Summative Assessment of CAYMAN at the University of Bradford

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European Regional
Development Fund

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Executive Summary

This report provides a summative assessment of CAYMAN (Chemistry Assets for Yorkshire Manufacturing) which was part funded through European Regional Development Funds (ERDF). CAYMAN was a £2.2 million project delivered across the Leeds City Region (LCR) by the Analytical Centre at the University of Bradford (UoB). Buckman Associates Ltd and Southern Horizons (UK) Ltd were commissioned to support the summative assessment process and this report is the final output. Research included primary and secondary methods, including a review of project documentation, an online survey of supported businesses, qualitative interviews with the project team and strategic stakeholders alongside the development of case studies.

Project Context

CAYMAN was developed within the context of a national and regional drive to increase innovation and R&D in businesses. The regional Innovation Strategy identified that the LCR performed relatively poorly on most innovation indicators. CAYMAN specifically sought to support its chemical sector by refurbishing existing equipment and supporting laboratory areas to provide new analytical techniques as well as providing a package of support to enable companies to access the facilities and engage with University expertise.

The project had a strong degree of fit with policy objectives and aimed to address a number of market failures in relation to businesses accessing analytical techniques, arising from imperfect information, market power and equity, providing it with a strong rationale. It was designed around five work packages which fitted together as a cohesive whole and related back directly to the project's objectives and targets. The expansion of the project to include the Faculty of Engineering and Informatics part way through the delivery period was warmly welcomed. However, whilst the output indicators selected reflect the project design, the output model incorrectly assumed at the outset that businesses could be counted twice if they engaged in different parts of the offer resulting in a misalignment in targets. However, sub-sequent re-structuring addressed this.

After the project started the Covid-19 pandemic created one of the most turbulent periods in recent history which exerted pressure on delivery. However, the team was able to mitigate well against this and interest from businesses remained strong. The project should therefore reasonably be expected to perform well against its output targets.

Project Progress

In March 2020 the national lockdown meant that the University research facilities were forced to close. However, permission to maintain a skeleton (socially distanced) staff presence on site enabled to the equipment to continue running over this period and delivery to continue remotely. The pandemic nonetheless impacted on the delivery of learning events, which were initially cancelled and then moved online. Over time, the team evolved their approach to the delivery of learning events into a model which was structured around four hours of online learning, followed by a bespoke client meeting and development of a 'mini-project.' A PCR was approved to reprofile following the pandemic and a second PCR enabled the team to expand their offer to businesses through the purchase of additional equipment.

At the time of the summative assessment, whilst 100% of the project's capital expenditure had been spent, only 78% of its revenue budget had been spent. This underspend was due to delays in recruitment and changes to the staffing structure (which was one of the most significant challenges encountered within the project) as well as the move to online delivery due to the pandemic. The revenue budget is not expected to be fully spent by project closure. At the time of the summative assessment, performance against output targets was broadly on track to meet overall targets. The project was slightly behind profile in relation to the number of businesses assisted (C1/C4) but a strong pipeline means that the team expect to achieve this

target by project closure. In contrast the other targets had already been met (C26 and P2), exceeded (C28) or were close to being met (C29).

Project Delivery and Management

Evidence from the evaluation interviews indicates that the project application process was somewhat protracted, primarily resulting from the team's limited prior experience of ERDF. However, once funding had been secured the team was able to mobilise and start the process of upgrading the equipment very quickly.

A website and brochure were developed and evidence indicates that the project was actively promoted with a healthy mix of direct approaches to businesses and promotion through third parties, though efforts were initially curtailed somewhat by the Covid-19 pandemic. More recently, the team had some success with LinkedIn and the specialist company that they employed – Interaction Northwest – generated a good number of leads, which may offer a learning point for future projects.

Evidence suggests that CAYMAN was well managed with clear systems in place to structure client engagement, project compliance and reporting. The governance and management structures were appropriate for the nature of the project and were felt to be working well in practice. However, the project experienced some challenges in terms of recruiting and retaining staff with the right combination of skills.

Feedback from participants showed high levels of satisfaction with all aspects of the project, with the team delivering a professional and high-quality service as well as keeping paperwork to a minimum (whilst ensuring compliance). 77.8% (14) respondents said that they would be very likely to recommend the project to others. It was also held in high regard by stakeholders who were impressed by how well the team translated academic concepts into commercial language and developed meaningful business interactions.

There is evidence that horizontal principles were embedded to some extent in the delivery. Efforts were certainly made to address the sustainability theme but despite the University's clear and strong commitment to E&D principles, the evaluators believe there was scope for the team to be more proactive in a) promoting E&D principles with businesses and b) reaching women led businesses.

Outcomes and Impact

The project made good progress towards achieving the outcomes and impacts set out in the logic model, particularly those relating to the development of new products and processes as well as engagement with Higher Education. There is evidence that businesses were supported along their technology readiness journey and had introduced new characterisation techniques as a result of the project. Engagement had helped businesses to solve R&D and production related problems and there is evidence that the project had already prompted businesses to take action, including the development or new products and services.

However, at the time of the summative assessment, it was not possible to quantify the economic growth experienced by participants, therefore it has not been possible to estimate the gross or net impacts arising from the project. However, looking to the future, over half of the survey respondents expected the support to result in an increase in turnover and/or profitability over time, indicating future economic benefits.

There is evidence that the project made a contribution to the achievement of ERDF programme results indicators and had resulted in wider benefits to the region in terms of contributing to the growth of the advanced manufacturing and biosciences cluster in the area as well as strengthening the R&D base. Stakeholders were confident that there will also be Strategic Added Value arising from the project over time, primarily stemming from the continuing relationships with businesses which it is hoped will lead to other research/knowledge transfer opportunities as well as contributions to the regional policy agenda.

Value for Money

At the time of the final summative assessment, total unit costs were significantly higher than the national benchmarks. This was to be expected given the high up-front capital costs incurred in undertaking the refurbishment and purchasing the equipment. When these capital costs are excluded, the unit costs fall within the normal range and are better than expected at the project design stage.

Conclusions and Learning

CAYMAN's strengths are that it:

- Was a well-designed project which benefitted from a relatively simple delivery model and a clear set of activities for participants;
- Was able to pivot delivery in response to the pandemic;
- Responded to the challenge of recruiting and retaining staff with the right combination of skills by outsourcing business development activity to a specialist company – Interaction Northwest – which generated a good number of leads;
- Expanded effectively to incorporate other parts of the University with different expertise and analytical equipment, increasing the offer for businesses;
- Kept paperwork and bureaucracy to a minimum for participants, whilst also meeting ERDF monitoring requirements; and,
- Benefited from an empathetic staff team which listened and responded well to the needs of beneficiaries in order to develop meaningful business relationships.

Potential weaknesses can be found in:

- Its inability to recruit and retain staff with the right combination of skills, though this was mitigated well with an alternative approach as highlighted above; and,
- Its approach to the delivery of the equality and diversity horizontal theme which could be improved.

For policy makers - there is emerging evidence that this sort of analytical project can provide tangible benefits to businesses in the region, by helping them to overcome specific R&D/production challenges. Therefore, LCR should consider the future role of this sort of project within the wider portfolio of economic development interventions.

For those designing and implementing similar interventions - the project's simple but effective design could be a learning point. Likewise, areas of good practice can be found in the team's approach to working with businesses along with the project's use of an outsourced company to generate leads.

For the grant recipient - for the grant recipient there may be learning in terms of how elements of projects (such as lead generation) can be outsourced and delivered more cost effectively than delivering in house. Greater thought could also be given to the integration of horizontal principles, particularly E&D, through delivery.

Section One: Introduction to the Report

This report provides a summative assessment of CAYMAN (Chemistry Assets for Yorkshire Manufacturing) which was part funded through European Regional Development Funds (ERDF) under Priority Axis 1b: Promoting Business Investment in Research and Innovation. CAYMAN was a £2.2 million project which commenced in 2019. It was delivered across the Leeds City Region (LCR), a more developed area, by the Analytical Centre within the Faculty of Life Sciences at the University of Bradford (UoB), with support, following a PCR, from the Faculty of Engineering and Informatics which enabled the team to expand their offer to businesses. The Analytical Centre is a specialist facility managing the major analytical equipment for the University and the project has no external delivery partners.

CAYMAN's main aim was to support the LCR's chemical sector by refurbishing existing equipment and the supporting laboratory areas to provide new analytical techniques as well as providing a package of support to enable companies to access the upgraded facilities and engage with UoB expertise.

As a result of the Covid-19 pandemic an initial Project Change Request (PCR) was approved to reprofile output delivery and a second PCR was approved to broaden the scope of the project from its original focus on the characterisation of liquid materials to include solid materials. This enabled the introduction of state-of-the-art equipment for surface analysis to complement the project's offer to businesses. At the same time, the second PCR extended the delivery timetable from an original practical completion date of 31st October 2022 to 30th June 2023 and the volume of outputs increased from 45 to 65 enterprises receiving support.

The University commissioned independent consultants Buckman Associates Ltd and Southern Horizons (UK) Ltd to provide a summative assessment of the project. This report follows on from an interim evaluation that was completed by the consultants in March 2021. The research follows the Department for Levelling Up Homes and Communities (DLUHC) guidance on completing summative assessments.

1.1 Methodological Note

The evaluation is underpinned by a 'theory of change approach' which is consistent with the summative assessment guidance. Although the most technically robust, or gold standard approach to this type of evaluation is to draw upon a comparator or control group in order to establish the counterfactual, this would not have been practical for CAYMAN. The project had a relatively small ERDF investment of just over £1.1 million (post PCR approval) and, with a significant proportion of the budget having been allocated to the capital component, it supported a relatively small number of direct beneficiaries. Therefore, the time and investment needed to conduct a counterfactual approach would not have been proportionate to the cost.

It would also have been challenging to establish or recruit a control group 18 months into the project when the summative assessment was commissioned. Ideally, control groups need to be carefully incorporated into the project design, ensuring the group is effectively matched to the target population, with ethical concerns having been considered. To be robust, participants are randomly assigned to two or more 'treatment groups' which receive a different intervention. Whilst the project did have two treatment groups (i.e. training/research project participants), the number of businesses in each group was small and participants were not randomly assigned to them. Likewise, whilst in theory it would have been possible to identify a third group that received no support, the number of businesses operating within this niche market meant that finding a suitable control group of companies that accurately reflected the characteristics of participants would have been challenging. As an alternative approach, theory of change enables the evaluation to focus on 'what works for who and in what circumstances' which can add real value to our

understanding of these sorts of initiatives. A set of research questions was developed for the summative as shown in Figure One overleaf.

The evaluation process included both primary and secondary research methods. A desk-based review of key documentation was undertaken alongside:

- An online survey of participating businesses. At the time of the summative assessment survey the project had supported 45 businesses and 18 of them took part in the survey (six completed the survey at the interim stage and 12 at the final summative assessment stage). As the sample size was relatively small, the findings cannot be considered statistically significant (at a 95% confidence level, the margin of error is 18%);
- Qualitative interviews with the delivery team and a strategic selection of external stakeholders; and,
- In-depth qualitative conversations with six supported businesses (two at the interim stage and four at the final stage) in order to develop case studies.

The evaluators believe that the evaluation methodology and research methods were appropriate for the summative assessment.

Figure 1: Evaluation Questions and Methods

Focus	Summary of DLUHC Requirements	Local Priorities	Sources of Evidence
Project Context	• What was the project seeking to do? • What was the economic and policy context at the time that the project was designed? • What were the specific market failures that the project was seeking to address? Was there a strong rationale for the project? • Was it appropriately designed to achieve its objectives? Was the delivery model appropriate? • Were the targets set for the project realistic and achievable? • How did the context change as the project was delivered and did this exert any particular pressures on project delivery? • Bearing in mind any changes in context or weaknesses in the project design / logic model, can the project reasonably be expected to perform well against its targets?	• To what extent has the Covid-19 pandemic impacted on project delivery, particularly given business reluctance to engage with on-site delivery?	• Desk based review of project documentation • Wider contextual review • Business survey (to explore the impact of Covid) • Stakeholder interviews • Delivery team interviews
Project Progress	• Has the project delivered what it expected to in terms of spend and outputs? • What are the factors which explain this performance? • When the project draws to a close, is it expected to have achieved what it set out to?	• To what extent did barriers to business participation (including financial ones) impede progress?	• Desk based review of core monitoring data and quarterly reports • Delivery team interviews (to understand performance and projections)
Project Delivery and Management	• Was the project well managed? Were the right governance and management structures in place and did they operate in the way they were expected to? • Has the project delivered its intended activities to a high standard? • Could the delivery of the project have been improved in any way? • Did the project engage with and select the right beneficiaries? Were the right procedures and criteria in place to ensure the project focused on the right beneficiaries? • How are project activities perceived by stakeholders and beneficiaries? What are their perceptions of the quality of activities / delivery? • To what extent have the horizontal principles been integrated into and shaped delivery?	• Could improvements have been made at the application stage? • How effectively was the project mobilised – what (if anything) could have been done better? • How effective were the project's promotional and engagement activities?	• Review of business engagement documentation/templates • Review of promotional strategies and materials • Minutes of steering group meetings • Business survey and case studies • Delivery team interviews • Stakeholder interviews

Focus	Summary of DLUHC Requirements	Local Priorities	Sources of Evidence
Outcomes/ Impacts	• What progress has the project made towards achieving the outcome and impacts set out in its logic model? • To what extent are the changes in relevant impact and outcome indicators attributable to project activities? • What are the gross and net additional economic, social and environmental benefits of the project (where relevant and applicable to project activities)? • Can these benefits be quantified and attributed to the project in a statistically robust way? To what extent has / will the project contribute to the achievement of ERDF programme result indicators? • What are the main sources of Strategic Added Value that the project has created?	• At company level, as a result of the project, have there been: ○ Increases in technology readiness ○ Increases in efficiency (productivity gains) ○ Increases in innovation investment • To what extent has the project strengthened the region's R&D base through improved facilities? • Has there been an uptake in characterisation techniques in the industry? • Have participating companies reached new markets? • What have been the wider impacts for university/industry collaboration?	• Desk review of core monitoring data, applying additionality calculations • Business survey and case studies • Delivery team interviews • Stakeholder interviews
Value for Money	• Was the scheme good value for money? • How does it compare with other interventions?	N/A	• Desk review of core monitoring data • Benchmarked against Regeneris/other unit costs
Conclusions and Lessons Learned	• What are the key conclusions? • What are the key learning points in relation to the above for: ○ The grant recipient/funding body ○ Those designing and implementing similar interventions ○ Policy makers	• What lessons can be learned for future funding applications?	• Analysis and synthesis of all findings

Section Two: Project Context

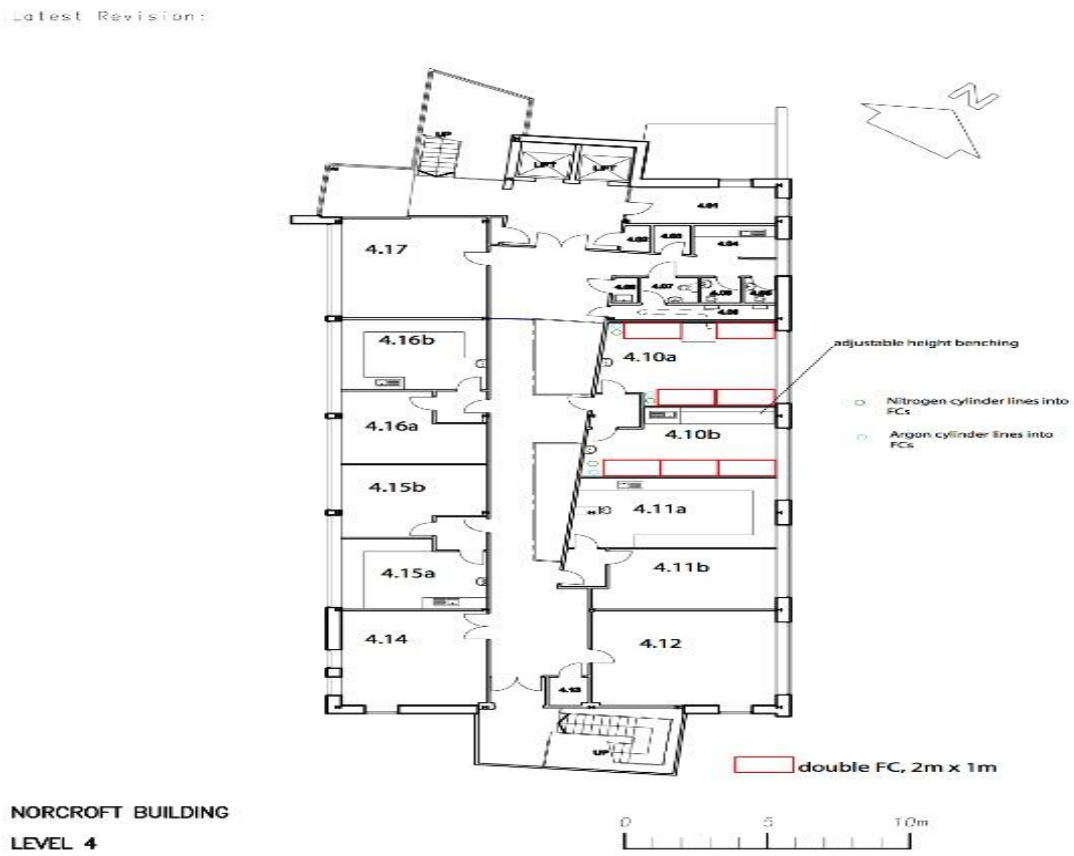
2.1 Introduction

This section of the report provides a commentary on what the project was seeking to do and what the policy context was when it was designed. It reflects on the market failures that the project was seeking to address, its core design features, targets and contextual changes that would impact on delivery.

