain regions may be disadvantaged. For example, one interviewee[97] involved in an unsuccessful application at one institution who became part of a successful UKRPIF award at a different institution stated that they felt geography plays a role in the investment that can be leveraged. They found it difficult to identify 'big players to invest' in smaller, more niche activities in certain regions, particularly in the North of England, due to a lack of relevant industry players nearby. However, they went on to be successful with a different HEP in the South, where it was easier to find major investors. Although this is only one example, it illustrates a broader point on the distribution of UKRPIF awardees. With limited 'big investors', HEPs will seek to form partnerships with smaller SMEs. This could make it harder to meet match-funding requirements, as multiple smaller partners may be less stable, with relationships and commitments more affected by external factors.

Regarding regional funding allocations (See Table 1), the devolved nations collectively received a smaller proportion of UKRPIF funding than some English regions (14.4% combined). Scotland and Wales each received 6.6% of the total UKRPIF allocation, with Northern Ireland receiving only 1.2% of the total funding. In England, London alone secured 31.3% of the total funding. While some regions like London may have more UKRPIF projects and a higher level of funding, there is more nuance to this point that requires a deeper examination of the number of eligible institutions, applications and application success rates in each region. For example, as Table 2 showed in Section 1.2:

- **While the East of England and the East Midlands have the same number of HEPs, HEPs in the East of England have submitted almost twice as many bids and seen a higher success rate**. Therefore, HEPs in the East of England seem more active in submitting bids and more successful when they do. Further work to understand the drivers of these differences could provide learnings for RE that could be integrated into targeted or general guidance for future bidders. Such guidance could help HEPs in other regions improve their bidding strategies and success rates,

[96] FUND-INT-03.

[97] UNS-INT-03.

creating a more equitable and competitive environment across all regions. Possible areas of exploration include examining differences in institutional support, collaboration networks, the availability of regional investors and bid preparation practices.

- **The Northeast has a comparable application rate to other regions. Two of the five eligible HEPs have submitted six bids between them; however, no projects have been funded in the region**. Further investigation to determine factors contributing to the lack of bidding success in this region would further strengthen RE's ability to ensure equitable fund distribution.
- **Across all regions, 25–55% of HEPs in each region do not submit a bid, while other HEPs in the region submit multiple, highlighting engagement level disparities within and between regions**. London has 38 eligible HEPs – almost four times as many as the East of England and Wales – but only around a quarter have submitted bids, compared with 55% and 25%, respectively. This variation in application rates underscores regional and intra-regional differences in bid submission activity, and the uneven participation rates may suggest that certain HEPs may face barriers to submitting bids or lack the resources and support needed to engage effectively in the bidding process. However, it may also reflect each region's industrial and R&D development, among other factors. As mentioned above, further understanding these regional differences in bidding rates will assist with ensuring the award's geographical equity. This is particularly important in the devolved nations, where the bid success rate is higher or comparable with other English regions, while the number of HEPs submitting bids is generally lower.

The complexities in regional and intra-regional disparities in bidding rates and bidding success among HEPs shed light on the current regional distribution of UKRPIF awards. While some regions, like the East of England, exhibit higher activity and success rates, others, such as London, show lower participation despite higher award numbers and more eligible institutions. Additionally, a notable proportion of HEPs do not submit any bids in some regions, whereas others submit multiple. These disparities suggest differences in institutional support, resource allocation and collaboration networks. Additionally, the level of awareness regarding UKRPIF funding opportunities (including being well-informed about upcoming calls) may vary across regions, contributing to geographical differences in bid rates. For example, institutions in Scotland have reported being less informed about forthcoming UKRPIF rounds.[98] This lack of awareness may hinder their ability to prepare and submit competitive bids, affecting their success in securing funding.

When considering the equity of regional funding distribution, relying on the number of eligible institutions and bid rates may have limitations. For example, London has secured 15 awards despite its lower application rate relative to its number of eligible HEPs, with some universities receiving more than one award. Concentrating UKRPIF awards in regions with a high number of HEPs, like London, could potentially hinder the development of a robust and geographically diverse R&I infrastructure across the UK. This sentiment may contribute to the perception of regional bias among stakeholders. A more developed understanding of these factors can help inform strategies to encourage more applications from underrepresented regions and promote a more equitable distribution of funding opportunities. Addressing

[98] FUND-INT-01.

these underlying factors through targeted interventions could enhance bid participation and success rates in underrepresented regions.

Why might these regional disparities exist?

Smaller HEPs may be disadvantaged in the bidding process, as they tend to have fewer resources to develop applications than larger, more established HEPs. One stakeholder echoed that smaller regional universities, particularly those in devolved nations, may struggle to compete with large research-intensive institutions that receive more Quality-Related (QR) funding and, therefore, have a greater capacity to develop bids (e.g. supported by established research offices and support staff). Additionally, larger, research-intensive institutions (of which there are more in certain regions, including London) tend to submit bids for more significant funding amounts due to their greater resources and institutional capacity to manage large award sizes, meaning a significant portion of the funding pool is allocated to a few high-capacity institutions, further skewing UKRPIF regional funding allocations. This concentration of resources can lead to an imbalance in R&I infrastructure across the UK, as regions with smaller institutions may lack the capacity to develop competitive bids. Undertaking an application for UKRPIF is disproportionately more difficult for those smaller HEPs because of those underdeveloped institutional support structures. While not necessarily something that changing UKRPIF can fix, it is an important consideration for RE if it decides to target this group more intensely. The funding bodies have noted that they consider the spread of institution type and geography.[96] As an interviewee from one of the funding bodies pointed out, this area is being consciously looked at and has particular relevance in decision-making when some applicants around the funding threshold are from smaller universities or underrepresented regions.[96]

One unsuccessful UKRPIF applicant pointed out that capital investments similar to UKRPIF have decreased in the past ten years. For many HEPs, there is no reasonable alternative funding available in their region to meet their research needs.[99] This emphasises the uniqueness of the UKRPIF in the sector and a potential gap in capital funding that might be addressed by UKRI and industry more broadly. Several funds provide funds for infrastructure or support other UKRPIF goals indirectly. These are summarised below[100]:

- **The UKRI Strength in Places Fund (SIPF)** funds revenue and capital investments, including buildings, to support innovation-led relative regional economic growth and enhance local collaborations. It has a strong emphasis on business innovation, and the aim is to develop local economic impact in defined economic geographies.
- UKRI additionally has a wider **Infrastructure Fund**, investing £481m into a portfolio of R&I infrastructure projects between 2022 and 2025.[101] Funding is allocated across various disciplines, such as the arts, physics, life and environmental science, social science, and medicine. The fund aims to address a breadth of societal issues, from climate change to adolescent mental health.

[99] UNS-INT-03; FUND-INT-03.

