

**INTERREG VA IMPACT EVALUATION – FINAL EVALUATION  
EXECUTIVE SUMMARY DOCUMENT  
PRIORITY 1 – RESEARCH AND INNOVATION**



**Special EU Programmes Body  
Comhlacht na gClár Speisialta AE  
Special EU Skemes Boadé**



**Cogent Management Consulting LLP**

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**EXECUTIVE SUMMARY DOCUMENT**  
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**CONTENTS**

	<b>Page</b>
<b>1. INTRODUCTION AND BACKGROUND .....</b>	<b>1</b>
1.1 Introduction .....	1
1.2 Background to the INTERREG VA Programme.....	1
1.3 Priority Axis 1: Research and Innovation – Rationale & Objectives .....	2
1.4 Overview of Projects and Partners .....	7
1.5 Project Contributions.....	9
1.6 The Evaluation – SEUPB’s Requirements & Methodology.....	10
<b>2. THE POSITION PRIOR TO THE FINAL REPORT .....</b>	<b>12</b>
2.1 Introduction .....	12
2.2 The Mobilisation of Projects .....	12
2.3 The Impact of the Pandemic on Projects (in December 2020).....	16
<b>3. POSITION OF THE PROJECTS (AT THE TIME OF REPORT) .....</b>	<b>17</b>
3.1 Project Expenditure to Date.....	17
3.2 The Extent to which the Priority Axis Output & Result Indicators have been achieved.....	18
<b>4. CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>23</b>
4.1 Introduction .....	23
4.2 Conclusions .....	23
4.3 Recommendations .....	32

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## List of Abbreviations

Abbreviation	Definition
AAL	Ambient Assisted Living
AFBI	Agri-Food and Biosciences Institute
AFC	Authentic Food Company
AFRC	Advanced Forming Research Centre
AICBRN	All-Island Climate and Biodiversity Research Network
AKI	Acute kidney injury
ARCH	Applied Research for Connected Health Centre
AREA	Action Renewables Energy Association
BDI	Biomedical Diagnostics Institute
BETTA	British Electricity Trading Transmission Arrangements
BREATH	Border and Regions Airways Training Hub
BSR	Business Status Review
B2B	Business to Business
C-TRIC	Clinical Translational Research and Innovation Centre
CASE	Centre for Advanced Sustainable Energy
CB	Cross Border
CDHT	Centre for Digital Healthcare Technology
CEO	Chief Executive Officer
CIT	Cork Institute of Technology
CKD	Chronic Kidney Disease
CO	Output Indicators
Co2	Carbon dioxide
Co-Innovate	The Innovation Pathway Programme
COPD	Chronic Obstructive Pulmonary Disease
COVRES	COVID Response Study
CPM	Centre for Personalised Medicine: Clinical Decision Making and Patient Safety
CSRI	Computer Science Research Institute
CTRIC	Clinical Translational Research and Innovation Centre
DCSDC	Derry City and Strabane District Council
DCU	Dublin City University
DEMON	Deep Dementia Phenotyping Network
DfE	Department for the Economy
DIT	Department for International Trade
DJEI	Department of Jobs, Enterprise and Innovation
DKIT	Dundalk Institute of Technology
DNDI	Dementia and Neurodegeneration Ireland
EAPCI	European Association of Percutaneous Cardiovascular Interventions
EBR	East Border Region Ltd
ECG	Electrocardiogram
ECME	Eastern Corridor - Medical Engineering Centre
EIMR	Environmental Interactions of Marine Renewables
EMEC	European Marine Energy Centre:
EP	Enterprise Partners
ER	Eligible Region
ERDF	European Regional Development Fund
ESB	Electricity Supply Board
EU	European Union
EUBCE	European Biomass Conference and Exhibition
EV	Electric Vehicles
EWTEC	European Wave and Tidal Energy Conference
FCU	Financial Control Unit
FLC	First Level Control
FTEs	Full-Time Equivalent Employees
GSK	GlaxoSmithKline
HEI	Higher Education Institution
HIE	Highlands and Islands Enterprise

Abbreviation	Definition
HLS	Health and Life Sciences
HR	Human Resources
HSE	Health and Safety Executive
ICU	Intensive Care Unit
IEA	International Energy Agency
IP	Intellectual Property
IPR	Intellectual Property Rights
IRBEA	Irish BioEnergy Association
ISCE	The International Society for Computerised Electrocardiology
ISEM	Integrated Single Electricity Market
ISG	International Stakeholder Group
ITS	Institute of Technology Sligo
KE	Knowledge Exchange
KTP	Knowledge Transfer Partnership
LEA	Local Enterprise Agency
LEO	Local Enterprise Offices
LoO	Letter of Offer
LPE	Laser Prototypes Europe
LUH	Letterkenny University Hospital
LyIT	Letterkenny Institute of Technology
MEG	Magnetoencephalography
MEP	Member of European Parliament
MES	Mass Energy Storage
MNI	Manufacturing NI
NHS	National Health Service
NHSH	NHS Highlands
NI	Northern Ireland
NIACE	Northern Ireland Advanced Composites and Engineering Centre
NIBEC	Nanotechnology and Integrated Bio-Engineering Centre
NICE	National Institute for Health and Care Excellence
NICRS	Northern Ireland Clinical Research Services
NIHE	Northern Ireland Housing Executive
NIHR	Northern Ireland Multimorbidity and Research Discovery
NIREV	Northern Ireland Reforming the Vision
NREAP	National Renewable Energy Action Plan
NUIG	National Universities of Ireland Galway
NWCAM	North West Centre for Advanced Manufacturing
PCI	Primary Coronary Intervention
PDRA	Post-Doctoral Research Associate
PhD	Postgraduate Doctoral Degree
PI	Principal Investigator
POC	Point of Care
POCT	Point-of-Care Testing
PPE	Personal Protective Equipment
PV	Photovoltaic
QUB	Queen's University Belfast
R&D	Research & Development
R&D&I	Research, Development & Innovation
R&I	Research & Innovation
RA	Research Associates
Radox	Radox Laboratories Ltd
RCs	Research Clusters
RE	Renewable Energy
REF	Research Excellence Framework
ROI	Republic of Ireland
ROS	Reactive Oxygen Species
RTDI	Research, Technology Development and Innovation
RULET	Rural-Led Energy Transition

Abbreviation	Definition
SAMS	Scottish Association for Marine Science
SE	Scottish Enterprise
SEF	Strategic Energy Framework
SEM	Single Electricity Market
SEUPB	Special European Union Programmes Body
SMART	Specific, Measurable, Achievable, Realistic and Timebound
SMEs	Small and Medium-sized Enterprises
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
SSAD	Small-Scale Anaerobic Digester
ST	Southern Trust
STEM	Science, Technology, Engineering and Maths
STEMM	Science, Technology, Engineering, Maths and Medicine
SWC	South West College
TCD	Trinity College Dublin
TRL	Technology Readiness Level
UCC	University College Cork
UCD	University College Dublin
UHI	University of Highlands and Islands
UK	United Kingdom
UKRI	UK Research and Innovation
UoG	University of Glasgow
UoS	University of Strathclyde
UU	Ulster University
UWS	The University of the West of Scotland
VRE	Variable Renewable Energy
VRGS	Virtual Research Graduate School
WHO	World Health Organisation
WHSCCT	Western Health and Social Care Trust
XR	Extended Reality

## 1. INTRODUCTION AND BACKGROUND

### 1.1 Introduction

The Special EU Programmes Body (SEUPB) has commissioned Cogent Management Consulting LLP (Cogent) to undertake a longitudinal Impact Evaluation of the INTERREG VA Programme (for Northern Ireland, Ireland and Western Scotland) Investment Priority Axis 1 – Research and Innovation to include three reports due by end of 2018, end of 2020 and early 2022.

This report represents the final in the series of three impact evaluation reports and provides an overview of the key activities and achievements of each project that was funded under Priority Axis 1. It also includes a summary of the previous evaluation findings and is anticipated to contribute directly to SEUPB's programme summary of evaluation findings, to be submitted to the EU Commission.

**It is noted that as a consequence of the outworkings of the Covid-19 pandemic and resultant delays caused in the implementation of projects, only one of the eight individual projects supported under Priority Axis 1 had been fully completed at the time (circa April/May 2022) of the Evaluation Team's consultations to inform this report (see Table 1.5 for further details), albeit most projects were nearing completion. However, for SEUPB's reporting requirements to the EU Commission, it was necessary to develop the final evaluation report at this time, therefore the report does not reflect the final position of most of the projects.**

This section of the report provides an overview of the Interreg VA Programme, Priority Axis 1 – Research and Innovation, its aims and objectives and the eight projects supported.

### 1.2 Background to the INTERREG VA Programme

Launched in January 2016, the INTERREG VA Programme was one of over sixty funding programmes across the EU that had 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, aimed to promote greater levels of economic, social and territorial cohesion to create a more prosperous and sustainable cross-border region.

The Programme had a total value of €283m, which was 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 have varied between priority axes of the Programme.

Figure 1.1: INTERREG VA Programme Priority Axes<sup>1</sup>



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 Co-operation Programme for the INTERREG VA Programme 2014-2020<sup>2</sup>. The Co-operation 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 Co-operation 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 – Rationale & Objectives

#### 1.3.1 Introduction

The Co-operation Programme (CP) 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.”

<sup>1</sup> Source: Citizens’ Summary: INTERREG VA Programme (2014-2020).

<sup>2</sup> Formally adopted in February 2015.

