



**INTERREG VA IMPACT EVALUATION**

**PRIORITY 1 – RESEARCH AND INNOVATION - KEY FINDINGS  
PAPER**



Special EU Programmes Body  
Foras Um Chláir Speisialta An AE  
Boord O Owre Ocht UE Projects



**Cogent Management Consulting LLP**

**6<sup>th</sup> October 2019**

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**PRIORITY 1 – RESEARCH AND INNOVATION**  
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## List of Abbreviations

Abbreviation	Definition
AAL	Ambient Assisted Living
AB	Advisory Board
ACS	Acute Coronary Syndrome
AD	Alzheimer's disease
AD	Anaerobic Digestion
AFC	Authentic Food Company
AFRC	Advanced Forming Research Centre
AKI	Acute kidney injury
APC	Article Processing Charge
ARCH	Applied Research for Connected Health Centre
BDI	Biomedical Diagnostics Institute
BETTA	British Electricity Trading Transmission Arrangements
BERD	Business Expenditure of Research and Development
BIM	Business Integration Manager
BIM	Building Information Modelling
BREATH	Border and Regions Airways Training Hub
BSR	Business Status Review
C-Is	Catalyst Inc's
c-Si	First Generation
C-TRIC	Clinical Translational Research and Innovation Centre
CAES	Compressed Air Energy Storage
CALIN	Celtic Advanced Life Science Innovation Network
CASALA	Centre for Affective Solutions for Ambient Living Awareness
CATS	Cambridge Academy of Therapeutic Sciences
CB	Cross Border
CEO	Chief Executive Officer
CE-SEA	Community Energy from Solar Envelope Architecture
CF	Clinical Fellow
CHF	Congestive Heart Failure
CI	Co-Investigators
CL	Commercial Lead
CO	Output Indicators
Co2	Carbon dioxide
Co-Innovate	The Innovation Pathway Programme
COPD	Chronic Obstructive Pulmonary Disease
CPM	Centre for Personalised Medicine: Clinical Decision Making and Patient Safety
CR	Cardiac Rehabilitation
CRP	Inflammatory Factors
CSRI	Computer Science Research Institute
CTE	Critical Technology Elements
CURAM	Centre for Research for Medical Devices
CVD	Cardiovascular Disease
DCNI	Director of Digital Catapult
DCSDC	Derry City and Strabane District Council
DCU	Dublin City University
DEL	Department for Employment and Learning, Northern
DIT	Department for International Trade
DJEI	Department of Jobs, Enterprise and Innovation
DKIT	Dundalk Institute of Technology
DME	Dimethyl ether
DNDI	Dementia and Neurodegeneration Ireland
DNO	Distribution Network Operator
DOFE	Design of Experiments
DSO	Distribution System Operators
DVEM	Dundalk Virtual Energy Microgrid
EAC	External Advisory Committee

Abbreviation	Definition
EBR	East Border Region Ltd
ECG	Electrocardiogram
ECME	Eastern Corridor - Medical Engineering Centre
EOI	Expressions of Interest
EOL	End-Of-Life
EP	Enterprise Partners
EQIA	Equality Impact Assessments
ER	Eligible Region
ERDF	European Regional Development Fund
ESB	Electricity Supply Board
ESCO	Energy Service Companies
ESG	Evaluation Steering Group
ESIF	European Structural and Investment Funds
EV	Electric Vehicles
FTEs	Full-Time equivalent employees
GBD	Global Burden of Disease
GBER	General block exemption Regulation
GD	Glen Dimplex
GENSSIS	Gravitational potential Energy Storage & Synchronous Inertial Stability
GHGs	Green House Gases
GIS	Geographic Information Systems
GDP	Gross Domestic Product
GNP	Gross National Product
GVA	Gross Value Added
HDOs	Healthcare Delivery Organisations
HEFCE	Higher Education Funding Council for England
HEFCW	The Higher Education Funding Council for Wales
HEV	Hybrid Electric Vehicles
HF	Heart Failure
HGSG	Human Genomics Strategy Group
HIE	Highlands and Islands Enterprise
HIPAA	Health Insurance Portability and Accountability Act
HLS	Health and Life Sciences
HP	Health Partners
HVMC	High-Value Manufacturing Catapult
IBD	Inflammatory Bowel Disease
ICA	Innovation Capability Audit
IDTs	Industrial Digitalisation Technologies
IIE	Institute of Industrial Engineers
IoT	Internet of Things
IP	Intellectual Property
IPR	Intellectual Property Rights
IRR	Innovation Ready Reckoner
ISCE	The International Society for Computerized Electrocardiology
ISEM	Integrated Single Electricity Market
ITS	Institute of Technology Sligo
ITT	Invitations to Tender
KTN	Knowledge Transfer Network
L&HS	Life and Health Sciences
LEA	Local Enterprise Agency
LEO	Local Enterprise Offices
LoO	Letter of Offer
LPE	Laser Prototypes Europe
LPWANS	Low powered wide area networks
LTCs	Long Term Conditions
LUH	Letterkenny University Hospital
LyIT	Letterkenny Institute of Technology
MB	Management Board

Abbreviation	Definition
MDMs	Medical Device Manufacturers
MDO	Multi-Disciplinary Optimisation
MES	Mass Energy Storage
MI	Myocardial Infarction
MNI	Manufacturing NI
MRE	Marine Renewable Energy
NHSH	NHS Highlands
NI	Northern Ireland
NIBEC	Nanotechnology and Integrated Bio-Engineering Centre
NICRS	Northern Ireland Clinical Research Services
NIGEAE	Northern Ireland Guide to Expenditure Appraisal and Evaluation
NIUR	NI Utility Regulator
NREAP	National Renewable Energy Action Plan
NUIG	National Universities of Ireland Galway
NWCAM	North West Centre for Advanced Manufacturing
O&M	Operation and Maintenance
OA	Open Access
OECD	Organisation for Economic Co-operation and Development
ORECNI	Office of Research Northern Ireland
PAM	Passive Acoustic Monitoring
PC	Project Coordinator
PCI	Primary coronary intervention
PCI	Project of Common Interest
PCK9	Proprotein Convertase Subtilisin Kexin Type 9
PCM	Phase Change Materials
PDRA	Post-Doctoral Research Associate
PDFR	Post-Doctoral Research Fellows
PDT	Programme Delivery Team
PEEK	Polyether ether ketone
PfG	Programme for Government
PhD	Postgraduate Doctoral Degree
PI	Principal Investigator
PMB	Project Management Board
PMC	Project Management Committee
PNAS	Proceedings of the National Academy of Science
POC	Point of Care
POCT	Point-of-care testing
PP	Polypropylene
PRPA	Peer Review Paper Assessment Panel
PV	Photovoltaic
QUB	Queen's University Belfast
R&D	Research & Development
R&D&I	Research, Development & Innovation
R&I	Research & Innovation
R&I	Research and Impact
RA	Research Associates
Randox	Randox Laboratories Ltd
RCs	Research Clusters
RE	Renewable Energy
REF	Research Excellence Framework
RF	Research Fellow
ROI	Republic of Ireland
ROS	Reactive Oxygen Species
RTDI	Research, Technology Development and Innovation
RY	Researcher years
SALMS	Sustainable Agricultural Land Management Strategy
SEF	Strategic Energy Framework
SEM	Single Electricity Market

Abbreviation	Definition
SEUPB	Special European Union Programmes Body
SFC	Scottish Funding Council
SMART	Specific, Measurable, Achievable, Realistic and Timebound
SMEs	Small and Medium-sized Enterprises
SMRC	Smooth Muscle Research Centre
SNEPs	Spontaneously Differentiated Neuroectodermal Progenitor Cell
SNSP	System Non-Synchronous Penetration
SOFC	Solid Oxide Fuel Cells
SONI	System Operator NI
SPIRE 1	Storage Platform for the Integration of Renewable Energy (2013-2015)
SPIRE 2	Storage Platform for the Integration of Renewable Energy
SSB	Scientific Supervisory Board
ST	Southern Trust
STEM	Science, Technology, Engineering and Maths
STEMM	Science, Technology, Engineering, Maths and Medicine
STLCA	Spatial-Temporal LCA
SWAN	Scientific Women's Academic Network
SWC	South West College
TCM	Thermochemical Materials
TE	Training Events
TES	Thermal Energy Storage
T-MED	Translational Medicine
TnI	Troponin I
TRA	Technology Readiness Assessment
TRL	Technology Readiness Level
TSO	Transmission System Operators
TTM	Technology Transfer Manager
TTO	Technology Transfer Offices
UCD	University College Dublin
UFU	Ulster Farmer Union
UG	University of Glasgow
UHI	University of Highlands and Islands
UIR	Ulster Institutional Repository
UK	United Kingdom
UKRI	UK Research and Innovation
UoA	Unit of Assessment
US	University of Strathclyde
UU	Ulster University
UWS	University of the West of Scotland
VPH	Virtual Physiological Human
VRE	Variable Renewable Energy
VRGS	Virtual Research Graduate School
WEC	Wave Energy Converters
WHO	World Health Organisation
WHST	Western Health and Social Care Trust

### Description of Statistics

In this report, proportions may be described as percentages, common fractions and in more general quantitative terms. Where more general terms are used, they should be interpreted as follows:

<b>Almost/nearly all</b>	more than 90%
<b>Most</b>	75% -90%
<b>A majority</b>	50% -74%
<b>A significant minority</b>	30% -49%
<b>A minority</b>	10% -29%
<b>Very few/a small number</b>	less than 10%

## 1. INTRODUCTION AND BACKGROUND

### 1.1 Introduction

The Special EU Programmes Body (SEUPB) has commissioned Cogent Management Consulting LLP (Cogent) to carry out an impact evaluation of INTERREG VA Programme<sup>1</sup> Investment Priority 1: Research and Innovation. This report provides a summary of the key findings emerging from the first formative evaluation of the Investment Priority. More substantive analysis and commentary can be found in the main Evaluation report and accompanying appendices.