[100] Much of this summary is presented in the UKRPIF evaluation inception report.

[101] UKRI (2024).

- **The Connecting Capability Fund (CCF)**[102] was established in 2017–2018 as the government allocated £100m in funding to incentivise universities to collaborate in research commercialisation. The CCF funding aims to connect English HEPs to stimulate effective commercialisation and collaboration with businesses. An initial £15m was provided to supplement the Higher Education Innovation Funding (HEIF) formula, and £85m supporting competitive project funding to complement the core funding mechanism. Although both knowledge exchange funds complement the UKRPIF by supporting collaboration with industry, they do not provide funds for capital investment.
- **The Science and Technology Facilities Council (STFC) retains responsibility for large-scale infrastructure investments** such as those on the Harwell Campus, and individual research councils also have discipline-specific investments in large centres or other pieces of infrastructure of national importance, e.g. the Natural Environment Research Council's (NERC's) six research centres, which are directly supported as part of the council's activities.
- At an **individual HEP level**, RE provides capital support through the Research Capital Investment Fund (RCIF), a formula-based funding mechanism that provided £206m support in FY2022–2023.[103] Additional formula allocations have been made in recent years. In FY2020–2021, a further £88m in capital investment was provided through the UKRI's World Class Laboratories Fund, administered by RE in collaboration with the devolved administrations. Further, in FY2022–2023, an additional RCIF allocation of £70.65m was made to address ongoing uncertainty over access to EU programmes, plus two further supplementary RCIF allocations of £3.87m and £25m.[104]
- In the **devolved nations**, the SFC, Medr, the Commission for Tertiary Education and Research (previously HEFCW) and the DfENI allocate formula capital to their respective HEPs through slightly different mechanisms and policies. The devolved funding bodies work alongside UKRI to ensure a unified approach towards capital investment across the UK, considering the specific needs and priorities of institutions in each nation.
- More widely, **other sources of investment** support capital projects. The National Institute of Health Research (NIHR) specifically supports infrastructure investment in health research, with interesting models such as Biomedical Research Centres (BRCs) aiming to drive collaboration between universities and healthcare providers to promote research and innovation uptake in healthcare settings.

In conclusion, whilst UKRPIF has been a key driver in supporting research and innovation in the UK, it is prudent to examine the challenges and concerns of applicants and other stakeholders to enhance its effectiveness and inclusivity. Challenges in the funding model include the high bar set by double-match funding requirements, the application process timelines and ongoing maintenance costs. There is also a perceived disciplinary bias in the distribution of awards. Moreover, it is essential to consider the challenges some types of institutions face, including smaller institutions, and examine the geographical spread of awards to foster a more equitable and diverse research landscape. Funders should review the guidance provided to the assessment panel to support ease and consistency in assessing bids and applicant guidance on presenting future

[102] UKRI (2023).

[103] RE (2022b).

[104] RE (2022a).

research development plans and past achievements. By doing so, RE can ensure that the funding model continues evolving to meet the changing needs of the UK's research and innovation landscape.

We will closely examine regional disparities in the final evaluation as part of the economic assessment. This will allow us to collect more data up to 2027/2028 and compare other economic indicators to the data presented here.

This concludes the assessment of UKRPIF's processes. The next chapter summarises this report's learnings and outlines our next steps.

8. Interim learnings and next steps for the evaluation

This chapter summarises the findings from this interim evaluation, assessing the performance of UKRPIF against its objectives. It also provides recommendations for the programme's delivery based on feedback from award recipients and stakeholders and self-reported data submitted by HEPs/award holders. We must acknowledge that self-reported data can introduce bias, particularly when retrospective. We anticipate data quality will improve with each submission as award holders become more familiar with the requirements and provide more current data. Therefore, the recommendations should be viewed within this context.

8.1. Learnings and interim recommendations

8.1.1. Conclusions

Overall, the UKRPIF is a long-standing scheme that is in good health. It has enabled HEPs across all four nations of the UK to establish high-quality research infrastructure, enabling similarly high-quality research. Besides this, it is a popular programme; proponents are keen to highlight its strengths and only highlight minor weaknesses. Specific conclusions are as follows:

- **The UKRPIF programme has positively contributed to enhancing research infrastructure and facilities at awarded HEPs**. This has occurred because of the building of infrastructure, the world-class equipment housed there, and the talent that such facilities have attracted, increasing HEPs' abilities and capacity to conduct world-class research.
- **UKRPIF-funded facilities are recognised as centres of research excellence by academic and industrial collaborators, both nationally and internationally**. This has been enabled by an increased ability to attract prestigious grant funding, talent and formal partnerships that were leveraged through access to those facilities.
- **The infrastructure and facilities are generally financially sustainable and adaptable**. In some cases, leveraged funding and best practices in building design and management have reduced maintenance costs, bolstered by additional income streams. However, where those factors are not present, some HEPs struggle to pay for upgraded equipment and maintenance due to increasing costs and other financial pressures currently impacting the sector.
- **The UKRPIF has helped to create and support partnerships between HEPs, industry, the third sector, public institutions, and the general public who access the facilities**. Co-location, leveraged funds and high-quality research have encouraged this collaboration.

- **The UKRPIF has provided a springboard for multiple kinds of further investment, including grants, philanthropic donations and industrial partner investments**. The initial investment de-risked external private investment sustainably, in some cases bringing in many times the original committed funding from RE.
- **UKRPIF projects have led to outputs and outcomes that may have a catalysing role in local, regional and national economic growth.** This may occur through multiple avenues and across various scales, generally manifesting over many years. Although we will conduct a complete and robust value-for-money (VfM) assessment as part of this study in 2028/2029, we have seen encouraging signs of economic benefits, including creating jobs and commercial outputs such as spin-outs.
- **UKRPIF has already begun to strongly impact research at the provider, national and global levels**. At the provider level, the injection of UKRPIF funding has been transformative, enabling institutions to enhance their research capabilities dramatically. Nationally, R&D infrastructure has been supported and improved, and strategic international partnerships have been enhanced. However, a longer-term view is required to measure this robustly and will be revisited in the next report.
- **UKPRIF projects have led to early socio-economic benefits**, including knowledge exchange between HEPs and the wider world, local partnership building, research insights that lead to products conferring real-world benefits, and contributions to government strategy.
- **UKRPIF awards have helped to enhance working cultures at HEPs, influenced R&I strategies and helped meet the sector's infrastructure needs**. However, there is a skew in the disciplines typically awarded UKRPIF funds, which may limit impacts across a broader range of fields.
- **For most HEPs consulted in this study, the facilities, current quality of research and academic partnerships would not have been delivered or accessed to the same extent (if at all) without the UKRPIF.**
- **UKRPIF awardees were consistently positive in their assessment of the programme and of the support from the programme team at RE for their flexibility, particularly through the COVID-19 pandemic**. Many benefited significantly from the fund, which fills a gap in infrastructure funding for cutting-edge research at HEPs, and found the programme easy to navigate.
- **There is a geographical skew in UKRPIF awards, partly due to lower bidding rates in underrepresented regions.** Further investigation is needed to understand the contributing factors in areas with fewer or less successful bids.
- **While most found the application process straightforward and proportionate, some considered the double-match funding threshold high and felt the work required to submit a bid was substantial, exacerbated by the limited time given to submit applications**. Issues were also raised around the lack of follow-on funding for maintenance and running costs.