It was anticipated that this priority axis would 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>3</sup>

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

<b>Table 1.1: Priority Axis 1 Investment Priorities and Specific Objectives</b>	
<b>Investment Priority</b>	<b>Associated Specific Objectives</b>
<b>1a - Enhancing research and innovation (R&amp;I)</b> 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 (HLS) 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.

### 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 Need for Investment

The Co-operation Programme outlined that the eligible region's economies are characterised by a low proportion of high-value-added exporting sectors and low levels of Research, Development and Innovation (R&D&I).

Noting that R&D&I had the potential to be 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 was anticipated that the INTERREG VA Programme would present 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).

<sup>3</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.



### Aim of the Investment Priority & Specific Objective

The aim of this investment priority (and its Specific Objective) was 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 toward the development of a more competitive, high value-added economy<sup>4</sup>.

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:

1. Health and Life Sciences (HLS); and
2. Renewable Energy.

It was anticipated that this focused approach would further develop research areas in which there was existing critical mass and where the region was considered to have distinct advantages (thereby aligning with the EU Smart Specialisation Platform).

#### *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 Need for Investment

The Co-operation Programme identified a range of barriers that were contributing to a low level of innovation activity among SMEs in the eligible region including the cost of innovation, a lack of internal funds and a lack of external finance.<sup>5</sup>

### Aim of the Investment Priority & Specific Objective

The aim of this investment priority (and its Specific Objective) was 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 sought 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.

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:

1. Preparatory interventions delivered via workshops;
2. Preparatory interventions delivered on a one-to-one basis;
3. An Innovation Capability Development Programme;
4. A cross-border Innovation Internship Programme; and
5. Cross-border R&I Projects.

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<sup>4</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 were eligible for support under the INTERREG VA programme.

<sup>5</sup> The CP defined innovation as the development of solutions that meet needs in new ways. The CP considered innovation to be wider than R&D insofar as it also covered improvements to products, tradable services and processes.

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

Table 1.2 provides a summary of the Specific Objectives, Result Indicators and Targets for Priority Axis 1: Research and Innovation:

Table 1.2: Summary of Specific Objectives, Results Indicators and Targets			
Specific Objective	Result Indicator	Baseline	Target
<b>1.1</b> To increase business and industry-relevant research and innovation capacity across the region within two target sectors; HLS and Renewable Energy	The annual number of peer-reviewed journal and conference publications in two target sectors (HLS 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%

In January 2023, SEUPB advised the following concerning the Objective 1.1 result indicator:<sup>6</sup>

- **Project Targets:** Each of the seven projects supported had an individual target for publications, which is reflected in the project’s Letter of Offer. This project (or LoO) target is an absolute number and may include inter-regional publications (depending on the wording of a given project’s letter of offer). SEUPB notes that from a contractual point of view, these project-level targets are the only targets that projects need to concern themselves with.
- **Programme Target:** SEUPB advises that the programme-level target is envisaged to be measured with a three-year rolling average, with the final target for 2023 being an average of 75 publications with cross-border authorship and with the potential to create economic impact across the years 2021, 2022 and 2023 (per Table 1.3). SEUPB notes that projects should not be judged against this target, which only relates to the programme as a whole.

Table 1.3: Projected Result Indicator Target (Per Technologia’s report) <sup>7</sup>							
Year	Health and life sciences			Renewable energies			Total Three-year average
	Researchers	Publications	Three-year average	Researchers	Publications	Three-year average	
2015	-	-	-	-	-	-	-
2016	30	-	-	26	-	-	-
2017	52	-	-	45	-	-	-
2018	50	-	-	44	-	-	-
2019	49	24	8	43	21	7	15
2020	47	43	22	41	37	19	42
2021	46	42	36	40	36	31	68
2022	-	40	42	-	35	36	78
2023	-	39	40	-	34	35	75

<sup>6</sup> Source: Email received from the SEUPB (Managing Authority) on 31<sup>st</sup> January 2023.

<sup>7</sup> Source: Final Report for priority axis 1: Research & Innovation (Technologia, August 2014)

The Output Indicators associated with Axis 1: Research and Innovation and its Specific Objectives are summarised below:

<b>Table 1.4: Summary of Output Indicators</b>			
<b>Output Indicator<sup>8</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>

<sup>8</sup> Each output indicator is defined in the 'Output Indicator Guidance' documents for Objectives 1.1 and 1.2.

## 1.4 Overview of Projects and Partners

There were two calls for applications under Priority Axis 1: Research and Innovation. A two-stage process was then initiated by SEUPB’s Joint Secretariat to assess applications submitted under each of the calls.<sup>9</sup> Full details of the assessment process, including admissibility criteria, were outlined for applicants in the ‘Call Documentation’ and the ‘Guide for Applicants’.

In total, eight projects were approved by the IVA Programme Steering Committee.<sup>10</sup> As illustrated below, seven projects were funded under Specific Objective 1.1 of the R&I Priority Axis; whilst one project - the Co-Innovate Programme – was funded under Specific Objective 1.2.

Table 1.5: Summary of Projects Approved for Funding <sup>11</sup>				
Lead Partner	Project Name	Operational start date	Original Anticipated end date	Latest (in July 2022) Revised Operational end date
<b>Objective 1.1</b>				
Dundalk Institute of Technology (DKIT)	BREATH (Border and Regions Airways Training Hub)	01/01/2017	31/12/2021	30/06/2022
Catalyst Inc.	NWCAM - North West Centre for Advanced Manufacturing	01/04/2017	31/12/2021	30/06/2022
Ulster University (UU)	ECME - Eastern Corridor - Medical Engineering Centre	01/03/2017	31/12/2021	31/07/2022
Ulster University (UU)	CPM - Centre for Personalised Medicine: Clinical Decision Making and Patient Safety	01/04/2017	31/12/2021	30/06/2022
South West College (SWC)	Renewable Engine	01/01/2017	31/07/2021	31/01/2022
Ulster University (UU)	SPIRE 2 - Storage Platform for the Integration of Renewable Energy 2	01/03/2017	31/12/2021	30/09/2022
Queen’s University Belfast (QUB)	The Bryden Centre for Advanced Marine and Bio-Energy Research	01/06/2017	31/12/2021	30/06/2022
<b>Subtotal</b>				
<b>Objective 1.2</b>				
InterTradeIreland	Co-Innovate (The Innovation Pathway Programme)	01/08/2016	31/03/2022	31/03/2023
<b>Total</b>				

As reflected in Table 1.5, as a consequence, largely of the outworkings of the Covid-19 pandemic and its associated restrictions, each of the eight projects received extensions to their original anticipated end dates.<sup>12</sup>

<sup>9</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>10</sup> Projects were approved at IVA Programme Steering Committees held on: 6/9/2016, 7/9/16, 23/11/2016 and 14/3/2017.

<sup>11</sup> Source (unless otherwise stated): Letters of Offer issued by the SEUPB.

<sup>12</sup> The most recent amendment is noted here, with further detail of previous extensions detailed in the respective project sections.

The seven projects that were funded under Specific Objective 1.1 received original Letters of Offer awarding cumulative ERDF and Government Match funding of c. €54.7m towards total project costs of €57.6m. The Co-Innovate Programme, which was funded under Specific Objective 1.2 received an original Letter of Offer awarding funding of c. €16.7m towards total anticipated project costs of €22.4m.

<b>Table 1.6: Summary of Projects Approved for Funding<sup>13</sup></b>									
<b>Lead Partner</b>	<b>Project Name</b>	<b>Per Original LoOs</b>				<b>Per Latest LoO (July 2022)</b>			
		<b>ERDF</b>	<b>Govt. Match</b>	<b>Other</b>	<b>Total</b>	<b>ERDF</b>	<b>Govt. Match</b>	<b>Other</b>	<b>Total</b>
<b>Objective 1.1</b>									
Dundalk Institute of Technology (DKIT)	BREATH (Border and Regions Airways Training Hub)	6,781,065	946,206	779,658	<b>8,506,929</b>	7,105,662	969,834	829,870	<b>8,905,366</b>
Catalyst Inc.	NWCAM - North West Centre for Advanced Manufacturing	7,462,875	1,055,531	261,447	<b>8,779,853</b>	7,462,875	1,050,425	266,553	<b>8,779,853</b>
Ulster University (UU)	ECME - Eastern Corridor - Medical Engineering Centre	7,108,480	1,043,238	211,199	<b>8,362,917</b>	7,108,480	1,043,238	211,199	<b>8,362,917</b>
Ulster University (UU)	CPM - Centre for Personalised Medicine: Clinical Decision Making and Patient Safety	7,415,033	1,213,953	795,941	<b>9,424,927</b>	7,415,033	1,213,953	795,941	<b>9,424,927</b>
South West College (SWC)	Renewable Engine	5,067,830	734,596	302,569	<b>6,104,995</b>	5,067,817	734,609	302,569	<b>6,104,995</b>
Ulster University (UU)	SPIRE 2 - Storage Platform for the Integration of Renewable Energy 2	5,668,754	794,174	240,318	<b>6,703,246</b>	5,668,754	794,174	240,318	<b>6,703,246</b>
Queen's University Belfast (QUB)	The Bryden Centre for Advanced Marine and Bio-Energy Research	8,289,778	1,077,624	385,278	<b>9,752,680</b>	8,289,778	1,075,706	387,196	<b>9,752,680</b>
<b>Subtotal</b>		<b>47,793,815</b>	<b>6,865,322</b>	<b>2,976,410</b>	<b>57,635,547</b>	<b>48,118,399</b>	<b>6,881,939</b>	<b>3,033,646</b>	<b>58,033,984</b>
<b>Objective 1.2</b>									
InterTradeIreland	Co-Innovate (The Innovation Pathway Programme)	14,702,502	1,969,242	5,771,291	<b>22,443,035</b>	13,949,530	1,934,276	4,823,379	<b>20,707,185</b>
<b>Total</b>		<b>62,496,317</b>	<b>8,834,564</b>	<b>8,747,701</b>	<b>80,078,582</b>	<b>62,067,929</b>	<b>8,816,215</b>	<b>7,857,025</b>	<b>78,741,169</b>

As illustrated above, as a consequence of project amendments, some projects received amended Letters of Offer, which led to the cumulative ERDF and Government Match grant awarded to Specific Objective 1.1 projects increasing from c€54.7m to €55.0m; whilst the ERDF and Government Match funding awarded to the Co-Innovate Programme decreased from c€16.7m to €15.9m. The rationale for changes in individual project budgets is discussed within the respective sections of the main report that relate to individual projects (i.e. Sections 3 to 10).