### 1.2 Background to the INTERREG VA Programme

Launched in January 2016, the INTERREG VA Programme is one of over 60 funding programmes across the EU that have been specifically designed to address problems that arise from the existence of borders. Borders can reduce economic development, hamper the efficient management of the environment, obstruct travel and hinder the delivery of essential health and social care services. The INTERREG VA Programme, therefore, aims to promote greater levels of economic, social and territorial cohesion to create a more prosperous and sustainable cross-border region.

The INTERREG VA Programme has a total value of €283m, which is funded as follows:

- 85% (€240m) via the European Regional Development Fund (ERDF), which is within the European Structural and Investment Funds (ESIF).
- 15% (€43m) via match funding from non-EU sources e.g. national, regional, local government, a project's own resources or private contributions. Contributions in-kind may be used as match-funding. NB: arrangements for match-funding may vary between priority axes of the Programme.

Figure 1.1: INTERREG VA Programme Priority Axes<sup>2</sup>



<sup>1</sup> For Northern Ireland, Ireland and Western Scotland

<sup>2</sup> Source: Citizens' Summary: INTERREG VA Programme (2014-2020).

As depicted above, the INTERREG VA Programme has four key priority axes, which were selected to address identified weaknesses in the programme region’s economy, as set out in the Cooperation Programme for the INTERREG VA Programme 2014-2020<sup>3</sup>. The Cooperation Programme states that the priority axes are congruent with ‘Europe 2020 - A Strategy for Smart, Sustainable and Inclusive Growth’ and the priority areas identified for European Territorial Cooperation within the EU Commission Position Papers for the UK and Ireland.

The following subsections provide further details of Priority Axis 1: Research and Innovation.

### 1.3 Priority Axis 1: Research and Innovation and its Objectives

#### 1.3.1 Introduction

The Cooperation Programme states that the key aim of Priority Axis 1: Research and Innovation is to “encourage investment in sectors that offer the most growth potential, whilst building on existing strengths, and helping the region to become more competitive in a global marketplace.”

It is anticipated that this priority axis will tackle two key weaknesses in the programme region’s competitiveness, namely the:

1. The low levels of expenditure on research, development and innovation (R&D&I); and
2. An under-representation of higher value-added sectors and innovation-active small and medium-sized enterprises (SMEs)<sup>4</sup>.

The **selected investment priorities** under Priority Axis 1: Research and Innovation and their **associated objectives** are as follows:

Table 1.1: Priority Axis 1 Investment Priorities and Specific Objectives	
Investment Priority	Associated Specific Objectives
<b>1a - Enhancing research and innovation</b> (R&I) infrastructure and capacities to develop R&I excellence, and promoting centres of competence, in particular, those of European interest.	<b>1.1</b> Increasing business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences and Renewable Energy.
<b>1b - Promoting business investment in R&amp;I</b> , developing links and synergies between enterprises, R&D centres and the higher education sector, in particular promoting investment in product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation, and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in key enabling technologies and diffusion of general-purpose technologies.	<b>1.2</b> Increasing the number and capacity of SMEs engaged in cross-border research and innovation activity in the region aimed at the development of new products, processes and tradable services.

<sup>3</sup> Formally adopted in February 2015.

<sup>4</sup> The Output Indicator Guidance document for Objective 1.2 (February 2016) defines SMEs as having: fewer than 250 full-time equivalent employees (FTEs), an annual turnover not exceeding €50m and/or an annual balance sheet total not exceeding €43m. Sole traders are excluded from this definition to maintain the purpose and ambitions of the INTERREG VA Programme to achieve significant change.



1.3.2 *Objective 1.1 - Increasing business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences and Renewable Energy*

The Co-operation Programme notes that the eligible region's economies are characterised by a low proportion of high value-added, exporting sectors and low levels of R&I. Noting that Research, Development and Innovation (R&D&I) is a key mechanism for the eligible region to realise its shared policy agenda to transform the region into a knowledge-based economy, characterised by increased research capacity and capability, which can produce new intellectual property, human capital and attract foreign direct investment, it is anticipated that the INTERREG VA Programme presents an opportunity to encourage the creation of new, and support the development of existing, cross-border R&D&I partnerships (including stakeholders from academic institutions, SMEs and Government agencies).

The aim of this investment priority (and its Specific Objective) is to utilise cross-border collaboration to increase the overall level of research and innovation competence and activity across the programme area in a strategic way designed to contribute towards the development of a more competitive, high value-added economy<sup>5</sup>.

In order to achieve the aim of creating or enhancing research and innovation centres within the timeframe of the programme, the selection of sectors with existing capacity and capability was deemed to be essential. Therefore, it was decided that programme support would be directed towards two sectors: Life and Health Sciences; and Renewable Energy<sup>6</sup>. It is anticipated that this focused approach would further develop research areas in which there are existing critical mass and those where the region has distinct advantages (thereby aligning with the EU Smart Specialisation Platform).

The **output indicators**<sup>7</sup> for Objective 1.1 are set out below:<sup>8</sup>

- 514 years' worth of PhD (or above) level research
- 5 research institutions participating in cross-border, transnational or interregional research projects
- 20 enterprises receiving support
- 10 enterprises receiving grants
- 20 enterprises receiving non-financial support
- 10 enterprises cooperating with research institutions
- 10 enterprises participating in cross-border, transnational or interregional research projects

The INTERREG VA Citizens' Summary suggested that the above outputs might be achieved through the following **indicative actions**:

<b>Table 1.2: Objective 1.1 Indicative Actions<sup>9</sup></b>
<ul style="list-style-type: none"> <li>• The creation of clusters which will enable the development of virtual centres of excellence within the region, involving capacity and competence building;</li> <li>• Clusters will complement existing R&amp;I strategies within jurisdictions by promoting cross-border cooperation and will take the form of partnership arrangements between existing institutions in academia, public sector agencies and private sector companies;</li> <li>• The further development of existing competence centres to facilitate increased levels of cross-border collaboration; and</li> <li>• The clusters will address market failure in the Research, Technology Development and Innovation (RTDI) landscape, whereby the risk associated with the longer-term nature of strategic research carried out cannot be addressed by individual companies.</li> </ul>

<sup>5</sup> The term R&D encompasses three types of activities: basic research, industrial research and experimental development. However, only industrial research and experimental development activities are eligible for support under the INTERREG VA programme.

<sup>6</sup> Definitions of these sectors are provided in Appendix I.

<sup>7</sup> Source: Citizens' Summary: INTERREG VA Programme (2014-2020).

<sup>8</sup> Each output indicator is defined in the 'Output Indicator Guidance' document for Objective 1.1.

<sup>9</sup> Source: Citizens' Summary: INTERREG VA Programme (2014-2020).

The **result indicator**<sup>10</sup> for this Objective 1.1 is the annual number of peer-reviewed journal and conference publications in two target sectors (Health and Life Sciences and Renewable Energy) with cross-border authorship and with the potential to create economic impact. The stated baseline value for 2014 (i.e. the start of the Programme period) is 4, whilst the target value for 2023 is 75<sup>11</sup>.

1.3.3 *Objective 1.2 – Increasing the number and capacity of SMEs engaged in cross-border research and innovation activity in the region aimed at the development of new products, processes and tradable services*

The Co-operation Programme notes that a range of barriers contributes to the high level of innovation<sup>12</sup> inactivity that exists among SMEs in the eligible region including the cost of innovation, a lack of internal funds and a lack of external finance.

The aim of this investment priority (and its Specific Objective) is to build a strong export-based economy through increased awareness of, and engagement in, innovation activities by SMEs in the eligible region, specifically on a cross-border basis. In doing so the priority seeks to (inter alia):

- Increase the capacity of SMEs and micro-businesses to participate in cross-border research and innovation activities;
- Increase levels of investment in the creation of cross-border centres and projects designed specifically to strengthen the links between SMEs and Research Institutions;
- Increase the number of enterprises actively innovating to bring new products and/or new processes to the market; and
- Build systems and cultures of open innovation across the eligible region.

In order to achieve these objectives, the Co-Operation Programme considered that it would be necessary to engage in an intensive programme of development with SMEs and micro-businesses within the region; which might include businesses participating in one or more of the following activities:

<b>Table 1.3: Strands of Activity anticipated to the undertaken as part of Objective 1.2<sup>13</sup></b>	
<b>1. Preparatory Interventions delivered via workshops</b>	An initial series of preparatory workshops for SMEs in the region, aimed at raising awareness of R&I and identifying those SMEs with potential to progress to more intensive development activities. This element describes a series of workshops to educate and influence SMEs on the importance of the innovation ecosystem enabling them to leverage this on a cross-border basis to advance their business. It is anticipated that these workshops will have cross-border participation and will serve to raise knowledge and awareness of other innovation actors and support systems across the border.
<b>2. Preparatory Interventions delivered on a one to one basis</b>	A more intensive preparatory intervention with individual SMEs, providing them with one to one advice and support in the identification of R&I opportunities. This element describes an in-firm activity to assess their current approach to innovation and how the local and cross-border innovation ecosystem is utilised. The output will identify specific areas where cross-border collaboration will be beneficial and the appropriate cross-border intervention for each individual SME. Where progression to strands 3 or 4 or 5 is not appropriate, SMEs will be signposted to alternative local and cross-border support mechanisms.