2.2 Aim of the Project

The aim of CAYMAN was to support the Leeds City Region's (LCR) chemical sector by refurbishing existing equipment and the supporting laboratory areas to provide new analytical techniques as well as providing a package of support to enable companies to access the upgraded facilities and engage with University expertise. Specifically, the project involved the upgrade of an existing 600 MHz nuclear magnetic resonance instrument (NMR) housed in the Norcroft Building on the UoB's city centre campus to dramatically improve this instrument's characterisation of synthetic polymers and biomolecules. The use of this improved NMR facility allowed the characterisation of complex polymers that are otherwise difficult and costly to analyse. The original project also included an upgrade of the associated laboratory space including the installation of new fume extraction cupboards and a full re-fit to enable the University to undertake engagements with regional companies as shown in Figure Two. These assets have been used to provide industrially relevant research and development activity by providing a package of support to regional companies.

Figure 2: CAYMAN Refurbishment Plan



As highlighted in the introduction, the scope of the project was broadened in conjunction with the Faculty of Engineering and Informatics, through a successful PCR to introduce state-of-the-art equipment including Raman Microscopy, Laser Induced Breakdown Spectroscopy and White-light Scattering Metrology for surface analysis where there was thought to be a larger market. This was made possible as a result of having secured a UK Research and Innovation (UKRI) low interest loan that could be used as match. It was anticipated that, by serving a larger cross-section of regional manufacturers with a broader scope of analytical capability, the team could have a substantially bigger impact in the region and the project's C1/C4 outputs were increased to reflect this.

Following the PCR, the project had the following ERDF output targets:

- C1: Number of enterprises receiving support – 65 (originally 45);
- C4: Number of enterprises receiving non-financial support - 65 (originally 45);
- C26: Number of enterprises co-operating with research entities – 12 (originally 9);
- C28: Number of enterprises supported to introduce new to the market products – 5 (no change);
- C29: Number of enterprises supported to introduce new to the firm products – 13 (originally 11) and,
- P2: Public or commercial buildings built or renovated – 248 (no change).

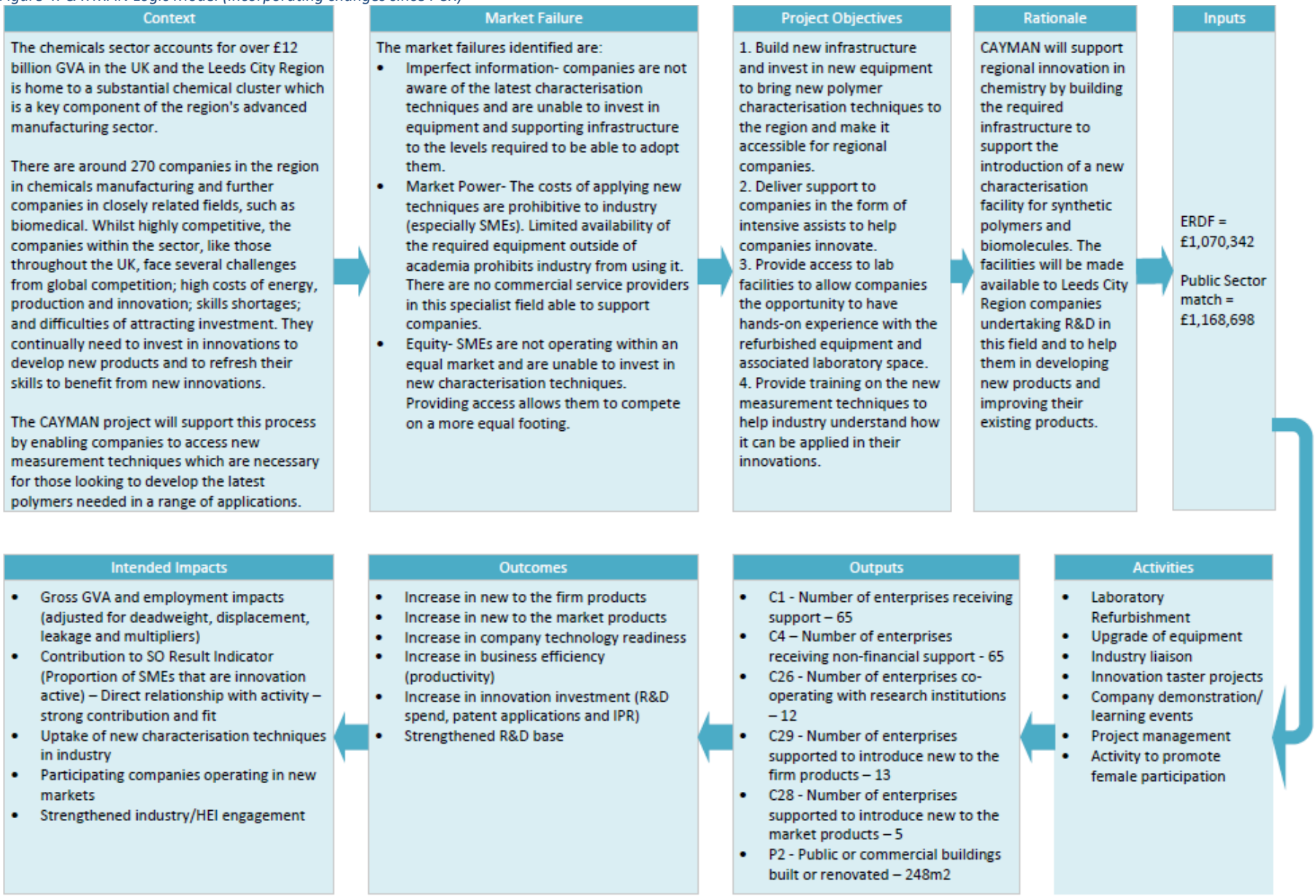
Expected outcomes and impacts were varied, as shown in Figure Four (overleaf). They included new products, increased technology readiness, efficiency (productivity) and R&D. With an uptake in new characterisation techniques within the industry, the project expected to generate GVA and employment impacts alongside new markets for participating businesses and strengthened industry/HEI engagement.

These impacts should make a strong and direct contribute to the specific objectives and results indicators for priority 1b shown below.

Figure 3: Priority 1b Specific Objectives and Results Indicators

	Specific Objective	Specific Results Indicators
Priority 1b	Increase investment in research and innovation by small and medium enterprises in sectors and technologies identified through Smart Specialisation	1) The proportion of SMEs that are innovation active as measured by the UK innovation survey 2) Increase in the R&D tax credit by number of claims under the SME scheme 3) Increase in the R&D tax credit by value of claims under the SME scheme

Figure 4: CAYMAN Logic Model (incorporating changes since PCR)



2.3 Contextual Factors and Market Failures

CAYMAN was developed within the context of a national and regional drive to increase innovation and R&D in businesses as reflected in the ESIF Strategy[1], LCR Strategic Economic Plan[2] and the Innovation Strategy.[3] The Innovation Strategy identified that the City Region performed relatively poorly on most innovation indicators with:

- Only a quarter of LCR firms investing in R&D;
- Only 8% of SMEs seeking external R&D support;
- SMEs not accessing their share (commensurate with the scale of the LCR business base) of Innovate UK support, ranking 14th across all Local Enterprise Partnership (LEP) areas; and,
- LCR ranking in the bottom half at 23rd out of the 39 LEP areas, in terms of European Patent Office patents per 10,000 residents.

As such, the Innovation Strategy had three priorities for action:

- Priority 1: Driving up innovation appetite across the City Region;
- Priority 2: Stronger innovation performance; and,
- Priority 3: New sources of innovation.

This project principally aligned with the objectives under Priority 2, which included innovation support for SMEs, innovation hot spots and innovation assets.

The application highlighted how the chemicals sector is economically important within the UK and regionally with the LCR being home to a substantial chemical cluster, a key component of the region's advanced manufacturing sector (one of six sectors identified in the Innovation Strategy). However, as identified in the application, companies within this cluster need to invest continually in R&D to enable them to remain competitive with companies from outside of the EU and with large multinational firms.

Whilst NMR has many potential benefits for businesses it is a costly and technically prohibitive technique, meaning that opportunities are often missed.

Within this context, the project aimed to address a number of market failures arising from:

- **Imperfect information** – although the Diffusion Ordered Spectroscopy (DOSY) techniques offered through this project had been proven in academia to provide a solution to known industry issues, many companies were not aware of them and would be unable to invest in equipment and supporting infrastructure to the levels required to be able to adopt them;
- **Market power** – with limited availability of the equipment outside of academia and the cost of applying any radically new measurement techniques being prohibitive to industry, especially for SMEs, as they take time and resources to embed; and,
- **Equity** – because DOSY measurements were not available as a service within the LCR outside of academia, SMEs were not operating within an equal market. Providing access would allow them to compete on a more equal footing.

[1] Leeds City Region LEP – European Structural and Investment Fund Strategy 2014-2020
[2] strategic-economic-plan.pdf (westyorks-ca.gov.uk)
[3] Leeds City Region Innovation Strategy, Regeneris 2014

2.4 Project Design

CAYMAN was originally delivered through five discrete Work Packages (WPs):

- **WP1** - refurbishment of two laboratories to provide preparation and synthetic chemistry space for activities associated with CAYMAN;
- **WP2** - tendering, purchase and installation of an upgraded control system for the existing 600 MHz NMR magnet;
- **WP3 -** industry liaison and business development activities to establish contact with potential SME beneficiaries;
- **WP4 -** delivery of discrete research and innovation projects and company demonstration/learning events using the upgraded facilities; and,
- **WP5 -** programme management and quality assurance governed by a Board chaired by the Head of School, Chemistry and Biosciences.

More latterly, delivery has included the purchase of additional equipment in conjunction with the Faculty of Engineering and Informatics and an expansion of the offer to businesses.

WP4 was initially originally designed to deliver 30 fully funded research and innovation projects to regional SMEs. Described as Polymer Research and Innovation Tasters (PRITs), these collaborative projects were expected to use the NMR facilities and high-field NMR techniques to investigate how they may be used to characterise macromolecular materials and complex chemical mixtures in an attempt to help develop new products and optimise manufacturing processes. The WP also included 15 fully-funded company demonstration/learning events to facilitate knowledge exchange between the University and regional SMEs to demonstrate the potential benefits of modern techniques in NMR. The PRITs and demonstration/learning events were subsequently expanded to incorporate access to the additional equipment that was purchased.

At the time of writing the interim evaluation in the early part of 2021, the company demonstration/learning events had not commenced but had just been re-configured for virtual delivery as a result of the Covid-19 pandemic. They were expected to be hosted on zoom and involve an introduction to the NMR, a review of more advanced techniques, case studies and guidance on sample preparation and instrument set up. In addition, it was hoped that attendees would have the opportunity to analyse their own samples and interpret the data. The University expected to make use of digital learning platforms to provide 'instrument access' and continue to demonstrate live data generation and processing using the 600MhZ NMR.

The evaluators understand that once the University re-opened when social distancing restrictions had been lifted, they found that there remained a limited appetite amongst businesses for face-to-face delivery and this part of the offer pivoted again and it was actually delivered as a hybrid model incorporating:

- Four hours of online learning delivered by an academic;
- Followed by an individual meeting with each client; and,
- The development of individual 'mini projects' based on the PRIT model but involving less intensive support than a full taster.

Stakeholders – both internal and external – reflected positively on the design of the project. The equipment and associated support were felt to be exactly what industry needed. In the words of an external stakeholder:

"The model is good…they have interesting capability and are very commercially minded. The cost of this sort of kit would be prohibitive for most SMEs"

Although commercial companies may offer an analytical service, stakeholders indicated that it was limited, and the interviews suggested that CAYMAN provided a much more valuable offer for businesses. As an external stakeholder pointed out:

"The University can do more than just testing – which is all a commercial company would offer – the team's ability to link businesses into other parts of the University is really important and adds value to businesses, providing advice that goes above and beyond just delivering an analytical service"

Likewise, whilst other universities may have measurement capabilities:

"CAYMAN's offer is reasonably unique. Other institutions will have some of the same equipment but they tend to be academically focused and not engaged with industry in the same way"

"Not all universities want to do this and are not used to working with industry. Bradford has a demonstrable track record and knows what industry needs. It can offer speed and efficiency"

The expansion of the project to include the Faculty of Engineering and Informatics within the model was warmly welcomed. Although not all of the equipment had been utilised at the time of the summative assessment, stakeholders certainly noted the potential. It was suggested that:

"The linkages between chemistry and engineering are really important for businesses, particularly those looking to export"

"It has provided a really good opportunity to cross-fertilise"

"Inclusion of the Raman microscope allowed the project to look at food samples, which is not possible without it"

2.5 Project Targets

In considering the appropriateness of project targets, the evaluation team considered whether the targets aligned with the proposed activities and the value of the investment.

As highlighted in the interim evaluation report, at the time the application was submitted UoB's Analytical Centre had not delivered many ERDF projects and therefore did not have an extensive experience of ERDF output indicators. As a result, the team had anticipated that businesses would be able to participate in both learning/demonstration events and PRITS and that each engagement would lead to a C1 output. Unfortunately, ERDF rules means that businesses could only be counted once for a C1, regardless of the amount of support provided. Therefore, under the initial delivery model, it was not feasible for businesses to take part in both. However, subsequent re-structuring of the learning events allowed the inclusion of a 'mini-project' which enabled these two valuable elements to be brought together and was a good compromise.

In terms of value of the investment, the evaluators assessed the proposed unit costs (originally and following the PCR) against benchmarks from the 2007-2014 programme[4] produced by Regeneris Research and the full analysis is included as an annex to the report. This shows that the original and revised forecast unit costs

[4] England ERDF programme 2014-2020: Output Unit Costs and Definitions. A final report by Regeneris Consulting

(including capital and revenue) were higher than the benchmarks produced by Regeneris across all indicators. This was to be expected given the high capital costs associated with the laboratory refurbishment and purchase of equipment. When the analysis considers revenue costs only, the unit costs (original and revised) fall within the normal range for all indicators, except for the C28 indicator.

2.6 Contextual Changes

Project delivery coincided with an unprecedented period of turmoil arising from the global Covid-19, wider economic uncertainty associated with the UK's departure from the European Union and more latterly the cost-of-living crisis. ONS data show that the disruption from the pandemic affected nearly every sector, including manufacturing.[5]

The pandemic principally affected two of the original CAYMAN activities:

- **Delivery of research and innovation projects** – despite the lockdowns and other restrictions imposed during the pandemic, the team could operate the machinery remotely and was therefore able to continue to deliver the research and development projects as per the proposed schedule. Whilst activity continued during this period, restrictions prevented face to face meetings or tours and meant businesses could not be present when the investigations were performed. Some of the businesses that took part in the summative assessment survey indicated that this was a shame, but it did not make a material difference to the outcome of the PRITs; and,
- **Delivery of group demonstration/learning events** – with various restrictions in place throughout 2020, the two proposed group demonstration/learning events were cancelled and the team developed alternative plans, eventually developing the hybrid model as highlighted above.

