



A2.3, O3: Results of ECIU University metrics pilot



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Beneficiaries

- Aalborg University, Denmark
- Dublin City University, Ireland
- Kaunas University of Technology, Lithuania
- Linköping University, Sweden
- Tampere University, Finland
- Hamburg University of Technology, Germany
- University of Aveiro, Portugal
- Autonomous University of Barcelona, Spain
- University of Stavanger, Norway
- University of Trento, Italy
- University of Twente, The Netherlands
- Institut National des Sciences Appliquées, France

Abstract

This deliverable examines the feasibility of piloting recommended metrics previously identified through a consultation process with the ECIU research community. The ability of institutional research offices to report and therefore implement the proposed metrics is assessed and data collection methods using common databases are explored to determine their suitability and limitations. This report identifies a subset of indicators which can be addressed through this 'proof of principle' mechanism and provides the baseline data for benchmarking the impact of ECIU University initiatives on the collaborative research activity of the network. The roll-out of the remaining identified ECIU-specific alternative metrics not captured in this report will be explored further in a later deliverable.

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Abbreviations and acronyms

| | |
|-------|---|
| AAU | Aalborg Universitet, Denmark |
| ALLEA | All European Academies |
| CRIS | Current Research Information System |
| CV | Curriculum Vitae |
| DCU | Dublin City University, Ireland |
| DMP | Data Management Plan |
| DOI | Digital Object Identifier |
| DORA | Declaration on Research Assessment |
| E+ | Erasmus+ |
| ECR | Early Career Researcher |
| EEA | European Education Area |
| ERA | European Research Area |
| ECIU | European Consortium of Innovative Universities |
| EU | European Union |
| H2020 | Horizon 2020 |
| HEU | Horizon Europe |
| HRS4R | Human Resources Strategy for Researchers |
| INSA | Institut National des Sciences Appliquées, France |
| JIF | Journal Impact Factor |
| KA2 | Key Action 2 |
| KPI | Key Performance Indicator |
| KTU | Kauno Technologijos Universitetas, Lithuania |
| LiU | Linköpings Universitet, Sweden |
| MS | Member States |
| NORF | National Open Research Forum (Ireland) |
| NWO | Nederlandse Organisatie voor Wetenschappelijk Onderzoek |
| OA | Open Access |
| ORCID | Open Researcher and Contributor Identity |
| PI | Principal investigator |
| R&I | Research & Innovation |
| RPO | Research Performing Organisation |
| SDG | Sustainable Development Goal |
| SEPO | Strategic European Projects Office |

The ECIU University

| | |
|----------|---|
| SMART-ER | ECIU University Research Institute for Smart European Regions |
| TAU | Tampereen Yliopisto, Finland |
| TecM | Tecnológico de Monterrey |
| TORA | DCU Research Costing Management Tool |
| TUHH | Technische Universität Hamburg, Germany |
| UA | Universidade de Aveiro, Portugal |
| UAB | Universitat Autònoma de Barcelona, Spain |
| UiS | Universitetet i Stavanger, Norway |
| UNITN | Università di Trento, Italy |
| UN SDG | United Nations Sustainable Development Goal |
| UT | Universiteit Twente, Netherlands |
| VPR | Vice-Presidents for Research |
| VRI | Virtual Research Institute |
| WOS | Web of Science |

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1. Introduction

In line with the strategic objectives of ECIU University, a number of recommended metrics were previously agreed in consultation with the ECIU research community to assess the performance and success of ECIU – in developing deeper cooperation as a Europe University alliance since 2019 – in supporting research collaborations that are open, engaged and relevant to societal challenges (A2.3 O2 deliverable). Critically, the use of metrics in this context aims to **demonstrate the added value of ECIU University** activities to researchers, partner institutions and external stakeholders, and are **not intended to appraise performance at an individual researcher or indeed at institutional level**.

Currently, there is growing momentum in Europe towards a reform in research assessment practices to move beyond the traditional and narrow metrics that still define a ‘publish or perish’ academic culture, and instead recognise the quality and impact of research in terms of a diverse range of outputs and activities. Recently, the European Commission initiated the voluntary signing of an agreement by research funders, research performing organisations (RPOs) and assessment agencies to move towards a common understanding and a set of shared principles within a European framework¹. European University alliances have also been invited to join this ‘Coalition of the willing’ as potential testbeds for new evaluation processes. ECIU University has therefore joined as a member of the coalition and is prepared to readily share our learnings, offer our collective expertise and utilise the network to pilot new or revised practices going forward. However, within the current metrics pilot it has to be recognised that **the availability, collection, and analyses of research-related metrics remains heavily within the bounds of the current system**. This report will therefore detail what ECIU-specific metrics are a) possible and b) practical to measure within reporting systems and online databases at the present time.