<sup>10</sup> The Programme’s impact is monitored through the use of output and result indicators. Projects receiving funding through INTERREG VA are expected to report progress against output indicators only (Output Indicator Guidance document for Objective 1.1, January 2017).

<sup>11</sup> Source: Cooperation Programme for the INTERREG VA Programme 2014-2020.

<sup>12</sup> The CP defines innovation as the development of solutions that meet needs in new ways. The CP considers innovation to be wider than R&D in so far as it covers improvements to products, tradable services and processes.

<sup>13</sup> Source: Cooperation Programme for the IVA Programme 2014-2020.

**Table 1.3: Strands of Activity anticipated to the undertaken as part of Objective 1.2<sup>13</sup>**

<b>3. Innovation Capability Development Programme</b>	Engaging with a targeted group of SMEs in an intensive R&I capability development programme. Participation in this element is optional and is dependent on the outcome of strand 2. Where participation does occur, the support provided will aim to address any internal barriers that will prevent the participating firms realising the full potential of the cross-border innovation providers and programmes.
<b>4. Cross-border Innovation Internship Programme</b>	Providing selected and targeted SMEs with the opportunity to avail of a cross-border internship programme that will make available to them a qualified graduate with the necessary skills to contribute to the R&I activity within their company.
<b>5. Cross-border R&amp;I Projects</b>	Engaging targeted SMEs in cross-border R&I projects that have been identified as having significant potential for economic impact within their companies and within the economy of the region.

The **output indicators**<sup>14</sup> for Objective 1.2 are set out below:<sup>15</sup>

- 1,408 enterprises receiving support;
- 1,408 enterprises receiving non-financial support;
- 469 enterprises receiving one-to-one innovation advice;
- 5 research institutions participating in cross-border, transnational or interregional research projects;
- 94 enterprises in receipt of an Innovation Capability Development Programme;
- 70 enterprises engaging an Innovation Intern, on a cross-border basis.
- 50 enterprises cooperating with research institutions;
- 19 enterprises participating in cross-border, transnational or interregional research projects;
- 19 enterprises receiving grants.

It is stated that the above outputs could be achieved through the following **indicative actions**:

**Table 1.4: Objective 1.2 Indicative Actions<sup>16</sup>**

- Education and awareness-building programmes aimed at SMEs.
- One-to-one mentoring and advice programmes for SMEs.
- Innovation capability audits within SMEs.
- Development and implementation of innovation action plans tailored to the needs of the SMEs which address innovation capability deficiencies.
- Innovation internship programmes incorporating technology job creation, designed to address the capability deficiencies.
- A collaborative R&D programme designed to create and support collaborative research projects between SMEs and research institutions.

The **result indicator**<sup>17</sup> for Objective 1.2 is the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations. The stated baseline value for 2014 (i.e. the start of the Programme period) is 22%<sup>18</sup>, whilst the target value for 2023 is 33%<sup>19</sup>.

<sup>14</sup> Source: Citizens' Summary: INTERREG VA Programme (2014-2020).

<sup>15</sup> Each output indicator is defined in the 'Output Indicator Guidance' document for Objective 1.2 (February 2016).

<sup>16</sup> Source: Citizens' Summary: INTERREG VA Programme (2014-2020).

<sup>17</sup> The Programme's impact is monitored through the use of output and result indicators. Projects receiving funding through INTERREG VA are expected to report progress against output indicators only (Output Indicator Guidance document for Objective 1.1, January 2017).

<sup>18</sup> NB: To determine this baseline, SEUPB advised that specific questions were introduced into the January/February 2015 version of InterTradeIreland's quarterly All Ireland Business Monitor Survey. It is understood that 146 (22%, N=676) of the business respondents indicated that they undertook R&D&I and were supported by another organisation outside their own jurisdictions i.e. Northern Ireland, the border region of Ireland or Western Scotland. For the purposes of this paper (which focuses on cross-border collaborative R&D&I activity being between Northern Ireland and the border region of Ireland, excluding Scotland), SEUPB advised that 119 (22%, N=548) of the total business respondents based in either Northern Ireland (N=79) or border region of Ireland (N=40) indicated that they undertook R&D&I and were supported by another organisation outside their own jurisdictions i.e. Northern Ireland or the border region of Ireland.

<sup>19</sup> Source: Cooperation Programme for the IVA Programme 2014-2020.

### 1.3.4 Summary of Specific Objectives, Result Indicators and Targets

Table 1.5 provides a summary of the Specific Objectives, Result Indicators and Targets for Priority Axis 1: Research and Innovation:

<b>Table 1.5: Summary of Specific Objectives, Results Indicators and Targets</b>			
<b>Specific Objective</b>	<b>Result Indicator</b>	<b>Baseline</b>	<b>Target</b>
<b>1.1</b> To increase business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences and Renewable Energy	The annual number of peer-reviewed journal and conference publications in two target sectors (Health and Life Sciences and Renewable Energy) with cross-border authorship and with the potential to create economic impact	4	75
<b>1.2</b> To increase the number and capacity of SMEs engaged in cross-border research and innovation activity in the region aimed at the development of new products, processes and tradable services	The percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations	22%	33%

The anticipated Output Indicators are summarised below:

<b>Table 1.6: Summary of Output Indicators</b>			
<b>Output Indicator<sup>20</sup></b>	<b>Objective</b>		<b>Total</b>
	<b>1.1</b>	<b>1.2</b>	
No. of enterprises receiving support	20	1,408	<b>1,428</b>
No. of enterprises receiving grants	10	19	<b>29</b>
No. of enterprises receiving non-financial support	20	1,408	<b>1,428</b>
FTE Years of PhD (or above) level research	514	0	<b>514</b>
No. of enterprises cooperating with research institutions	10	50	<b>60</b>
No. of enterprises participating in cross-border, transnational or interregional research projects	10	19	<b>29</b>
No. of research institutions participating in cross-border, transnational or interregional research projects	5	5	<b>10</b>
No. of enterprises receiving one to one innovation advice	-	469	<b>469</b>
No. of enterprises in receipt of an innovation capability development programme	-	94	<b>94</b>
No. of enterprises engaging an innovation intern, on a cross-border basis.	-	70	<b>70</b>

### 1.4 The Evaluation – SEUPB’s Requirements

To fulfil the requirement of Article 114(1) of the Common Provisions Regulation (EU No: 1303/2013), SEUPB’s Managing Authority has submitted to the Commission an Evaluation Plan for the INTERREG VA Programme<sup>21</sup>. The Evaluation Plan has been put in place to facilitate learning and maximise the proposed investments of the Programme<sup>22</sup>.

<sup>20</sup> Each output indicator is defined in the ‘Output Indicator Guidance’ documents for Objectives 1.1 and 1.2.

<sup>21</sup> The Evaluation Steering Group (ESG), a sub-group of the Programme Monitoring Committees for the PEACE IV and INTERREG VA Programmes, was established to ensure the effective implementation of the Evaluation Plan for each Programme.

<sup>22</sup> Article 56(3) of Regulation (EC) No: 1303/2013 requires that an evaluation should assess how the support provided has contributed to the achievement of the objectives of the programme. Article 54 requires the impact evaluation to comment on the contribution of the priority axis to the EU 2020 objectives. In addition, Article 7 of the above regulation requires that Member States ensure equality between men and women and the integration of a gender perspective are taken into account and promoted throughout the preparation and implementation of the programmes, including in the monitoring and evaluation of the programmes. Article 7 also specifies that the programme authorities must take appropriate steps to prevent any discrimination on any of the specified grounds. Article 8 requires that the objectives of the funds shall be pursued in line with the principle of sustainable development and with the European Union’s promotion

The Plan outlines two types of evaluation:

1. **Implementation Evaluations** which will assess the efficiency and effectiveness of the implementation mechanism established for the programme (these will not form any part of this assignment); and
2. **Impact Evaluations** which will be carried out on each priority axis to test the intervention logic of that priority axis and form a view of the effectiveness and impact of the investment.

In relation to the Impact Evaluations, the Plan states that the evaluations will assess achievements as regards effectiveness (the attainment of the specific objectives set and of the intended results), efficiency (the relationship between the funding disbursed and the results achieved) and impact (the contribution of the programme to the end objectives of the EU Cohesion Policy).

SEUPB has commissioned Cogent to undertake a longitudinal Impact Evaluation of Priority Axis 1 – Research and Innovation to include 3 reports due by end of 2018, end of 2020 and early 2022<sup>23</sup>.

The overall focus of the evaluation is to assess (at three stages of implementation), the impact of the interventions within the ‘Research and Innovation’ Priority Axis. As a full implementation evaluation is being undertaken across INTERREG VA concurrently with the Impact Evaluation, **the Impact Evaluation does not seek to assess the implementation of projects nor how the Programme is operating. Rather than addressing financial and operational issues**, the purpose of the impact evaluation is learning, through an exploration of the contribution of the Programme to the movement of the Result Indicator, to inform the remainder of the INTERREG VA Programme and potential future programming periods.