8.1.2. Recommendations

Drawing on feedback regarding the funding model and processes from awardees and other stakeholders, we present our interim recommendations for the RE, the UKRPIF Programme Board and the devolved funding bodies below. These recommendations were developed through direct suggestions from award holders and

RAND Europe's triangulation of the evidence presented in this report. Acknowledging that some of this evidence may be self-reported or subjective, these recommendations will continue evolving throughout the evaluation. They will be assessed in the context of additional intelligence gathering, the feasibility within the confines of the UKRPIF business case and the funding's capital designation.

Re-examining the funding model to be more inclusive of different types of HEPs[105]: A key identified challenge is the double-match funding requirement, which can be particularly difficult for smaller or less established HEPs. It has been suggested that the eligibility criteria could be eased to address this, potentially by adjusting the threshold based on the size of HEPs, allowing alternative forms of co-investment or looking at a tiered funding model. Such changes could enable smaller HEPs to submit competitive bids and potentially alleviate the geographical and disciplinary skew of awards. This would allow a more diverse range of institutions and disciplines to benefit from the funding, fostering a more inclusive research landscape. However, these thresholds were originally intended to secure significant match-funding sums from industry and targeted HEPs able to manage extensive facilities. Changing the thresholds could affect those conditions.

Resource support for smaller HEPs[10]: Submitting a bid to the UKRPIF is resource-intensive, requiring significant capacity and time. This can pose a challenge for smaller HEPs. To level the playing field, it has been suggested that a specific fund could be made available for small HEPs to help them develop their bids. This could provide much-needed support in scoping their plans and assembling a high-quality application. By providing this support, the UKRPIF could help to ensure that all institutions, regardless of size, have an equal opportunity to secure funding. This may be akin to a pump-priming-type award. Again, this would depart from the current model, which targets established research-intensive HEPs, but could help extend UKRPIF's impacts. This may also benefit under-represented disciplines (broadly non-STEM), typically the focus of smaller, specialised HEPs.

Supporting and promoting joint bids: Emphasising collaborative bids (i.e. involving more than one HEP) could further ease the resource burden on smaller HEPs. By encouraging partnerships and collaborations, the UKRPIF could help smaller institutions meet the financial and research excellence criteria, enhancing their chances of securing funding. This approach would benefit the smaller institutions and support the creation of national research networks.

Enhance transparency in bid the evaluation process and improve scoring standardisation: Providing clearer and more comprehensive guidelines on the assessment criteria and scoring system would help ensure applicants better understand what is expected and how their proposals will be assessed. RE could explore UKRI assessment practices to determine what is standardised and how UKRPIF processes could be aligned with them, including providing applicants with scoring descriptors and other similar assessment criteria.

[105] FUND-INT-02; PL-RMIX-INT-19; UNS-INT-03.

Additionally, steps could be taken to ensure criteria are applied consistently across the panel, with better inter-rater reliability. This could be done in several ways, including via multiple panels (there is currently only one panel per round) that review a small number of proposals separately to check the level of agreement and make any necessary adjustments, roving reviewers (across multiple panels), or including another layer of review where inter-panel scores diverge beyond a certain threshold.

Introducing a running cost component[106]: The current UKRPIF funding model focuses on capital investment, enabling HEPs to develop high-profile facilities and equipment. However, the ongoing maintenance costs of these facilities pose a constant challenge for many project leads, particularly those from smaller institutions with less support from their universities. To address this, it has been suggested that a running cost component could be introduced alongside the capital investment component, which could be provided on a needs basis. This would ensure that institutions have the necessary resources to maintain and operate their facilities effectively over the long term, thereby enhancing the sustainability and impact of the funded projects. However, this may go against the original concept of the double-match funding model in that the UKRPIF intends to encourage the long-term support of industry, including post-award running costs. Another option may be to ensure the double-match funding from industry aims explicitly to cover more of the longer-term upkeep costs, weighting the public investment more towards the grant's early years, if possible.

Further encouraging HEPs to future-proof facilities[107]: Although excellent efforts via the World Class Laboratories' additional funding in 2020 and net-zero call have helped make facilities more sustainable, some facilities have reported being at or over their capacity shortly after becoming operational. This could be better anticipated if a growth and future approach was more embedded in the plans of HEPs, encouraged by language in the UKRPIF call documentation and potentially the application templates that ask bidders to think strategically about future capacity needs. By future-proofing facilities' long-term plans to cater for increased capacity needs, the UKRPIF could help HEPs ensure that these facilities continue delivering high-quality, impactful research and can continue to scale. This approach would involve taking a more strategic view of the facilities' future needs and growth potential, ensuring they are designed and built with future expansion in mind. Further funding via UKRPIF could then be considered if and when the issue of improving the ambitious planning of HEPs is resolved.

Prioritising regional needs with subsequent funding calls, considering the existing portfolio as a whole[20]: Clearer guidelines and criteria around place-based components and regional socio-economic impact could help reduce the geographical skew in the distribution of awards and/or encourage applications to address government priorities

[106] OTH-R5-INT-03; PL-R2-INT-12; PL-RMIX-INT-19.

[107] PL-R2-INT-12.

around regional disparities. By prioritising regional needs and encouraging more purposeful bids from underrepresented regions, the UKRPIF could contribute to a more geographically diverse research landscape. This approach would ensure that the benefits of the UKRPIF are spread more evenly across the UK, contributing to regional development and reducing disparities in research and innovation capabilities.

Increasing flexibility in the delivery phase may be helpful in some cases[108]: The timescale for the facilities' delivery phase can be challenging for project leads, particularly given the uncertainties that can cause delays. On the other hand, the timescales were established to ensure facilities were built fast enough to begin being used for high-quality research and help realise the return on investment of public funds more quickly. While RE's flexibility has been appreciated (e.g. in allowing HEPs to create bespoke facilities, make changes to co-investors and alter timelines due to COVID-19), there is a desire for even more flexibility around delivery times. This would acknowledge that time constraints cannot compromise the construction of cutting-edge, high-value buildings. By allowing for more flexibility in the delivery phase, the UKRPIF could better accommodate the realities of large-scale construction projects and reduce the pressure on project leads. However, this is another trade-off to consider: balancing speed and flexibility.