<sup>13</sup> Source: Letters of Offer issued by the SEUPB.

## 1.5 Project Contributions

The contribution that each of the eight projects was anticipated to make to the Output Indicators is detailed below:

<b>Table 1.7: Projects Approved for Funding – Stated Contributions to Output Indicators (source: Letters of Offer issued by the SEUPB)</b>									
<b>Output Indicator</b>	<b>1.1 – Life &amp; Health Sciences</b>				<b>1.1 – Renewable Energy</b>			<b>1.2</b>	<b>Total</b>
	<b>BREATH</b>	<b>NWCAM<sup>14</sup></b>	<b>ECME</b>	<b>CPM</b>	<b>Renewable Engine</b>	<b>SPIRE2</b>	<b>Bryden Centre</b>	<b>Co-Innovate</b>	
No. of enterprises receiving support	5	9	10	5	8	12	30	1,408	<b>1,487</b>
No. of enterprises receiving grants	2	2	5	3	4	2	8	30	<b>56</b>
No. of enterprises receiving non-financial support	5	9	10	5	8	12	30	1,408	<b>1,487</b>
Years of PhD (or above) level research	89.5	98.5	95	80.19	57.0	83	132.5	n/a	<b>635.69</b>
No. of enterprises cooperating with research institutions	5	9	10	5	8	12	30	50	<b>129</b>
No. of enterprises participating in cross-border, transnational or inter-regional research projects	2	9	10	5	8	12	30	30	<b>106</b>
No. of research institutions participating in cross-border, transnational or inter-regional research projects	3	4	5	4	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>14</sup> The targets for outputs CO01, CO04, CO26 and CO41 were revised in the 20<sup>th</sup> September 2021 LoO (from 8 to 9).

## 1.6 The Evaluation – SEUPB’s Requirements & Methodology

### 1.6.1 SEUPB’s Requirements

To fulfil the requirement of Article 114(1) of the Common Provisions Regulation (EU No: 1303/2013), SEUPB’s Managing Authority submitted to the Commission an Evaluation Plan for the INTERREG VA Programme<sup>15</sup>. The Evaluation Plan was put in place to facilitate learning and maximise the proposed investments of the Programme<sup>16</sup>. The Plan outlined 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.

Concerning 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.

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 was being undertaken across INTERREG VA concurrently with the Impact Evaluation, **the Impact Evaluation was not expected to assess the implementation of projects nor how the Programme had operated. Rather than addressing financial and operational issues**, the purpose of the impact evaluation was learning, through an exploration of the contribution of the Programme to the movement of the Result Indicator, to inform the INTERREG VA Programme and potential future programming periods.

As such, the Impact Evaluation Team was required to assess the following:

- To what extent were the Specific Objectives achieved?
- To what extent were the targets for the Result Indicators achieved?
- Comment on the effectiveness and added value of cross-border collaboration concerning the Specific Objectives.
- Identify if any external factors impacted, positively or negatively, the achievement of the Specific Objectives.
- Comment on whether the two target sectors were appropriate.
- Identify whether there were synergies between projects funded under both objectives;

<sup>15</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>16</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 of the aim of preserving, protecting and improving the quality of the environment taking into account the polluter pays principle.

- Whether collaborations had affected the quality and capacity for research and innovation in the eligible area?
- What had been the impact on business and industry?
- What had been the impact of cross-border collaborations under both objectives?
- Whether any new ways of working/partnerships/relationships had been created as a result of activities carried out within the priority axis?
- Identify any key areas of best practice and learning;
- Identify whether there were any barriers to cross-border Co-operation that the priority axis had not addressed.
- The contribution of the priority axis to<sup>17</sup>:
  - EU 2020 objectives;
  - The Atlantic Strategy; and
  - The horizontal principles of equality and sustainable development?

### 1.6.2 Methodology

Across the three distinct cycles of research, the Evaluation Team employed the following methodology:

- Consulted with SEUPB personnel both to identify report-specific requirements and to identify any project-specific issues encountered or developments of note;
- Extensive desk research activities that encompassed detailed reviews of materials such as:
- INTERREG VA policy and operational documents, such as the Co-operation Programme;
- Policy and strategy documents of specific relevance to individual projects and/or the eligible region;
- Project applications and supporting materials;
- Letters of Offers and subsequent amendments (where relevant);
- Analysis of all monitoring data available on the progress of projects supports including both activities undertaken and their financial expenditure against budget;
- Extensive engagement with the eight individual projects to assess the projects against their targets and key achievements.

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<sup>17</sup> NB An overview of the aims and objectives of these strategies is provided in Appendix II.



## 2. THE POSITION PRIOR TO THE FINAL REPORT

### 2.1 Introduction

As reflected in Section 1, the specification for the evaluation requested that this final report provide a summary of the findings featured in the previous evaluation reports. At a high-level, the first two reports considered the following:

1. The first report considered the mobilisation of the eight projects and their early progress towards achieving their output indicators. This early activity also naturally led to a detailed consideration of the intervention logic associated with the priority axis;
2. Given the considerable upheaval caused to many aspects of organisations' operations and people's lives, the second report placed a particular emphasis on the impact of the pandemic on projects, emerging risks and barriers to the successful completion of projects, and the identification of methods by which such risks or barriers could be minimised.

This section provides a summary of the key findings featured in those reports.

### 2.2 The Mobilisation of Projects

At the time of the first report, each of the eight projects was, for the most part, at the early stages of their rollout, and whilst some had encountered some operational issues, none reported any issue pertaining to their mobilisation that they considered, at that time, was significant enough to ultimately affect the successful delivery of their project. Albeit, even at that early juncture, some projects were of the view that delays encountered would likely mean that they would require an extension to the timeframes stipulated in their respective Letters of Offer.

The types of issues encountered included the following:

- **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 projects. A commonly shared view amongst the Partners was 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 because several 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 Health and Life Sciences). This inadvertently created significant demand within the market for those students at the one time, resulting in a shortage of available students and, by association, delays in recruitment.

On the supply side, it was noted by several partners that there had been limited appetite from domestic applicants which was suggested might have resulted from several factors including the scale of the research bursary that was available to potential students, 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 demand and supply side factors, several partners indicated that they had to ultimately seek applications from potential international PhD students.

- **Staff mobility issues** – Related to the above, difficulties had been encountered concerning non-EU resident PhD students taking up research positions in the eligible region due to visa-related restrictions. At the time of the first report, a number of the Projects' Partners expressed concern that such mobility issues might potentially be exacerbated following the UK's departure from the EU (i.e. following 'Brexit');
- **'Background' and 'foreground' IP issues impacting business recruitment and wider engagement in research projects** - Several of the projects' partners noted that they had faced difficulties encouraging business engagement on their respective projects due to concerns relating to IP. For some businesses, these concerns were 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 anticipated to be owned by the academic institutions;

- **EU/SEUPB and University procurement requirements hindering the progression of research** - A number of the project partners considered that their project’s progression 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)** - Some project partners indicated that there have been several changes to the profile of their project’s research team during the initial delivery period which had, on occasions slowed project progress;
- **Changes to industrial partners** - A small number of project partners indicated that their originally anticipated industry partners had to be replaced due to a variety of business-specific circumstances (e.g. businesses going into administration, businesses having more pressing priorities); and
- **The claims process adversely impacted business engagement** - A small number of project partners noted that the administration and bureaucracy associated with the claims process had resulted in businesses leaving their project and other businesses not being willing to receive the financial support that was potentially available through the projects.

Nonetheless, at the time of the first report, each of the seven projects that had been funded under Specific Objective 1.1 was progressing with their PhD (or above) led research and the majority of the projects had identified the businesses that were anticipated to benefit from direct financial support to take forward additional R&I activity.

The final project (and the only project that had been supported under Specific Objective 1.2) had made strong progress concerning the delivery of the knowledge transfer and capability strands of the Programme (Strands 1, 2 and 3), but had at the time of the first report only begun to approve businesses/projects that were anticipated to receive financial support (through Strands 4 and 5). However, the Co-Innovate Programme project partners did (at the time of the first report) raise concerns that the outworkings of Brexit might affect their efforts to recruit businesses onto Strands 4 and 5 of their programme. This was because it was anticipated that businesses participating in Strands 4 and 5 would be required to contribute 50% of their project costs, and the project partners had received some indication from businesses that had participated in Strands 1, 2 and 3 that they had reservations concerning the commitment of funds and resources that might ultimately be required to address emerging needs following Brexit.