A further exploration of the policy and political developments in research assessment reform will be addressed in the upcoming deliverable A2.3 O4 ‘Roadmap for further alternative metrics roll-out’.

2. Objective

The objective of this deliverable is to explore the feasibility of reporting the alternative ECIU metrics designed to support researcher engagement in challenge-based research, citizen science, open science and high quality collaborative activities, in particular relating to Sustainable Development Goals (SDGs). Based on the findings from earlier A2.3 reports, evaluation at ECIU-level serves to demonstrate the effectiveness of ECIU initiatives over time, allowing a detailed overview of cooperation across the network and providing evidence to identify and exploit strengths and opportunities and highlight areas for improvement. Within this initial pilot, we will determine the baseline data from which future monitoring can be benchmarked.

¹

https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_era-policy-agenda-2021.pdf

3. Overview of ECIU metrics pilot

3.1 Consultation

To inform the approach to piloting the recommended ECIU metrics, their implementation within current institutional reporting systems first needed to be assessed. This process had been initiated in the A2.3 O2 deliverable with a case study presented for DCU, however determining the overall feasibility of reporting required consultation across all ECIU partners. Thus, in conjunction with the development of the SMART-ER key performance indicators, an online questionnaire was developed to collect feedback from research information system experts on the ability and capacity to collect ECIU metrics data within their institutions.

Survey respondents were given the opportunity to answer *Yes*, *No* or *Unsure* on their institution's ability to report each indicator which had previously been identified in deliverable A2.3 O2. The survey results for ECIU WP2-related metrics are shown in Figure 1. For the majority of indicators less than 40% of institutions responded favourably on their current ability to report on the proposed metrics, with external funding awarded being the only metric shown to be suitable for reporting in most institutions at present.