In summary, some of the above recommendations ask the UKRPIF Programme Board, including the devolved funding bodies and RE delivery team, to reflect on the UKRPIF's initial objectives and design. There are trade-offs around whether it should aim to include all types of HEP or support the larger, research-intensive institutions most likely to handle and execute large infrastructure grants successfully. The fund's intended role in the broader landscape is an issue that requires ongoing review, raising the important question of whether this fund is problematic by not supporting a broader range of institutions or if a different investment mechanism should cover that role in the UK system. As the evaluation progresses, this issue will be revisited as the evidence base and alternative design options become clearer.

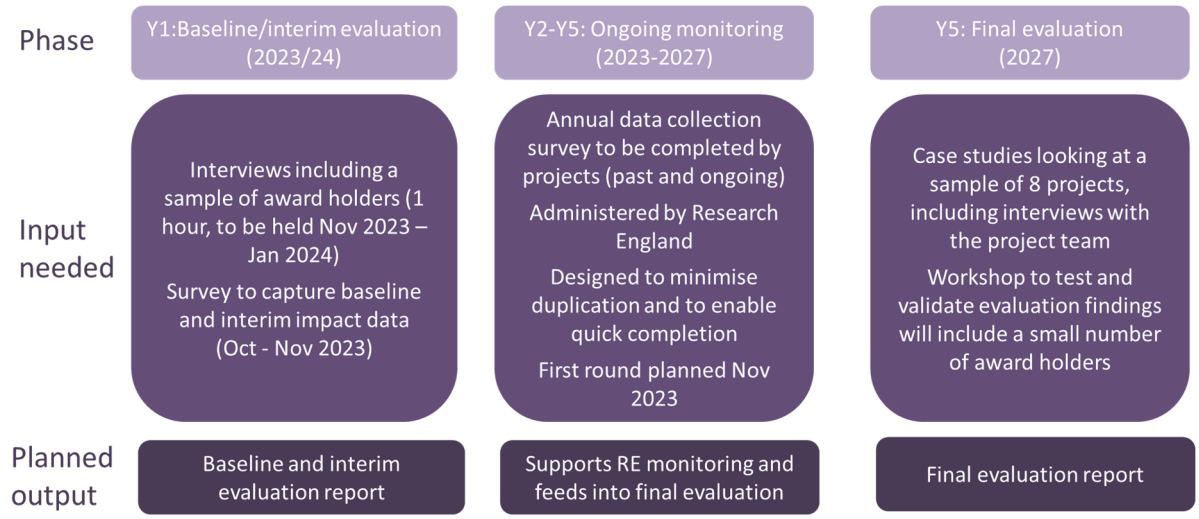
8.2. Next steps for the evaluation

This stage of the evaluation has collected initial data on the interim impacts of UKRPIF and insights into the effectiveness of its processes. The next evaluation stage will aim to check many of these findings with additional monitoring data, particularly around potential contributions to economic growth and the facilities' sustainability in terms of maintenance and adaptability.

The evaluation is implemented in three phases (Figure 27), and this report presents the findings from the baseline data collection and interim evaluation (**Phase 2a**), building on primary and secondary data against key evaluation metrics at baseline and the interim evaluation stage from all projects in Rounds 1–6.

[108] PL-R1-INT-07; PL-R1-INT-08; PL-R2-INT-12.

Figure 27: Summary of the evaluation timings



Source: RAND Europe.

This phase will be followed by ongoing monitoring (**Phase 2b**) up to 2027 based on tools developed as part of this phase, which RE will primarily lead. Throughout the ongoing monitoring, UKRPIF-awarded institutions will be required to report on the progress of their projects in three different ways:

- **Annual data returns for performance dimensions**: From the project completion date for up to ten years afterwards.
- **Strategy and outcome statements**: A qualitative reflection on how the objectives in the original bid are being resourced and delivered, how the institution is creating the environment in which they will achieve and/or exceed these objectives, and what they have achieved under each core performance dimension.
- **Impact case studies relating to the social or economic achievements of the project**: A qualitative reflection on the project's evidenced socio-economic achievements.

Lastly, the final phase of the evaluation (**Phase 3**) will cover all projects funded up to this point, providing a final assessment of process, impact and value for money. Similarly to the baseline data collection in Phase 2a, the final evaluation will involve several different data collection activities, including:

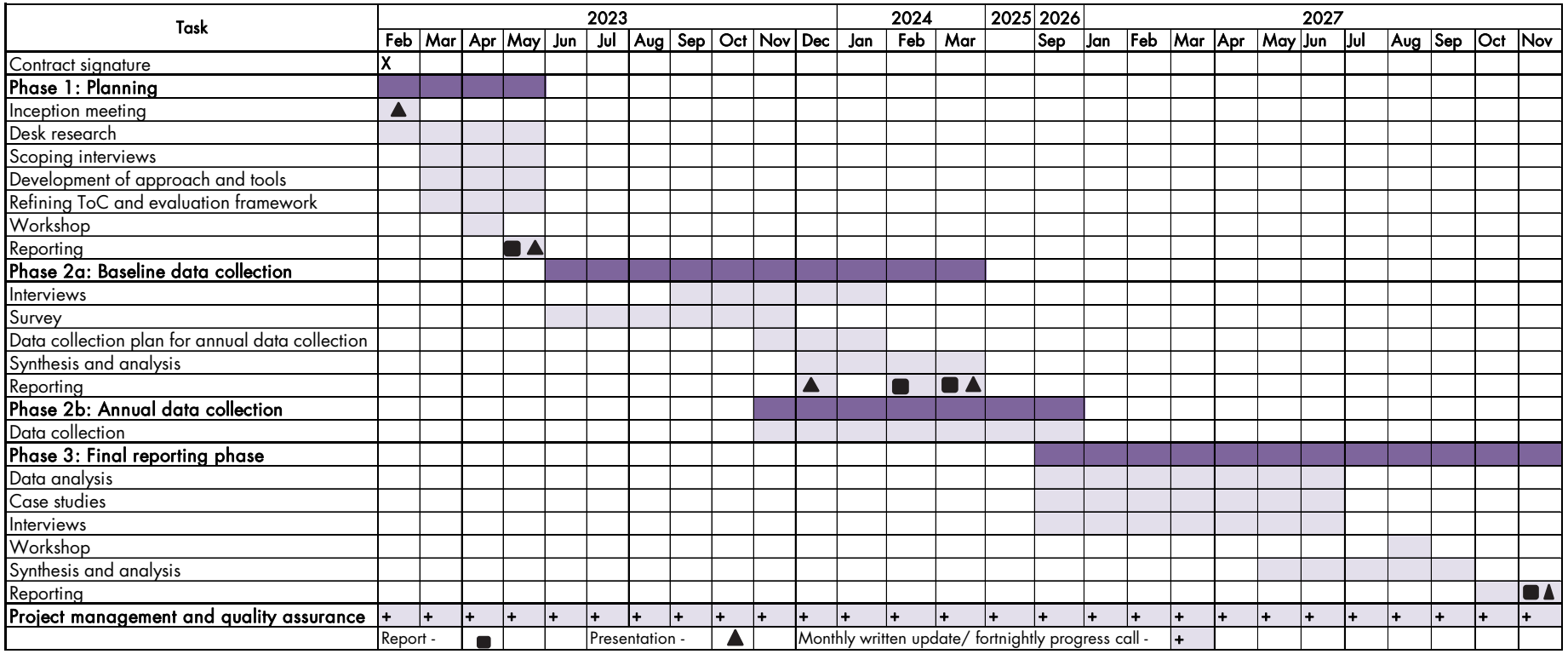
- **Secondary data analysis**: Any data gaps identified at the beginning of Phase 3 will be supplemented with an analysis of broader secondary datasets that become available over the intervening period.
- **Case studies**: Through deliberative sampling to reflect the range of delivery contexts and experiences, we will conduct eight case studies focusing on UKRPIF awards to enable a more in-depth exploration of the mechanisms of the pathways set out in the ToC. In addition, we will also conduct 2–4 vignettes of unsuccessful applicants to uncover potential alternative pathways that illustrate if and how those outside the programme go on to develop their facilities by other means.
- **Interviews**: We will conduct interviews to inform the final evaluation, including with project leads at UKRPIF awarded HEPs, stakeholders who can contribute to the evidence base for the case