Other issues encountered at the time of the first report by the Co-Innovate Programme project partners included:

- **Delays in businesses progressing along the Co-Innovate support funnel due to Strand 2 ‘bottlenecks’**- The project partners advised that the requirement for businesses to complete two separate business assessment tools (i.e. a Business Status Review and Innovation Capability Audit) in Strand 2 had inadvertently served to delay the progress of businesses through to subsequent strands of the Programme’s support;
- **Delivery of activity in the Highlands and Islands area of the eligible region** - Levels of activity in this area were below what was anticipated at the outset due to two interrelated reasons. Firstly, the project partners had not anticipated the time that would be required to engage with businesses located in these peripheral locations on a face-to-face basis. Secondly, and related to this point, the project partners had originally anticipated that activity in the Highlands and Islands area would be delivered by two in-house Programme managers (as opposed to availing of external resources, as was being utilised in the other programme areas). However, in retrospect, the Project Partners considered that they had underestimated the level of resource that was required to deliver the Programme within the stipulated timeframes. Consequently, the Project Partners sought and received approval from SEUPB to utilise external consultants to support the delivery of Strand 2 activity within the Highlands and Islands area; and

- **Cross-border/transnational focus of support limiting engagement from some businesses** - Whilst acknowledging the anticipated merits of the cross-border and transnational nature of the support, the project partners were 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 had created (perceived or actual) geographical/logistical difficulties for some businesses, resulting in them being unwilling to participate in the Programme, particularly when other support mechanisms were available in their home jurisdiction which did not require them to take forward collaboration outside their home jurisdiction.

Across all eight projects, there was agreement that the INTERREG VA funding had successfully enabled the Project Partners to draw together different but complimentary skills and knowledge (e.g. in different academic research areas) and in doing so, had provided a strong platform to strengthen the capacity and capability of the academic institutions to undertake collaborative R&I for the ultimate benefit of business and industry.

Early synergies had emerged (both in actuality or the potential of such was actively 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 were focused on the area of renewable energy.

However, a key finding, at this early juncture, related to the reasonableness of the targets and indicators established for the Priority Axis. Indeed, even at the (then) early stage in the various Specific Objective 1.1 projects' rollout many of the programme-level output indicators had already been achieved and in most cases, exceeded by some considerable margin. A notable exception was the number of Years of PhD (or above) level research untaken, which the Evaluation Team considered unsurprising, given the fact that the research elements of the projects were continuing to be undertaken, and many projects had encountered some delays in the recruitment of research staff.

Consequently, the Evaluation Team noted the following observations:

- Whilst noting that the Common Output and Results Indicators had been set by the Commission and agreed by the 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 appeared to be more overly representative of the 'activities' and 'inputs' being delivered under the Priority Axis, whilst the Results Indicator identified under Specific Objective 1.1 appeared to be more overtly representative of an 'Output'.

The Evaluation Team noted that best practices in the UK concerning programme development and its evaluation (reflected, at that time, in guidance featured in the Northern Ireland Guide to Expenditure Appraisal and Evaluation and the UK Treasury's Green Book) identified the importance of establishing activity-based targets, it also advised that 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). The Evaluation Team subsequently advised that caution should be taken in utilising the stated output targets that had been established for the Investment Priority as an indicator of whether the Priority Axis had ultimately delivered value-for-money.

- On review of the number and nature of Common Output indicators, the Evaluation Team was of the view that fewer (or different) specific targets/indicators should have been adopted as (for those established) the delivery of a single element of activity offered 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 had been delivered under the Investment Priority.

The Evaluation Team also identified the following uncertainties concerning the Investment Priority's Result Indicators:

- The overall Results Indicator for Specific Objective 1.1 was stated as being to increase the annual number of peer-reviewed journal and conference publications in two target sectors (HLS and Renewable Energy) with cross-border authorship and with the potential to create economic impact from 4 to 75 by 2023. Concerning this, the Evaluation Team noted the following:
  - Based on the INTERREG VA Operational Programme, it was understood that the Managing Authority had carried out a survey-interview of higher education institutions in the region to establish the number of peer-reviewed journals and conference publications within either of the two target sectors (HLS and Renewable Energy) that also had cross-border authorship to establish the annual baseline (which was subsequently identified as 4). However, based on the outputs from their research activity, several 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.
  - The Evaluation Team noted that given that it would appear more probable that the number of peer-reviewed journal and conference publications would likely ramp-up in line with the levels of research activity being undertaken (and not, therefore, be linear over the life of a project), it would have been beneficial for annual quantified targets to have been established to ensure that progress could be measured at different junctures towards the (seeming) 2023 average annual target. Albeit, the Evaluation Team recognises that given delays in projects commencing due to difficulties securing PhD students and wider research staff that any annual targets established before the programme launch may have required subsequent revision as the programme and individual projects progressed.
  - Based on the Evaluation Team's discussion with Project Promoters, and its review of SEUPB's LoOs and Project Assessment materials and completed monitoring materials, the Evaluation Team identified that ambiguity existed as to the specific nature of the Result Indicator. Whilst noting that the Result indicator indicated that the quantified target relates to the annual number of peer-reviewed journals and conference publications, the review of SEUPB's Stage 1 and 2 Assessment reports for individual projects appeared to indicate that this target was, in many cases, being interpreted in terms of cumulative rather than annual outputs.
  - The Evaluation Team noted that it was unclear as to how a publication's 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 was overtly focused on increasing business and industry-relevant research and innovation capacity.
- The Evaluation Team noted that the UK Treasury's Green Book guidance identifies 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 had been established, the Evaluation Team noted that it had reservations as to whether Priority Axis 1 had the potential to fully deliver on this indicator of value-for-money, with the Evaluation Team advising that in its view (but based upon its experience of evaluating many other similarly focused interventions available within the eligible region such as Invest NI's Competence Centre Programme, Grant for R&D Programme etc.) many of the output indicator targets had been set at too low a level.

NB: The Evaluation Team was subsequently commissioned to analyse what would be more appropriate targets. SEUPB has advised that these revised targets will form the basis of a programme modification to increase the target values.

### 2.3 The Impact of the Pandemic on Projects (in December 2020)

Given the considerable upheaval caused to many aspects of organisations' operations and people's lives, the second report placed a particular emphasis on the impact of the pandemic on projects, emerging risks and barriers to the successful completion of projects, and the identification of methods by which such risks or barriers could be minimised.

The key findings from the Evaluation Team's consultation with project partners at the time (December 2020) of the second report included:

- 6 of the 8 projects considered that the onset of the COVID-19 pandemic and the associated lockdown and disruption to normal working practices had created a risk that their project would not fully achieve its aims and objectives. One project (NWCAM) considered that there was a 'high risk' that this was the case;
- 3 of the 8 projects had made some adaptations to their project as a result of the COVID-19 pandemic;
- 3 of the 8 projects considered that their project would likely require an extension to its originally anticipated timescales to complete successfully; and
- 1 of the 8 projects considered that they would likely not be able to spend their full budget allocation.

It should be noted that the Evaluation Team spoke with the projects at a time (end of August/start of September) when COVID-19 restrictions had been eased/lifted to some extent and projects may have been more optimistic about their ability to achieve project aims and objectives within the original timeframe. However, at the time of drafting the second report (late December 2020), further restrictions were being implemented in Northern Ireland and the Republic of Ireland, which the Evaluation Team noted might pose a significant risk to cross-border collaboration activities during their implementation.

Of further note, whilst six projects felt (in August/September 2020) it was feasible to make up for the delays experienced as a result of the pandemic, they noted that this would depend on how long the lockdown continued, as although the projects were considered to have adapted well to remote working, some work could not be completed remotely (e.g. laboratory-based work). It is the view of the Evaluation Team, at that time, that the ongoing uncertainty associated with the duration of lockdowns and the severity of restrictions, meant that there continued to be a significant ongoing risk to the successful completion of the projects.

Given the uncertainty, the Evaluation Team recommended that SEUPB continued (as it has been doing throughout the pandemic) to regularly monitor the activity undertaken and progress made by each project. In particular, the Evaluation noted that it would be important to engage with projects to discuss potential changes to project activities, timelines or budgets.

It is understood that SEUPB's Joint Secretariat subsequently asked each of the projects to formally report back in early 2021 as to any further project amendments that might be required as a consequence of the pandemic. A further point to note concerning this is that the Joint Secretariat advised that the Irish Government had offered to cover the cost of any extensions offered to PhD students to allow them to complete their studies.

The remainder of this report relates to the position of projects at the time of consultation concerning the development of this final evaluation report i.e. the period April to June 2022.

### 3. POSITION OF THE PROJECTS (AT THE TIME OF REPORT)

#### 3.1 Project Expenditure to Date

Table 3.1 provides a summary of the total estimated expenditure to July 2022 and also the proportion of ‘project time’ that has passed as of July 2022.