More latterly, shortages arising from supply chain challenges in the wake of the pandemic also affected delivery of the additional equipment that was purchased following the PCR. The evaluators understand that they were custom orders which were impacted by the availability of chips which had been in short supply since the pandemic.

More broadly stakeholders noted that following a large expansion in activity during the previous decade, the manufacturing sector has been hit by a period of turbulence in recent years, resulting from BREXIT, the Covid-19 pandemic and, more recently, by workforce shortages. Whilst this potentially created a challenging time in which to deliver a project like CAYMAN, it was also pointed out these factors made the interaction between industry and academia even more important. As noted in the PCR, CAYMAN's output delivery remained high despite the pandemic with demand for capital assets that would be unaffordable for individual SMEs predicted to grow. Equally, Covid had created opportunities for some companies within the target sectors where bespoke analytical projects could add value.

2.7 Contextual Assessment

The changing economic context exerted pressures on delivery, but the team put in place mitigations which ensured that activities could continue to take place. As demand for the project remained high post pandemic, the evaluators conclude that the project should reasonably be expected to perform well against its output targets.

[5] https://www.ons.gov.uk/businessindustryandtrade/business/businessservices/bulletins/businessinsightsandimpactontheukeconomy/28january2021

PROJECT CONTEXT: SUMMARY OF KEY POINTS ADDRESSING THE EVALUATION QUESTIONS

- CAYMAN was developed within the context of a national and regional drive to increase innovation and R&D in businesses. An Innovation Strategy identified that the City Region performed relatively poorly on most innovation indicators.
- CAYMAN sought to support the LCR chemical sector by refurbishing existing equipment and the UoB's supporting laboratory areas to provide new analytical techniques as well as providing a package of support to enable companies to access the upgraded facilities and engage with University expertise.
- The project was designed to support objectives set out in the LCR's Strategic Economic Plan, ESIF Strategy and Innovation Strategy. These all highlighted the relatively poor innovation performance in the region and the opportunities for a number of key sectors to address this deficit. The key sectors included advanced manufacturing, of which the chemicals sector is a key part. The application highlighted the region's strength in the chemicals sector and the need for companies in this sector to invest in R&D to remain competitive.
- NMR has many potential benefits for businesses but it is a costly and technically prohibitive technique, meaning that opportunities are often missed. The project aimed to address a number of market failures in relation to businesses accessing this technique, arising from imperfect information, market power and equity, providing it with a strong rationale.
- The project was designed around five work packages which fitted together as a cohesive whole and related back directly to the project's objectives and targets. The evaluation team believe that it was well designed with an appropriate delivery model and this was also the view of the stakeholders consulted through this evaluation.
- The expansion of the project to include the Faculty of Engineering and Informatics within the model was warmly welcomed.
- However, whilst the output indicators selected reflect the project design, the output model incorrectly assumed at the outset that businesses could be counted twice if they engaged in a PRIT and a learning/demonstration event. Therefore, the C1 target did not align well with the intended delivery model. However, subsequent re-structuring of the learning events, enabled them to include a 'mini-project' which helped to bring these two elements together.
- Analysis shows that forecast unit costs were higher than average, reflecting the inclusion of capital elements but when these are excluded, the unit costs fell within the normal range for most indicators.
- The economic context has shifted significantly since the project started, with the Covid-19 pandemic creating one of the most turbulent periods in recent history. This exerted pressure on delivery. However, the team was able to mitigate well against this and interest from businesses remained strong.
- Given the above, the project should reasonably be expected to perform well against its output targets. However, wider economic conditions mean that growth related outcomes (such as increases in GVA, productivity and jobs) may potentially be more challenging to achieve.

CASE STUDY: Io-Cyte Ltd

Io-Cyte Ltd is a three year old start-up company which has developed a new advanced wound dressing for use on chronic, hard to heal wounds such as ulcers, pressure sores and burns. Io-Cyte is a spin-out from Xiros Ltd, a well-established SME company dedicated to orthopaedics.

Wound care places a massive burden on healthcare systems globally and the NHS spends an estimated £5bn per year on wound care, caring for over 2 million wounds. The new dressing, developed by Io-Cyte, is designed to be anti-microbial, anti-inflammatory and highly absorbent whilst maintaining the right conditions for the wound to heal. A key property of the dressing is its anti-microbial properties. In the wound environment, bacteria often form colonies that excrete a protective gel over the colony (known as biofilm). These protect the bacteria from common anti-bacterial products and prevents the wound from healing.

The new dressing uses Iodine as its active anti-microbial agent. The team at Io-Cyte wanted to be able to accurately measure the amount of Iodine in the product and the form in which it exists (as it is only active in the molecular form). The team currently use a relatively simple titration process to test Iodine levels, which is effective, but not particularly accurate. In submitting information to regulatory authorities, they knew they would need to provide more accurate results, as well as being able to identify the proportion of Iodine in the active form and the stability of the active ingredient over time. Further, they knew that they would need to be able to accurately measure Iodine levels as they scaled up their production processes to ensure product quality.

The team initially approached the Centre for Process Innovation (a founding member of the UK Government's High Value Manufacturing Catapult) for advice, but the Centre referred them to CAYMAN at the University of Bradford. The CAYMAN team quickly established that they were eligible for support and met with the Io-Cyte team to understand the problem they were trying to solve. In the words of David Farrar (R&D Director):

"We had some helpful discussions with the University. They had a good understanding of the problem we were trying to solve and took time to think about it and come up with the best solution"

Whilst the team at Io-Cyte expected the University to suggest the use of complicated kit and techniques such as ICP mass spectrometry, they actually proposed a standard titration test as the best method of measuring the Iodine levels. Io-Cyte had already been using titration tests, but their equipment did not allow a particularly precise measurement as it was based on a subjective assessment of colour changes. The University however had access to auto-titration equipment, in which electronic sensors record the measurement (potentiometric method). This equipment therefore allowed a much more precise measurement to be taken.

The research report provided Io-Cyte with an accurate and precise measurement of Iodine levels in their product and speciation of molecular from ionic iodine which they have included within the information pack recently send to the United States regulator (the Food and Drug Administration). As the company moves forward into the production phase, the support from the project to identify the most appropriate Iodine measurement technique means that Io-Cyte can now invest in their own auto-titration equipment, confident that the equipment will perform as required.

Section Three: Project Progress

3.1 Introduction

The section of the report provides an independent assessment of CAYMAN's progress. It focuses on progress in relation to project milestones as well as the achievements against contracted targets for outputs and spend.

3.2 Milestones

Figure Five (overleaf) sets out progress against the project's milestones (as set out in the application). Those items towards the bottom of the table marked with an Asterix and highlighted in italics have been either added to the programme or reprofiled as a result of the PCRs. The Figure shows that despite the challenging circumstances in which the project has been operating, momentum had been maintained throughout which is a testament to the hard work and commitment of the team.

The quarterly reports show that there were some early slippages in the timetable in relation to WP1 largely attributable to the unforeseen delays in delivery of the fume cupboards but the key milestones in relation to WP1 were all achieved. There were also some delays in staff recruitment but in WP2 the NMR was actually commissioned ahead of schedule. With the upgraded equipment and facilities having been successfully completed, a project launch event took place in January 2020. However, shortly after this in March 2020 the University research facilities were forced to close as a result of the national lockdown imposed by the UK government in response to the Covid-19 pandemic. The CAYMAN team sought and received permission for the University's management to maintain a skeleton (socially distanced) staff presence on site to keep the NMR running over this period even though the team itself was not able to access the facilities directly. This meant that experiments could continue through remote access and results shared with businesses via zoom. However, the initial training event that was scheduled for delivery in April 2020 had to be cancelled, as was the second one scheduled for September 2020. Learning events were subsequently moved online but they proved to be more challenging to fill than anticipated, initially as a result of so many staff being on furlough during the pandemic. The PCR reprofiled this part of the project's delivery over an extended period.

Physical attendance at the specific events profiled during this period was also impossible during the lockdown but the team continued to attend events remotely where possible.

Despite the closure of the research facilities in March the project team continued to actively discuss new R&D projects with potential clients and business engagement continued to be remarkably strong in the circumstances. Case studies were developed during the lockdown period and mounted on the CAYMAN website to which a specific news section was added. A CAYMAN brochure[6] was also assembled and designed using the Universities' design and print partner (Inprint and Design) which has been used as an initial introduction to potential clients. As discussed in Section Four, the team has continued to explore different approaches to marketing and promotion as the project progressed. Whilst the Analytical Centre officially re-opened again in July 2020, the team continued to utilise 'Microsoft Teams' meetings for the majority of clients for the remainder of the project as this was the preference for the majority of clients.

As a result of the second PCR, the team was able to expand their offer to businesses, initially through the purchase and installation of the Raman microscope in May 2022 as well as equipment to support Laser

[6] https://www.bradford.ac.uk/analytical-centre/cayman/CAYMAN-PROJECT-brochure-University-of-Bradford_2020.pdf

Induced Breakdown Spectroscopy and White-light Scattering Metrology in Quarter 3 2022.

The team has also evolved their approach to the learning events over time, developing a model that became structured around four hours of online learning, followed by a bespoke client meeting and the development of a 'mini-project' (smaller than a PRIT).

At the time of writing this report, outputs were behind schedule. Despite the strong industry engagement there have nevertheless been challenges in converting the interest into project outputs but the team remains optimistic that targets can be met, particularly with the expanded offer that has been made available through the additional equipment that was purchased. Feedback from the stakeholder interviews also indicated that the ERDF eligibility criteria has been a challenge in some circumstances particularly for those companies that appear to fit the SME criteria on initial engagement but actually turn out to be subsidiaries of a much larger (and therefore ineligible) business. Equally (as detailed in section 4.2.4) stakeholders highlighted that despite the team's best efforts to minimise paperwork it could nonetheless be a barrier to participation for some businesses.

Figure 5: Project Milestones

	Planned start date	Planned completion date	Position
Full Application Submission	May-2019	July-2019	Complete
Appraisal Process	May-2019	July-2019	Complete
NMR equipment tendering process	Aug-2019	Sept-2019	Complete
Lab refurbishment tendering process	May-2019	July-2019	Complete
Contracting Process	July-2019	Oct-2019	Complete
Offer letter / Signed Funding Agreement	Oct-2019	Oct-2019	Complete
Project Start	Oct-2019	Oct-2019	Complete
NMR equipment – placement of order	Oct-2019	Oct-2019	Complete
Lab refurbishment – placement of order	Aug-2019	Aug-2019	Complete
Lab refurbishment	Oct-2019	Dec-2019	Complete
Core Staff Recruitment Activities	Oct-2019	Oct-2019	Complete
Attendance at NEPIC Cluster Connect 2019 (Commercial Manger(s))	Oct-2019	Oct-2019	Complete
Establish Advisory Group & Steering Group (structures, systems, reporting)	Dec-2019	Dec-2019	Complete
Establish project management systems (templates, processes, reporting)	Dec-2019	Dec-2019	Complete
Establish Marketing and Comms Plan & Employer Engagement Strategy	Dec-2019	Dec-2019	Complete
Completion of lab refurbishment	Dec-2019	Dec-2019	Complete
NMR equipment – delivery & installation	Jan-2020	Jan-2020	Complete
Project launch (launch event at UoB & web presence)	Jan-2020	Jan-2020	Complete
NMR equipment – commissioning	Mar-2020	April-2020	Complete
Group Training / demonstration Session 1 (2 days, 5 companies)	April-2020	April-2020	**Cancelled**
Delivery of first PRIT outputs (x3)	April-2020	July-2020	Complete
Promotion of first successful engagements (i.e. case study)	Jun-2020	Jun-2020	Complete
Attendance at PraxisAuril Consultancy Connect 2020	Jun-2020	Jun-2020	**Cancelled**
Attendance at NEPIC Cluster Connect 2020	Jun-2020	Jun-2020	**Cancelled**
Group Training / demonstration Session 2 (2 days, 5 companies)	Sept-2020	Sept-2020	**Cancelled**
Delivery of PRIT outputs (x4)	Oct-2020	Dec-2020	Complete
Mid-Term Evaluation	Feb-2021	Feb-2021	Complete
Group Training / demonstration Session 2 (2 days, 5 companies)	Mar-2021	Mar-2021	Complete
Delivery of PRIT outputs (x5)	April-2021	Jun-2021	Complete
Attendance at NEPIC Meet the Members 2020	July-2021	July-2021	Complete
Delivery of PRIT outputs (x3)	July-2021	Sept-2021	Complete
Delivery of PRIT outputs (x6)	Oct-2021	Dec-2021	Complete
Delivery of PRIT outputs (x5)	Jan-2022	Mar-2022	Complete
***Delivery of PRIT outputs (x5)**	*Apr-2022*	*Jun-2022*	Complete

	Planned start date	Planned completion date	Position
Delivery of PRIT outputs (x6)	*Jul-2022*	*Sep-2022*	Complete
Delivery of PRIT outputs (x6)	*Oct-2022*	*Dec-2022*	Complete
Delivery of PRIT outputs (x7)	*Jan-2023*	*Mar 2023*	*Ongoing*
Delivery of final PRIT outputs (x5)	*April-2023*	*Jun-2023*	
Final Evaluation and Summative assessment	*Jun-2023*	*Jun-2023*	*Complete*
Main Activity End Date	*May-2023*	*May-2023*	
Financial Completion / Final Defrayals	*May-2023*	*May-2023*	
Final Claim Submitted	*Jun-2023*	*Jun-2023*	
Practical Project Completion (final output reporting)	*Jun-2023*	*Jun-2023*	

3.3 Spend and Output Performance

Reflecting the slippages in WP1, delayed recruitment and early delivery of the NMR in WP2 an initial PCR was submitted to re-profile the budget. This PCR did not request any changes to the overall funds – merely an adjustment to the spending profile. In light of the Covid-19 pandemic and in particular the inability to deliver socially distanced company demonstration/learning activities, the PCR also made a request to defer outputs from 2020 to 2021.

As highlighted above, a second PCR expanded the project's offer, expenditure, outputs and timeline. Figure Six shows the project's performance at the point of the last claim (i.e. up until the end of December 2022) and projected performance at project closure. In summary as of Quarter 4 2022:

- **Expenditure** – 100% of the capital expenditure had been spent, but only 78% of the revenue budget had been spent. By project closure this is expected to have risen to 82%, which is still a significant shortfall. The reasons for this under-performance include:
    - Delays in recruitment and subsequent changes to the staffing structure which was one of the most significant challenges encountered within the project;
    - The move to online delivery due to the pandemic which reduced the need for travel and subsistence expenditure.
- **Outputs** – as at the end of Quarter 4, 2022, the project had supported 49 enterprises (75% of its revised target and 92% of the expected position at the end of Quarter 4 2022). The team had a strong pipeline of businesses that had signed up for support in the remaining five months of delivery and were therefore confident that these outputs would be achieved by project closure. The number of enterprises supported to develop new to the firm products (C29) was just one output short at the time of the summative assessment and therefore the team was confident that this will be achieved by project closure. The remaining outputs (C26/C28/P2) had already been achieved at the time of the summative assessment which is an excellent achievement.