As such, the Impact Evaluation Team is required to address the following:

- To what extent have the Specific Objectives been achieved?
- To what extent have the targets for the Result Indicators been achieved?
- Comment on the effectiveness and added value of cross border collaboration in relation to the Specific Objectives?
- What external factors have impacted, positively or negatively, on the achievement of the Specific Objectives?
- Were the two target sectors appropriate?
- What synergies have there been between projects funded under both objectives;
- How have collaborations affected the quality and capacity for research and innovation in the eligible area?
- What has the impact been on business and industry?
- What has been the impact of cross-border collaborations under both objectives?
- What new ways of working/partnerships/relationships have been created as a result of activities carried out within the priority axis?
- Identify key areas of best practice and learning;
- Are there barriers to cross-border cooperation that the priority axis is not addressing?
- What is the contribution of the priority axis to<sup>24</sup>:
  - EU 2020 objectives;
  - The Atlantic Strategy; and
  - The horizontal principles of equality and sustainable development?

of the aim of preserving, protecting and improving the quality of the environment taking into account the polluter pays principle.

<sup>23</sup> The report received in 2022 will include a summary of all previous findings and will contribute directly to the programme summary of evaluation findings, to be submitted to the EU Commission.

<sup>24</sup> NB An overview of the aims and objectives of these strategies is provided in Appendix II.

## 2. OVERVIEW OF PROGRAMME ACTIVITY AND SUPPORTED PROJECTS

### 2.1 Introduction

Section 2 provides a high-level overview of the programme activity and projects supported under Priority Axis 1 of the INTERREG VA Programme.

### 2.2 Overview of Programme Activity

There were two calls for applications under Priority Axis 1: Research and Innovation. A two-stage process<sup>25</sup> was then initiated by the SEUPB's Joint Secretariat to assess applications submitted under each of the calls. Full details of the assessment process, including admissibility criteria, were outlined for applicants in the 'Call Documentation' and the 'Guide for Applicants'. Further details on the calls and applications received at each stage are presented below:

Objective	Call opened	Call closed	Applications received		Applications approved
			Stage 1	Stage 2	
1.1	21 <sup>st</sup> March 2016	6 <sup>th</sup> May 2016	10	7	7
1.2 <sup>26</sup>	7 <sup>th</sup> September 2015	21 <sup>st</sup> October 2015	3	2	1

Further details on the 8 projects approved by the IVA Programme Steering Committee<sup>27</sup> are included in Tables 2.2 and 2.3:

Lead Partner	Project Name	Project Cost (€)
<b>Objective 1.1</b>		
Dundalk Institute of Technology	BREATH (Border and Regions Airways Training Hub)	€8,506,929
South West College	Renewable Engine	€6,104,995
Catalyst Inc.	North West Centre for Advanced Manufacturing	€8,779,853
Ulster University	Eastern Corridor - Medical Engineering Centre (ECME)	€8,362,917
Ulster University	Storage Platform for the Integration of Renewable Energy (SPIRE 2)	€6,703,246
Ulster University	Centre for Personalised Medicine: Clinical Decision Making and Patient Safety (CPM)	€9,424,927
Queen's University Belfast	The Bryden Centre for Advanced Marine and Bio-Energy Research	€9,752,680
<b>Subtotal</b>		<b>€57,635,547</b>
<b>Objective 1.2</b>		
InterTradeIreland	Co-Innovate (The Innovation Pathway Programme)	€22,443,035
<b>Total</b>		<b>€80,078,582</b>

<sup>25</sup> Stage one - short application form and admissibility checks. Stage two – submission of full business plan and associated appendices (prepared in line with SEUPB's Business Plan Guidance).

<sup>26</sup> The Call Documentation indicated that only one applicant, that could successfully demonstrate that their project proposal would deliver all of the Output Indicators under this specific objective, would be awarded funding. Applicants who could not deliver the output indicator targets in full were advised not to apply.

<sup>27</sup> The decision as to whether to fund a project rested entirely with the IVA Programme Steering Committee.

<sup>28</sup> Projects were approved at IVA Programme Steering Committees held on: 6/9/2016, 7/9/16, 23/11/2016 and 14/3/2017.

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Project Ref	Lead Partner	Project Name	Operational start date	Operational end date	Project Cost (€)	ERDF Allocation		
						(€)	%	
<b>Objective 1.1</b>								
045	Dundalk Institute of Technology (DIT)	BREATH (Border and Regions Airways Training Hub)	01/01/2017	31/12/2021	€8,506,929	€6,781,065	79.7%	
046	South West College	Renewable Engine	01/01/2017	31/07/2021	€6,104,995	€5,067,817	83.0%	
047	Catalyst Inc.	North West Centre for Advanced Manufacturing	01/04/2017	31/12/2021	€8,779,853	€7,462,875	85.0%	
048	Ulster University	Eastern Corridor - Medical Engineering Centre (ECME)	01/03/2017	31/12/2021	€8,362,917	€7,108,480	85.0%	
049	Ulster University	Storage Platform for the Integration of Renewable Energy (SPIRE 2)	01/03/2017	31/12/2021	€6,703,246	€5,668,754	84.6%	
052	Ulster University	Centre for Personalised Medicine: Clinical Decision Making and Patient Safety (CPM)	01/04/2017	31/12/2021	€9,424,927	€7,415,033	78.7%	
053	Queen's University Belfast	The Bryden Centre for Advanced Marine and Bio-Energy Research	01/06/2017	31/12/2021	€9,752,680	€8,289,778	85.0%	
<b>Subtotal</b>					<b>€57,635,547</b>	<b>€47,793,802</b>		
<b>Objective 1.2</b>								
003	InterTradeIreland	Co-Innovate (The Innovation Pathway Programme)	01/08/2016	31/03/2022	€22,443,035	€14,702,502	65.5%	
<b>Total</b>					<b>€80,078,582</b>	<b>€62,496,304</b>		

The anticipated contribution that each of the 8 projects would make to the Priority's key Output Indicators is detailed

Output Indicator	Project Ref								Total
	1.1							1.2	
	045	046	047	048	049	052	053	003	
No. of enterprises receiving support	5	8	8	10	12	5	30	1,408	<b>1,486</b>
No. of enterprises receiving grants	2	4	2	5	2	3	8	30	<b>56</b>
No. of enterprises receiving non-financial support	5	8	8	10	12	5	30	1,408	<b>1,486</b>
Years of PhD (or above) level research	89.5	57.05	98.5	95	83	80.5	132.5	n/a	<b>636</b>
No. of enterprises cooperating with research institutions	5	8	8	10	12	5	30	50	<b>128</b>
No. of enterprises participating in cross-border, transnational or inter-regional research projects	2	8	8	10	12	5	30	30	<b>105</b>
No. of research institutions participating in cross-border, transnational or inter-regional research projects	3	4	4	5	4	4	5	5	<b>34</b>
No. of enterprises receiving one to one innovation advice								469	<b>469</b>
No. of enterprises in receipt of an innovation capability development programme								94	<b>94</b>
No. of enterprises engaging an innovation intern, on a cross-border basis								70	<b>70</b>

<sup>29</sup> Source: Letters of Offer issued by the SEUPB.

### 3. KEY FINDINGS

#### 3.1 Introduction

This section provides a summary of the key findings emerging from the first tranche of research. For ease of reference, the key findings have been summarised in-line with each aspect of the Terms of Reference.

#### 3.2 Overview of activity supported

Seven projects have been funded under Specific Objective 1.1 of the R&I Priority Axis with the commitment of c. €57.6m of funding to increase business and industry-relevant research and innovation capacity across the eligible region within the Health and Life Sciences and Renewable Energy sector. Notwithstanding a number of issues faced by each of the projects, each is progressing with their PhD (or above) led research and the majority of the projects have identified the businesses that will benefit from direct financial support to take forward additional R&I activity.

One project - the Co-Innovate Programme – has been funded under Specific Objective 1.2 with the commitment of c. €22.4m of funding with the aim of increasing the number and capacity of SMEs engaged in cross-border research and innovation activity in the region aimed at the development of new products, processes and tradable services. To date, project delivery has exclusively focused around the delivery of the knowledge transfer and capability strands of the Programme (Strands 1, 2 and 3) with the initial approval of businesses/projects to receive financial support (through Strands 4 and 5) only recently commenced.

#### 3.3 Key areas of best practice and learning

Encouragingly, the projects partners in receipt of support under Specific Objective 1.1, cited a number of key areas of best practice and learning which have, in their view:

- Supported project delivery;
- Enhanced levels of cross-border and transnational knowledge transfer and collaboration;
- Created a joint sense of project ownership and removed perceptions of the project being location-centric;
- Created a greater 'Centre' ethos (as opposed to the project being a broker of individual research projects); and
- Supported the potential for longer-term sustainability after INTERREG VA funded period.

Specific examples of the good practice cited by the Projects Partners include:

- Development of research staff's knowledge, skills and commercial acumen through the delivery of academic and industry secondments in other areas in the eligible region (Bryden Centre, BREATH);
- Delivery of Research Colloquia at which PhD students have participated in a two-day away-day during which they were required to present the progress of their respective research projects engage in team-building activities and problem-solving group projects (Renewable Engine);
- Geographical rotation of the project's communication and outreach activities (e.g. ECME, NWCAM, Renewable Engine);
- The utilisation of industry facilities (e.g. NIACE) to support project delivery (NWCAM);
- Research staff being allocated a supervisor in another area within the eligible region to support project progress and their development (Bryden Centre);
- The utilisation of the research base generated through the project partners to leverage additional funding which has, in turn, encouraged additional stakeholders to join the project (SPIRE 2);
- The utilisation of dedicated 'Innovation Brokers' to support the commercialisation process (NWCAM);
- The establishment of a project management and team communication platform (using the 'Basecamp' software), which provides an opportunity for research staff to contribute to research



projects and papers (which they are not primarily responsible for) from their inception (renewable Engine) (Renewable Engine);

- Joint training sessions focusing on developing transferable and ‘real-world’ skills such as resilience, entrepreneurship, presentation and time management skills (ECME);
- The delivery of scientific meetings which bring together the academic institutions to facilitate knowledge transfer and good practice (all projects); and
- The establishment of an informal ‘Project Managers’ Group has facilitated open discussion in relation to INTERREG and how to approach particular SEUPB requirements. According to the project partners, this allows for cross-over of learning and insights that have been gained by each project manager (all projects).