<b>Table 3.1: Project Costs – Anticipated and Estimated Actual July 2022</b>				
<b>Project</b>	<b>Anticipated Total (€)</b>	<b>Total Actual/ Estimated Expenditure in July 2022<sup>18</sup></b>	<b>Anticipated % of the total budget</b>	<b>Proportion of Timescale Passed in July 2022</b>
<b>Objective 1.1</b>				
NWCAM	8,779,853	8,366,831	95%	100%
Renewable Engine	6,104,995	5,440,803	89%	100%
Bryden Centre	9,752,680	8,791,852	90%	100%
SPIRE 2	6,703,246	6,016,351	90%	97%
ECME	8,362,917	8,125,466	97%	99%
BREATH	8,905,366	8,131,646	91%	100%
CPM	9,424,927	8,155,296	87%	100%
<b>Subtotal</b>	<b>58,033,984</b>	<b>53,028,245</b>	<b>91%</b>	<b>-</b>
<b>Objective 1.2</b>				
Co-Innovate	20,707,185	14,655,403	71%	89%
<b>Total</b>	<b>78,741,169</b>	<b>67,683,648</b>	<b>86%</b>	<b>-</b>

Key points to note concerning expenditure (in July 2022) under INTERREG VA Programme Investment Priority 1: Research and Innovation include:

- At an overall Axis level, the eight projects have incurred expenditure of almost nine-tenths (86%) of their total budget. However, this differs considerably between the two Objectives:
  - The seven projects under Objective 1.1 have incurred 91% of their total budget; and
  - Whilst Objective 1.2 has incurred less than three-quarters (71%) of their total budget.
- Whilst five of the Objective 1.1 projects were complete as of July 2022, four<sup>19</sup> of the projects had only recently (in June 2022) completed at that time. A fifth project (Renewable Engine) which was completed in January 2022 advised the Evaluation Team that they were behind on the claims process. Therefore the expenditure presented may not reflect the final expenditure position for the Investment Priority due to the timing of submission and verification of final claims.
- All eight projects advised the Evaluation Team that they would have some level of underspend.

<sup>18</sup> Estimated total expenditure is used for those projects that are still in progress whereas for those projects that have been completed actual expenditure is used.

<sup>19</sup> NWCAM, BREATH, Bryden Centre and CPM.

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

### 3.2.1 Specific Objective 1.1

Encouragingly, despite the onset of the COVID-19 pandemic, at an overall Specific Objective 1.1 level all of the output indicators have been achieved and in most cases, exceeded by some considerable margin<sup>20</sup>.

Table 3.2: Overview of progress made towards the Output Indicators under Specific Objective 1.1												
Output Indicator	Programme Target	Combined project targets (based on Letter of Offers)	Actual Output <sup>21</sup>								Variance from Programme Target	Variance from Combined project targets
			BREAT H	Renewable Engine	NWCA M	ECME	SPIRE2	CPM	Bryden Centre	Total		
No. of enterprises receiving support	20	79	7	10	10	10	16	5	127	185	825%	134%
No. of enterprises receiving grants	10	26	3	5	4 <sup>22</sup>	12	2	3	4	33	230%	27%
No. of enterprises receiving non-financial support	20	79	7	10	10	10	16	3	127	183	815%	132%
Years of PhD (or above) level research	514	635.69	93.6	60.58	104.86	103.09	81.8	86.7	117.43	648.06	26%	2%
No. of enterprises cooperating with research institutions	10	79	7	8	10	12	16	5	127	185	1750%	134%
No. of enterprises participating in cross-border, transnational or inter-regional research projects	10	76	3	10	10	12	16	5	127	183	1730%	141%
No. of research institutions participating in cross-border, transnational or inter-regional research projects	5	29	3	4	4	5	4	4	5	29 <sup>23</sup>	480%	-

<sup>20</sup> NB: At the time of writing, the SEUPB was in the process of commissioning a report to verify the outputs per project.

<sup>21</sup> Source: Project Progress Reports and discussion with Project Partnerships.

<sup>22</sup> Discussion with project, and the project's presentation to SEUPB in March 2022, albeit the most recent progress report states 0.

<sup>23</sup> This includes 14 unique research institutions, as follows UU (involved in 5 projects), QUB (4), DkIT (3), LyIT (3), UHI (3), IT Sligo (2), UoS (2), AFBI (1), SWC (1), NUIG (1), DCU (1), UCD (1), UoG (1) and UWS (1).

As reflected in Section 1.3.4, Specific Objective 1.1’s Result Indicator and Target was to achieve 75 peer-reviewed journal and conference publications with cross-border authorship and with the potential to create economic impact in two target sectors (HLS and Renewable Energy) on a three-year rolling average basis across the years 2021, 2022 and 2023. At the time of the Evaluation Team’s analysis (May/June 2022) it is not possible to determine whether this target will be met. Albeit it is noted that SEUPB has advised that in its view, the cumulative number (201, per Table 3.3) of cross-border publications reported by the seven projects over a 5 and a half year period (January 2017-May/June 2022) as having been generated (and notwithstanding that some of those publications may not ultimately contribute to the programme result indicator as a consequence that they may not have cross-border authorship and/or have the potential to create economic impact) suggest that the final target of 75 for the end of 2023 (or 225 across 2021, 2022 and 2023) “*is achievable, if far from certain*”. The Evaluation Team would concur with the “*far from certain*” sentiment suggested by SEUPB and recommend that SEUPB introduce robust monitoring for the final phases of the Programme to definitively ascertain the extent to which the project target was achieved.

The Evaluation Team notes that its consultations with the seven Specific Objective 1.1 projects during April/May 2022 indicated that they had achieved 201 peer-reviewed publications with cross-border authorship at that time (see Table 3.3)<sup>24</sup>, which is 36% lower than the combined projects’ targets (i.e. the targets featured in the projects’ Letters of Offer).

Table 3.3: Specific Objective 1.1 - Overview of progress made towards the Letter of Offer targets relating to the number of peer-reviewed publications with cross-border authorship				
Project	Targets (per Letters of Offer)	Actual (as of April/May 2022) <sup>25</sup>	% Achieved	Notes
BREATH	33	50	152%	The project was due to be completed in June 2022.
NWCAM	30	18	60%	The project was due to be completed in June 2022. The project partnership advised the Evaluation Team that the two ROI academic partners were only involved in 3 (of 16) research projects, which limited the opportunities for cross-border publications.
ECME	81	49	60%	The project was due to be completed in July 2022. The project partnership highlighted that they might not achieve their target.
CPM	13	16	123%	The project was due to be completed in June 2022.
Renewable Engine	10	9	90%	The project was completed as of January 2022. The project advised (in May 2022) that an additional 3 publications with cross-border authorship had been submitted and were under review.
SPIRE2	78	39	50%	The project was due to be completed in September 2022. The project partnership noted that there was an inherent issue with the target requiring cross-border authorship, as the SPIRE 2 project has only one cross-border academic partner (DkIT) and only one PhD contracted in DkIT. An associated issue with cross-border publications is the REF peer review system at universities which places a demand on the quality and impact of the research publication as well as critical research protocols. Whilst the project lead highlighted that there were plenty of cross-border workings, it is not reflected in the paper numbers. The project lead indicated that the project is therefore unlikely to achieve the target of 78 publications with cross-border authorship.
Bryden Centre	68	20	29%	The project was due to be completed in June 2022. Concerning the cross-border focus of the target, the project partnership highlighted that it was unlikely that the project would achieve the target.
<b>Total</b>	<b>313</b>	<b>201</b>	<b>64%</b>	

<sup>24</sup> Source: It is noted that the actual number of peer-reviewed publications with cross-border authorship produced by the projects will be subject to independent verification (commissioned by SEUPB).

<sup>25</sup> Source: Consultations with project leads.



As reflected in Table 3.3, in April/May 2022, two of the seven Specific Objective 1.1 projects had achieved their Letter of Offer targets relating to the number of peer-reviewed publications with cross-border authorship. However, of the five that had not, four did not consider that they would achieve the targets set in their LoO or indeed that there was scope for many more such publications to be derived from their projects (notwithstanding any lag that might be experienced between the time that research activity is undertaken, and research papers being developed and published). For that reason, the Evaluation Team considers that it is unlikely that the Programme Target will be achieved.

In addition, two Specific Objective 1.1 projects had targets relating to publications other than those with cross-border authorship. Of the two projects, at the time of consultation, BREATH was unable to provide an exact figure against its target of 15 Peer-Reviewed Publications with Inter-Regional Authorship but was confident that the target had been exceeded.

<b>Table 3.4: Specific Objective 1.1 - Overview of progress made towards the Letter of Offer targets relating to the number of 'other' publications</b>		
<b>Project</b>	<b>Letter of Offer Target</b>	<b>Actual Achievement</b>
BREATH	15 Peer-Reviewed Publications with Inter-Regional Authorship	Exceeded
CPM	30 'Other' Publications	56 - Exceeded

### 3.2.2 Specific Objective 1.2

As of April 2022, the Co-Innovate project had achieved the majority of its output indicator targets but was slightly under the targeted number of enterprises receiving one-to-one innovation advice (linked to Strand 2) and engaging an innovation intern, on a cross-border basis (linked to Strand 4). Albeit it is noted that the Co-Innovate Partners advised that they were confident that the target number (N=469) of enterprises receiving one-to-one innovation advice would be met by the end of the Programme.

However, the Co-Innovate project partners advise that due to the timing required to recruit an intern for a project to be implemented, it is unlikely that the number of enterprises engaging an innovation intern on a cross-border basis target, will increase beyond the 66 featured in Table 3.5 (representing a small shortfall of four such projects).

<b>Table 3.5: Overview of progress made (at April 2022) 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	1,412	+<1%
No. of enterprises receiving non-financial support	1,408	1,412	+<1%
No. of enterprises receiving one-to-one innovation advice	469	447	-5%
No. of enterprises in receipt of an innovation capability development programme	94	97	+3%
No. of enterprises engaging an innovation intern on a cross-border basis	70	66	-6%
No. of enterprises cooperating with research institutions	50	66	+32%
No. of enterprises participating in cross-border, transnational or interregional research projects	30	35	+17%
No. of enterprises receiving grants	30	35	+17%
No. of research institutions participating in cross-border, transnational or interregional research projects	5	5 <sup>26</sup>	0%

<sup>26</sup> The five research institutions are participating in eight Strand 5 research projects: South West College (1), Scottish Association for Marine Science (1), Dundalk Institute of Technology (2), Ulster University (2) and Queen's University Belfast (2).