Figure 6: Spend and Output Performance as the End of Quarter 4 2022

Indicator	Targets		Performance at Time of Evaluation		Projected Performance at Project Closure	
	Original	Revised	No.	% of target	No.	% of target
Total Capital Expenditure	£944,779	£1,441,779	£1,441,779	100%	£1,441,779	100%
Total ERDF capital Expenditure	£567,434	£822,743	£822,743	100%	£822,743	100%
Total Revenue Expenditure (£m)	£655,370	£794,261	£616,301	78%	£652,874	82%
Total ERDF revenue expenditure (£m)	£228,713	£247,599	£215,079	87%	£230,533	93%
C1: Number of enterprises receiving support	45	65	49	75%	65	100%
C4: Number of enterprises receiving non-financial support	45	65	49	75%	65	100%
C26: Enterprises co-operating with research institutions	9	12	12	100%	13	108%
C28: Number of enterprises supported to introduce new to the market products	5	5	7	140%	7	140%
C29: Number of enterprises supported to introduce new to firm products	11	13	12	92%	13	100%
P2: Public or commercial buildings built or renovated	248	248	248	100%	248	100%

Source: Monitoring data Key: Red = less than 85%, Amber = between 85% and 95% and Green = greater than 95

3.4 Business Participation

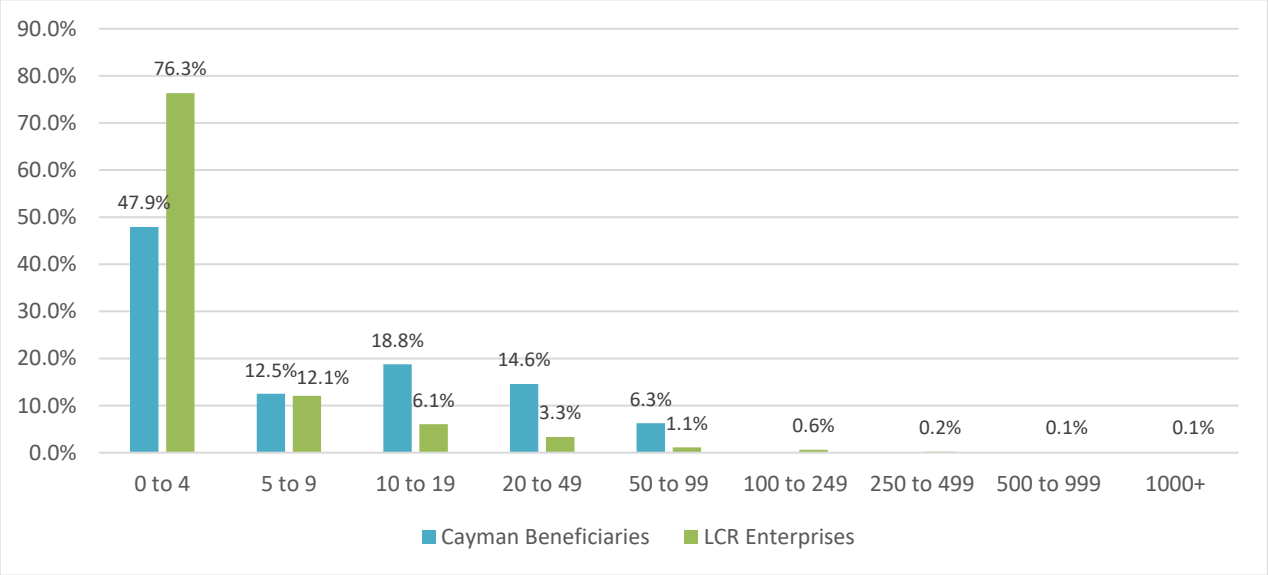
3.4.1 Profile of Participants

The project monitoring data show that 75.5% of businesses were in the manufacturing sector, 22.5% were in the professional, scientific and technical sector and 2.0% were in the education sector. This profile is consistent with the nature of the project which had a strong focus on materials.

The data also reveal that prior to support, the majority of beneficiaries were actively involved in innovation, with 73.5% having had at least one product or process innovation in the previous three years and 65.3% having spent money on R&D in the last financial year.

Figure Seven shows that the project supported businesses across all size bands up to the threshold of 250 employees. Within this profile, the project supported a greater proportion of larger SMEs than that seen within the LCR business base. This was perhaps to be expected given the focus on supporting manufacturing businesses, which are often more likely to employ staff.

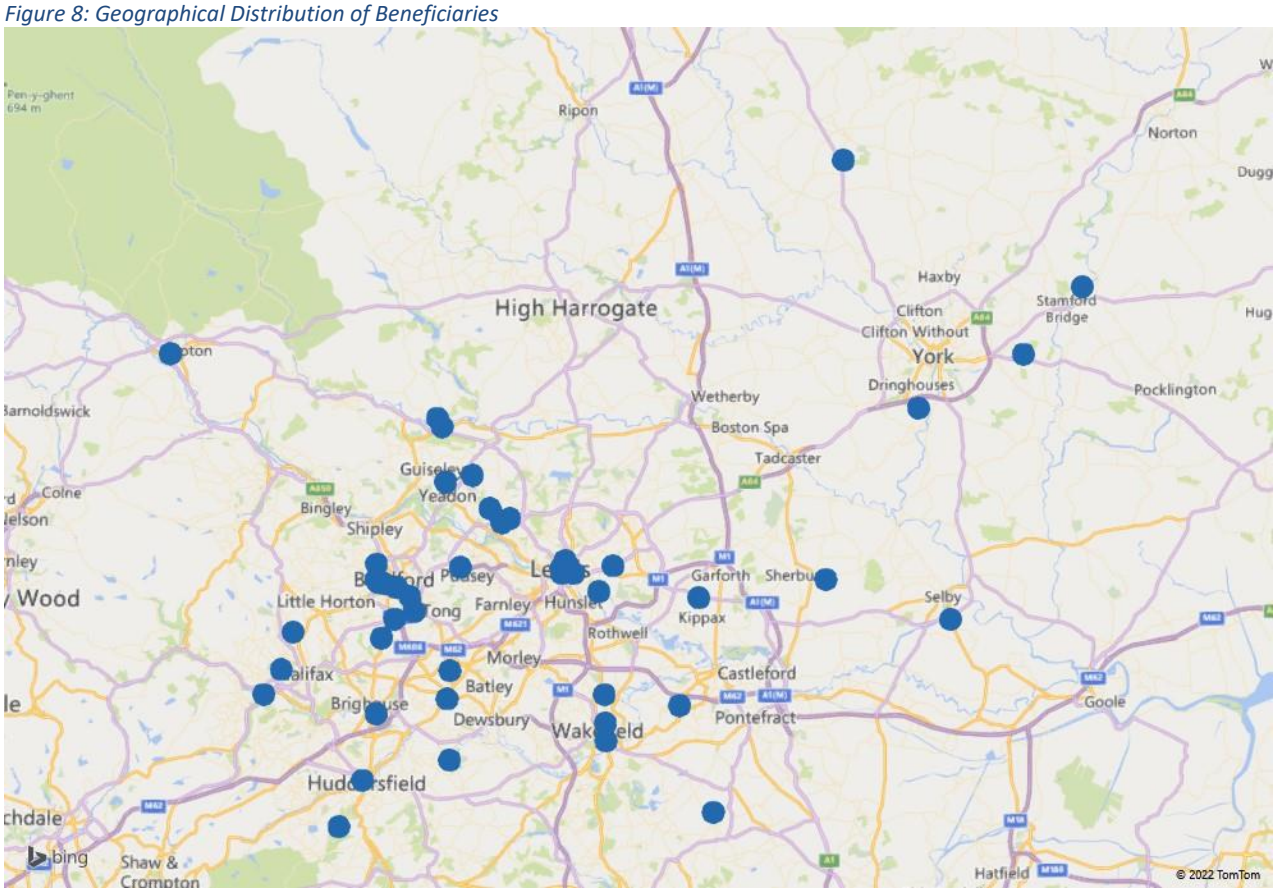
Figure 7: Profile of Beneficiaries by Business Size, Relative to LCR Business Base



Source: CAYMAN Monitoring Data (Q4,2022), UK business counts 2022 (nomisweb)

Figure Eight below shows that the majority of beneficiaries were located within the current Leeds City Region, however, a small number were located outside this area, reflecting the fact that the LEP boundaries changed during the life of the project.

Figure 8: Geographical Distribution of Beneficiaries



Source: CAYMAN Monitoring Data (Q4,2022)

PROJECT PROGRESS: SUMMARY OF KEY POINTS ADDRESSING THE EVALUATION QUESTIONS

- Despite unforeseen delays, the NMR was commissioned ahead of schedule, enabling a launch event to take place in January 2020. Shortly after in March 2020, the national lockdown meant that the University research facilities were forced to close. However, permission to maintain a skeleton (socially distanced) staff presence on site enabled to the NMR to continue running over this period and delivery to continue remotely.
- The pandemic nonetheless impacted on the delivery of learning events, which were initially cancelled and then moved online. Even then, the large number of people on furlough made these challenging to deliver. Over time, the team evolved their approach to these into a model which was structured around four hours of online learning, followed by a bespoke client meeting and development of a 'mini-project.'
- A PCR was approved following the pandemic and a second PCR enabled the team to expand their offer to businesses through the purchase of equipment to support alternative analytical techniques.
- At the time of the summative assessment, whilst 100% of the project's capital expenditure had been spent, only 78% of its revenue budget had been spent. By project closure this is not expected to be fully spent. The reasons include delays in recruitment and changes to the staffing structure (which was one of the most significant challenges encountered within the project) as well as the move to online delivery due to the pandemic.
- In terms of progress against outputs, at the time of the summative assessment, performance was broadly on track to meet overall targets. The project was slightly behind profile in relation to the number of businesses assisted (C1/C4) but a strong pipeline means that the team expect to achieve this target by project closure. In contrast the other targets had already been met (C26 and P2), exceeded (C28) or were close to being met (C29).
- Stakeholder interviews highlighted that the ERDF eligibility criteria and paperwork were occasionally a barrier to business participation, although the project is expected to achieve all of its output targets by project closure despite this.
- The project supported SMEs from across the original and revised LCR geography. It primarily supported businesses from the manufacturing and professional, technical and scientific sectors and the majority were innovation active prior to receiving support. Whilst all participants were SMEs, the project supported a greater proportion of larger SMEs than that seen within the LCR business base.

CASE STUDY: Brouns and Co, Linseed Oil and Paint

BROUNS & CO
LINSEED OIL AND PAINT

Brouns and Co was founded by historic building conservation expert, Michiel Brouns (inset), who gained his expertise surveying historic buildings in his native Netherlands, before moving to the UK in 2006 and setting up Brouns and Co in Yorkshire. Initially, the company imported Linseed paint from Sweden, but early in Spring 2022, the company brought the manufacturing process back into Yorkshire. It now employs a core staff of seven people.

Linseed paint and oils are traditional treatments for wood and metal which disappeared from the UK market after the second world war but continued to be used in a small way in Sweden and Denmark. Linseed oil paint protects against all weathers meaning that wood and iron do not rot or rust one painted. It also enables the evaporation of moisture instead of trapping it under an impermeable film. Made with 100% all natural ingredients, the paint does not contain any plastics or Volatile Organic Compounds (VOCs).

Michiel was contacted by CAYMAN through LinkedIn and decided to take them up on their offer. In Michiel's words:

"I decided to respond to the approach on LinkedIn because they weren't trying to sell me anything, it wasn't a sales pitch, just a straightforward offer about how they could help me with technical analysis and data"

Keen to understand a bit more about the chemical properties of some parts of their supply chain, Michiel was put in touch with another member of the team who explained in layman's terms, the tests that could be done and what the limitations of those tests were.

The tests were undertaken quickly and successfully addressed 95% of the queries, reflecting their known limitations. Michiel described the tests as playing a pivotal part in enabling them to start manufacturing Linseed paint again in Yorkshire. Had he not been able to participate in the project, he would most likely, have gone abroad where there is greater knowledge of the paints.

The impact of bringing the manufacturing process back to Yorkshire is significant. It means the company has far more control over the quality of its products and can react much more quickly to the market. Looking to the future, the company has significant growth plans, including exporting large quantities to the US next year.

The project has also changed the company's views on working with the Higher Education sector. In Michiel's words:

"We have not worked with any universities before, but as this has been a successful process, we are much more positive now about working with universities on technical aspects of our business"

Section Four: Project Delivery and Management

4.1 Introduction

This section of the report provides a qualitative analysis of the implementation of the project covering all key aspects of delivery, including the integration of horizontal principles. It also covers beneficiary engagement and the quality of support, drawing on fieldwork with supported businesses and stakeholders.

4.2 Project Delivery

4.2.1 Project Application and Mobilisation

Evidence from the evaluation interviews indicates that the project application process was somewhat protracted, primarily resulting from the team's limited prior experience of ERDF. There were some particular issues around state aid and it was described as a 'steep learning curve' which is not unusual for new ERDF applicants, however, additional support was provided by UoB's central Research and Innovation team, enabling a successful bid to be made. The team was confident that the lessons learned from the experience around state aid, eligibility criteria and so forth will help them with future applications.

Although the application process took longer than planned, stakeholders were pleased that once funding had been secured the team was able to mobilise and start the process of upgrading the equipment very quickly. It was felt that they had a clear specification and established a good working relationship with the company that was procured.

Subsequently, the team also worked closely with UoB's central Research and Innovation colleagues to submit the PCR which expanded and extended the programme. A UKRI low interest loan provided the match and the work undertaken around this also provided intelligence to support the expansion. An internal call for capital equipment had been issued when the loan was secured and the team was able to assess alignment of the results against CAYMAN objectives to bring together a small group of academics with the right expertise and interest to engage. As highlighted elsewhere in the report, the outcome was a decision to purchase three new pieces of equipment and the Research and Innovation team supported CAYMAN to work through the logistics and accountability issues that arose as a result of this cross-departmental development.

4.2.2 Governance and Management Arrangements

The project sat within the School of Chemistry and Biosciences at UoB, specifically in the Analytical Centre team within the Faculty of Life Sciences (subsequently expanded to Engineering and Informatics). It was governed at an operational level by a Steering Group whose terms of reference, according to the application form, were to be jointly agreed by the LEP and Managing Authority. However, engagement with the LEP was more limited than initially expected, primarily due to the pressures placed on both organisations as a result of the pandemic and the Managing Authority declined to take part.

Meeting on a quarterly basis to strategically review delivery progress and oversee the project from a financial perspective, the Steering Group's primary concern was to ensure that the project delivered against the funding contract and that action was taken as necessary to minimise risk to the University as the Accountable Body. The team reflected that the group served its purpose and was a useful forum. Mixed views were expressed as to the lack of involvement from both the LEP and Managing Authority. Whilst this may have been beneficial for building relationships and cross promoting activities, it does not appear that CAYMAN has suffered as a result of their absence.

The project also benefited from an Advisory Group, comprising a selection of businesses and other industry representatives that the department regularly works with. This group was much more strategic in nature, with a broader remit to provide insight into the needs of industry across Chemistry and Biosciences (not just CAYMAN) and fed into the PCR process.

Bi-weekly operational core team meetings were an important feature of the project. These provided an opportunity to review the pipeline as well as the progress of individual projects including closing them down effectively when completed. To their credit, the team upheld the discipline of documenting decisions and key actions arising from those meetings as a clear record which have been held on a Sharepoint system.

Evidence from the evaluation interviews also indicated that the active engagement of the University's finance team within the governance and management arrangements was particularly beneficial.

Overall, the evaluators conclude that the governance and management arrangements for CAYMAN were sensible for a project of this nature and appear to have worked well in practice.

4.2.3 Day-to-Day Delivery Structures and Staffing

Under the leadership of the previous Head of School, who was also the Principal Investigator (PI), the project was overseen on a day-to-day basis by the Director of the Analytical Centre. It had a dedicated team of delivery staff who were employed directly by UoB but the team was also able to draw on wider University expertise as required and, as highlighted above, the inclusion of the Engineering and Informatics Faculty strengthened these arrangements.