studies, key wider stakeholders involved in delivery and funding, and any other stakeholder groups not adequately captured by the selected case studies.

- **Workshop, analysis and deliverables:** Evidence from the preceding sources will be analysed using our CA&PT framework detailed in the inception report (Steps 5 and 6: gather further evidence and finalise contribution stories) to develop a set of emerging findings which will be explored and validated at a workshop with key stakeholders to be agreed with the client but likely to include those involved in Fund delivery and oversight alongside a sample of award holders. Alongside this, the **economic assessment** will establish whether the aggregate monetary value of the outputs, outcomes and impacts delivered by UKRPIF are greater than its costs.

The findings from the impact and economic evaluations will be brought together in the **final report**, which will offer an assessment of the programme against the evaluation questions specified, as well as wider observations and lessons learned that may be relevant to future investment.

Figure 28: Evaluation timeline



Source: RAND Europe.

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Annex A. Contribution claims

The table below outlines the contribution claims developed for UKRPIF as part of the evaluation framework. They correspond to specific evaluation questions, elements in the UKRPIF ToC, and associated assumptions, influences and risks. These claims form the basis of the Contribution Analysis and Process Tracing Analysis approach.

Table 6: UKRPIF contribution claims

Contribution Claim (Working Hypothesis)	Aligned EQ(s)	Element in ToC	Associated assumptions, influences and risks
Activities -> outputs: UKRPIF funding and within-sector co-investment lead to improved research facilities because UKRPIF was designed to allow for high-quality and sufficiently funded projects with robust strategic business cases built on research excellence, demonstrating strong, sustainable collaborations (with double match funding) and contribution to economic growth, and overall value for money.	EQ1.6, EQ1.7, EQ9.4	**Inputs:** Co-investment from UKRPIF, RPIF investment. **Activities:** Project delivery. **Outputs:** Improved research facilities, facilities with provisions for increased collaborations, dedicated facilities for industry engagement and collaboration.	**Assumptions:** All. **Influences:** COVID-19. **Risks:** N/a.
Activities -> outputs: UKRPIF funding leads to facilities with provisions for increased collaboration because UKRPIF encouraged collaborative bids between HEPs and Ros that build on collective research strengths and addressed the market failure of coordination between R&I actors by providing a joint venture based on R&I collaboration.	EQ1.4	**Inputs:** Co-investment from UKRPIF, RPIF investment. **Activities:** Project delivery. **Outputs:** Increased collaboration.	**Assumptions:** Create strategic partnerships with other organisations. **Influences:** COVID-19. **Risks:** N/a.
Activities -> outputs: Non-public co-investment, e.g. Industry co-investment and charitable funding and philanthropic donations, lead to dedicated facilities for industry engagement and collaboration because UKRPIF's double-match funding ensures	EQ1.1, EQ1.4	**Inputs:** Co-investment from industry, charity or philanthropic donations **Activities:** Project delivery **Outputs:** Facilities with provisions for	**Assumptions:** Enhance research facilities at leading UK HEIs; create strategic partnerships with other organisations; projects demonstrate a viable business case that offers an attractive

Contribution Claim (Working Hypothesis)	Aligned EQ(s)	Element in ToC	Associated assumptions, influences and risks
that all parties have 'skin-in-the-game' with cross-sector collaboration designed-into the infrastructure's functions.		increased collaboration; facilities dedicated to industry engagement and collaboration by design. **Outcomes:** Academic collaborations and networks established and expanded; increased engagement with industry; stakeholder collaborations and networks established or expanded. **Impact:** Higher sustained level of industry investment.	return on private investment. **Influences:** Development of comparable or superior facilities, COVID-19's impact on the ability to engage and collaborate with industry. **Risks:** Investors may decline their investment or refuse to further invest due to the time lag between investment, R&I results and potential commercialisation, potentially compounded by delays.
Outputs -> Outcomes: Improved research facilities lead to improved quality of research because world-class research is more likely to occur in state-of-the-art facilities, itself increasing capability and stemming from the quality requirements set out for projects by UKRPIF.	EQ1.2, EQ1.9	**Inputs:** Co-investment from UKRPIF, RPIF investment **Activities:** Project delivery **Outputs:** Improved research facilities **Outcomes:** Increased research activity; increased educational provision; improved quality of research; new/improved technologies or solutions to key areas; Impact: Reputation in the field; improved UK academic standing; establish UK academic leadership in key areas; train future generations of scientists or industry professionals.	**Assumptions:** Enhance research facilities at leading UK HEIs; translate research outputs into usable technology relevant to real-world applications. **Influences:** Develop comparable or superior facilities (possible competition), COVID-19. **Risks:** Investors may decline or refuse to further invest due to the time lag between investment, R&I results and potential commercialisation, potentially compounded with delays.
Outputs -> Outcomes: Facilities with provisions for increased collaboration lead to the implementation of collaborative projects and programmes because advances in scientific understanding and technological breakthroughs occur in physical (and virtual) environments that enable the interaction and engagement of different disciplines and people from different disciplines to interact and engage with people from different backgrounds and sectors, strengthening collaborations and subsequent joint efforts.	EQ1.4, EQ4.1	**Outputs:** Facilities with provisions for increased collaboration and implementation of collaborative projects and programmes. **Outcomes:** Academic collaborations and networks established and expanded; increased engagement with industry; stakeholder collaborations and networks established or expanded.	**Assumptions:** Create strategic partnerships with other organisations. **Influences:** COVID-19 pandemic. **Risks:** N/a.
Outputs -> Outcomes: Dedicated facilities for industry engagement and collaboration lead to increased investment from industry because large-scale, successful partnerships	EQ1,5, EQ1.7	**Outputs:** Dedicated facilities for industry engagement and collaboration. **Outcomes:** First rounds of investments	**Assumptions:** Stimulate additional investment in higher education research.