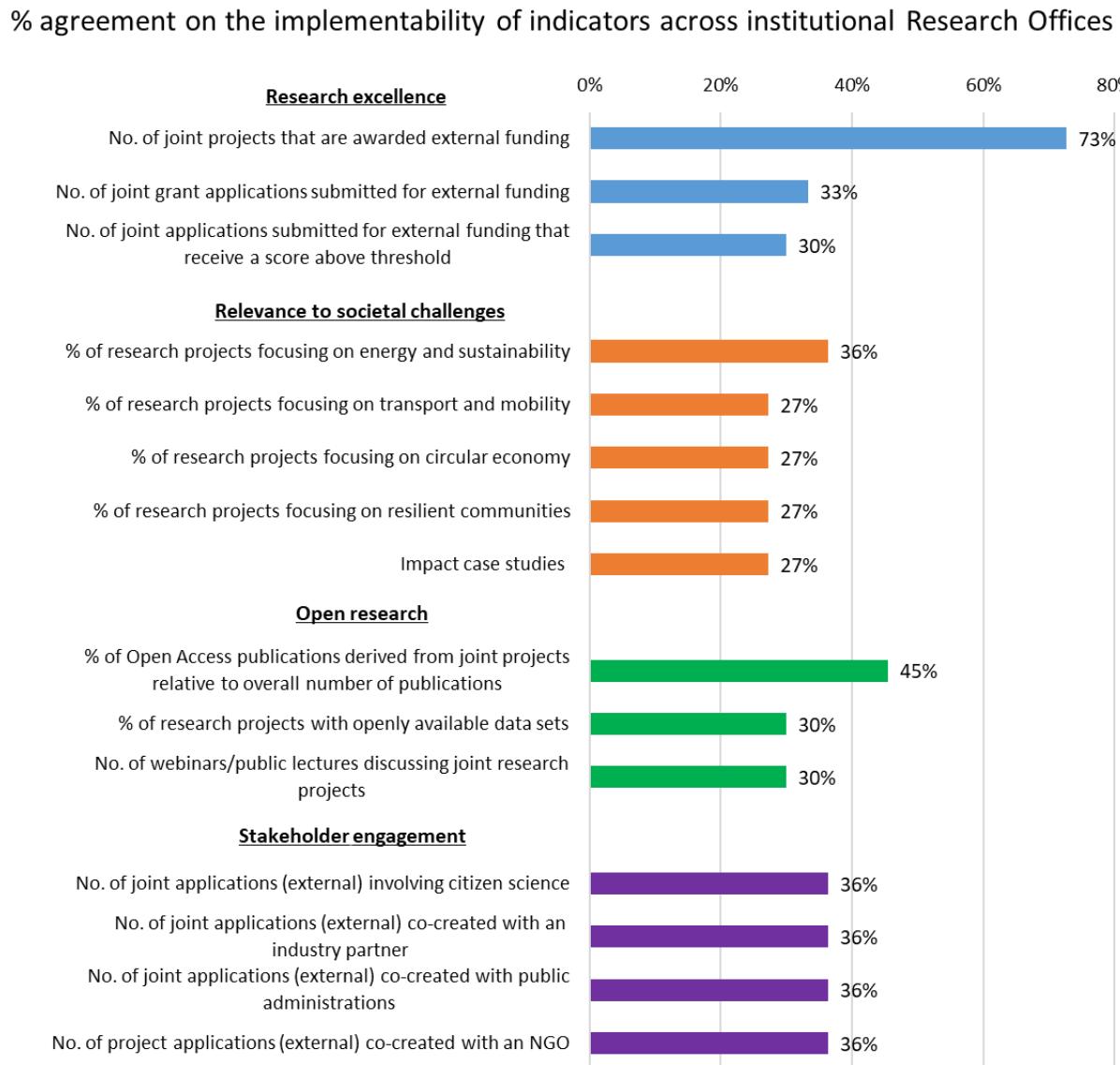


Figure 1 % reportability of ECIU-related research metrics within current institutional systems.

Survey respondents were also given the opportunity to provide open feedback relating to each metric, with the full summary of responses available in Appendix I. This provided further insight into the capabilities and requirements of institutions, with system updates and investment needed in many cases to record and monitor the proposed indicators. For those who suggested reporting was possible at present, significant time commitment would be necessary to complete a substantial manual review of data, even for the most traditional indicators on funding awarded and publications. This would be followed by additional steps requiring the collation of all individual institutional reports and cross checking to compile a master list for ECIU University related activities. As such, **a full roll-out of ECIU research metrics requiring significant changes in institutional processes, resource and time dedication is not seen to be realistic during the pilot phase.**

3.2 Approach and limitations

Given the variability in reporting ability across partners, a decision was made to determine the scope for data collection at a central level, removing the onus on research office reporting while still

allowing integration of the data both from an institutional perspective and the wider ECIU level. This would entail the use of web-based solutions and visualisation tools to capture available data on the collaborative activities of the alliance. However, **this approach relies on the analysis of common databases mainly capturing data on awarded projects and traditional research outputs e.g. publications.**

The tools used within this report are:

- **European funding databases:**
 - o **Research & innovation:** The Horizon Dashboard (freely accessible) is an interactive reporting platform that allows users to view, visualise and filter Horizon 2020 data and all Horizon Europe data currently available².
 - o **Education & training:** The Erasmus+ Projects platform (freely accessible) offers a detailed search tool for ongoing and completed projects funded under Erasmus+ programme³.
- **SciVal***: A powerful bibliometric-based research assessment tool which uses the publication database Scopus as a data source. It allows the visualisation of research performance, benchmarking and collaboration across researchers, institutions, regions and countries. SciVal considers outputs from journals, conference proceedings, trade publications, book series, and stand-alone books for inclusion⁴. *SciVal requires an Elsevier.com account or institutional access for its use. Depending on the subscription different modules and functionalities can be made available to users.

Data collection protocols for each database to extract desired information relating to ECIU metrics are provided in Appendix II.

A number of limitations were also encountered with the chosen approach:

1. The full scope of joint international and national awards and the diversity of all project-related outputs are not captured within this initial pilot and thus results reported for the purpose of this deliverable can be considered sub-metrics within broader ECIU indicators.
2. Despite the use of publicly available databases to alleviate burdensome reporting within institutions, a substantial level of manual review still remains in the extraction of ECIU-relevant data and remains subject to variation and the potential for human error.
3. Most projects or outputs presented in this report cannot be attributed to ECIU University directly (given the relatively short lifetime to date), but rather serve to showcase recent levels of collaboration across the network. For the purpose of this pilot we will therefore account for any 'joint' project or output involving two or more ECIU partners and the relevant metrics have been rephrased accordingly.
4. When setting data cut-off points, November 2019 - the start date for the ECIU University Erasmus+ project - is used to illustrate the number of projects awarded or outputs produced since the establishment of ECIU as a European University alliance. Specifically, this means that any awarded projects with call deadlines post-Nov 2019, or outputs published from Nov 2019 onwards are considered in the analysis of data for determining ECIU metrics. In reality,

² [Funding & tenders \(europa.eu\)](https://funding-and-tenders.ec.europa.eu/)

³ [Projects | Erasmus+ \(europa.eu\)](https://projects.ec.europa.eu/)

⁴ <https://scival.com/>

the preparation of these applications or publications in many instances will have significantly preceded this timeframe.

5. A subset of proposed ECIU metrics cannot be addressed through the tools selected for the pilot. The options and feasibility of their roll-out will therefore be considered later in deliverable A2.3 O4.