Ultimately, it is the view of the Project Partners that the collaborative working has served to draw together different but complementary research strengths and in doing so, strengthened the capacity and capability of the academic institutions to undertake collaborative R&I for the ultimate benefit of business and industry.

In relation to the Co-Innovate Programme (supported under Specific Objective 1.2), the project partners note that whilst the Programme’s structure and content is potentially too elongated (particularly at Strand 2), the multi-faceted ‘umbrella’ of support delivered through the Co-Innovate Programme is unique and offers the potential to take SMEs on a journey which will increase their knowledge and understanding of innovation, enhance their capability to engage in a collaborative project and ultimately de-risk their initial steps into undertaking a cross-border/transnational collaborative by contributing towards its financial costs. Linked to this, it was noted that the ‘funnel’ approach and content of support has served to ‘handhold’ businesses through an unfamiliar environment and safeguard monies by ensuring that businesses are questioned and challenged at each strand of support.

### 3.4 Synergies between projects

Our discussions with the Projects Partners indicate that a number of synergies have emerged (both realised to date or currently being explored) between the individual projects funded under Specific Objective 1.1, most notably between the Renewable Engine, Bryden Centre and SPIRE 2 projects which focus of the area of renewable energy. Example of synergies include:

- A number of PhD students from the Renewable Engine project attended the Bryden Centre Summer School at UHI during 2019 which the Project Partners indicate served to (inter alia) enhance levels of cross-project industry engagement, garner a greater understanding of each project’s research focus and capabilities;
- The Bryden Centre, Renewable Engine and SPIRE 2 are working closely together with the Advanced Forming Research Centre (AFRC) at University of Strathclyde, Energy Technology Partnership (Scotland) and CASE (NI) in delivering regular joint showcasing and presentations of the PhD work in renewables and energy storage at events such as All-Energy Conference and Exhibition in Glasgow. The event in 2019 was deemed by the Project Partners to have been a major success with several Bryden Centre presentations being made in collaboration with both Renewable Engine and SPIRE 2. Preparations are underway for the Innovation Zone showcase at All-Energy in 2020;
- SPIRE 2’s management team at Ulster works closely with the co-located ECME and Centre for Personalised Medicine staff across common Doctoral College activities including generic training and development of PhDs and in delivering on the Marie Curie principles for research;
- Given their respective research strengths, the Renewable Engine and Bryden Centre is actively exploring the potential to collaborate in relation to a project focused around the area of anaerobic digestion; and
- Discussions are ongoing between the Bryden Centre and SPIRE 2 project to identify opportunities for joint PhD training.

A number of project partners also suggested that support delivered through their respective project’s may also serve to stimulate businesses engagement in wider collaborative R&I supports that exist at different stages on the Innovation Escalator (e.g. Innovation Vouchers, the Knowledge Transfer Programme).

Whilst the Co-Innovate Project Partners (supported under Specific Objective 1.2) note that they have attended a number of SEUPB-facilitated events/information days with the management teams of the other INTERREG VA Priority 1 projects, to date they suggest that there have not been any overt synergies between the projects largely due to the fact that the seven projects funded under Specific Objective 1 are supporting activities focusing on earlier Technology Readiness levels (i.e. on undertaking research in the R&D&I continuum) whereas the Co-Innovate Programme is more overtly focused on supporting projects which are at higher TRLs and closer to the market (i.e. on undertaking innovation in the R&D&I continuum).

Notwithstanding this, the Project Partners suggest that the support delivered to date (i.e. under Strands 1 to 3) has served to increase businesses' preparedness to engage in other collaborative R&I supports, both within and across jurisdictions, on the innovation escalator. Indeed, as noted, businesses that did not proceed onto further strands of support have been signposted to other R&I supports which are deemed to be more relevant for their stage of development.

### 3.5 Reasonableness of Targets and Indicators established for the Priority Axis

Based on its review of the output and result indicators/targets established for the Investment Priority, the Evaluation Team makes the following observations in relation to their reasonableness:

- Whilst noting that that the Common Output and Results Indicators have been set by the Commission and agreed by Member States to support EU-wide measurement and comparison, when viewed in the context of the Evaluation logic chain - which illustrates the intrinsic linkages between an intervention's aims, inputs, activities, outputs and outcomes – the output indicators appear to more overly representative of the 'activities' and 'inputs' being delivered under the Priority Axis, whilst the Results Indicator identified under Specific Objective 1.1 is more overtly representative of an 'Output'.

Figure 3.1: The logic chain to Evaluation



Whilst the Northern Ireland Guide to Expenditure Appraisal and Evaluation (NIGEAE) and Green Book guidance reflects the importance of establishing activity-based targets, these should be viewed as a 'means-to-an-end'. That is to say, their delivery should be seen as an important step in facilitating the ultimate achievement of an intervention's stated outputs, outcomes and ultimate aims (in this case the overarching Specific Objectives). In this regard, caution should be taken in utilising the stated output targets that have been established for the Investment Priority as an indicator that the Priority Axis has ultimately delivered value-for-money.

- On review of the number and nature of Common Output indicators, we are of the view that the Commission should have adopted fewer (or different) specific targets/indicators as (for those established) the delivery of a single element of activity offers the potential to contribute to the achievement of multiple indicators and, in doing so, may potentially create a 'false' sense of achievement in the context of what has actually been delivered under the Investment Priority. For example, a business that has received financial support to engage in research and innovation activities with a cross-border academic institution may potentially contribute to the achievement of five of the seven Common Outputs indicators for Specific Objective 1.1 i.e.:

- No. of enterprises receiving support
- No. of enterprises receiving grants
- No. of enterprises receiving non-financial support
- No. of enterprises cooperating with research institutions
- No. of enterprises participating in cross-border, transnational or interregional research projects.

To illustrate the previous two points, and given the nature of the intervention, we have identified the types of targets/indicator that could have been established and monitored by Project Promoters in Table 3.1 below. In doing so, each has been considered in the context of each stage of the Evaluation logic chain:

<b>Table 3.1: Examples of indicators/targets along to Evaluation logic Chain</b>	
<b>Stage of the logic chain</b>	<b>Potential Indicators/targets</b>
<b>Aims</b>	<ul style="list-style-type: none"> <li>• To increase business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences and Renewable Energy (Specific Objective 1.1)</li> <li>• To increase the number and capacity of SMEs engaged in cross-border research and innovation activity in the region aimed at the development of new products, processes and tradable services (Specific Objective 1.2)</li> </ul>
<b>Inputs</b>	<ul style="list-style-type: none"> <li>• Level of funding awarded per project</li> <li>• Time provided by businesses</li> <li>• Time provided by academia including FTE Years of PhD (or above) level research</li> </ul>
<b>Activities</b>	<ul style="list-style-type: none"> <li>• The nature and number of the R&amp;D projects that have been undertaken (incl. the TRL targeted)</li> <li>• The extent of R&amp;D&amp;I, collaborative working and/or networking activities being undertaken by industry and academia before and after receiving support</li> <li>• Nature of collaborative activities taken forward as a result of the collaborative activity e.g.: <ul style="list-style-type: none"> <li>– Shared information/knowledge</li> <li>– Shared facilities</li> <li>– Shared equipment</li> <li>– Shared raw materials</li> <li>– Established new business contacts</li> <li>– Jointly tendered to win larger and/or more contracts</li> <li>– Jointly managed a supply chain</li> <li>– Identified good/best practice</li> <li>– Avoiled of other business' complementary strengths and capabilities</li> <li>– Increased your scale of operations through the creation of economies of scale</li> <li>– Supported you to exploit emerging regional, national and international market opportunities</li> </ul> </li> <li>• Nature of any R&amp;D&amp;I undertaken before and after receiving support (e.g. basic research, experimental development industrial research)</li> <li>• Levels of 'activity' additionality - Degree to which businesses would have engaged in collaborative R&amp;I with an academic institution and/or with another industrial partner (s) (where relevant)</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>• No. of peer-reviewed journal and conference publications in two target sectors (Health and Life Sciences and Renewable Energy) with cross-border authorship and with the potential to create economic impact</li> <li>• No. of prototypes/demonstrators developed</li> <li>• No. of license agreements issued</li> <li>• No. of spin-offs/Spinouts (and spin-ins if relevant)</li> <li>• No. of invention disclosures</li> <li>• No. of patents awarded</li> <li>• No. of new product/process or services developed</li> <li>• No. of existing product/process or services adapted</li> <li>• PhDs/Masters awarded</li> <li>• New products and/or processes created</li> <li>• Adapted products and/or processes created</li> <li>• Mobility of Staff (between partners)</li> <li>• Number of workers upskilled</li> <li>• No. of new potential new customers and/or suppliers identified</li> <li>• New geographic and/or sectoral markets entered into</li> <li>• Leveraging of other further funding</li> </ul>