As reflected in Section 1.3.4, Specific Objective 1.2's Result Indicator and Target was to increase the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations from a baseline position of 22% in 2014 to 33% by 2023.<sup>27</sup>

The Evaluation Team notes that the number of SMEs in the eligible region greatly exceeds the number of businesses (1,408) that were anticipated to participate in the Co-Innovate Programme. As such, it would not have been possible for the Co-Innovate Programme to achieve the 11% uplift (featured in the target) in isolation. This was discussed with SEUPB and NISRA who advised that the approach adopted in setting specific Objective 1.2's Result Indicator was in line with guidance issued by the EU during March 2014 concerning monitoring and evaluation during the programme period 2014-2020.<sup>28</sup> The guidance document outlines the following advice:

- The intended *result* is the specific dimension of well-being and progress for people that motivates policy action, i.e. what is intended to be changed, with the contribution of the interventions designed.
- Once a result has been chosen it must be represented by appropriate measures. This can be done by identifying one or more result indicators. *Result indicators* are variables that provide information on some specific aspects of results that lend themselves to be measured.
- Different factors can drive the intended result towards or away from the desired change.
- *Outputs* are the direct products of programmes; they are intended to contribute to results;
- The values of result indicators, both for baselines and at later points in time, in some cases, can be obtained from national or regional statistics. In other cases, it might be necessary to carry out surveys or to use administrative data, such as the registry of enterprises or unemployment benefit recipient data.
- Concerning evaluation, the guidance notes that changes in the result indicator are due to the actions co-financed by the public intervention, for example by the Funds, as well as *other factors*. In other words, the difference between the situation before and after the public intervention does *not* equal the effect of public intervention:

**Change in result indicator = contribution of intervention + contribution of other factors**

As such, SEUPB and NISRA advised that the result indicator for Specific Objective 1.2 was not anticipated to measure the direct impacts of the projects supported and instead it was anticipated to measure changes in the characteristics of a given area due to programme interventions and/or other factors (i.e. external to the Interreg VA programme).

The Evaluation Team notes that c.100 SMEs engaged in research and innovation involving cross-border collaborations as a result of the Co-Innovate Programme. They were:

- The 66 enterprises that engage an innovation intern on a cross-border basis; and
- The 35 enterprises that participated in cross-border, transnational or interregional research projects.

Therefore, it is likely that the Co-Innovate Programme has made a modest contribution to the Result Indicator and Target to increase the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations from a baseline position of 22% in 2014 to 33% by 2023.

<sup>27</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>28</sup> Programming Period 2014-2020, Guidance Document on Monitoring and Evaluation of European Cohesion Policy, European Regional Development Fund (March 2014)

### 3.2.3 Summary

Table 3.6 provides a summary of the progress made towards Priority Axis 1: Research and Innovation's overarching Output Indicators.

<b>Table 3.6: 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	1,597	12%
No. of enterprises receiving grants	40	68	70%
No. of enterprises receiving non-financial support	1,428	1,595	12%
Years of PhD (or above) level research	514	648	26%
No. of enterprises cooperating with research institutions	60	251	318%
No. of enterprises participating in cross-border, transnational or interregional research projects	40	218	445%
No. of research institutions participating in cross-border, transnational or interregional research projects	10	34 <sup>29</sup>	240%
No. of enterprises receiving one-to-one innovation advice	469	447	-5%
No. of enterprises in receipt of an innovation capability development programme	94	97	3%
No. of enterprises engaging an innovation intern, on a cross-border basis	70	66	-6%

<sup>29</sup> This includes 15 unique research institutions, as follows UU (involved in 6 projects), QUB (5), DkIT (4), LyIT (3), UHI (3), SWC (2), IT Sligo (2), UoS (2), AFBI (1), NUIG (1), DCU (1), UCD (1), UoG (1), UWS (1) and Scottish Association for Marine Science (1).

## 4. CONCLUSIONS AND RECOMMENDATIONS

### 4.1 Introduction

This report has considered the effectiveness and impact of the investment made under the INTERREG VA Programme Investment Priority Axis 1 – Research and Innovation. This section of the report considers key conclusions and recommendations arising from the review of each of the eight projects supported.

It should be noted that this report represents the final in the series of three impact evaluation reports. As a consequence of the outworkings of the Covid-19 pandemic and resultant delays caused in the implementation of projects, two of the eight individual projects supported under Priority Axis 1 had yet to be fully completed at the time of this report (August 2022). However, for SEUPB's reporting requirements to the EU Commission, it was necessary to develop the final evaluation report at this time.

### 4.2 Conclusions

#### 4.2.1 Overarching Conclusion on Activity Supported

Launched in January 2016, the INTERREG VA Programme was one of over sixty funding programmes across the EU that had 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, aimed to promote greater levels of economic, social and territorial cohesion to create a more prosperous and sustainable cross-border region.

The INTERREG VA Programme had four key priority axes, which were selected to address identified weaknesses in the programme region's economy, as set out in the Co-operation Programme for the INTERREG VA Programme 2014-2020. One of those was Priority Axis 1: Research and Innovation. The Co-operation Programme identified that the key aim of Priority Axis 1: Research and Innovation was 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 was anticipated that this priority axis would 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).

The Priority Axis had two specific objectives:

- Firstly, to increase business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences (HLS) and Renewable Energy (Specific Objective 1.1); and
- Secondly, 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).

Ultimately, seven projects were funded under Specific Objective 1.1 of the R&I Priority Axis with a total anticipated project cost of c. €58m and one project - the Co-Innovate Programme – was funded under Specific Objective 1.2, and had a total anticipated cost of c. €20.7m.

At an overall level, the Evaluation Team's review of each of the seven support projects under Specific Objective 1.1 indicates that they have:

- Placed considerable investment in two key areas (i.e. Health & Life Sciences and Renewable Energy) that have wide-reaching strategic and social importance and offer considerable potential for the further development of high value-added products and processes, alongside key contributions to facilitating healthier populations and a greener environment. Consequently, the work of the projects has contributed to the shared policy agenda of the eligible region 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;
- Each of the project partnerships was comprised of academic institutions (and individual academics) and organisations of considerable standing and expertise in their area of focus. However, for many, it was their first time engaging either at all or to the extent made possible with the INTERREG VA funding on a cross-border cross-jurisdictional basis. On that basis, it is clear that the projects have successfully encouraged the creation of new, and supported the development of existing, cross-border R&D&I partnerships (including stakeholders from academic institutions, SMEs and Government agencies).
- As reflected through the Evaluation Team's consultations with members of individual project partnerships, the seven projects enabled the sharing of expertise and experience to an extent that the project partners consider would simply not have been possible without INTERREG VA funding, and thereby have contributed considerably to knowledge transfer and an overall increase in the level of research and innovation competence and activity across the programme area in a strategic way that is designed to contribute toward the development of a more competitive, high value-added economy.
- Importantly, for the economy of the eligible region, a key outworking of the seven projects has been a considerable increase in the number of PhD-level researchers who offer the potential to either continue to research in two key sectoral areas or to become employed in those industry sectors.

Furthermore, the Evaluation Team's review of the Co-innovate project which was the only project supported under Specific Objective 1.2, indicates that it has:

- Supported over 1,400 SMEs to overcome a range of barriers and to take the initial steps to enhance the level of innovation that they were engaged in, increase their 'innovation capacity' and for many to engage with a research institution for the first time and/or to engage collaboratively on a cross-border basis for the first time;
- Indeed, many of those businesses successfully progressed through the programme's support framework and successfully introduced new innovative products and processes, which should serve to help build a strong export-based economy in the eligible region.

On an overall basis, the Evaluation Team considers that it is evident that the projects supported under Priority Axis 1: Research and Innovation have contributed to its aim 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"*. They have also successfully helped 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).

#### 4.2.2 *The extent to which the Project Outputs have been achieved*

As reflected in Section 2.3, despite the onset of the COVID-19 pandemic, at an overall level, each of the output indicators that were established for Specific Objective 1.1 has been achieved and in most cases, exceeded by some considerable margin.

At an individual Specific Objective 1.1 project-level, at the time that the Evaluation Team consulted with the projects (i.e. April/May 2022), five projects<sup>30</sup> had achieved each of their output indicators, whilst the remaining two projects (the Bryden Centre and SPIRE 2) had achieved the majority of their output indicators. For those two projects, the project partnerships were confident that the remaining outputs would be achieved before the projects were completed (June and September 2022 respectively) except for the Bryden Centre's targets concerning the number of enterprises receiving grants (four versus a target of eight). The project noted that as a consequence of the pandemic-related lockdowns, businesses had been reluctant to engage with the Knowledge Exchange placements aspects of the project's activity, as it would have required having PhD students on-site at a time when their business operations were in flux.

Under Objective 1.2, the Co-Innovate project had achieved (and in many instances exceeded) seven (of 9) of the project output indicators at the time of consultation (April 2022). Of the two remaining targets, the Co-Innovate Partners are confident that the target number (N=469) of enterprises receiving one-to-one innovation advice (Strand 2) will be met by the end of the Programme (i.e. March 2023), however, they anticipate, as a consequence of the pandemic-related restrictions, that there will continue to be a small shortfall (of 4 projects) in the number of enterprises engaging an innovation intern on a cross-border basis target (linked to Strand 4).