The phrasing of a number of metrics have been adjusted based on the feedback from research offices, resulting from the above limitations, and the features and functionalities of the tools used for data collection.

Overall, **this report mainly serves to highlight the available baseline data on pre-existing collaborations (before and since Nov 2019) across ECIU partners** and from which future benchmarking can occur. Establishing an evidence base for the current levels of activity will allow for tracking of the impact of ECIU University over time, with meaningful comparisons envisioned within the start-up phase of ECIU University development (2023 – 2025).

The summary of available results is given in Section 3.3 with deeper analysis of joint projects and publications also provided in Sections 4 & 5.

3.3 Summary of results

| | Recommended ECIU metric (A2.3 O2) | Adjusted metric for pilot phase (A2.3 O3) | Results (Nov 2019 – July 2022) |
|---|--|--|---|
| 1 | Number of awarded ECIU University research projects across the Alliance | Number of joint projects with two or more ECIU partners awarded European funding | H2020/HEU: 15 Erasmus+ KA2: 11 |
| 2 | % of awarded ECIU University research projects in each institution (as compared to overall number of externally funded research projects) | % of joint EU-funded projects with two or more ECIU partners in each institution (as compared to overall number of EU-funded projects) | H2020/HEU: 6 – 36% (Median 11%) Erasmus+ KA2: 0 – 38% (Median 11%) |
| 3 | Number of ECIU University research projects submitted for external funding which receive a score above threshold | | |
| 4 | % of outputs related to UN SDGs deriving from ECIU University research projects (as opposed to non-SDG focus) | % of joint publications related to UN SDGs with two or more ECIU partners (as opposed to non-SDG focus) | 33% |
| 5 | % of awarded ECIU University funding applications focusing on UN SDGs | % of joint EU-funded projects focusing on ECIU SDG 11 thematic areas | H2020/HEU: 40% Erasmus+ KA2: 36% |
| 6 | Impact case studies for ECIU University research projects related to relevant UN SDGs | | |
| 7 | % of Open Access publications derived from ECIU University projects relative to overall number of publications, including Diamond, Gold, and Green Access routes | % of Open Access publications relative to overall number of ECIU joint publications, including Diamond, Gold, and Green Access routes | 70% |

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|----|---|--|---|
| 8 | % of ECIU University research projects with openly available data sets (as compared to overall number of ECIU University research projects) | | |
| 9 | Number of webinars and public lectures discussing ECIU University research projects | | |
| 10 | Impact case studies measuring the degree and impact of researchers' engagement with non-academic stakeholders (e.g. students, citizens, local communities, industrial partners) via dissemination | | |
| 11 | Number of industry partners involved in ECIU University research projects | % joint EU-funded projects with external stakeholder involvement | H2020/HEU: Industry – 87%; Public body – 40% Erasmus+ KA2: SME – 11%; NGO – 11%; Other societal partner – 9% |
| 12 | Number of challenge-based events organised by researchers (education, research, innovation) | | |
| 13 | % of awarded ECIU University research funding applications involving citizen science | % of joint EU-funded projects involving citizen science | H2020/HEU: 20% |
| 14 | ECIU University to send an annual survey to researchers involved in ECIU University research projects (with questions related to age group, gender, career stage, type of contracts) | | |

Table 1 Summary of ECIU metrics addressed during the pilot phase.

4. Joint projects with ECIU partners

In line with the approach outlined in Section 3 above, the initial piloting of ECIU metrics at a central level is limited to the analysis of **joint European projects** across the network. While there are numerous EU funding programmes that support research and innovation projects⁵, the Horizon 2020/Horizon Europe framework programme will be exclusively considered for the metrics pilot as the key R&I funding instrument. To capture a broader range of externally funded awards across ECIU, educational projects within the Erasmus+ programme were also included in the pilot. Determining the number of joint awards supported by other international agencies (such as Wellcome Trust, UKRI, NIH) or national funding bodies would require extensive search and review by individual research offices which was not feasible at this stage.

The online Horizon and Erasmus+ platforms offer different user features and thus individual data collection protocols are required (Appendix II). Unlike the Horizon Dashboard, the Erasmus+ platform provides more limited interactive functionalities and the identification of collaborative projects between two or more ECIU institutions requires a more extensive manual review and extraction in Excel. As such, to demonstrate proof of principle within the pilot, Erasmus+ Key Action 2 'Cooperation among organisations and institutions' was selected as the test case for evaluation based on its key aims to support innovative practices in line with ECIU priorities and also the instrument within which the European University alliances are funded⁶.