**Table 3.1: Examples of indicators/targets along to Evaluation logic Chain**

Stage of the logic chain	Potential Indicators/targets
<b>Outcomes and Impacts</b>	<ul style="list-style-type: none"> <li>• Safeguarded turnover</li> <li>• Increased sales in domestic, external and export markets</li> <li>• Reduction in costs</li> <li>• Increased employment (FTEs) within the business</li> <li>• Employment Safeguarded/Retained</li> <li>• Increased expenditure on Research, Development and Innovation (R&amp;D&amp;I)</li> <li>• Improved the skills of the business' workforce;</li> <li>• Increased competitiveness;</li> <li>• Increased productivity/efficiency;</li> <li>• Impact on the business' survival;</li> <li>• No of innovation active/inactive SMEs;</li> <li>• Impact of the project on R&amp;I culture, mindsets and behaviours:               <ul style="list-style-type: none"> <li>– Businesses' commitment to engaging in R&amp;D&amp;I;</li> <li>– Businesses' understanding of the benefits of working collaboratively with academia and/or other businesses;</li> <li>– Businesses likelihood of engaging in collaborative research activities with other academic institutions and businesses in the future;</li> <li>– Business' confidence in engaging collaborative research activities;</li> <li>– Business' capacity to undertake collaborative R&amp;I has increased;</li> <li>– Business' capability to undertake collaborative R&amp;I has increased;</li> <li>– The degree to which collaboration now represents a more fundamental part of the business' growth strategy.</li> </ul> </li> </ul>

Ultimately, the Evaluation Team is of the view that many of the aforementioned issues could potentially have been addressed had the project applications been robustly independently economically appraised.

- The overall Results Indicator for Specific Objective 1.1 is to increase the annual number of peer-reviewed journal and conference publications in two target sectors (Health and Life Sciences and Renewable Energy) with cross-border authorship and with the potential to create economic impact from 4 to 75 by 2023. In relation to this we note the following:
  - Based on the INTERREG VA Operational Programme, the Evaluation Team understands that the Managing Authority carried out a survey-interview of higher education institutions in the region to establish the number of peer-reviewed journals and conference publications to establish the annual baseline (which was subsequently identified as 4). However, based on the outputs from their own research activity, a number of Project Promoters questioned the source of the identified baseline, suggesting the number appeared low, and by association then, potentially served to overinflate the potential impact that would be made by the Investment Priority.
  - Given the fact that the annual number of peer-reviewed journal and conference publications would likely ramp-up in line with the levels of research activity being undertaken, in retrospect it would have been beneficial for annual quantified targets to have been established to ensure that progress could be measured towards the annual 2023 target at different annual points (as opposed to in 2023).
  - Based on our discussion with Project Promoters, our review of SEUPB's LoOs and Project Assessment materials and completed monitoring materials, ambiguity exists as to the specific nature of the Result Indicator. Whilst noting that the Results indicator indicates that the quantified target relates to the annual number of peer-reviewed journal and conference publication, our review of SEUPB Stage 1 and 2 Assessment reports for individual projects appears to indicate that this target is being interpreted in terms of cumulative rather annual

outputs. For example, per the Table below, it was anticipated that the Bryden Centre Project would contribute 68 of the 75 peer-reviewed journal and conference publications, equivalent to 91% of the target. However, our discussion with Project Promoters and review of their monitoring materials suggest that this target is being interpreted as being the total number of publications that the project would contribute, as opposed to the annual number in 2023.

<b>Result Indicator</b>	<b>Programme Target</b>	<b>Project Target</b>	<b>% Contribution</b>
The annual number of peer-reviewed journal and conference publications in two sectors (Health and Life Sciences and Renewable Energy) with cross border authorship and with the potential to create economic impact.	75	68	91%

- It is unclear as to how a publications potential to ‘create economic impact’ could be measured in practice or its usefulness as the overall indicator to show progress towards the overarching Specific Objective 1.1 which is overtly focused on increasing business and industry-relevant research and innovation capacity.
- NIGEAE and Green Book guidance indicates that ‘Efficiency’ - the degree to which an intervention has achieved the maximum output from a given set of inputs - is a key measure of determining the value-for-money that has been provided by an intervention. On consideration of the scale of investment made at an individual project level and the Output and Results Indicators that have been established, the Evaluation Team would have reservations as to whether SEUPB has the potential to fully deliver on this indicator of value-for-money. For example, if the Results indicator is reflective of the total number of peer-reviewed journal and conference publications (as opposed to the annual number), the fact that the Bryden Centre project is potentially contributing 91% of the overall target suggests that the scale of the target is, in retrospect too low, and SEUPB could potentially have derived additional outputs by identifying a relatively higher target.

Similarly, the number of enterprises (N=20) anticipated to be supported through Specific Objective 1, appears low given the quantum of funding being provided and when viewed in the context of other similarly focused interventions available within the eligible region (e.g. Invest NI’s Competence Centre Programme, Grant for R&D Programme etc.) and the overall focus of the Specific Objective.

- The Evaluation Team is of the view that greater focus should have been placed on ensuring that the Results indicator associated with Specific Objective 1.2 adhered to the ‘SMART’ (Specific, Measurable, Achievable, Realistic and Timebound) principles. Whilst the Evaluation Team is not privy to the target setting methodology or sources of information that was adopted/utilised by SEUPB to quantify the Results indicator target, if read literally, the scale of the target appears unachievable in the context of the support that is anticipated to be delivered through the Co-Innovate Programme. For example, in consideration of NI alone, we note that there were 67,235 SMEs in NI in 2014 (the baseline year). To achieve 33% of SMEs engaged in research and innovation involving cross-border collaboration in this region would require support to be provided to 7,396. However, the maximum number of SMEs anticipated to benefit from Co-Innovate support is 1,428 (leaving a shortfall of 5,968 within the NI element of the eligible regional alone).

<b>Table 3.3: Calculation of the potential contribution of the Co-Innovate Programme</b>	
Total SMEs in NI (2014 <sup>30</sup> )	67,235
No. estimated to be engaged in research and innovation involving cross-border collaborations during the baseline period (22% of SMEs)	14,792
No. estimated to be engaged in research and innovation involving cross-border collaborations during the baseline period (33% of SMEs)	22,188
No. of SMEs required to benefit from Co-Innovate support to achieve the Result Indicator target	7,396
Maximum no. of SMEs anticipated to benefit from Co-Innovate support	1,428
Difference between no. of SMEs required to benefit from Co-Innovate support to achieve the Result Indicator target and the maximum no. of SMEs anticipated to benefit from Co-Innovate support	5,968

In addition, it is unclear as to why the target has been limited to the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations on the basis that the project is ultimately seeking to support SMEs within the entirety of eligible region (including SW Scotland and the Highlands and Islands) and project delivery is being taken forward on this basis (as well as being included by the Project Promoter against the Results indicator target). As such, greater attention should have been given to ensuring this indicator was more ‘achievable’ and ‘realistic’.

In summary, based on our review of the targets established, the significant scale of investment made through the Priority and the progress that has been made by the individual projects at this interim stage (see Section 3.6), the Evaluation Team is of the view that SEUPB could potentially have secured greater levels of VFM in the event that more challenging SMART Programme targets had been established at the outset.

### 3.6 Extent to which the Priority Axis Output & Result Indicators have been achieved

Notwithstanding the concerns expressed in relation to the reasonableness of the targets established, the Evaluation Team has undertaken an interim assessment of the progress made towards Output Indicators and, in the context of Specific Objective 1.1, the Result Indicator.

#### **Specific Objective 1.1**

As detailed in Table 3.4, whilst support is continuing to be delivered to business and industry, many of the Programme output indicators have already been achieved and in most cases, exceeded by some considerable margin. Unsurprisingly, given the fact that the research elements of the projects continue to be undertaken, coupled with the reported delays in the recruitment of research staff, the number of PhD (or above) level research is currently 58% below target.

Subject to a small number of the projects receiving an extension to the timeframes stipulated within their letter of offer (NWCAM and Bryden Centre), the Evaluation Team is not aware of any specific factors that will inhibit the overall achievement of the stated outputs by the end of the project period.

<sup>30</sup> Source: NI Inter-Departmental Business Register - Number of Private Sector VAT and/or PAYE Registered Businesses Operating in NI

Output Indicator	Programme Target	Combined project targets (based on project applications)	Actual Output								Variance from Programme Target	Variance from Combined project targets
			BREATH	Renewable Engine	NWCAM	ECME	SPIRE2	CPM	Bryden Centre	Total		
No. of enterprises receiving support	20	78	5	10	9	5	12	4	47	<b>92</b>	360%	18%
No. of enterprises receiving grants	10	26	0	3	-	-	2	3	-	<b>8</b>	-20%	-69%
No. of enterprises receiving non-financial support	20	78	5	10	9	5	12	4	47	<b>92</b>	360%	18%
Years of PhD (or above) level research	514	636	39.83	24.42	23.62	33.6	29.81	32.57	33.29	<b>217.14</b>	-58%	-66%
No. of enterprises cooperating with research institutions	10	78	8	10	9	0	12	5	47	<b>91</b>	810%	17%
No. of enterprises participating in cross-border, transnational or inter-regional research projects	10	75	1	10	9	0	12	4	47	<b>83</b>	730%	11%
No. of research institutions participating in cross-border, transnational or inter-regional research projects	5	29	3	4	4	5	4	4	5	<b>29</b>	480%	-

In terms of progress towards the Specific Objective's Result Indicator, the Evaluation Team notes that 48 peer-reviewed publications with cross-border authorship have been created, 36% lower than the target (assuming that this target relates to the cumulative rather than the annual number). Whilst noting the concerns raised by the SPIRE 2 project in relation to the achievability of its individual Result Indicator, based on the feedback from the Project Partners, the Priority remains on track to achieve the Result indicator at an overarching level.