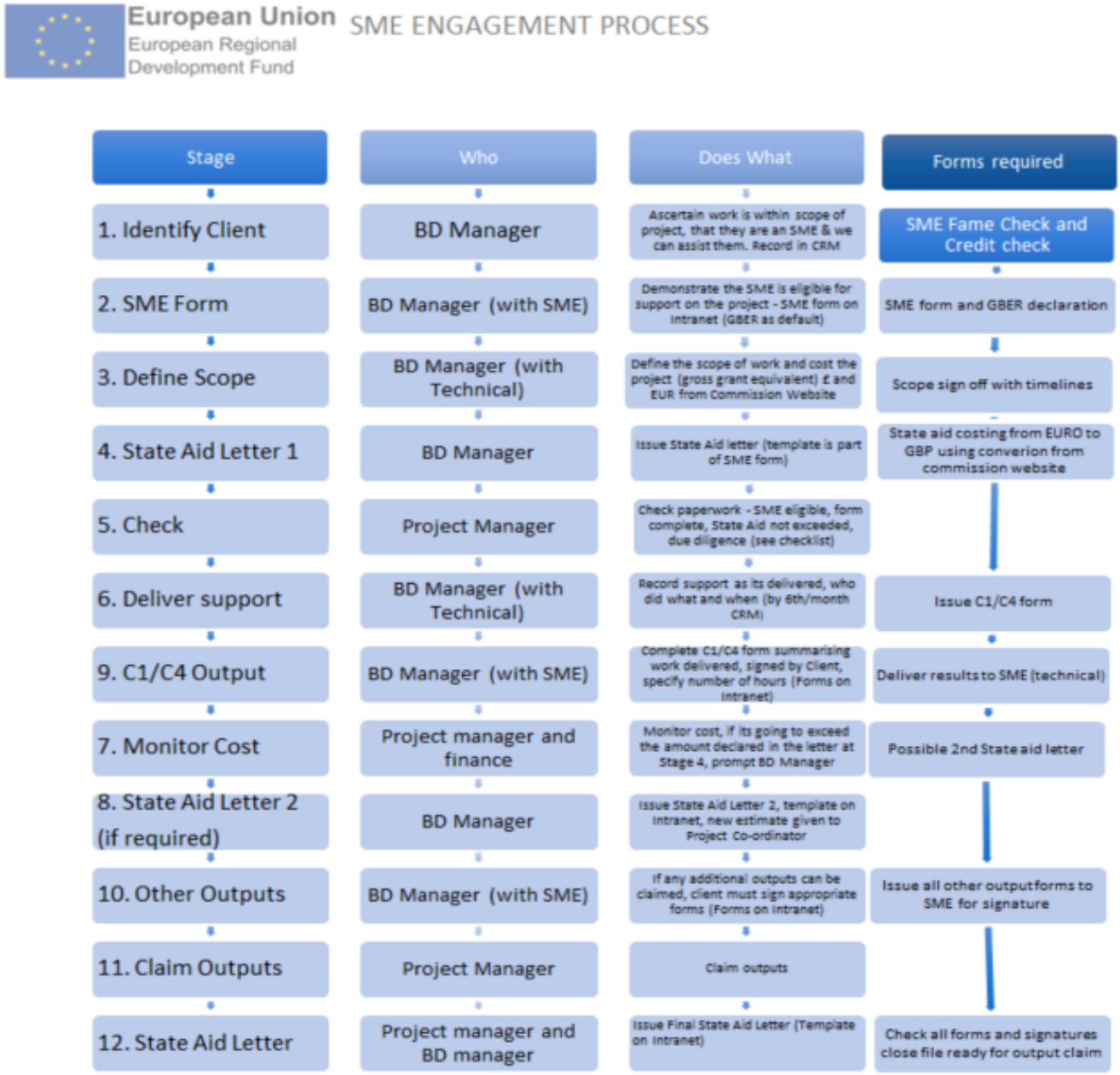
As a result of some early staffing changes the team structure deviated slightly from the initial plan, with one dedicated member of CAYMAN staff occupying a split (Project Manager/Business Development Manager) role for the majority of the original funding period. However, this individual resigned from post in February 2022 and was not replaced. The team reflected that it was challenging to recruit and retain staff on projects such as this where there was a requirement for them to have technical skills, an understanding of ERDF and understanding of university systems, particularly when the posts were advertised on a fixed term fractional basis. However, it appears that the challenges were managed without detriment to the project. When the Project Manager/Business Development Manager left, the team's two senior members of staff absorbed more of the day-to-day workload into their own roles and the business development function was delivered through a specialist company (Interaction Northwest) which generated leads for the project. The outsourcing of the business development function was considered to be successful, and this approach may offer a learning point for future projects. They were supported by commercial, innovation focused and technician staff which were all provided on a fractional basis by members of the Life Sciences Faculty. Additionally, the team benefitted from dedicated business development support from the Faculty of Engineering and Informatics following the PCR. The project had senior level leadership and 'back-office' support from elsewhere in the University throughout its lifetime.

As a relatively small team, CAYMAN staff met regularly and the delivery structure was felt to work well.

4.2.4 Project Management Systems

A clear SME engagement process was put in place as shown in Figure Nine with related information collated and presented at different levels of detail for management reports to the CAYMAN Steering Group, internal UoB monitoring and for formal claim reporting to the Managing Authority. The team received positive feedback on their systems and processes from their initial audit.

Figure 9: SME Engagement Process



Within this process data capture reflected the CAYMAN customer journey and included:

- **Enquiry/engagement and diagnostic** – these processes established SME eligibility and details of any previous State Aid support (gateway checks). An application form was developed for businesses that were interested in the project, capturing key information about the company, its size, state aid position and status, confirming that it was not classed as an undertaking in financial difficulty and was within the programme area. This was verified using the Fame postcode checker. Given the complexity of some business models a separate form was also designed to understand company ownership. Stages 1 to 2 therefore confirmed that the businesses met ERDF eligibility criteria and that that the solution offered (PRIT/demonstration event) could address a business need. The review of project monitoring data (see section 3.4)

indicates that participants met eligibility criteria and the business survey findings show that participants had a genuine need and benefitted from the project. Therefore, it is the evaluators view that the project's systems and procedures ensured that it supported the 'right beneficiaries;' and,

- **On-going review** - setting out the process of providing the support identified from the diagnostic and how the support will be constructed. This took the form of an internal tracker, enabling the team to quickly see the status of each project.

SMEs received a formal Letter of Approval which contained the company details and sign off, Terms and Conditions, proposed estimated costings and timelines. It also included key documents, such as the state aid assessment, which the SMEs were instructed to retain for audit purposes. As highlighted in the previous section, a CAYMAN brochure was assembled in the autumn of 2020 and has subsequently been used as an initial introduction to the project.

The evaluators are aware that output data was captured on a continuous basis. It was collated and reported on quarterly or in accordance with the schedule set out in the Funding Agreement.

The project management systems appeared to have worked well and business survey indicated that respondents found the paperwork and administration requirements acceptable. Indeed, an external stakeholder pointed out that:

"They make it as painless for businesses as possible which isn't easy for ERDF projects"

Nonetheless, a consistent view was expressed that paperwork could be a barrier to engaging for some businesses. The team also reflected paperwork was not perceived to be a barrier if businesses had an urgent need for support:

"If a business had a really urgent need for support, they were willing to complete the sign-up paperwork the same day in order to get the analysis done more quickly, but if the project was less urgent it could take longer"

At the interim summative assessment there was a small amount of feedback from project participants to suggest that communication during the project could be improved and the team took steps to improve interim reporting and communication to participants. Feedback from businesses during the final summative assessment fieldwork did not reveal any communication concerns, indicating that this issue had been resolved.

4.2.5 Horizontal Principles

The project was underpinned by the UoB's Environmental and Sustainability policies. Measures here focused on energy and resource efficiency, travel management and procurement. Further, as a result of the pandemic, a large proportion of business interaction had to be undertaken remotely which reduced the need to travel. Where feasible, it was expected that beneficiary SMEs would also be encouraged to build environmental considerations into the sourcing/procurement for the materials, consumables and any equipment required to deliver the innovation support.

It was pointed out that the projects have been driven by the companies that the team was working with, some of which have been environmentally driven, for example, through introducing process efficiencies

which reduce the use of hazardous chemicals. Likewise, some projects have by their nature contributed to the circular economy agenda:

"There are lots of circular economy impacts from polymers and plastics informed by chemical composition as identified within the project"

Additionally, the evaluators are aware that particular efforts were made to procure state-of-the art fume cupboards which are more environmentally friendly with a new style of motor that moderates the air, reducing the volumes required to the extent that is possible.

Equality and Diversity (E&D) is very high on the agenda for UoB which has a stated commitment to improving the representation, progression and success of minority ethnic staff and students. The University is a member of the Race Equality Charter Mark and operates a Centre for Inclusion and Diversity. It is also committed to gender equality, holding an Athena SWAN (AS) Bronze award at an institutional level in recognition of its role in advancing the careers of women in Science, Technology, Engineering, Maths and Medicine (STEMM). The project application made a commitment to ensuring that E&D was considered through its internal recruitment practices as well as in its work with SMEs. According to the project application, the team had planned to work with SMEs that were committed to equal opportunities and had clear policies and practices in place as determined at the point of engagement. It was anticipated that feedback would be provided to the SMEs where appropriate, with facilitation of any activities necessary to increase their awareness or implement policies in this area. The evaluators understand that, in practice this has not necessarily taken place. The CAYMAN team found that many companies were reluctant to disclose any E&D data and the team did not actively asked businesses about their E&D policies which have been something of a missed opportunity given how committed the University is to this agenda.

Additionally, no specific attempts were made to engage women within the project. Although some stakeholders reflected that this was perhaps not needed due to the diverse nature of the sector, the evaluators nevertheless suggest that there may have been scope to be more proactive in reaching out to businesses led by women by engaging with relevant networking groups in the area, such as the Women in Business Network and Women in Science groups (e.g. WISE). Specifically, it may have been worth reaching out several local projects including:

- Women Empowered through Coaching and Networking (WECAN) – Delivered by the Leeds Beckett University, to build the leadership skills, capabilities and opportunities of women in the Leeds City Region; and,
- Empowering Women with Tech, a Leeds based group that works to elevate, educate and empower women in digital, tech and science careers.

4.3 Beneficiary Engagement and Quality of Support

This section of the report discusses the project's recruitment methods and provides some beneficiary perspectives drawn from the online survey of businesses that was conducted to inform the summative assessment. Of the 45 businesses sent a link to the survey, 18 replied. Therefore, whilst the response rate is healthy, the sample size is nonetheless small and results should be interpreted with some caution.

4.3.1 The Engagement Process

The CAYMAN team developed a website and brochure for the project and evidence suggests that it was actively promoted. One stakeholder indicated that:

"The project is right on the money with what the industry needs so it's not been a hard sell"

Efforts were curtailed somewhat by the Covid-19 pandemic. Whereas in different circumstances the team would have presented at conferences, held exhibition stands and so forth, this was not an option for much of the delivery period. They did, however, utilise online event opportunities where possible and more latterly some collaborative face-to-face events were held which were considered to be useful.

In the early stages of the project 'cold calling' techniques were employed, using an internal database which had a target list of 100-150 companies, including a number of businesses that they had worked with before. This approach met with mixed success and the team found that people were often harder to access during the pandemic. At the time of writing the interim evaluation report the team was beginning to develop a new marketing strategy which explored other avenues for promoting CAYMAN including content designed specifically for the Chemistry world, for example, with the Royal Society of Chemistry's special interest groups where there is a potentially sizeable audience. They also experimented with, and had some success from, using LinkedIn to promote the project. As highlighted above, following the departure of the Project Manager/Business Development Manager a specialist company – Interaction Northwest – was employed to generate leads and evidence indicates that this was successful. The expanded project (post PCR) also provided a broader range of potential businesses to work with including, for example, food companies and commodity chemicals which the team had not worked with before.

An external stakeholder reflected on how important the 'translational element' was within the process:

"Direct conversations with businesses are so important. They need to really understand the benefits and the CAYMAN staff are very good at translating academic concepts into non-academic speak"

The team also endeavoured to develop and maintain their networks for cross-referrals, including with other ERDF projects such as ForTaMP, which provided fully funded support for SMEs in the Leeds City Region, North and West Yorkshire to scale up a product or improve a process. Indeed, an external stakeholder commented that CAYMAN was very well connected within the wider community and as such it has benefitted from some word-of-mouth referrals. However, reflections from the team indicated that perhaps more could have been done to engage with a broader range of related organisations.

Of the 18 participants taking the business survey:

- 38.9% (7) had a prior relationship with the UoB, who invited them to take part;
- 33.3% (6) had heard about it through a third party such as a sector support organisation or the Growth Hub;
- 11.1% (2) were approached directly by the UoB having not worked with them before;
- 11.2% (2) approached the UoB with a technical issue or need for analysis; and,
- 5.6% (1) found the project through an internet search.

This suggests that the project's engagement strategy had a healthy mix of direct approaches to businesses as well as wider promotional activities.

Stakeholders felt that the project team interacted very well with businesses:

"I have referred businesses into CAYMAN and have been very impressed by how quickly they follow up on the initial enquiry. It's clear that they want to develop meaningful relationships with businesses and they are really good at linking them into other parts of the University to support broader objectives"

It was further suggested that:

"The team is very good at listening to businesses and not just pushing a particular solution"

4.3.2 Motivations for Taking Part

The business survey asked participants why they got involved with the project. Several respondents were motivated by the opportunity to undertake exploratory research using equipment and analytical expertise not normally available to them:

"To assist us with analytical work in ongoing research projects that we could not conduct due to lack of expertise and equipment"

"Access to specific technical expertise not available elsewhere"

"The powerful new NMR capabilities looked as if they might be capable of carrying out useful analytical work on polymer systems of interest to my company"

"The university could offer access to analytical equipment and expertise that didn't exist within our business"

But others, needed help to solve a problem:

"We had a technical issue that we needed help with"

"To try and help with an investigation into product matching"

"To help resolve an ongoing issue"

And for other, previous experience with the University was an important factor:

"Have dealt with the University before and they were excellent, so this was a fantastic opportunity"

"1. A strong working history with UoB and an understanding of their capabilities. 2. A small project came to mind that would be perfect for the study (good timing). 3. Free analysis - as a small company, using external university resources can be expensive. The chance for free work isn't one to be turned down."

And finally, a small number of respondents saw it as an opportunity to upskill and expand their knowledge:

"It was a good opportunity to expand the knowledge in analytical testing for problem solving issues"

"Opportunity to upskill"

Stakeholders also recognised that businesses needed a clear reason to engage in a project like this (i.e. an analytical challenge/suitable project) and this is where showcasing could be a powerful tool: helping businesses to understand the offer and what it can do for them:

"Businesses often don't know things like this exist. And some businesses don't even know they need to innovate. There can be a lack of head space to think about these things and when people get into the right head space they can then become bewildered by the range of different techniques available and the expense of the equipment. It's difficult for businesses to know which one will give them the best result. That's where the CAYMAN taster concept works well"

Even then, there were potential barriers, which could arise from time and resource pressures within the business. It was also pointed out that:

"Sometimes people will have had bad experiences with universities and other projects before which will put them off"

4.3.2 Satisfaction with Support

Satisfaction from a beneficiary perspective was explored within the business survey. Of the 18 participants, 83.3% (15) had undertaken a research and innovation project (PRIT) and 16.7% (3) had participated in a demonstration/learning workshop. Of the 15 that had undertaken a PRIT, 85.7% found it 'very useful' and 14.3% found it 'somewhat useful'. The reasons given for why the PRIT was very useful were:

- It allowed businesses to undertake analysis that they could not do themselves with (some) equipment that is not readily available to businesses:

  "It was something we couldn't do ourselves and didn't think could get done. So very positive!"

  "As a small company we do not have the resources to perform detailed investigations using technology"

  "There is no other capability to do this in the UK"

- It helped businesses to solve a production related problem:

  "The results were used to confirm that distillation of a raw material had the desired effect of increasing purity and reducing polymerisation variability. Distillation has now been introduced into the production process. The results were used to support a change to a production process"

  "Helpful in understanding the composition of our product and in developing a methodology for quantifying the drug in the product - essential for understanding the product and process"

  "Analysis allowed us to identify impurities present in a key chemical material that impacts on the stability of products we manufacture"

- It helped businesses with research and development:

  "We are testing an idea out using the equipment and data resources on the results"

  "The activities gave us an understanding and access to techniques that we were not familiar with and would give us solutions to some of our research problems"

"Providing a proof of concept to tell us whether our technical hypothesis is correct & has potential for further development"

The reasons for why it was only somewhat useful for other survey participants were that:

"Analytic techniques are needed to support our materials development programme and we use many. Analysis will always be a support activity to the main synthesis, processing, and testing work we do i.e. with the NMR work done to date, it has been done well and is informative, but it has not changed our business - yet!"

"It confirmed what we already thought to be correct but didn't give us the answer we were looking for"

All three of the businesses that took part in a demonstration/learning workshop found them 'very useful.' Interestingly the reasons given for the usefulness of the demonstration/learning activities centred around the analytical process, reflecting the fact that the demonstration process also included an opportunity to analyse samples as the comments below indicate:

"Demonstrated the potential of the technique for rapid analysis of materials for which the existing techniques are time consuming and technically demanding"

"It helped to identify the sediment in a product"

Figure Ten shows how participants responded to a question which asked them to rank a series of statements about the CAYMAN offer on a scale of 1 to 5, where 1 is 'completely disagree' and 5 is 'completely agree.' These responses were very positive with the weighted average for each statement exceeding 4.61. It is a credit to the CAYMAN team that 88.9 % (16) of respondents completely agreed that the project staff understood the chemical characterisation issues facing their business and 83.3% (15) completely agreed that the staff supported them well during their engagement with the project. It is also encouraging that 83.3% (15) would be keen to continue working with the University.

Whilst two respondents provided a neutral response to the statements about paperwork and administrative requirements and kit and facilities, they did not expand on the reasons for this score.