Although chosen as an ECIU metric (Table 1, #3), it should be noted that unsuccessful funding applications cannot be captured through the mechanisms chosen for the pilot phase. The Horizon Dashboard provides aggregated data on evaluated proposals down to the regional level but further details on institutional statistics are not publicly available. Furthermore, sharing review scores is often at the discretion of the individual applicants, and thus this metric will likely be limited only to specific ECIU-led proposals going forward.

4.1 Total projects overview (2014-2022)

To build a more comprehensive picture of the collaborative landscape of the network as a whole, all joint projects between ECIU partners were first examined over the last full programming period (2014 – 2020 for both H2020 and Erasmus+) and up to the current date of the new Horizon Europe and Erasmus+ frameworks (July 2022).

The total number of Horizon projects (Figure 2) and Erasmus+ KA2 projects (Figure 3) each ECIU partner university shares with the other member institutions is shown below. In addition, the proportion of joint projects in comparison to the total number of awards for each partner is provided in Table 2, with ECIU partner involvement ranging from 8 – 29% (Median = 11%) across H2020/HEU awards and 7 - 44% (Median = 15%) for Erasmus+ KA2.

⁵ https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls_en

⁶ <https://erasmus-plus.ec.europa.eu/opportunities/opportunities-for-organisations/cooperation-among-organisations-and-institutions>

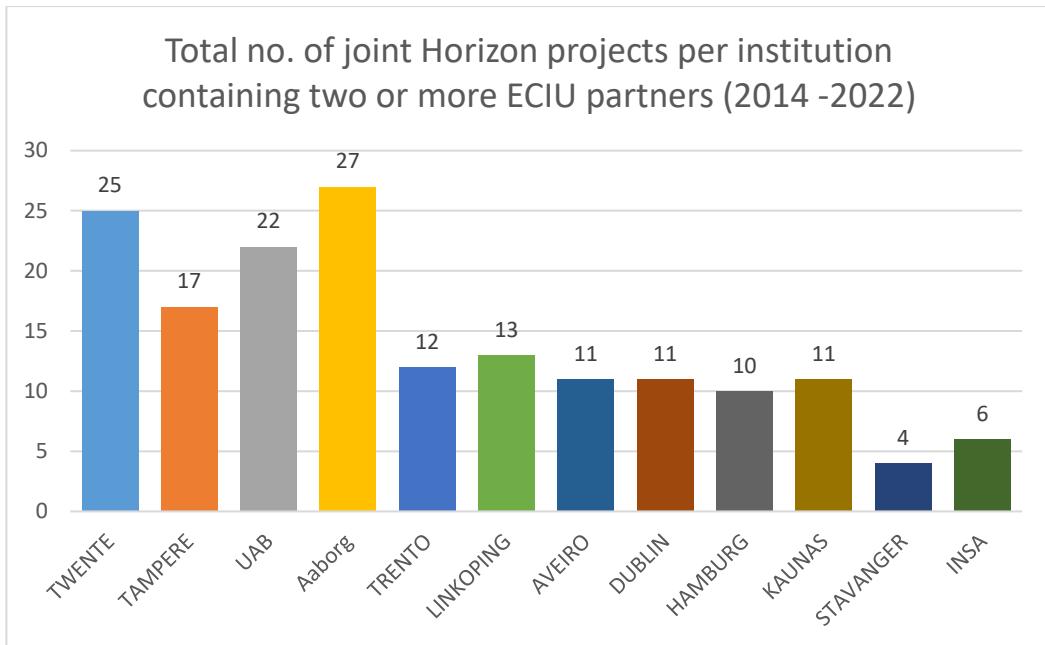


Figure 2 No. of joint H2020/HEU projects awarded from 2014 -July 2022 for each ECIU partner institution