Output Indicator	Programme Target	Actual Output								Variance
		BREATH	Renewable Engine	NWCAM	ECME	SPIRE2	CPM	Bryden Centre	Total	
No. of peer reviewed publications with cross-border authorship	75	21	-	-	4	6	17 <sup>31</sup>	0	48	-36%

<sup>31</sup> This includes 4 peer-reviewed REF standard journal publications in the H&LS Sciences field with cross border authorship and 13 other high-quality peer-reviewed publications which have cross-border authorship.

### Specific Objective 1.2

The progress made towards the Output Indicators established under Specific Objective 2 should be viewed in the context that support is continuing to be delivered under the knowledge transfer and capability strands of the Programme (Strands 1, 2 and 3) and the initial approval of businesses/projects to receive financial support has only commenced (hence no progress has been made towards a number of the output indicators). The reported delays in businesses progression along the Co-Innovate support funnel due to Strand 2 ‘bottlenecks’ and the potential impact of ‘Brexit’ may impact on the project’s overall ability of the project to deliver on all of its Output Indicators (at least within the timeframes stipulated within its current LoO).

<b>Table 3.6: Overview of progress made towards the Output Indicators under Specific Objective 1.2</b>			
<b>Output Indicator</b>	<b>Target</b>	<b>Actual</b>	<b>Variance</b>
No. of enterprises receiving support	1,408	1,131	-20%
No. of enterprises receiving grants	30	0	-100%
No. of enterprises receiving non-financial support	1,408	1,131	-20%
No. of enterprises cooperating with research institutions	50	0	-100%
No. of enterprises participating in cross-border, transnational or interregional research projects	30	0	-100%
No. of research institutions participating in cross-border, transnational or interregional research projects	5	0	-100%
No. of enterprises receiving one to one innovation advice	469	255	-46%
No. of enterprises in receipt of an innovation capability development programme	94	0	-100%
No. of enterprises engaging an innovation intern, on a cross-border basis	70	62	-11%

Table 3.7 provides a summary of the progress made towards the Priority’s overarching Output Indicators.

<b>Table 3.7: Overarching progress towards the Priority’s Output Indicators</b>			
<b>Output Indicator</b>	<b>Target</b>	<b>Actual</b>	<b>Variance</b>
No. of enterprises receiving support	1,428	1,223	-14%
No. of enterprises receiving grants	40	8	-80%
No. of enterprises receiving non-financial support	1,428	1,223	-14%
Years of PhD (or above) level research	514	217	-58%
No. of enterprises cooperating with research institutions	60	91	52%
No. of enterprises participating in cross-border, transnational or interregional research projects	40	83	108%
No. of research institutions participating in cross-border, transnational or interregional research projects	10	29	190%
No. of enterprises receiving one to one innovation advice	469	255	-46%
No. of enterprises in receipt of an innovation capability development programme	94	0	-100%
No. of enterprises engaging an innovation intern, on a cross-border basis	70	62	-11%



### 3.7 Factors that have impacted on project delivery including the achievement of Project Output and Result indicators and the Priority's Specific Objectives

Each of the Project Partners in receipt of support under Specific Objective 1.1 advises that they have encountered issues that have impacted on the delivery of their respective projects to date.

Whilst noting that some of these issues have combined to slow progress towards elements of the output indicators (e.g. number of PhD years delivered), in general, the Project Partners do not anticipate that these will ultimately have an adverse impact on the longer-term achievement of Project Output and Result indicators and the Priority's Specific Objectives (albeit a number of project partners note that the ultimate achievement of these targets will be conditional on them receiving an extension to the timeframes stipulated in their respective Letters of Offer (e.g. NWCAM, Bryden Centre)).

Examples of issues commonly cited by the projects' partners include:

- **Staff mobility issues** - Difficulties have been encountered in non-EU resident PhD students taking up research positions in the eligible region or travelling outside their eligible region country of research residence due to visa restrictions. A number of the Projects Partners expressed concern that such mobility issues could potentially be exacerbated following the UK's departure from the EU (i.e. following 'Brexit');
- **'Background' and 'foreground' IP issues impacting on business recruitment and wider engagement in research projects** - Several of the projects' partners noted during consultation that they have faced difficulties encouraging business engagement on their respective project's due to concerns relating to IP. For some businesses, these concerns related to the potential for other businesses to use their 'background' IP, resulting in a loss of their competitive position in the marketplace. However, in the majority of cases, the concerns around IP principally related to the fact that industry would not own any 'foreground' IP emanating from the research, with this ultimately being owned by the academic institutions;
- **Delays in the recruitment of PhD students and wider research staff** - The majority of the projects' partners indicated that they had encountered delays in the recruitment of PhD students and wider research staff to support the delivery of their respective project's. A commonly shared view amongst the Partners is that this situation may have arisen due to interrelated demand and supply-side factors.

On the demand side, it was noted that the issues may have arisen due to the fact that a number of different projects (including those funded through Priority 1 of the INTERREG VA Programme) were simultaneously seeking to recruit PhD students within the Priority's two sectors (i.e. Renewable Energy and Life and Health Sciences). This inadvertently created significant demand within the market for these students at the same time, resulting in a shortage of available students and, by association, delays in recruitment.

On the supply side, it was noted by a number of partners that there has been limited appetite from domestic applicants which has potentially resulted from a number of factors including the scale of the research bursary that was available to potential students and/or increasing salaries in the private sector and student costs/fees which may have served to detract potential students from a potential career in research.

As a result of the combination of these demand and supply-side factors, a number of partners indicated that they had to ultimately seek applications from potential international PhD students. However, there were subsequent delays in these students working on the projects due to the necessity to secure visas;

- **EU, SEUPB and University Procurement requirements hindering the progression of research** - According to a number of the project partners, the progression of research has been hindered due to specific checks and processes required to obtain necessary approval for purchasing equipment and materials needed to conduct research;
- **Changes to the research team profile during the delivery of the research projects (including issues relating to staff retention).** A number of the project partners have indicated that there have been a number of changes to the profile of the project's research team during the initial delivery period which has, on occasions slowed project progress;
- **Changes to industrial partners** - A small number of project partners indicated that industry partners have had to be replaced due to specific business' circumstances (e.g. businesses going into administration, businesses having more pressing priorities); and
- **The claims process adversely impacting on business' engagement** - Linked to the previous point, it was noted by a small number of project partners that the administration and bureaucracy associated with the claims process has resulted in a business leaving the project and other businesses not willing to receive the financial support that is currently available through their respective project's.

The Evaluation notes that there are specific issues relating to two projects - CPM and SPIRE 2 - funded under Specific Objective 1.1, which may impact on their ultimate success and potentially the achievability of their respective output and results indicators.

In the case of CPM, two of the project's partners have indicated that, in relation to Research Cluster 4 ('Unscheduled care in Diabetes'), delays in project progress continue due to lack of a named partner in Letterkenny University Hospital to assist the team members to progress the research. As of July 2019, no patient interviews have been completed on this site and the Lead Partner notes that this may mean that the Project Partners will need to plan the main study without the benefit of preliminary data. Ultimately, the Lead Partner suggests that this may impact on the overall success of the main study. Without a named LUH representative on the RC4 team, time is also being lost trying to negotiate access, research approval and recruitment which might delay completion of the 'in-patient' doctoral study.

In terms of the SPIRE 2 project, the Project Partners have indicated that they are unlikely to deliver on their Results indicator of 78 peer-reviewed cross border publications on the basis that the project has only one cross border academic partner (DkIT) and only one PhD contracted in this partner.

In terms of the Co-Innovate Programme (supported under Specific Objective 1.2), the project partners advise that the project has encountered a number of issues in the delivery of the project to date and uncertainty presently exists as to the potential impact of these issues on the overall achievement of the Project's Output and Result indicators and the Priority's Specific Objective. Specific issues cited by the Project's Partner include:

- **Uncertainty of 'Brexit' on business recruitment** - Consultation with the project partner's indicates that there have been delays in approving Strand 4 and 5 projects due to uncertainties that presently exist amongst the business community in the eligible region in relation to the potential impact of the UK's withdrawal from the EU (i.e. 'Brexit'). As noted previously, businesses participating in Strands 4 and 5 are required to contribute 50% of the total project costs. However, it is understood that a number of businesses have expressed reservations to commit funds and resources which may be required to address emerging needs following Brexit.
- **Delays in businesses progression along the Co-Innovate support funnel due to Strand 2 'bottlenecks'** - During consultation the project partners indicated that the requirement for businesses to complete two separate business assessment tools (i.e. a Business Status Review and Innovation Capability Audit), coupled with businesses' availability to engage in the support and provide the requisite information, had served to delay the progress of businesses through to subsequent strands of the Programme's support. In retrospect, the Project Partners suggested that it would have been beneficial to merge the two assessments into one in order to expedite the process and the bureaucracy placed on businesses;

- **Delivery of Programme activity in the Highland's and Island's area of the eligible region** - The project's partners note that levels of activity in the Highland's and Island's area is below that anticipated at the outset due to two interrelated reasons. Firstly, due to its peripheral location, the time required to engage with businesses located on the Scottish Island's on a face-to-face basis (noted as being up to three days) has taken longer than was anticipated at the outset. Secondly, and related to this point, it was initially anticipated that all strands of Programme activity would be delivered in the Highland's and Island's area by two Programme manager (as opposed to availing of external expertise to support programme delivery, as was being utilised in the other areas of the eligible region). However, in retrospect, the Project Partners suggest that the level of resource that was initially allocated was significantly below the level required to deliver the Programme within the stipulated timeframes. As such, it is understood that the Project Partners sought approval from SEUPB (and was subsequently granted approval) for the Programme to utilise external consultants to support the delivery of Strand 2 activity within the Highland's and Island's area; and
- **Cross-border/transnational focus of support limiting engagement from some businesses** - Whilst noting the merits of the cross-border and transnational nature of the support, the project partners are of the view that the need for businesses to engage with academia (as part of Strands 4 and 5) on a cross-border/transnational basis creates geographical/logistical difficulties (perceived or actual) for some businesses, resulting in them unwilling to engage with the Programme, especially when other support mechanisms are available in their home jurisdiction which does not require them to take forward collaboration outside this jurisdiction.