Figure 10: Respondents Ranking of a Series of Statements on a Scale of 1-5

	1 - completely disagree	2	3	4	5 - completely agree	Weighted average
The project staff understood the chemical characterisation issues facing my business	0.0%	0.0%	0.0%	11.1%	88.9%	4.89
The staff supported me well during my engagement with the project	0.0%	0.0%	0.0%	16.7%	83.3%	4.83
I would be keen to continue working with the University	0.0%	0.0%	0.0%	16.7%	83.3%	4.83
Activities were delivered at times/venues that suited my business	0.0%	0.0%	0.0%	27.8%	72.2%	4.72
The kit and facilities on offer were state of the art	0.0%	0.0%	5.6%	22.2%	72.2%	4.67
The action planning process was valuable	0.0%	0.0%	0.0%	38.9%	61.1%	4.61
The paperwork and administrative requirements were acceptable	0.0%	0.0%	5.6%	27.8%	66.7%	4.61

Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

When asked what (if anything) could have improved their experience of the project, nearly half the respondents who answered this question indicated that no improvements were needed as the comments below illustrate:

"Nothing. All good"

"From the first introductory talks about the CAYMAN PROJECT to the receipt of the reports and the follow-up discussions, everything has been totally satisfactory"

However, other respondents suggested ways in which they felt that the project could have been improved:

- **Face to face activity** – four respondents indicated that Covid-19 had impacted on their experience of the project by preventing them from meeting up and being able to see the equipment in person. Whilst two of these comments were made as part of the Interim summative assessment 'wave', the other two were made as part of the final 'wave.' However, it is not clear when these two respondents took part in the project. Whilst the evaluators recognise that virtual meetings have become the norm across society since the pandemic, the team may wish to think about how 'blended approaches' could be utilised in future projects to allow businesses to see the equipment or meet face to face if that is their preference;
- **Equipment failure** - one respondent reported that part of the investigation could not be completed due to equipment failure, but the individual indicated that this did not affect the result and was perhaps unavoidable; and,
- **Further investigation/broader scope** – one respondent indicated that 'a broader scope' would have been beneficial but did not provide any further explanation. Another indicated that the whilst the results confirmed what they had already thought to be the case, it did not give them the results they were looking for and therefore further investigation would have been useful.

Additionally, as highlighted elsewhere, at the interim summative assessment stage two comments were made which reflected a desire to see more regular communication about progress. No similar comments were made in the final summative assessment 'wave' which suggests that the team had made improvements in their approach during the intervening period. However, one participant in the case study interviews indicated that they would have appreciated further explanation of the test results and support to understand and interpret them.

4.3.4 Likelihood of Recommending to a Friend or Colleague

The surveys also included a 'Net Promoter Score' question which asks on a scale of 0-10 how likely the recipient would be to recommend the project to a friend or colleague. The results show that 61% (11) respondents gave a score of 10, 16% (3) a score of 9, 16% (3) a score of 8 and 5.6% (1) a score of 7. The Net Promotor Score methodology works by assigning those people that score 9 or 10 to the category of 'promoters,' those that score 7-8 to the category of 'passives' and those that score 6 or under to the category of 'detractors.' The Net Promoter Score is the percentage of promoters minus the percentage of detractors (i.e. ignoring the passives) which gives a possible range of +100% to -100%. CAYMAN achieved a Net Promotor Score of 77.78, which is an excellent score. However, whilst this is an outstanding result, it should be treated with a degree of caution given the small sample size.

PROJECT DELIVERY AND MANAGEMENT: SUMMARY OF KEY POINTS ADDRESSING THE EVALUATION QUESTIONS

- Evidence from the evaluation interviews indicates that the project application process was somewhat protracted, primarily resulting from the team's limited prior experience of ERDF. However, support was provided by UoB's central Research and Innovation team, enabling a successful bid to be made and the team was confident that the lessons from the experience around state aid, eligibility criteria etc will help them with future applications.
- Although the application process took longer than planned, stakeholders were pleased that once funding had been secured the team was able to mobilise and start the process of upgrading the equipment very quickly. The evaluators are not aware of anything that could have been done better in the mobilisation phase.
- Engagement with the central Research and Innovation team was also valuable in securing the PCR and navigating the internal processes surrounding this.
- A website and brochure were developed and evidence indicates that the project was actively promoted with a healthy mix of direct approaches to businesses and promotion through third parties, though efforts were initially curtailed somewhat by the Covid-19 pandemic. More recently, the team had some success with LinkedIn and the specialist company that they employed – Interaction Northwest – generated a good number of leads.
- Evidence suggests that CAYMAN was well managed with clear systems in place to structure client engagement, project compliance and reporting. The governance and management structures were appropriate for the nature of the project and were felt to be working well in practice.
- Feedback from participants showed high levels of satisfaction with all aspects of the project, with the team delivering a professional and high-quality service. 77.8% (14) respondents said that they would be very likely to recommend it to others.
- Whilst at the interim stage feedback suggested that delivery could be improved through better communication with regard to progress, this issue appears to have been resolved.
- Evidence suggests that the businesses supported to date all met programme eligibility criteria and aligned with the project's target audience. The project's SME engagement process ensured eligibility criteria were met and the support provided could address a business need. Therefore, it is the evaluators view that the project's systems and procedures ensured that it supported the 'right beneficiaries.'
- The project was held in high regard by both the stakeholders interviewed and beneficiaries completing the survey. Stakeholders were impressed by how well the team translated academic concepts into commercial language and developed meaningful business interactions. 88.2% (15) of respondents receiving a PRIT found the support 'very useful' and 11.8% (2) found it 'somewhat useful.'
- There is evidence that horizontal principles were embedded to some extent in the delivery. Efforts were certainly made to address the sustainability theme but despite the University's clear commitment to E&D principles, the evaluators believe there was scope for the team to be more proactive in a) promoting E&D principles with businesses and b) reaching women led businesses.

CASE STUDY: London Oil Refining Company (LORCO)

LORCO is a Bradford based business, which owns the Astonish Brand of household cleaning products. Established approximately 40 years ago, it employs between 75 and 100 staff, mainly in production, although the company does have its own product development laboratory.

The company had a problem with its shower cleaner, which under colder conditions, suffered from a wispy, hazy precipitate, (where chemicals in solution start to solidify). They knew the problem was associated with a particular surfactant, known as APG, which the company sourced from a number of different suppliers.

When the CAYMAN team approached LORCO, who had worked with the University of Bradford before, it seemed like an excellent opportunity tackle this problem.

Sally Pearson, a development chemist at LORCO, submitted samples to the CAYMAN team to run through the NMR and mass spectrometers. The process found an impurity present in the affected samples, but not the unaffected ones, suggesting that the manufacture method of the AG may differ between suppliers. It is thought that the impurity may stem from the use of a catalyst in the manufacturing process by some suppliers and not others. The difference in manufacture method may be the cause of the precipitate seen. Whilst the team at LORCO still has work to do, the support from CAYMAN has helped them to understand the nature of the problem and address the immediate needs of the business.

In the short term, the company has addressed the problem by carefully selecting suppliers where the impurity is not seen. Whilst these sources are slightly more expensive, it ensures that LORCO can continue production and avoid recalls. In the longer term, they are working in the lab to tweak the formulation as well as working with other supply chain businesses to improve their processes.

Without support from CAYMAN, the LORCO team would have continued to investigate the problem, but as they do not have the equipment available to the University of Bradford, they would not have gained the knowledge about the differences between the samples.

In Sally's words:

"It has been a really good exercise to do really, and it's good to get an idea of what the University can do for us. They have much more analytical skills than us, so it's good to get that third party analysis done"

Section Five: Project Outcomes and Impact

5.1 Introduction

Having provided an overview of progress and outputs in Section Two, this section of the report focuses on the wider outcomes and impacts arising from CAYMAN's work.

5.2 Business Impacts

5.2.1 Improving Understanding

Figure Eleven below shows that involvement in the project has improved participants' understanding of the analytical facilities available at the UoB, how analytical techniques could improve production processes and how analytical techniques could improve R&D activity. A large proportion of respondents indicated that these areas had been improved 'very much.'

Figure 11: Extent to which Involvement with the Project has Improved Understanding

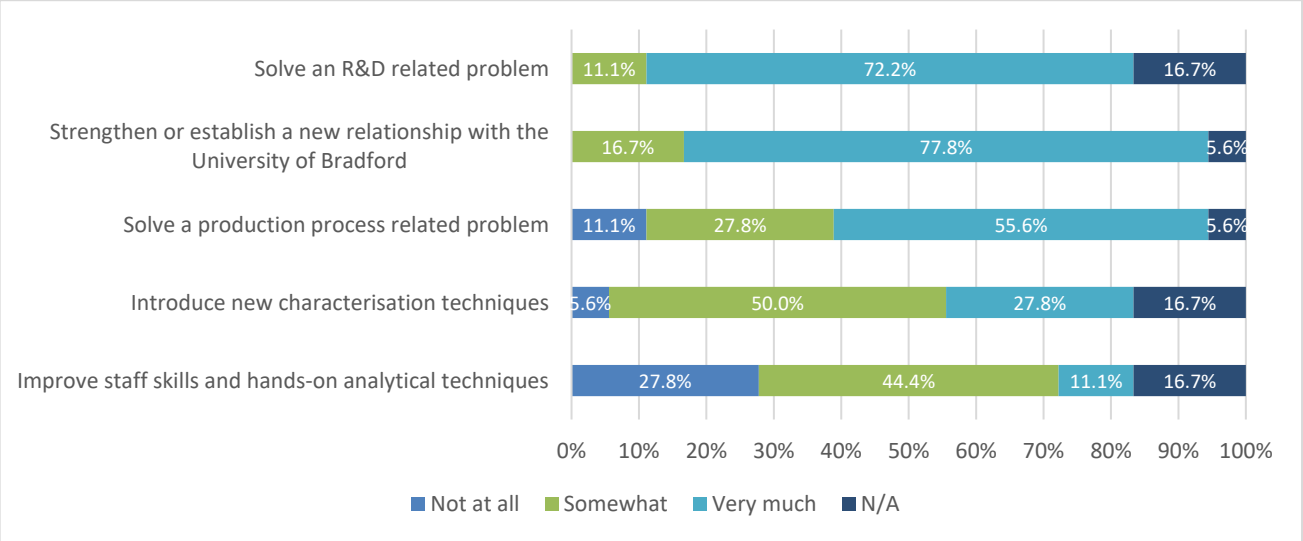
	Not at all	Somewhat	Very Much	N/A
The analytical facilities available at the University of Bradford	0.0%	11.1%	88.9%	0%
How analytical techniques can improve your production processes	0.0%	16.7%	77.8%	5.6%
How analytical techniques can improve your R&D activity	0.0%	16.7%	72.2%	11.1%

Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

5.2.2 Changes to the Business

Figure Twelve below shows the extent that involvement in the project has helped businesses to achieve various outcomes. This shows that the outcomes most influenced by the project were 'solving an R&D related problem' and 'strengthening or establishing a new relationship with the UoB', with in excess of 70% of businesses indicating that involvement in the project had helped them 'very much.' The outcome where the contribution was lowest was 'improving staff skills and hands-on analytical techniques' where only 11.1% (2) of respondents indicated that involvement had helped them 'very much' although 44.4% (8) of respondents indicated that it had done 'somewhat.' This is unsurprising given that only three survey respondents had participated in a learning/demonstration event.

Figure 12: Extent to which Involvement in the Project has Helped the Business to Achieve Various Outcomes



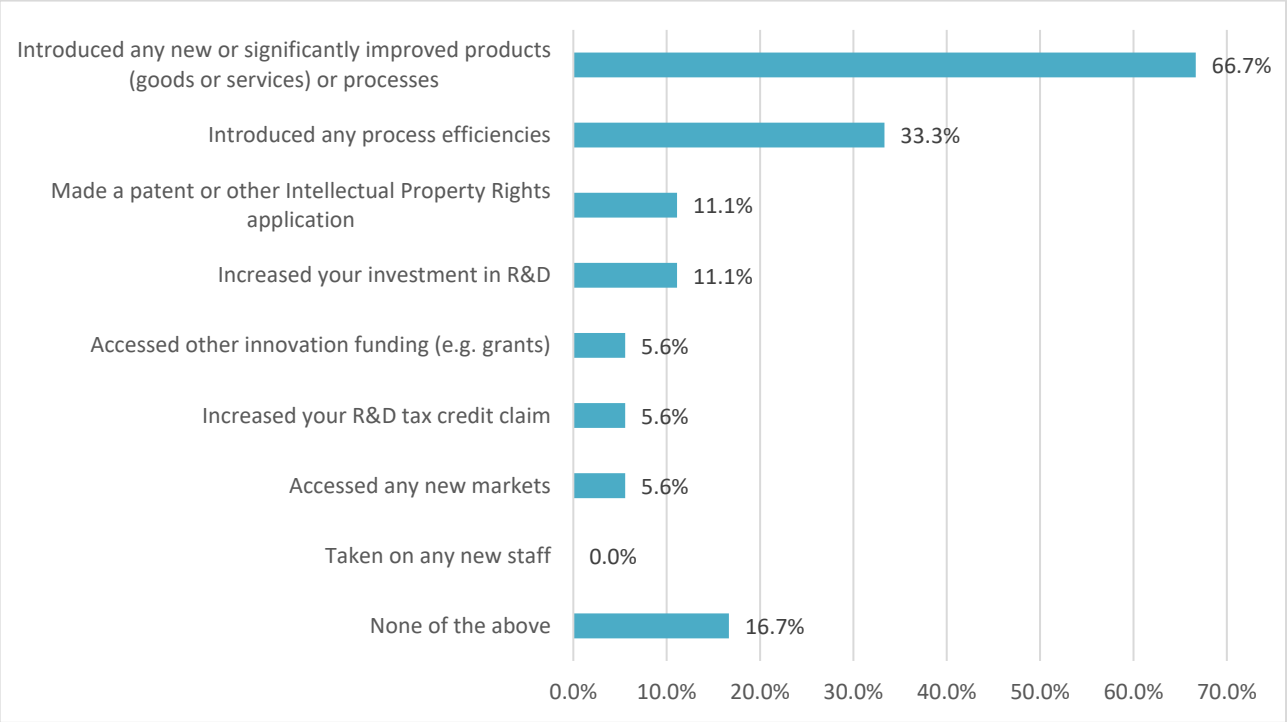
Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

Figure Thirteen below shows the actions that businesses had already taken as a result of the project. Overall, 83.3% (15) of respondents had taken at least one of the actions listed, which is a significant achievement. 66.7% (12) had introduced new or significantly improved products or processes and 33.3% (6) had introduced process efficiencies. These are significant benefits which should have a direct and positive impact on the performance of participating businesses.

Fewer businesses reported making a patent or other Intellectual Property Rights application, increasing their investment in R&D, accessing other innovation funding or increasing their R&D tax credit claim, however, almost a quarter of survey respondents had undertaken at least one of these actions. This may reflect the fact that the project did not provide intensive support.

Whilst no respondents reported taking on any additional staff, one business expected to take on four to five staff in the future as a result of their engagement.