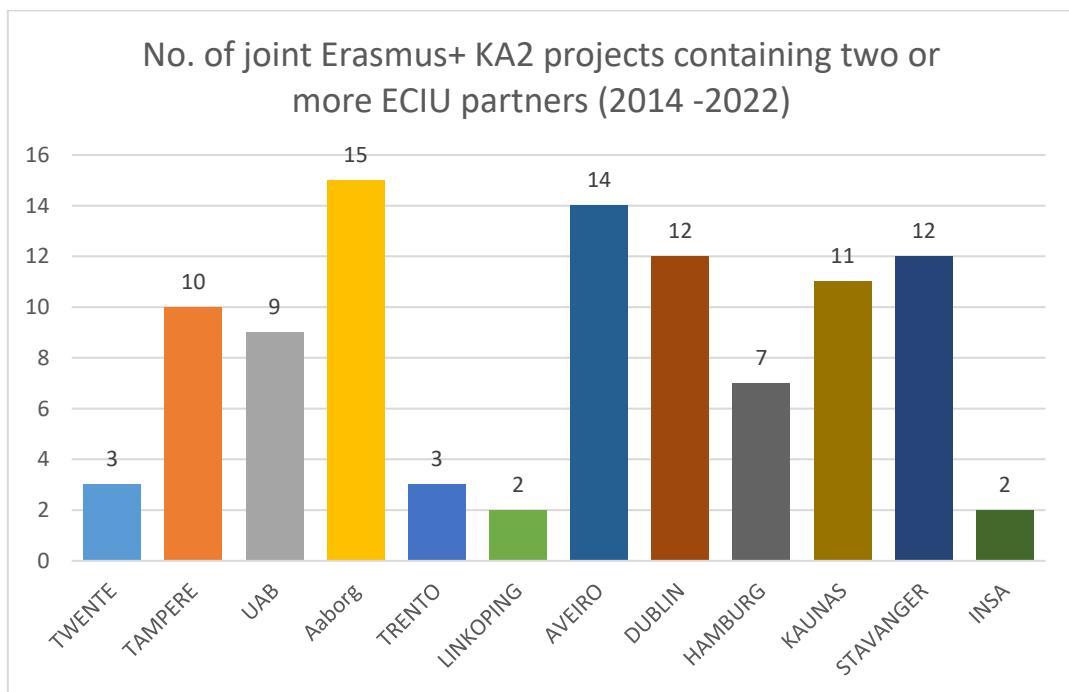


Figure 3 No. of joint Erasmus+ KA2 projects awarded from 2014 – July 2022 for each ECIU partner institution

| | No. of joint Horizon projects containing two or more ECIU partners (2014 -2022) | Total no. of Horizon projects per institution (2014 - 2022) | % ECIU partner collaboration (2014 - 2022) | No. of joint Erasmus KA2 projects containing two or more ECIU partners (2014 -2022) | Total no. of Erasmus KA2 projects per institution (2014 - 2022) | % ECIU partner collaboration (2014- 2022) |
|------------------|---|---|---|---|---|---|
| TWENTE | 25 | 211 | 12% | 3 | 34 | 9% |
| TAMPERE | 17 | 188 | 9% | 10 | 78 | 13% |
| UAB | 22 | 200 | 11% | 9 | 87 | 10% |
| AALBORG | 27 | 191 | 14% | 15 | 78 | 19% |
| TRENTO | 12 | 149 | 8% | 3 | 21 | 14% |
| LINKOPING | 13 | 121 | 11% | 2 | 29 | 7% |
| AVEIRO | 11 | 92 | 12% | 14 | 96 | 15% |
| DUBLIN | 11 | 91 | 12% | 12 | 80 | 15% |
| HAMBURG | 10 | 34 | 29% | 7 | 16 | 44% |
| KAUNAS | 11 | 48 | 23% | 11 | 72 | 15% |
| STAVANGER | 4 | 26 | 15% | 12 | 36 | 33% |
| INSA | 6 | 32 | 19% | 2 | 6 | 33% |

Table 2 Comparison of joint EU-funded projects with ECIU partners vs total number of EU-funded projects per institution 2014 – July 2022

Given the same project will be reflected more than once when analysing institutional data, the removal of duplicates gives a total number of **75 joint H2020/HEU projects and 42 joint Erasmus+ KA2 projects awarded across the alliance since 2014**. The full project lists are available in Appendices III & IV.

The number of awarded projects per call year is shown in Figures 4 & 5. The decrease in research projects awarded in 2021 can likely be attributed to the closing out of the H2020 framework. For Erasmus+, a significant rise in the number of projects is seen at the end of the 2014 – 2020 programme. Further analysis of work programmes is needed before any conclusions can be made regarding whether the increase in awards seen in 2019/2020 can be attributed directly to ECIU University. The ECIU University project itself is included in the 2019 data.

Within each figure blue bars represent the previous H2020 and Erasmus+ programming period; green bars represent projects awarded in the new HEU/Erasmus+ programmes to date.