### 3.8 Impact on business and industry

It is the view of the Evaluation Team that the impact of the projects, funded under Specific Objective 1, on business and industry can only be assessed in the longer term given the interim nature of the implementation of projects and the widely recognised time lag between engaging in R&I activities and the realisation of tangible benefits by business and industry. More specifically, time will be required to move the research up the TRL scale and bring the technologies to market (assuming the R&D can be commercialised by the businesses and wider industry). The scale of this time lag will invariably depend on a range of factors including the sector in which the technology is being developed in, the technology's starting point on the TRL scale and associated degree of novelty.

Notwithstanding this, a number of the projects partners noted a number of ongoing positive activities and outputs, which offer the potential to support the longer-term growth and competitiveness of the project's industry members including the development of industrial competencies, IP (NWCAM), development of new and/or adapted products and processes.

Furthermore, anecdotal feedback from a number of the projects partners indicates that their respective projects have served to (at least in part) support the achievement of a range of other more intangible, interim 'measures of success' including:

- Businesses identifying wider research and business development opportunities.
- Businesses increasing their knowledge and understanding of the benefits of working collaboratively with academic institutions which may result in the development of longer-term working relationships;
- Businesses developing a greater understanding of the respective research strengths and capabilities that exists within the academic institutions;
- Academia increasing its understanding of the needs of industry;
- Businesses being supported to take forward commercially focused R&D which may not have been undertaken due to their capacity and capability; and
- The establishment of an industrial focal point for collaborative R&D within the renewable energy and life and health science sectors;

The independent assessment of these tangible and intangible business benefits/impacts will be a core focus of the Evaluation Team's next tranche of research.

In terms of the Co-Innovate Programme, the Evaluation Team undertook an online survey and telephone consultations with 267 businesses that received support through one or more of the first three strands of support delivered by the Co-Innovate Programme (i.e. Strand 1: Innovation Workshop, Strand 2: Capability Review/Business Assessments and Strand 3: Innovation Capability Development (Mentoring) support).

The analysis of businesses' feedback indicates that the majority of businesses (more than 80%) are satisfied with the support that they received and, importantly, have realised the knowledge and capability developments that were envisaged under each strand of support. Of note, the majority of businesses indicated that they have enhanced their knowledge and understanding of:

- The key concepts, practices and principles of innovation, as well as the potential benefits that can be derived from engaging in collaborative innovation;
- How their business is performing relative to other innovative SMEs; and
- The issues that are inhibiting their growth and associated opportunities/actions for development and are taking measures forward to address these issues.

Furthermore, the majority of businesses indicated that they have increased their readiness to ultimately take forward a collaborative R&D project.

Notwithstanding the largely positive feedback received, the Evaluation Team does however note that there was a sizeable minority of businesses that indicated that they were not satisfied with the support that they had received, with frequently raised concerns by this cohort including that they felt the support was too high level and generic, not tailored to the specific needs of the business, there were delays in receiving the outputs from the support and, linked to this, communication around receipt of information and their progress on the programme more generally could have been more effective. Consequently, these businesses indicated that they had not derived aspects of the benefits that were anticipated to be achieved from their participation in the Programme. It appears that these issues are most pronounced in relation to Stage 2 of the Co-Innovate Programme.

Whilst noting that levels of activity are, at this juncture, largely completed for the initial Strands of the Co-Innovate Programme, the Project Promoter should be mindful of the feedback received and seek to address (as far as possible) the issues that have been identified by recipients of support.

### **3.9 Contribution of the Priority Axis to Policy Objectives**

The Evaluation Team is of the view that the 8 projects funded under the Priority Axis offer the potential to contribute to a range of economic, energy and life and health science strategic imperatives that exist across the eligible region. However, the actual contribution of the project to these strategic imperatives/targets can only be measured in the longer term (e.g. when the outputs from the research are ultimately implemented).

### **3.10 Appropriateness of the sectors supported by the Investment Priority**

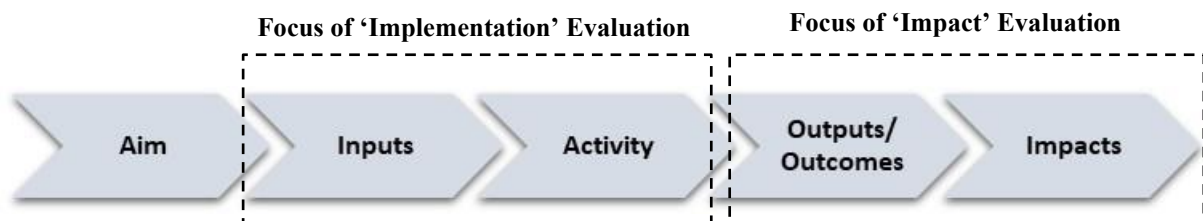
It is the view of the Project Partners and shared by the Evaluation Team, that the sectors supported by the Research and Innovation Investment Priority (i.e. Life and Health Sciences, Renewable Energy and, in the case of the Specific Objective 1.2, Agri-Food/Tech) continue to be appropriate.

Linked to the key tenets of the SMART Research and Innovation Strategy for Smart Specialisation (RIS3), the sectors selected represent the research and innovation priorities where the eligible region has competitive strengths (both within its current research and industry base) to drive economic growth and prosperity, as well as address major societal challenges.

### 3.11 Recommendations

1. By way of aiding post-project evaluation and potentially supporting the achievement of relatively greater levels of VFM, SEUPB should ensure that all objectives, outputs and result indicators (including established baselines) established for all future programmes adhere to the ‘SMART’ criteria and are reasonable in the context of the quantum of support being allocated.
2. Linked to Recommendation 1, SEUPB should ensure that robust challenge is given the assessment of an individual project’s potential contribution to overarching targets indicators.
3. By way of aiding ongoing Evaluation, the Project Partners should be encouraged to review their approach to monitoring and progress reporting with a more overt focus being placed on documenting:
  - The nature and intensity of interaction with business and industry;
  - The impact and relevance of the project’s activities for business and industry (i.e. the ‘so what?’); and
  - How activities are ‘additional’ and add-value to those already being carried out by the academic institution
4. The ‘logic chain’ to Evaluation illustrates the intrinsic linkages between an intervention’s aims, inputs, activities, outputs and outcomes (as depicted in Figure 11.1). However, the Evaluation Team understands that SEUPB has commissioned two separate evaluations – an ‘Implementation’ Evaluation and ‘Impact’ Evaluation - which focus on assessing the progress made by the Priority (and projects supported therein) at different stages of the logic chain.

**Figure 3.2: The logic chain to Evaluation**



However, given the interlinkages that exist between each stage of the logic chain, the Evaluation Team is of the view that a more rounded, holistic approach should be taken to Evaluation which would require the assessment of the implementation and impact made by the Priority axis as part of one evaluation. For example, in a scenario in which an intervention does not achieve its anticipated outputs/outcomes or impacts, this would naturally lead to the question as to why such a scenario arose. Based on the logic chain to Evaluation, such a scenario could have arisen as a result of the implementation of the activities of the intervention which, in turn, may have been influenced by the scale and quality of inputs utilised to deliver the activities. Therefore, any rationalisation as to why an intervention’s outturns are achieved (or otherwise) requires a ‘joined-up’ approach to Evaluation focused on each stage of the logic chain.

5. Whilst noting that the delivery of Strand 2 of Co-Innovate activity is largely complete, future project applicants/promoters should be encouraged to ensure that every opportunity is taken to streamline programme delivery in order to maximise participant engagement whilst minimising levels of administration and bureaucracy.
6. The Co-Innovate Lead Partner should be encouraged to undertake a review of its processes for communicating with and delivering all project-related outputs to, recipients of support, ensuring that (as far as possible) both are delivered in a timely manner.

7. SEUPB should request the CPM Lead Project Partner to provide details of the actions that are being taken to resolve the ongoing resourcing issue relating to the lack of a named partner in Letterkenny University Hospital, as well as provide clarity as to how any continuing absence will impact upon the overall delivery of the project (as originally proposed). If the issue cannot be resolved to SEUPB's satisfaction and the issue is likely to materially impact on the delivery of the project, consideration should be given to scale of investment made to the project.
8. Clarity should be provided to all project partners as to how SEUPB is defining the 'cross-border' aspect of the Result Indicator of Objective 1.1.
9. In-light of Recommendation 8, the SPIRE 2 Lead Project Partner should provide clarity as to the project's ongoing ability to deliver on its Result Indicator (of delivering 78 peer-reviewed cross border publications). In the event that the project does not offer the ability to deliver the Result Indicator to the initial level anticipated, careful consideration should be given to any amended target in light of the scale of investment made through the project.