Contribution Claim (Working Hypothesis)	Aligned EQ(s)	Element in ToC	Associated assumptions, influences and risks
generate their own momentum (critical mass) and attract additional funding over time, and the challenge of information asymmetry and competition are reduced as the initial fixed cost and risk exposure lessens for industry partners (i.e. the initial sunk expense of building the facilities is shared and the completed facility is ready for subsequent R&I to commence, leading to new investment).		from industry co-funded programmes/ contract research undertaken; increased investment from industry, co-funded programmes/contract research undertaken; increased income from research grants. **Impact:** Higher sustained level of industry investment.	**Influences:** COVID-19 pandemic. **Risks:** N/a.
Outcomes -> impacts: Improved quality of research leads to established UK academic leadership and strengths in key strategic growth areas because UKRPIF projects contributed to the training of researchers (capability and capacity building), new/improved solutions in strategic areas that UKRPIF specifically helped steer, and established reputations for world-class facilities.	EQ1.2, EQ4.3, EQ5.2	**Inputs:** Co-investment from UKRPIF, RPIF investment. **Activities:** Project delivery. **Outputs:** Improved research facilities. **Outcomes:** Increased research activity; increased educational provision; improved quality of research; new/improved technologies or solutions in key areas; graduates with relevant skills Impact: reputation in the field; improved UK academic standing; established UK academic leadership and strengths in key strategic areas.	**Assumptions:** Enhance research facilities at leading UK HEIs; translate research outputs into usable technology relevant to real-world applications. **Influences:** Development of comparable or superior facilities; other public investments in research infrastructure from UKRI and international funder activities. **Risks:** Investors may decline or refuse to further invest due to the time lag between investment, R&I results and potential commercialisation, potentially compounded by delays.
Outcomes -> impacts: Increased investment from industry and successful collaborative projects with industry lead to a higher sustained level of industry investment because increasing the total volume of collaborative R&I will cause businesses to invest to a greater extent in riskier and potentially higher-value R&I and cause academics to increase the share of use-oriented research.	EQ1.4, EQ1.5, (EQ1.6)	**Outputs:** Increasing R and I, increasing partnerships. **Outcomes:** Increased investment from industry, co-funded programmes/ contract research undertaken; collaborative projects and programmes implemented, joint applications; collaborative projects and programmes implemented, joint publications. **Impact:** Higher sustained level of industry investment.	**Assumptions:** Create strategic partnerships with other organisations; stimulate additional investment in higher education research. **Influences:** Development of comparable or superior facilities; external shocks such as the COVID-19 pandemic. **Risks:** Investing in R&I involves substantial risk, not least because of the time lag between investment, R&I results and potential commercialisation. Compounded with any delays, external partners may find their original investment to have taken too long to bear fruit and could decide to withdraw or decline to provide any additional investment.

The table below summarises the criteria used to decide the strength of evidence per claim in this report's main body.

Table 7: Categorisations and descriptions for evidence strength assessments

Strength of evidence supporting the contribution claim	Criteria for passing tests
Strong support for the programme theory that UKRPIF significantly contributed to observed outcomes	**IF:** All or the vast majority of process tracing tests are passed, and the evidence assessment is strong in most cases. No hoop tests fail. **OR:** All Smoking Gun and Double Decisive tests are passed in support of Working Hypotheses (WH), **AND** Smoking Gun and Double Decisive tests fail for the Alternative Hypotheses (AH). Some Straw-in-the-wind tests in support of PH may fail and pass in favour of AH.
Moderate support for the contribution claim	**IF:** No Hoop tests fail. Evidence in support of some WH Smoking Gun or Double decisive tests may not have been found or are inconclusive. Most Straw-in-Wind tests pass. Evidence for the Straw-in-wind test is triangulated with other sources (for example, interviews with different groups of manufacturers, investors and sector experts who support the same WH contribution claim). **AND:** Following the criteria above, more WH tests pass than AH tests. Evidence is stronger in favour of the claim that UKRPIF drove outcomes, e.g. evidence based on Authoritative Sources supports WH.
Mixed or weak support	**IF:** Some conflicting evidence in favour of WH, e.g. some Smoking Gun evidence, was found, but Hoop tests failed (suggesting the ToC or the types of tests used need revising). **OR:** On balance, most evidence tests are in favour of WH. However, these are based on Straw-in-the-Wind tests, with little support from Authoritative Sources.
No support for the programme theory or stronger **support for the alternative hypotheses** that other factors primarily drive other observed outcomes	**IF:** Fundamental tests favouring WH fail (e.g. Hoop tests). No Smoking Gun or double decisive tests are passed. **OR:** Evidence favouring the AH is found to follow the criteria for 'Strong support' but not for the WH. This suggests that outcomes are primarily driven by other external factors and not the introduction of UKRPIF itself.

Annex B. Survey Questions

1) Can you please state your UKRPIF facility's build completion date (an estimate is sufficient, the exact day is not critical. Leave blank if your facility is not yet fully built/complete)

DD/MM/YYYY

2) To what extent is your facility operating as planned? By this, we mean whether the facility is in use and at the capacity intended, both in terms of occupancy and usage.

Please select one answer:

Operational levels exceed the physical capacity available (e.g is oversubscribed)
Facility is operating at a greater capacity than expected
Facility is fully operating as intended
Facility is operating but not yet at the capacity intended
Facility is built but not operational
Other (please specify)

3) What classification(s) would you apply to your UKRPIF-supported facility?

Please select one answer:

Single-site facility (distinct research entity or a unified body of equipment at one physical location.)
Multi-site or distributed facility (network of geographically separated facilities that jointly perform or coordinate research functions based on a common scientific theme. This can comprise collections, archives, and scientific libraries, among others)
Virtual facility (ICT-based systems used for research. This can comprise high-performance communication networks, large datasets, and computing facilities, among others)
Other (please specify)

4) What type of project is your UKRPIF-supported facility?

Please select all that apply:

New building
Scale up and expand an existing building

Refurbish or repurpose an existing building
Purchase new equipment
Other (please specify)

Are the objectives of the UKRPIF programme being met?

5) To what extent has your UKRPIF funding enhanced the facilities at your institution between the point of your award and the present day, directly attributed to the funding? E.g. improved equipment to increase the quality of research.