#### 4.2.3 *The extent to which the Specific Objectives & Result Indicators have been achieved*

Specific Objective 1.1's Result Indicator and Target was to achieve 75 peer-reviewed journal and conference publications with cross-border authorship and with the potential to create economic impact in two target sectors (HLS and Renewable Energy) on a three-year rolling average basis across the years 2021, 2022 and 2023. At the time of the Evaluation Team's analysis (May/June 2022) it is not possible to determine whether this target will be met. Albeit it is noted that SEUPB has advised that in its view, the cumulative number (201, per Table 11.3) of cross-border publications reported by the seven projects over a 5 and a half year period (January 2017-May/June 2022) as having been generated (and notwithstanding that some of those publications may not ultimately contribute to the programme result indicator as a consequence that they may not have cross-border authorship and/or have the potential to create economic impact) suggest that the final target of 75 for the end of 2023 (or 225 across 2021, 2022 and 2023) "*is achievable, if far from certain*".

The Evaluation Team would concur with the "*far from certain*" sentiment suggested by SEUPB and recommend that SEUPB introduce robust monitoring for the final phases of the Programme to definitively ascertain the extent to which the project target was achieved.

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<sup>30</sup> NWCAM, Renewable Engine, ECME, BREATH and CPM.

The Evaluation Team notes that its consultations with the seven Specific Objective 1.1 projects during April/May 2022 indicated that they had achieved 201 peer-reviewed publications with cross-border authorship at that time (see Table 12.1). which is 36% lower than the combined projects' targets' (i.e. the targets featured in the projects' Letters of Offer).<sup>31</sup>

<b>Table 12.1: Specific Objective 1.1 - Overview of progress made towards the Letter of Offer targets relating to the number of peer-reviewed publications with cross-border authorship</b>			
<b>Project</b>	<b>Targets (per Letters of Offer)</b>	<b>Actual (as of April/May 2022)<sup>32</sup></b>	<b>% Achieved</b>
BREATH	33	50	152%
NWCAM	30	18	60%
ECME	81	49	60%
CPM	13	16	123%
Renewable Engine	10	9	90%
SPIRE2	78	39	50%
Bryden Centre	68	20	29%
<b>Total</b>	<b>313</b>	<b>201</b>	<b>64%</b>

In April/May 2022, two of the seven Specific Objective 1.1 projects had achieved their Letter of Offer targets relating to the number of peer-reviewed publications with cross-border authorship. However, of the five that had not, four did not consider that they would achieve the targets set in their LoO or indeed that there was scope for many more such publications to be derived from their projects (notwithstanding any lag that might be experienced between the time that research activity is undertaken, and research papers being developed and published). For that reason, the Evaluation Team considers that it is unlikely that the Programme Target will be achieved.

In addition, two Specific Objective 1.1 projects had targets relating to publications other than those with cross-border authorship. Of the two projects, at the time of consultation, BREATH was unable to provide an exact figure against its target of 15 Peer-Reviewed Publications with Inter-Regional Authorship but was confident that the target had been exceeded.

<b>Table 11.4: Specific Objective 1.1 - Overview of progress made towards the Letter of Offer targets relating to the number of 'other' publications</b>		
<b>Project</b>	<b>Letter of Offer Target</b>	<b>Actual Achievement</b>
BREATH	15 Peer-Reviewed Publications with Inter-Regional Authorship	Exceeded
CPM	30 'Other' Publications	56 - Exceeded

It is noted that private sector industry was intrinsically involved in each of the seven projects supported under Specific Objective 1.1. As such, the Evaluation Team considers that the projects supported have successfully contributed to increasing business and industry-relevant research and innovation capacity across the region within two target sectors; Health and Life Sciences (HLS) and Renewable Energy.

Specific Objective 1.2's Result Indicator and Target was to increase the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations from a baseline position of 22% in 2014 to 33% by 2023. The Evaluation Team notes that the number of SMEs in the eligible region greatly exceeds the number of businesses (1,408) that were anticipated to participate in the Co-Innovate Programme. As such, it would not have been possible for the Co-Innovate Programme to achieve the 11% uplift (featured in the target) in isolation. This was discussed with SEUPB and NISRA who advised that the approach adopted in setting specific Objective 1.2's Result Indicator was in line with guidance issued by the EU during March 2014 concerning monitoring and evaluation during the programme period 2014-2020, whereby the result indicator was not anticipated to measure the direct impacts of the projects supported. Instead, it was anticipated to measure changes in the characteristics of a given area due to programme interventions and/or other factors (i.e. external to the Interreg VA programme).

<sup>31</sup> Source: It is noted that the actual number of peer-reviewed publications with cross-border authorship produced by the projects will be subject to independent verification (commissioned by SEUPB).

<sup>32</sup> Source: Consultations with project leads.

The Evaluation Team notes that c.100 SMEs engaged in research and innovation involving cross-border collaborations as a result of the Co-Innovate Programme. They were:

- The 66 enterprises that engage an innovation intern on a cross-border basis; and
- The 35 enterprises that participated in cross-border, transnational or interregional research projects.

Therefore, it is likely that the Co-Innovate Programme has made a modest contribution to the Result Indicator and Target to increase the percentage of SMEs in the eligible region involved in research and innovation involving cross-border collaborations from a baseline position of 22% in 2014 to 33% by 2023.

In total, the Co-Innovate Programme supported over 1,400 businesses in the eligible region. On that basis, the Evaluation Team considers that the project successfully achieved Specific Objective 1.2 i.e. it served 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.

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

Each of the seven projects that received support under Specific Objective 1.1 advised that they encountered issues that impacted the delivery of their respective projects, most notably associated with the outworkings of the pandemic and its associated lockdowns. Examples of issues commonly cited by the projects' partners include:

- **Covid-19** – The Covid-19 pandemic impacted all projects, for example, the Covid-19 pandemic and the related restrictions on the movement of people meant that:
  - Various staff across the project partnership and/or the private sector businesses that they were working with started working remotely and/or had furloughed staff.
  - Projects lost access to laboratories across each of the academic partners, to testing and development sites (within the industry partners) and to patients, which had a substantial impact on project progress.
- **Brexit** - A further marketplace factor of considerable significance that occurred during the project period was the withdrawal of the United Kingdom (UK) from the European Union on 31 January 2020. Several of the projects' partners noted during consultation that the outworkings of Brexit resulted in the project facing difficulties, for example in securing materials;
- **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 projects. A commonly shared view amongst the Partners was 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 because several 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 Health and Life Sciences). This inadvertently created significant demand within the market for those students at the one time, resulting in a shortage of available students and, by association, delays in recruitment.

On the supply side, it was noted by several partners that there had been limited appetite from domestic applicants which was suggested might have resulted from several factors including the scale of the research bursary that was available to potential students, 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 demand and supply side factors, several partners indicated that they had to ultimately seek applications from potential international PhD students.

- **Staff mobility issues** – Related to the above, difficulties had been encountered concerning non-EU resident PhD students taking up research positions in the eligible region due to visa-related restrictions. At the time



of the first report, a number of the Projects' Partners expressed concern that such mobility issues might potentially be exacerbated following the UK's departure from the EU (i.e. following 'Brexit');

- **'Background' and 'foreground' IP issues impacting business recruitment and wider engagement in research projects** - Several of the projects' partners noted that they had faced difficulties encouraging business engagement on their respective projects due to concerns relating to IP. For some businesses, these concerns were 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 anticipated to be owned by the academic institutions;
- **EU/SEUPB and University procurement requirements hindering the progression of research** - A number of the project partners considered that their project's progression 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)** - Some project partners indicated that there had been several changes to the profile of their project's research team during the initial delivery period which had, on occasions slowed project progress;
- **Changes to industrial partners** - A small number of project partners indicated that their originally anticipated industry partners had to be replaced due to a variety of business-specific circumstances (e.g. businesses going into administration, businesses having more pressing priorities); and
- **The claims process adversely impacted business engagement** - A small number of project partners noted that the administration and bureaucracy associated with the claims process had resulted in businesses leaving their project and other businesses not being willing to receive the financial support that was potentially available through the projects.

Encouraging, however, whilst the issues encountered no doubt caused operational complications for projects and combined to slow progress towards elements of the output indicators (e.g. number of PhD years delivered), each of the projects advised that, in general, none of the issues encountered ultimately had an overlay adverse impact on the longer-term achievement of the Project Output Indicators. Concerning this, the projects spoke positively about the role that SEUPB's staff played and the flexibility shown in allowing budgets to be amended and/or project timescales to be extended to account for the issues faced.

In terms of the Co-Innovate Programme (supported under Specific Objective 1.2), the project partners similarly advised that they encountered many similar issues to those noted above, such as the impact of the pandemic-related restrictions on travel that hindered efforts to encourage cross-border collaboration; the uncertainty caused by Brexit amongst businesses that had influenced businesses' perceptions of risk and willingness to invest in innovation activities. Similarly, though, the Co-Innovate Partners engaged closely with SEUPB to agree on new project timelines and subsequently achieved all almost of their anticipated outputs.

#### 4.2.5 *Key areas of best practice and learning*

Encouragingly, the projects partners in receipt of support under Specific Objective 1.1, cited several 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 the 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 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);
- The utilisation of industry facilities (e.g. NIACE) to support project delivery (NWCAM);
- PhD students being allocated a supervisor in another area within the eligible region to support project progress and their development (BREATH, Bryden Centre, Renewable Engine);
- 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, NWCAM, SPIRE 2);
- 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 concerning INTERREG and how to approach particular SEUPB requirements. According to the project partners, this allows for a 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.