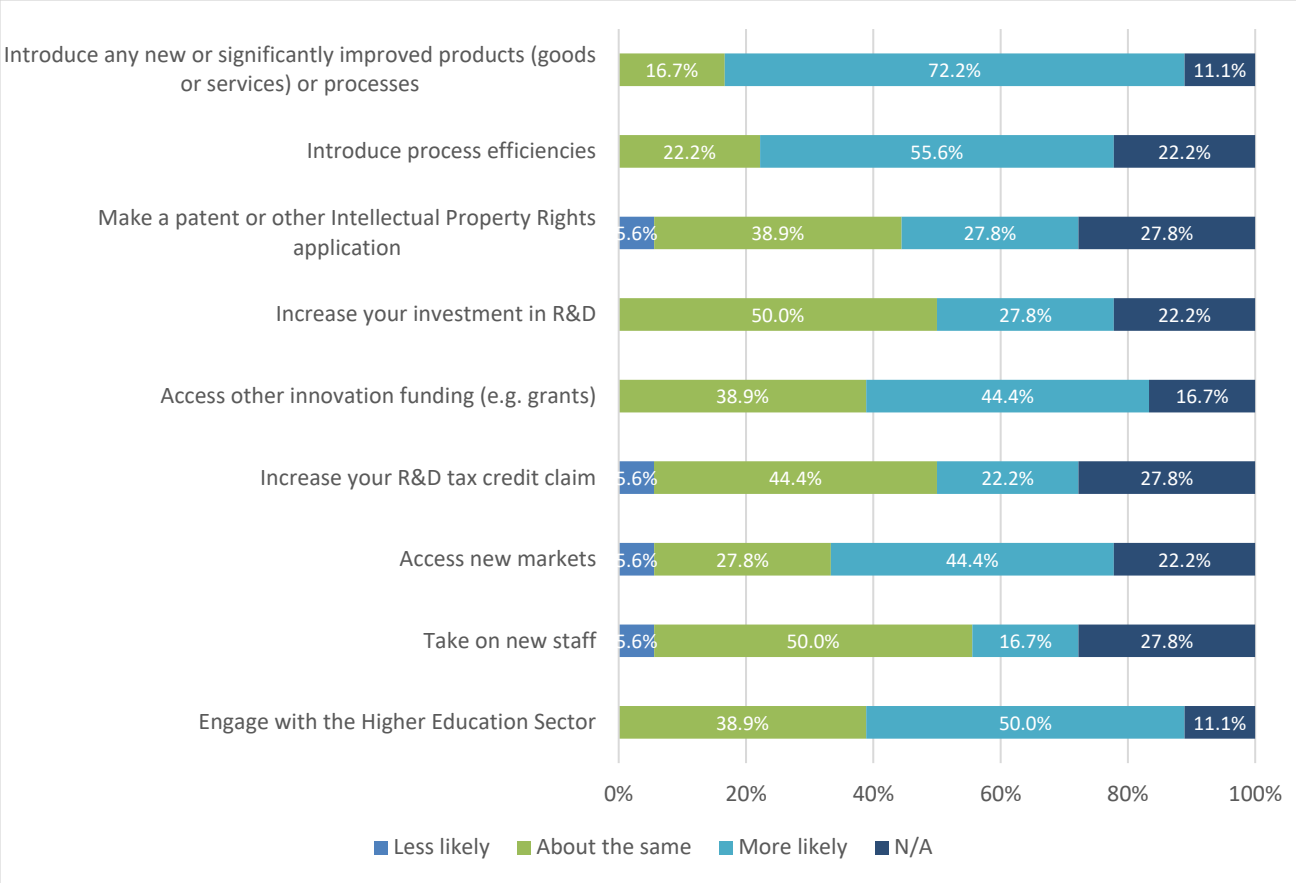
Figure 13: Actions Taken a Result of CAYMAN



Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

The survey also explored the extent to which participants were more or less likely to take these actions, compared to their position before participating in the project. Overall, 88% (16) of respondents indicated that they were more likely to take at least one of the actions listed, which is a very positive finding. Figure Fourteen shows that 72.2% (13) of respondents were more likely to introduce new or significantly improved products or services and 55.6% (10) were more likely to introduce process efficiencies. Half the respondents also indicated that they were more likely to engage with the Higher Education sector, which is encouraging. The results also show that respondents were more likely to undertake some of the innovation activities highlighted above, with 44.4% (8) of respondents indicating that they were more likely to 'access other innovation funding' and 'access new markets.' These results show that the benefits of being involved in CAYMAN are likely to continue to materialise into the future.

Figure 14: Extent to which Participants are More or Less Likely to take Actions Compared to their Position Before Participating in CAYMAN



Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

5.2.3 Qualitative Benefits

The business survey gave respondents the opportunity to leave additional comments about CAYMAN. A selection are as follows:

"The help that CAYMAN provided has been of great value to the textile industry processing sector at which the investigation aimed. Without CAYMAN it is unlikely that this R&D would have been carried out and the problems would have remained unsolved"

"As a polymer and polymer composite research and development company with a significant consultancy component to our activities, we are knowledgeable about many analytical and test methods and have many in-house - but not NMR. We were particularly interested to learn more about molecular diffusion rates which, in theory, could be deduced using the University of Bradford NMR facility and we are now examining the data generated in the CAYMAN project to see whether we can apply the findings in an effective way in our polymer design work. The main outcome of the programme undertaken is that the data has been novel - and this is the way we learn to take steps forward with our business"

"The project has benefited the development of products for sale in both the UK and export markets around the globe"

In addition, the project team collected feedback from businesses as part of their monitoring process, which illustrate some of the business benefits:

"The CAYMAN project by the University of Bradford using their NMR spectroscopy will benefit our business. It has confirmed that our chosen formulation meets our initial requirements. An added benefit is that it has shown the drug and delivery system are independent. The project has shown an additional benefit by giving us the release characteristics of the drug. The enhanced data will progress our development of the next stages of the project. We now intend to ask funders for additional funds to develop a further product."

"We are a start-up high-tech company that needs external support in several areas. The extensive polymer and other analytical capabilities at the UoB which is located close to the company's premises, is a valuable asset in the region. CAYMAN, is particularly valuable as it allows exploratory work to be carried out of a type impossible within a small company – and many large ones! The benefits stemming from the CAYMAN project work carried out are primarily related to the impact that NMR, thermal (DSC, TGA), and the UoB's links to ICP-MS capabilities, have been particularly helpful and exploring these techniques with experience university staff has led to several possible QA test methods which will become important when we start to manufacture our product. The prospect of using the UoB facilities and expertise on a commercial basis for the future analytical work needed by the company is being explored. In short, Ke-Assured's involvement with the UoB through the CAYMAN project scheme has been interesting and very worthwhile."

"I have a better understanding of the product now and the purity which is important for customers. I will now proceed to make an application for FDA compliance which this report was needed for. If we can get FDA Compliance the market is much larger for this product."

"The project allowed us to monitor residual solvent with much faster turn-around than was previously possible, and to feed this crucial data back in to our experimental plan. It has increased the quantity and pace of analysis that we can conduct, having a potentially significant impact on commercial and in-house programmes going forward."

5.3 Economic Impacts

The survey also explored the economic impact of CAYMAN in terms of business turnover. Given the unprecedented challenges for many businesses of Covid-19, Brexit and the cost-of-living crisis, the survey started by asking businesses if their turnover had increased, decreased or stayed the same since receiving support. 83.3% (15) of respondents reported that it had stayed the same, with 11.1% (2) indicating that it had decreased and only 5.6% (1) indicating that it had increased. It should be noted that the question sought to understand overall turnover change (as opposed to the turnover change attributed to the project). Whilst this finding may be 'true' (i.e. the businesses in the survey have not grown), it may also be a function of the study design. It may be the case that participants completed the survey quite quickly after receiving support (e.g. within a financial year) and therefore might have found it difficult to assess whether their turnover had changed since receiving support.

Of those whose turnover had stayed the same, 40.0% (6) indicated that the support from CAYMAN had helped 'a little' to maintain their turnover and 26.7% (4) indicated that it had helped 'a lot.' These findings suggest that CAYMAN has contributed to safeguarding the turnover of just over half of its beneficiaries. However, it has not been possible to quantify the scale of this impact in terms of GVA.

The survey also asked businesses the extent to which they expected support from CAYMAN to result in increases in turnover, profitability or resilience in the future. 77.8% (14) of respondents indicated that they

expected at least one of these measures to improve as a result of the support from CAYMAN. Figure Fifteen shows that 72.2% (13) of respondents expected the support to result in an increase in their business resilience, 58.9% (10) expected the support to result in an increase in turnover and 53% (9) expected the support to result in an increase in profitability. These findings suggest that whilst the economic impact to date has been modest, future economic impact is likely to be more significant. This may indicate that there is a time lag between the intervention and the benefits accruing to the business.

Figure 15: Extent to which Support from CAYMAN will Result in Increases in Turnover, Profitability or Resilience in the Future

	Not at all	A little	A lot	Don't know
Turnover	17.7%	41.2%	17.7%	23.5%
Profitability	23.5%	35.3%	17.7%	23.5%
Resilience	5.6%	44.4%	27.8%	22.2%

Source: CAYMAN Summative Assessment, Business Survey 2022, n = 18

5.4 Benefits for the University

Stakeholders spoke positively about the benefits for the University. Numerous examples were given of the team having created new relationships with companies and/or deepened existing ones. There is evidence of commercial contracts forming on the back of the CAYMAN projects and the team is expecting to grow its contract research portfolio over time with NMR forming a core part of that offer.

The findings from the business survey above reinforce this point, with 88.9% (16) respondents indicating that the involvement in the project had improved their understanding of the analytical facilities available at the UoB and half of all respondents indicating that they were now more likely to engage with Higher Education.

These relationships are also leading to academic benefits. For example, the University has been approached to collaborate on an academic bid to the British Heart Foundation which the team believes would not have happened without CAYMAN. The project has also been submitted as a Research Excellence Framework (REF) impact case study, demonstrating the impact of the underpinning research on society which is an excellent achievement.

Internally, the stronger working relationship that has been forged with the Faculty of Engineering and Infographics has also been beneficial, leading to the cross fertilisation of ideas and expertise.

5.5 Benefits for the Region

There is some evidence that the project has brought wider benefits to the region in terms of contributing to the growth of the advanced manufacturing and biosciences cluster as well as strengthening the R&D base by providing facilities that were not previously available in the region. The fact that the team has over-delivered on their C27 and C28 output targets will have benefitted companies' bottom line, opening up new markets and contributing to their competitiveness.

From an external perspective it was suggested that:

"Bradford as an institution sees itself as part of a bigger community and region. Not all universities are like that"

Although stakeholders indicated that the region itself tends to be under-represented in sectoral networks, the team has endeavoured to interact with relevant sectors where possible and, working with the Research

and Innovation team, are actively trying to influence policy agendas, including the UK Shared Prosperity Fund. Qualitative feedback from one business survey respondent supported this point:

"The help that CAYMAN provided has been of great value to the textile industry processing sector at which the investigation aimed. Without CAYMAN it is unlikely that this R&D would have been carried out and the problems would have remained unsolved"

However, it was acknowledged that there is more yet to be done to influence wider policy agendas.

CASE STUDY: Microtex

Drawing on his considerable experience in the textile microscopy and materials industries, Dr Phil Greaves founded his own company: Microtex Analysis over thirty years ago.

Based in Otley, West Yorkshire, Microtex is a specialist microscopy consultancy providing analytical and investigative services for manufacturers, processors and retailers of textiles at all stages. The company also works with test houses, trading standards and the legal profession, undertaking product/process evaluation and technical investigations.

Phil approached the University of Bradford when he was presented with a recurring problem by a local manufacturer which required specialist analysis facilities that were beyond his own capability. The University put him in touch with the project CAYMAN team and he was invited into the University for a full tour of the facilities which in Phil's words:

"…was such an eye opener. I had no idea what they had available. The Analytical Centre is just fantastic and they were so welcoming, especially considering that we were just coming out of a global pandemic"

Following a more detailed conversation about the requirement and an examination of the samples, the team devised a programme of investigation to support Phil with his analysis. Phil was particularly impressed by how open the team was to applying their usual processes for analysing biological and chemical materials to an investigation of textiles, experimenting with different techniques to find the best solution. He couldn't have been happier with the results:

"The team was able to identify a particular lubricant in the production process that was causing the problem. We presented the results to the company together and they have been able to improve their manufacturing processes and also reduce their costs as a result of the investigation"

Phil was so impressed with the experience that he has already referred two other businesses to the Project CAYMAN team to benefit from their expertise and intends to work with them on a commercial basis when the ERDF project comes to an end:

"This project was the start of a new relationship with the University of Bradford which I'm excited to continue. They have tremendous capabilities and now I understand the breadth of their facilities and expertise I can expand my own offer to businesses, working with them. They will be my 'go-to' analytical test centre which will be hugely beneficial both for me and the University as well as for the businesses that we'll be able to support together"

5.6 Progress Towards the Project Logic Model and SO Indicators

Figure Sixteen summarises the evidence found in relation to the outcomes and impacts outlined in the project logic model, which also includes the Strategic Objective Results Indicators.

Figure 16: Evidence of Contribution to Outcomes and Impacts Outlined in the Logic Model

	Outcomes and Impacts outlined in the Project Logic Model	Evidence
Outcomes	Increase in new to the firm products	Output data show that at the time of the summative assessment, the project had achieved 12 new to the firm products and seven new to the market products. Alongside this, 66.7% (12) of survey respondents had already introduced new or significantly improved products or processes and 72.2% (13) are now more likely to in the future.
	Increase in new to the market products	
	Increase in company technology readiness	The business survey found that CAYMAN had improved business' understanding of the facilities available at the UoB as well as how analytical techniques could improve production processes and R&D capacity. As well as improving understanding, the project led to an increase in innovation activity as well as a greater propensity to undertake innovation activity in the future. There is evidence that businesses are being supported (with analytical techniques) along the technology readiness journey.
	Increase in business efficiency (productivity)	The business survey found that 33.3% (6) of respondents had already taken an action to introduce process efficiencies as a result of CAYMAN and 55.6% (10) are now more likely to in the future.
	Increase in innovation investment (R&D spend, patent applications and IPR)	16.6% (3) of business survey respondents had either increased investment in R&D or made a patent or other Intellectual Property Rights application as a result of their involvement with CAYMAN, although 27.8% (5) indicated that they are now more likely to.
	Strengthened R&D base	The upgraded equipment and facilities will have strengthened the R&D base by providing facilities that are not currently available in the region.
Intended Impacts	Gross GVA and employment impacts (adjusted for deadweight, displacement, leakage and multipliers)	Despite strong evidence that businesses had created new products and services and improved the efficiency of the processes, findings from the business survey indicate that few had increased their turnover or employment to date. However, a majority of respondents indicated that they expected the support to result in an increase in turnover or profitability in the future.
	Uptake of new characterisation techniques in industry	77.8% (14) of business survey respondents had introduced new characterisation techniques to their business.
	Participating companies operating in new markets	The business survey found that just 5.6% (1) of respondents had accessed new markets as a result of CAYMAN, although 44.4% (8) indicated that this was now more likely in the future.
	Strengthened industry/HEI engagement	94.4% (17) of business survey respondents had strengthened or established a new relationship with the UoB. More broadly, 50.0% (9) indicated that they are now more likely to engage with the Higher Education sector.
Specific Results Indicators	The proportion of SMEs that are innovation active as measured by the UK innovation survey	The business survey found evidence that as a result of CAYMAN businesses were now more likely to invest in R&D, access other innovation funding and make a patent or other intellectual property rights application than before participating in CAYMAN, although a significant proportion were innovation active prior to support.
	Increase in the R&D tax credit by number of claims under the SME scheme	Whilst only 5.6% (1) of business survey respondents had already increased their R&D tax credit claim 22.2% (4) of respondents were now more likely to in the future.
	Increase in the R&D tax credit by value of claims under the SME scheme	

5.7 Strategic Added Value

The project's Strategic Added Value (SAV) derived in the main from the interaction with the businesses. Particularly for some of the smaller businesses who have never interacted with academic before, this initial step will have been particularly valuable. It was also observed by one stakeholder that the project has helped businesses to shortcut development time through increasing their capabilities for technical applications in government priority areas such as the green economy. In doing so, CAYMAN was thought to have contributed to wider government agendas.

More generally, stakeholders were confident that there will be additional SAV arising from the project over time. It is expected that this will stem primarily from the continuing relationships with businesses (both old and new) which, it is hoped will lead to further research and knowledge transfer projects as well as broader up-skilling opportunities. It was pointed out that previous funded projects within the Department have led to really deep engagements with businesses – leading onto collaborations such as Knowledge Transfer Partnerships (KTPs) and in one case an opportunity for the UoB to become a scientific partner to a particular company. Stakeholders were hopeful that CAYMAN will generate similar added value over time and evidence from the business survey, case studies and broader feedback suggests that this is the case:

"Lots of spin offs can and will come from developing those meaningful relationships and building trust"

Additionally, as highlighted in Section 1.6, there is an opportunity for the project to now engage in different regional policies as they evolve. The evaluators are aware that UoB is making a contribution to regional agendas which aim to raise the profile of the Chemistry and Bioscience industries and there may be opportunities for projects like CAYMAN to play into those conversations, demonstrating the important role that HEI/industry interaction makes in economic development.

The University is acutely aware, for example, of the shortage of people progressing into HE in the industry which is expected to be exacerbated by BREXIT. In the words of one internal stakeholder:

"We need to 'grow our own' with vocational pathways".

UoB is actively working on this agenda in partnership with their local Further Educational Colleges and are hopeful that CAYMAN's engagement with businesses can act as something of a conduit for achieving those broader goals. The Faculty's Level 6 apprenticeship programme appears to be going from strength to strength and the project has provided an opportunity to promote this and other placement opportunities for both students and graduates.