Please select one answer:

To a large extent	To a moderate extent	To some extent	Not at all	Don't know/ N/A

6) Overall, to what extent did your UKRPIF funding increase the capability for world-class research at your institution between the point of your award and the present day, attributed to the funding?

Please select one answer per row:

	To a large extent	To a moderate extent	To some extent	Not at all	Don't know/ N/A
Increased the quality of staff research skills and knowledge (e.g. upskilling, enabling career progression)					
Attracted high-quality research and technical talent to your institution					
Increased overall productivity in terms of research output (however it is that you measure research productivity)					
Increased the number of graduates with research and industry-ready skills					
Contributed to the translation of research into practical applications and for human benefit					
Increased ability to commercialise research outputs (e.g. Intellectual Property [IP], patenting, products)					

Increased ability to attract commercial contracts, grants and/or research contracts					
Contributed to the development of emerging fields					
Other (please specify)					

7) Overall, to what extent did your UKRPIF funding increase the capacity for world-class research at your institution between the point of your award and the present day, attributed to the funding?
Please select one answer per row:

	To a large extent	To a moderate extent	To some extent	Not at all	Don't know/ N/A
Increased staff capacity to deliver more research outputs than before UKRPIF					
Increased funding capacity to deliver more research outputs than before UKRPIF					
Retained or protected research and technical staff jobs					
Increased capacity to enrol more students					
Increased the availability of facilities for research (e.g. more lab space, more equipment, etc.)					
Addressed research skills shortages					
Other (please specify)					

8) To what extent do you agree or disagree with the following statements:
Please select one answer per row:

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree	Don't know/ N/A
'We are able to maintain, financially, the facilities funded by UKRPIF'						
'Financially, we are able to invest in upgrading the facilities funded by UKRPIF'						
'We are able to use the space flexibly and adapt the facilities funded by UKRPIF to new and emerging research requirements'						

8b) In the previous question, you selected [merge code] to it being easy to maintain the facilities funded by the UKRPIF.

[If Strongly agree or Agree] Why do you say that it is easy to maintain the facilities funded by the UKRPIF?

9) Thinking about the UKRPFI programme generally and not just your project, to what extent do you think the programme meets the needs of the HE sector?
Please select one answer per row:

	To a large extent	To a moderate extent	To some extent	To no extent	Don't know/ N/A
Enhance the research facilities of universities undertaking world-leading research					
Encourage strategic partnerships between universities and other organisations active in research					
Stimulate additional investment in higher education research					

Strengthen the contribution of the research base to economic growth					

What are the research impacts and benefits of the UKRPIF?

10) To what extent did the UKRPIF funding allow you to better establish, strengthen and leverage strategic partnerships between the point of your award and the present day with the following groups, directly attributed to the funding?

Please select one answer per row:

	To a large extent	To a moderate extent	To some extent	Not at all	Don't know/ N/A
Academic/University					
Private sector (e.g. industry)					
Third sector (Charity/Non-Profit/NGO)					
Public sector (e.g. policymakers, local government)					
Other (please specify)					

11) To what extent has UKRPIF funding allowed you to widen your pool of strategic partnerships on a geographic level between the point of your award and the present day, directly attributed to the funding? E.g. it may have allowed you to establish more partnerships in the local community than without the facility.

Please select all that apply:

	To a large extent	To a moderate extent	To some extent	To no extent	Don't know/ N/A
Local/ regional level					
National level					
International level					

What are the wider socio-economic impacts and benefits of the UKRPIF programme?

12) Has UKRPIF funding allowed your institution to produce research that has influenced/contributed to government strategy and priorities?
Please select all that apply:

Project output(s) cited in government strategy documents (e.g. white papers)
UKRPIF facility used for projects of national importance
Conducting research that directly contributes to government strategies, e.g. Net Zero by 2050
Other
Don't know/ N/A

13) If applicable, please provide specific examples of the above research, however brief.

14) Thinking about after the completion of your facility, has the facility established revenue streams (ongoing income, e.g. third parties paying to access/utilise the facility) that support the running costs of the facility beyond the original funding and **distinct from further investment (e.g. additional research council grants)**?
Please select one answer:

Yes
No
Don't know

15) [If Q14 is 'Yes'] What is the value of the revenue streams that the facility established that support the running costs of the facility? Please indicate the average value per year:

Less than £50,000
£50,000 to £100,000
More than £100,000 and up to £500,000
More than £500,000 and up to £1 million
More than £1 million and up to £2 million
More than £2 million and up to £5 million
More than £5 million and up to £10 million
More than £10 million

16) [If Q14 is 'Yes'] Please provide specific examples of established revenue streams which support the running costs of the facility, beyond the original UKRPIF funding:

17) What other research outcomes are you aware of stemming from your UKRPIF project that are not included in the survey? For example, this may include quality-adjusted life years (QALY) gained from new technologies, processes, services, reduced Co2 emissions, cost savings, patents granted, etc.

What is the impact of the UKRPIF programme on the higher education (HE) sector?

18) To what extent has your UKRPIF funding influenced your overall research infrastructure/capital strategy at your institution between the point of your award and the present day? For example, it may be that your facility is now considered a benchmark for future such buildings at your institution in terms of planning, materials, consultation approach, etc.

Please select one answer:

To a large extent	To a moderate extent	To some extent	Not at all	Don't know/ N/A

Could the programme benefits still have been achieved without the UKRPIF investment?

19) How likely is it that your institution would have delivered the facility supported by UKRPIF in the absence of that funding?

Please select one answer:

Very likely	Likely	Unlikely	Very unlikely	Don't know/ N/A

20) What progress towards delivering these facilities would your institution have made without this funding?

21) How likely do you think the following would have been achieved without the UKRPIF investment, compared to with the investment?

Please select one answer per row:

	Very likely	Likely	Unlikely	Very unlikely	Don't know/ N/A
Enhanced research facilities at your HEP to undertake world-leading research					
Strategic Partnerships between your HEP and other organisations					
Co-investment from partners					
Additional investment post-award					
Economic growth (E.g. local/national, jobs, spin-outs)					

22) To what extent would the programme's benefits, which you have previously described in the preceding questions, have come about if you had not received UKRPIF funding? (E.g. increased capacity for research, greater number of doctoral students)

Please select one answer:

All benefits would have been achieved
Most benefits would have been achieved
Some benefits would have been achieved
None of the benefits would have been achieved
Don't know/N/A

How effective is the UKRPIF funding model?