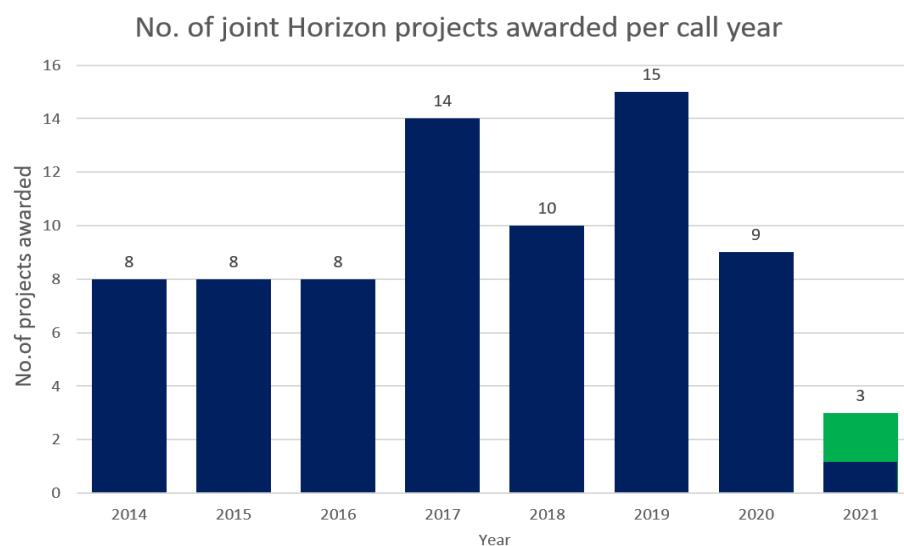


Figure 4 Total no of joint H2020/HEU projects awarded per call year across the alliance.

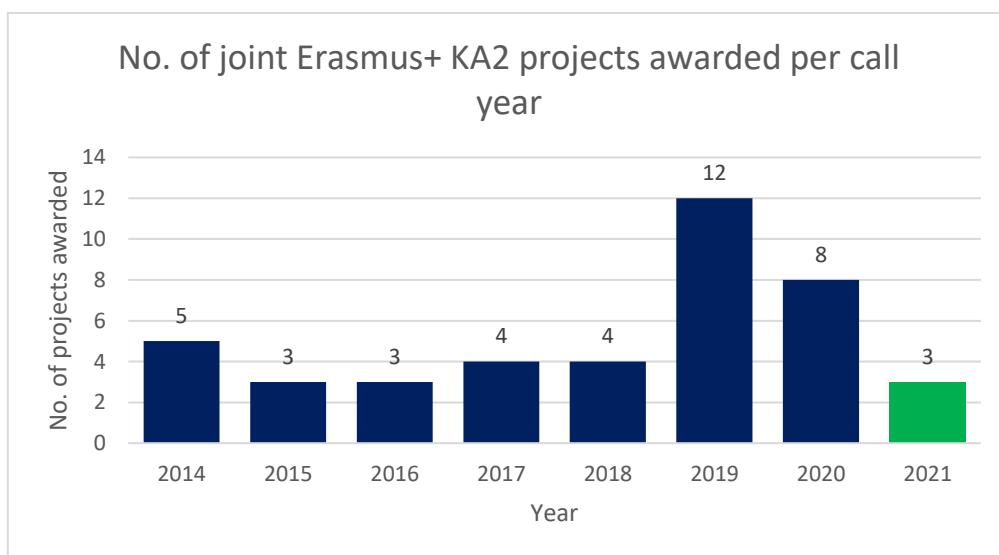


Figure 5 Total no. of joint Erasmus+ KA2 projects awarded per call year across the alliance.

4.2 Joint projects awarded since ECIU University (Nov 2019)

Of particular interest collectively and for each partner institution is how the alliance can further promote collaboration among member institutions following the initiation of the ECIU University pilot in November 2019.

Based on call deadlines post Nov-19, the **total number of successful joint Horizon applications is 15 (13 H2020 + 2 HEU) and Erasmus+ KA2 is 11** up to current date (July 2022). The number of projects awarded per institution is presented in Figures 6 & 7. Table 3 shows the number of joint projects awarded versus the total number of awards per institution from the period Nov 2019 – July 2022 (based on call deadlines). The proportion of projects with ECIU partner involvement ranges from 6 – 36% (Median = 11%) across H2020/HEU awards and 0 - 38% (Median = 11%) for Erasmus+ KA2.

As noted in the limitations outlined in Section 3, these awards do not stem from ECIU University activity directly but instead the data offers a **useful insight into active collaborations within the alliance at present**. Going forward, ECIU-linked versus unassociated awards will be distinguished following the establishment of the ECIU Strategic European Projects Office (SEPO) in February 2022 which will provide greater oversight and tracking of top-down ECIU R&I and educational projects. Furthermore, bottoms-up collaborations among the research community are now supported by the SMART-ER Seed Programme and Citizen Science pilots and any external funding arising from these initiatives will also be monitored.