Concerning the Co-Innovate Programme (supported under Specific Objective 1.2), the project partners note that whilst, in hindsight they consider that the Programme's structure and content may be too complex for some SMEs (particularly at Strand 2), they are of the view that the multifaceted 'umbrella' of support delivered through the Co-Innovate Programme was unique and was ultimately successful in increasing SMEs' knowledge and understanding of innovation, enhancing their capacity to engage in collaborative projects and ultimately de-risking their initial steps into undertaking a cross-border/transnational collaborative by contributing towards its financial costs.

Linked to this, it is considered that the Co-Innovate Programme's use of a 'funnel' model approach and use of both group workshops and bespoke one-to-one support served to 'handhold' businesses with limited 'innovation experience' through an unfamiliar environment and helped them to reduce the level of risk associated with the introduction of new products and processes.

#### 4.2.6 *New ways of working/partnerships/relationships created*

Across the eight projects, a myriad of new cross-border and cross-jurisdictional relationships have been developed and which are reflected, in part, in the earlier sections of this report. Most positively, each of the project partners has indicated that they hope to continue to work in partnership and share knowledge and good practice with both their project partners and stakeholders engaged with.

#### 4.2.7 Synergies between projects

Our discussions with the Projects Partners indicate that several synergies have emerged between the individual projects funded under Specific Objective 1.1, for example:

- NWCAM and SPIRE 2 collaborated to offer multi-disciplinary working/training sessions (on commercialisation and career development for example) to their PhD students to offer a cross-over of INTERREG VA thematic areas and open the PhD researchers to new insights into new research disciplines that they would not have otherwise had exposure to.
- Several PhD students from the Renewable Engine project attended the Bryden Centre Summer School 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;
- SPIRE 2, ECME and CPM management teams at Ulster work closely with staff across common Doctoral College activities including generic training and development of PhDs and delivering on the Marie Curie principles for research;
- Given the synergies between the NWCAM, CPM and ECME projects the Project Managers coordinated project events to avoid duplication in the marketplace;
- A number of the projects engaged in the informal 'Project Managers' Group' which facilitated open discussion concerning INTERREG and how to approach particular SEUPB requirements. According to the project partners, this allowed for a cross-over of learning and insights that have been gained by each project manager.

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

#### 4.2.8 Impact on Business and Industry

It is the view of the Evaluation Team that the full impact of the projects, funded under Specific Objective 1, on business and industry will only become fully measurable in the medium-to-longer term given 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 businesses and the 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, the technology's starting point on the TRL scale and the associated degree of novelty.

Notwithstanding this, the projects' partners noted several positive activities, outputs and outcomes 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, and development of new and/or adapted products and processes. For example:

- **Knowledge Transfer/Exchange** - The projects provided access to expertise and provided opportunities for learning and knowledge transfer between the academic institutions and industrial partners. For example, on CPM the Voscuris team were able to use the registry questionnaire as a use case for gaining user feedback and further development of mobile data collection tools, with the potential to replace the RedCap solution if suitable. The insight gained from this collaboration informed the later development of the Voscuris Covid Note app, a tool for enabling patients experiencing post-covid syndrome to record their symptoms.
- **Development of industrial competencies** - For example, on the NWCAM project NuPrint's competencies have been developed as a result of undertaking a pilot project with Altnagelvin hospital-based around smart labelling for secure patient information transfer;

- **Development of healthcare products** – For example:
  - On NWCAM, Armstrong Medical launched its AquaVENT® VT breathing circuit just before the WHO declared the global coronavirus pandemic. AquaVENT® VT benefits from R&D generated through the NWCAM collaboration with UU which developed a novel method of production of tubing used to create a ‘breathable’ expiratory limb. The research enabled Armstrong Medical to significantly reduce the risks associated with the pooling of condensed water vapour in the tubing. The innovative step also minimised the interference by moisture on sensitive electronics on ventilators, relieving hospital caregivers of some aspects of the continuous monitoring of the equipment in use.

This technology has now been incorporated into several critical care ventilator circuits for adult, paediatric and neonatal patients who require assistance with their breathing. By expanding the range of breathing circuits and electromedical devices Armstrong Medical supplies to hospital intensive care units, they were able to respond rapidly to global demand for these critical respiratory devices as caregivers around the globe scrambled to secure the means by which to treat COVID-19 patients.
  - ProAxis Ltd used its ECME funding to develop an assay for the detection of the biomarker Cathepsin in COVID-19 patients.
- **Development of new products** – For example, the Renewable Engine project’s development grants supported five businesses to produce 5 new product prototypes, and one of the SPIRE 2 funded partners, Arbarr, in conjunction with DKIT, developed new products concerning providing battery and heat storage to an off-grid island.
- **Development of new processing models** – For example, on NWCAM, IT Sligo used AI to develop a predictive production model to save energy for GSK. GSK introduced the model in its Irvine plant and it resulted in a reduction in energy costs of 5-10%. GSK plan to roll the model out into all its UK plants, with the potential to roll out across Europe.
- **Identification of new clinical targets** – For example, the BREATH project identified a potential new clinical target as a result of the collaboration with Almac Discovery.
- **Supported industry to secure additional investment** – For example, the Bryden Centre project supported industry to secure follow-on funding of c.£1.8m (as of April 2022), and the ECME project supported 42 Genetics Ltd to secure further research funding totalling £700k from Innovate UK.

#### 4.2.9 Contribution of the Priority Axis to Policy Objectives

The Evaluation Team is of the view that the eight projects funded under the Priority Axis 1: Research & Innovation have successfully contributed to a wide variety of policy objectives and in particular those relating to the EU Cohesion Policy and EU 2020 objectives. Cohesion Policy is the EU’s main investment policy which targets all regions and cities in the European Union to support job creation, business competitiveness, economic growth, sustainable development, and improve citizens’ quality of life.

In line with the Cohesion Policy’s thematic objectives, across the eight projects, the activities supported have served to:

1. Strengthen research, technological development and innovation;
2. Enhance the competitiveness of SMEs
3. Support the shift towards a low-carbon economy;
4. Promote climate change adaption, risk prevention and management;
5. Preserve and protect the environment and promote resource efficiency;
6. Promote sustainable and quality employment and support labour mobility;
7. Invest in education, training and lifelong learning.

In addition, in line with EU2020 Objectives, the projects supported have contributed to the following priorities:

- **Smart growth:** developing an economy based on knowledge and innovation.
- **Sustainable growth:** promoting a more resource-efficient, greener and more competitive economy.

#### 4.2.10 *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. Health and Life 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.

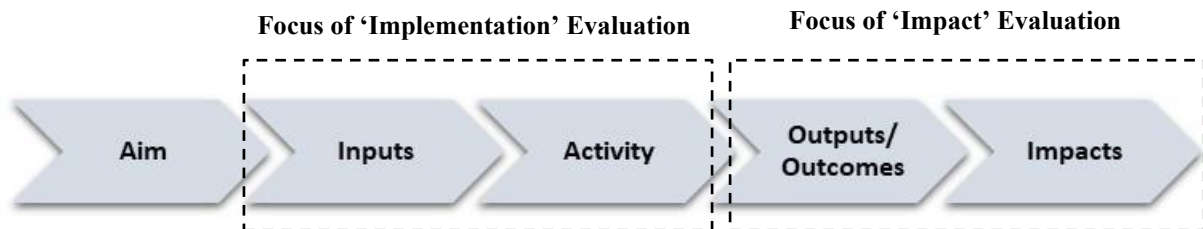
### 4.3 **Recommendations**

To help inform similar programmes of activity going forward, the Evaluation Team makes the following recommendations;

1. Given the importance of Specific Objective 1.1's Result Indicator and Target to the overall Investment Priority Axis 1 – Research and Innovation, it will be of crucial importance that SEUPB introduces robust monitoring for the final phases of the Programme to definitively ascertain the extent to which the project target was achieved.
2. By way of aiding post-project evaluation and potentially supporting the programme's ability to measure 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.
3. Linked to recommendation 1, before a project receives a Letter of Offer SEUPB should ensure that robust challenge is given to the assessment of an individual project's potential contribution to overarching targets indicators.
4. By way of aiding ongoing Evaluation, the Project Partners should be encouraged to review their progress reporting and project-level post-project evaluation templates 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.

5. The ‘logic chain’ to evaluation illustrates the intrinsic linkages between an intervention’s aims, inputs, activities, outputs and outcomes (as depicted below). However, the Evaluation Team understands that SEUPB has commissioned two separate evaluations – an ‘Implementation’ Evaluation and an ‘Impact’ Evaluation - which focus on assessing the progress made by the Priority (and projects supported therein) at different stages of the logic chain.

**Figure 4.1: 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.

6. Most projects considered that aspects of the INTERREG VA programme were administration intensive and on occasion, the level of work needed was not commensurate with the value offered to the project. Concerning such aspects of the programme, the following is recommended:
- Where possible, simplify both the procurement and claims processes used and ensure that the same processes are not overly prohibitive for SMEs and inadvertently act as a deterrent to their participation;
  - If this is not possible, offer the projects and programme participations greater level of support to navigate and understand the processes used (including the use of eMS);
  - Seek to streamline SEUPB’s claims and verification processes so that projects are not placed under undue cashflow pressures;
  - Simplify the project monitoring requirements and ensure that monitoring is focused on key indicators.