PROJECT OUTCOMES AND IMPACT: SUMMARY OF KEY POINTS ADDRESSING THE EVALUATION QUESTIONS

- The project made good progress towards achieving the outcomes and impacts set out in the logic model, particularly those relating to the development of new products and processes as well as engagement with Higher Education.
- There is evidence that businesses were supported along their technology readiness journey and had introduced new characterisation techniques as a result of the project.
- The project helped businesses to solve R&D and production related problems and there is evidence that it had already prompted businesses to take action, including the development of new products and services. Importantly, since engaging with CAYMAN, respondents had a greater propensity to take a wide range of actions in the future (including investment in R&D and accessing new markets). This means the benefits are likely to continue to accrue beyond the life of the project.
- It was not possible to quantify the business growth that may have already accrued through these business benefits at this time, although there is some evidence that the project has helped to safeguard GVA (not quantified).
- Looking to the future 58.9% (10) of respondents expected the support to result in an increase in turnover and 53% (9) expected the support to result in an increase in profitability over time, indicating future economic benefits.
- There is evidence that the project made a contribution to the achievement of ERDF programme results indicators. The business survey found evidence that as a result of the project, businesses are now more likely to invest in R&D, access other innovation funding and make a patent or other intellectual property rights application than before participating in CAYMAN. The business survey also found that whilst only 5.6% (1) had already increased their R&D tax credit claim 22.2% (4) of respondents were now more likely to in the future.
- There have also been wider benefits to the region in terms of contributing to the growth of the advanced manufacturing and biosciences cluster in the area as well as strengthening the R&D base by providing facilities that were not previously available in the region.
- Stakeholders were confident that there will be Strategic Added Value arising from the project over time, primarily stemming from the continuing relationships with businesses which it is hoped will lead to other research/knowledge transfer opportunities as well as contributions to the regional policy agenda. More broadly it is hoped that the relationships established with SMEs could also support the Faculty's growing degree apprenticeship programme, which would provide a wider regional benefit.

CASE STUDY: WJN Partnership and Gluco Technology

Professor Anthony Johnson and Dr Steve Wong are polymer chemists with a long track record in academia and industry including time at the University of Bradford where Prof. Johnson held the posts of Chairman of the Postgraduate School of Polymer Science and Head of Chemistry at different times. Their interest in polymer reaction engineering has led to them setting up a number of their own businesses to commercialise products, as well as a successful consultancy business.

Having been introduced to the CAYMAN project, they were excited about how the NMR technology might complement their own in-house analytical capabilities. After contemplating where NMR techniques could be most beneficial, two projects were devised (one in each company):

- **Gluco Technology**: Established in 1998, Gluco Technology was set up to commercialise a novel adhesive discovered by the team. The commercialisation process started well, with a contract to supply General Motors in the US. However, this fell through with the near collapse of GM in the early 2000s. Subsequently, Gluco secured contracts with many SMEs and multinationals, but as yet the team still consider that Gluco has not fulfilled the full potential of the adhesive technology which they believe still holds considerable promise. This product is still being developed alongside a number of others.

- **WJN Partnership**: Established in 2017 by the three directors of Gluco Technology (Wong, Johnson and Neil), WJN Partnership was set up to purchase premises (in Bradford and close to the University) to house their extensive range of equipment as well as to explore specific and broader areas of interest such as novel security systems. They are also interested in the low-energy content manufacturing processes using batch and continuous methods to make finished products directly from raw materials, biodegradable polymers being a particular target.

To enhance their marketing and sales capability, the Partnership has joined forces with a specialist marketing and investment company which is providing the support needed to take forward projects for both companies. The hope is that the activities of the two micro-SMEs will lead to significant growth as manufacturing companies when the world emerges from the Covid 19 pandemic.

The NMR technology has allowed them to look at new polymer formulations being developed in both companies. The analytical technique has helped them to better understand interactions taking place between constituents in the formulations. It is hoped that this type of fundamental molecular information (e.g. molecular diffusion rates) will contribute to the macroscopic behaviour of polymers being designed e.g. rheological behaviour during melt processing. In the short term, the NMR studies have been carried out as part of the patenting strategy of both companies, with applications in train.

The pair was delighted to have the opportunity work with the NMR through CAYMAN as this type of analytical technology would not merit purchasing for their own laboratory. They are thrilled that the University has expanded its analytical services with such a powerful new instrument and look forward to further collaboration in the future. In Tony's words:

"The University team were utterly professional and have helped us to understand the molecular properties of our new formulations, which will help with the long-term development of our products"

Section Six: Value for Money

6.1 Introduction

Value for Money (VFM) is normally assessed with reference to project outputs and impacts, benchmarked against other similar interventions, as well as calculating a Return on Investment (RoI). However, as business survey respondents indicated that their turnover/employment levels had not grown as a result of the project, it has not been possible to estimate gross or net GVA arising from growth. Whilst these respondents indicated that the support had helped them to maintain their position, it was not possible to estimate the amount of GVA that was safeguarded as a result of the project. Therefore, it has not been possible to estimate a Return on Investment.

6.2 Benchmarking

Figure Seventeen shows the relative Value for Money of CAYMAN in terms of the unit costs of key outputs,[7] compared with national research conducted by Regeneris Consulting on behalf of DCLG. The Regeneris study developed a series of benchmarks for the proposed 2014-2020 programme by calculating mean, median and lower quartile unit cost values for a range of outputs based on DCLG data from the 2007-2014 programme.[8] For some indicators, Regeneris Consulting provide a recommended unit costs.

The unit costs for the project were calculated on the basis of the performance at the time of the summative assessment based (i.e. Quarter 4 2022) in terms of:

- Total costs (excluding any private match[9]); and,
- Revenue costs (excluding any private match).

The total unit costs were significantly higher than the national benchmarks. This was expected given the high up-front capital costs incurred in undertaking the refurbishment and purchasing the equipment. When these capital costs are excluded, the unit costs fall within the normal range of the national benchmarks and, with the exception of C1 unit costs, are better than expected at the project design stage.

[7] Outputs which are a subset of other outputs have been excluded
[8] England ERDF programme 2014-2020: Output Unit Costs and Definitions. A final report by Regeneris Consulting
[9] To be consistent with the Regeneris methodology, which excludes any private sector investment

Figure 17: Value for Money – Benchmarking Analysis

Indicator	Total unit cost based on Q4 2022 performance	Unit costs based on Q4 2022 performance – Revenue only	Regeneris Research (based on DCLG database of 1,000 projects funded through the 2007-2014 programmes)
Expenditure	£2,058,080	£616,301	
C1: Number of enterprises receiving support	£42,002	£12,578	The study highlights that this unit cost is particularly prone to variability, reflecting the variation in intensity of support. Across the 623 projects: **The mean unit cost was £34,000,** **The median was £10,200 and** **The lower quartile £4,700** However, the report points out that much higher unit costs can be justified for more intensive support
C26: Enterprises co-operating with research institutions	£171,507	£51,358	Based on evidence from c. 200 projects: **The mean cost was £100,000 (but skewed by some major outliers)** **The median cost was £42,000** **The lower quartile cost was £17,000** The authors recommend that a figure of £38,000 for more intensive projects involving a few firms in the collaboration, although the higher mean figure may be appropriate for projects involving a capital element
C28: Number of enterprises supported to introduce new to the market products	£294,011	£88,043	The Regeneris study notes that the C28 indicator is new to the current programme and therefore, some caution needs to be exercised. The report notes that as the old definition was based on results, rather than activity, the unit costs for the new definition should be at least 25% lower. The unit costs based on 78 observations and reduced by 25% are: **Mean = £70,500** **Median = £21,000**
C29:Number of enterprises supported to introduce new to the firm products	£171,507	£51,358	The Regeneris study notes that the C28 indicator is new to the current programme and therefore, some caution needs to be exercised. The report notes that as the old definition was based on results, rather than activity, the unit costs for the new definition should be at least 25% lower. The unit costs based on 78 observations and reduced by 25% are: **Mean = £70,500** **Median = £21,000**

Source: CAYMAN Monitoring Data (Q4, 2020) and Regeneris Consulting

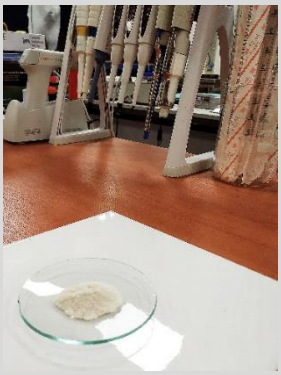
VALUE FOR MONEY – SUMMARY OF KEY POINTS ADDRESSING THE EVALUATION QUESTIONS

- At the time of the final summative assessment, total unit costs were significantly higher than the national benchmarks. This was to be expected given the high up-front capital costs incurred in undertaking the refurbishment and purchasing the equipment.
- When these capital costs are excluded, the unit costs fall within the normal range of the national benchmarks and are better than expected at the project design stage.

CASE STUDY: AgriFoodX

AgriFoodX is a research, consultancy and training company which specialises in the use of agri-food by-products as a source of environmentally sustainable material for innovative food products, supplements, pharmaceuticals, personal care and packaging. Established just over three years ago, it employs four people and is based just outside York.

Company Director, Graham Bonwick, first heard about the opportunity to work with CAYMAN via an email from the Local Enterprise Partnership, who were advertising the demonstration and learning workshops. Graham was interested in these sessions as they offered an opportunity to learn a new technique and work with a local Higher Education institution as well as getting to know people and make connections.



The team at AgriFoodX were aware of NMR, but wanted to improve their understanding of it and work out what it could do for them in the future. As the event provided an opportunity to bring a sample, Graham provided a sample of Chitosan (see inset). Chitosan is derived from crustacean shells (a waste product) and is composed of two molecules. As a naturally derived product, the proportion of these molecules varies considerably, and this variability affects the solubility and behaviour and therefore the potential end uses of the product. Traditional chemical characterisation methods can be slow and time-consuming and therefore Graham was keen to understand if NMR could provide a faster characterisation method for use in the supply chain.

The learning and demonstration workshop proved to be really valuable, improving Graham's understanding of the process and science behind the NMR as well as improving his understanding of the University of Bradford and their capabilities. In Graham's words:

"We did not know a lot about the University of Bradford before, but this has been very positive"

The analysis undertaken through the workshops proved that the NMR could deliver rapid results as well as cut down on the need for other tests. In Graham's words:

"We have actually got a better understanding of our materials than we expected. This cuts down on the need for other tests and gives us confidence on some of our materials"

Looking to the future, the sampling conducted during the project proved that the NMR technique could be useful within this sector and the team at AgriFoodX are exploring further collaborative commercial opportunities with the University of Bradford.

Section Seven: Emerging Conclusions

7.1 Overall Assessment

There was a strong rationale for CAYMAN and the project made good progress against its project logic model, despite the challenges of operating under pandemic restrictions for a significant period of time. Although the team does not expect to spend the entire budget as forecast, it is expecting to either achieve or exceed all outputs by project closure which is an excellent result.

Evidence suggests that CAYMAN was well managed, with clear systems in place as well as appropriate governance structures. Feedback from stakeholders was positive and participants showed high levels of satisfaction with all aspects of the project. Beneficiaries found the research useful and the results have helped businesses to solve R&D and production related problems. There is evidence that the project has already prompted businesses to take action, including to develop new products and services. Moreover, survey respondents indicated a greater propensity to take a wide range of actions in the future (including investment in R&D and accessing new markets), meaning that the benefits are likely to continue accruing beyond the life of the project.

As a core aim of the project, over 90% of survey respondents indicated that involvement in the project had enabled them to strengthen or establish a new relationship with the UoB and half indicated that they are now more likely to engage with the Higher Education sector.

However, at the time of the summative assessment, it was not possible to quantify the economic growth experienced by participants, therefore it has not been possible to estimate the gross or net impacts arising from the project. Looking to the future, over half of the survey respondents expected the support to result in an increase in turnover and/or profitability over time, indicating future economic benefits.

Stakeholders were likewise confident that there will be Strategic Added Value arising from the project over time, primarily stemming from the continuing relationships with businesses which it is hoped will lead to other research/knowledge transfer opportunities as well as contributions to the regional policy agenda.

7.2 Strengths and Weaknesses

The summative assessment guidance requires evaluators to identify strengths and weaknesses in projects. This was challenging as the project performed well and only minor weaknesses could be identified.

CAYMAN's strengths are that it:

- Was a well-designed project which benefitted from a relatively simple delivery model and a clear set of activities for participants;
- Was able to pivot delivery in response to the pandemic;
- Responded to the challenge of recruiting and retaining staff with the right combination of skills by outsourcing business development activity to a specialist company – Interaction Northwest – which generated a good number of leads;
- Expanded effectively to incorporate other parts of the University with different expertise and analytical equipment, increasing the offer for businesses;
- Kept paperwork and bureaucracy to a minimum for participants, whilst also meeting ERDF monitoring requirements; and,

- Benefited from an empathetic staff team which listened and responded well to the needs of beneficiaries in order to develop meaningful business relationships.

Potential weaknesses can be found in:

- Its inability to recruit and retain staff with the right combination of skills, though this was mitigated well with an alternative approach as highlighted above; and,
- Its approach to the delivery of the equality and diversity horizontal theme which could be improved by being more proactive in a) promoting E&D principles with businesses and b) reaching women led businesses.

7.3 Learning Opportunities

7.3.1 Lessons for Policy Makers - there is emerging evidence that this sort of analytical project is providing tangible benefits to businesses in the region, by helping them to overcome specific R&D/production challenges. Therefore, policy makers within the LCR should consider the future role of this sort of project within the wider portfolio of economic development interventions.

7.3.2 Lessons for those Designing and Implementing Similar Interventions - the project's simple but effective design could be a learning point for those designing and delivering similar interventions. Likewise, areas of good practice can be found in the team's approach to working with businesses. They have been particularly effective at translating academic concepts into commercial language which helps to make the research offer more accessible as well as engaging businesses in meaningful relationships. This is borne out of the team really understanding business challenges and opportunities and providing clients with a tailored response to their needs rather than pushing a particular solution. The project's use of an outsourced company to generate leads was also beneficial.

7.3.2 Lessons for the Grant Recipient – for the grant recipient there may be learning in terms of how elements of projects (such as lead generation) can be outsourced and delivered more cost effectively than delivering in house. Greater thought could also be given to the integration of horizontal principles, particularly E&D, through delivery.

ANNEX 1: FORECAST UNIT COSTS RELATIVE TO NATIONAL BENCHMARKS

	Original Costs		Revised Costs (post PCR)		Regeneris Research (based on DCLG database of 1,000 projects funded through the 2007-2014 programmes)
	Unit costs (public capital and revenue only)	Unit costs (public revenue only)	Unit costs (public capital and revenue only)	Unit costs (public revenue only)	
Costs	£1,600,148	£655,370	£2,236,040	£794,261	Not applicable
C1: Number of enterprises receiving support	£35,559	£14,563	£34,400	£12,219	The study highlights that this unit cost is particularly prone to variability, reflecting the variation in intensity of support. Across the 623 projects: • The mean unit cost was £34,000, • The median was £10,200 and • The lower quartile £4,700 However, the report points out that much higher unit costs can be justified for more intensive support
C26: Enterprises co-operating with research institutions	£177,794	£72,818	£186,337	£66,188	• The mean cost was £100,000 (but skewed by some major outliers) • The median cost was £42,000 • The lower quartile cost was £17,000 The report recommends that a figure of £38,000 for more intensive projects involving a few firms in the collaboration, although the higher mean figure may be appropriate for projects involving a capital element
C28: Number of enterprises supported to introduce new to the market products	£320,029	£131,074	£447,208	£158,582	The Regeneris study notes that the C28 indicator is new to the current programme and therefore, some caution needs to be exercised. The report notes that as the old definition was based on results, rather than activity, the unit costs for the new definition should be at least 25% lower. The unit costs based on 78 observations and reduced by 25% are: • Mean = £70,500 • Median = £21,000
C29: Number of enterprises supported to introduce new to firm products	£145,468	£59,580	£172,003	£61,097	The Regeneris study notes that the C29 indicator is new to the current programme and therefore, some caution needs to be exercised. The report notes that as the old definition was based on results, rather than activity, the unit costs for the new definition should be at least 25% lower. The unit costs based on 78 observations and reduced by 25% are: • Mean = £70,500 • Median = £21,000