23) To what extent do you think the eligibility criteria (e.g. funding levels available, timeframe to spend the funding, co-investment requirements) of UKRPIF are suitable for and support the following:

Please select one answer per row:

	To a large extent	To a moderate extent	To some extent	To no extent	Don't know/ N/A
Your type of provider (e.g. research-intensive, civic, specialist)					
Your discipline(s) focus					

The size and type of your partnership model (e.g. a large group of smaller contributing co-investors, mostly public/NGO co-investors rather than industry)					

24) From your knowledge, have any unintended or surprising positive and/or negative consequences occurred as a result of your UKRPIF project? E.g. at an operational/ management/research level:

25) How satisfied are you with the UKRPIF scheme in terms of its processes between the point of your award and the end of the spending period?

Please select one answer per row:

	Very satisfied	Satisfied	Unsatisfied	Very unsatisfied	Don't know
Call marketing					
Programme design (e.g. double match-funding, grant length, world-class research focus)					
Application process					
Selection processes (e.g. assessment stages, feedback on application, transparency)					
Time from application to award					
Programme monitoring					
Post-award support (e.g. ongoing contact with Research England)					
Post-project completion support, if applicable (Research England pointing you towards further calls, dissemination opportunities)					

The extent to which the scheme met your process needs (e.g. in terms of contracts, extensions, finance arrangements)					

26) What is your overall experience of the UKRPIF scheme?

Please select one answer:

Very positive	Positive	Neutral	Negative	Very negative	Don't know

27) If you were to change one thing about the UKRPIF programme to improve it, what would that be?

28) If you have any further comments or have had any issues completing this survey, please detail these in the box below:

On behalf of RAND Europe, Frontier Economics and Research England, thank you for taking the time to complete this survey.

Annex C. Award Holder Interview Guide

Introduction

1. Could you briefly describe the UKRPIF project you were involved in and your role in this?
    a. Has your university previously been working with similar activities?
2. Can you briefly sum up your overall experience with the UKRPIF programme?

Discussion of direct impacts of the UKRPIF

3. To what extent has the UKRPIF funding helped to enhance the facilities at your institution?
    a. [If to at least some extent] Could you please describe what facilities have been enhanced as a result of UKRPIF funding].
    b. [If to no/ little extent] Why do you think that the UKRPIF funding has not helped to enhance the facilities in your institution?
    c. Is there anything you can suggest that may (further) increase the ability of UKRPIF to enhance your facilities?
4. In your opinion, would your institution have been able to deliver any/ all of these facilities in the absence of UKRPIF?
    a. [If yes]: Which facility/ies would still be able to have been delivered?
5. To what extent do you feel the UKRPIF funding has facilitated knowledge exchange between your institution and other HEPs?
    a. [If to at least some extent for any level] Are there any specific ways that UKRPIF helped contribute to this knowledge exchange?
    b. [If to a small extent] What prevented UKRPIF from facilitating any/ much knowledge exchange?
6. To what extent, if at all, would this/ese knowledge exchange/s have taken place without UKRPIF?
    a. [If to at least some extent]: Which knowledge exchange/s do you think would still have taken place?
7. Has the UKRPIF helped increase the capability and capacity for world-class research at your institution?
    a. [If yes]: In what ways has this capability and capacity been increased?
    b. [If no] How could UKRPIF be improved to help increase the capability and capacity for world-class research at your institution?
    c. How would research activity and capacity at your institution compare with and without UKRPIF funding?

Discussion of broader impacts of UKRPIF

8. To the best of your knowledge, have the activities enabled by UKRPIF affected the international reputation of your institution and/or its facilities?
    a. [If yes] Could you provide any examples of how UKRPIF has affected the international reputation of your institution/s and/or its facilities?
    b. [If no] Why do you think that UKRPIF has not affected the international reputation of your institution/s and/or its facilities?
        i. Is there anything that could be improved for UKPIF that may contribute to increasing this reputation?
9. In your opinion, does your UKRPIF-funded project contribute to government strategies and priorities?
    a. [If no] Could it be adapted to meet government strategies and priorities?
10. Are you aware of any of your programme outputs being used by policymakers?
    a. [If yes] How are your programme outputs being used by policymakers?
11. Do you think your facilities funded by UKRPIF are easy to maintain?
    a. [If yes or at least to some degree] In what way/s are they easy to maintain?
        i. Could you provide an example of a facility that is easy to maintain?
    b. [If to no or to only a small extent] Why are your facilities not easy to maintain?
        i. What would make them easier to maintain?
    c. And, in your opinion, are these facilities easy to develop?
12. Has the funding enabled your facilities to adapt to new developments within its field?
    a. [If yes] Are you able to provide an example of how your facilities have adapted to new developments within their field as a result of the UKRPIF funding?
    b. How do you think UKRPIF delivery could be improved to allow your facilities to better adapt to new developments within your field?
13. In your opinion, has UKRPIF influenced the research infrastructure strategy of your institution?
    a. [If yes] In what way/s has UKRPIF influenced the research infrastructure strategy of your institution?
    b. [If no] Have you any suggestions on how UKRPIF could be changed to facilitate this?

Anticipated impacts vs actual impacts

14. Please could you tell me about what positive impacts you anticipated from your UKRPIF-funded project/s?
    a. How do these anticipated impacts compare to the actual impacts your project has had?
        i. Can you provide an example/s of any actual impacts?
    b. [If differences] Why were there differences between the anticipated and actual impacts of your projects?
        i. Were there any unanticipated impacts?
        ii. Is there anything that could be done to help ensure greater alignment between anticipated impacts and actual impacts?
15. On the other hand, did you anticipate any disbenefits of the UKRPIF investment?
    a. Did these anticipated disbenefits materialise from your UKRPIF-funded project?

Discussion of the UKRPIF funding model

16. What do you think about the requirements for the UKPIF funding model?
    a. What is good about/ works well for the requirements?

   b. Are there any ways that the requirements for the UKRPIF funding model could be improved?
17. In what ways, if any, did the requirements for the funding help maximise the impact of the programme?
18. To what extent did the requirements of the UKRPIF constrain research and impact?
    a. Did UKRPIF make a step change in UK research?
    b. Does it support novel and high-risk research areas?
    c. Is it suitable for your type of provider, discipline and size of excellent research consortia?
        i. Do you think there are any types of providers, disciplines or sizes of excellent research consortia for which it constrains research and impact?
19. In your view, were the funding thresholds appropriate? (i.e. was the amount of funding appropriate)
20. Thinking about the funding structure of UKRPIF, is there anything that you think works well?
21. Conversely, is there anything about the funding structure of UKRPIF that could be improved?
22. What is your experience of the funding model in relation to the timeframe of completion?
23. What were the needs of your institution that you hoped UKRPIF would meet?
    a. To what extent has the UKRPIF met the needs of your institution?
    b. [If to at least some extent] How has the UKRPIF meet the needs of your institution?
    c. What would need to change in the funding model of UKRPIF to ensure it meets the needs of your institution?

Concluding questions

24. Is there anything else relating to the UKRPIF that you would like to add that we have not yet covered?