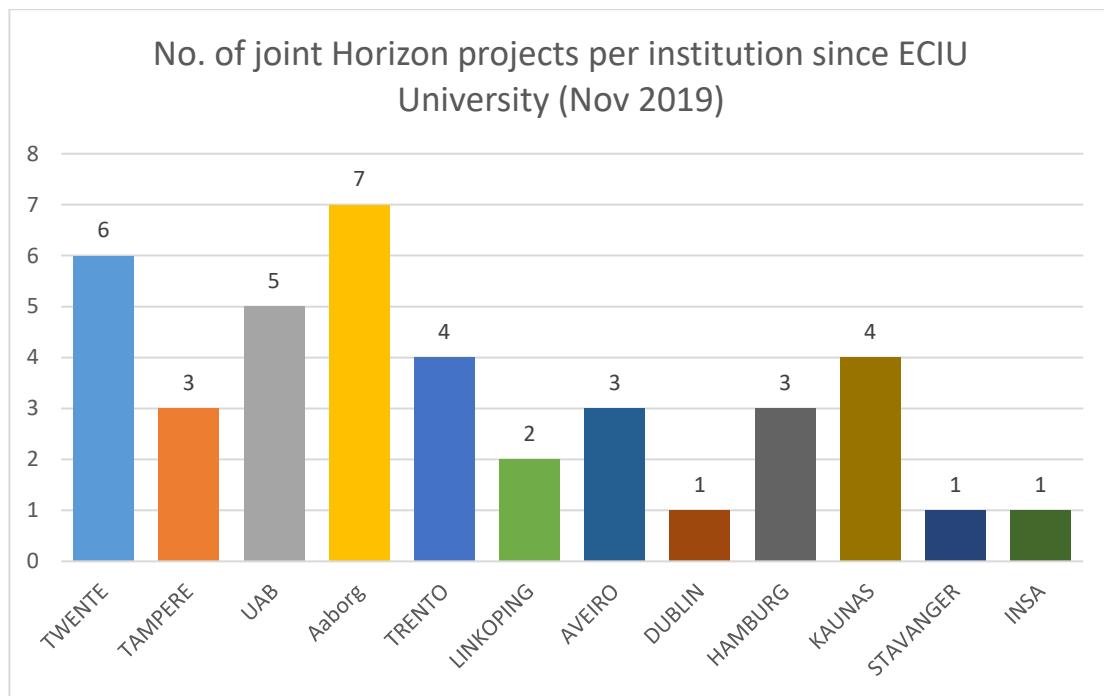


Figure 6 No. of joint H2020/HEU projects awarded for each ECIU institution from Nov 2019 – July 2022

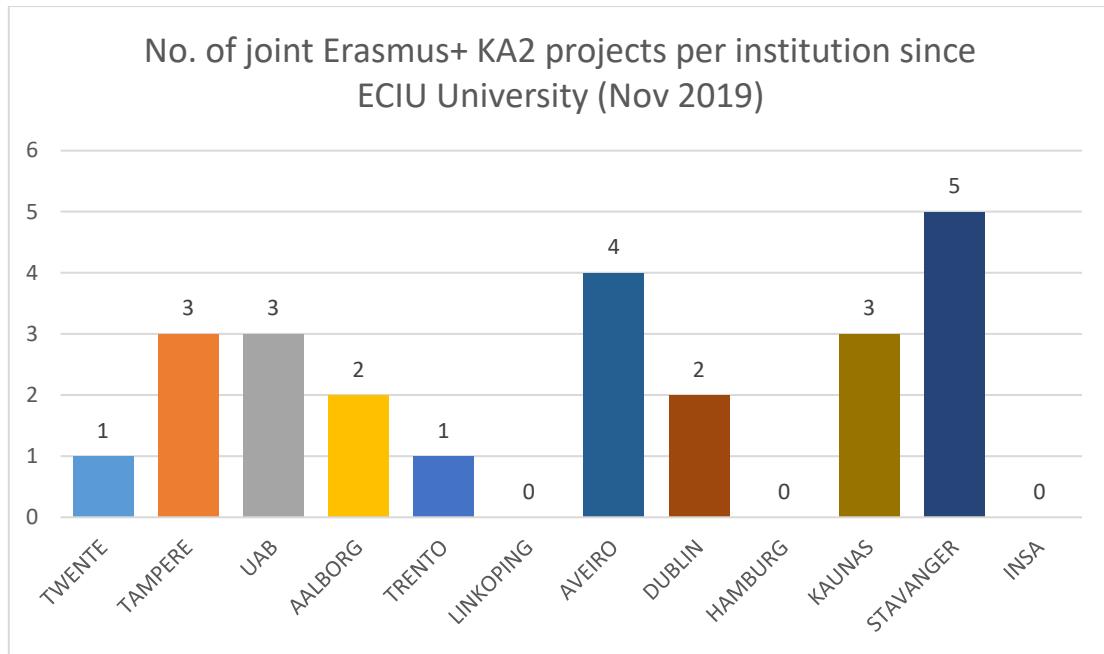


Figure 7 No. of joint Erasmus+ KA2 projects awarded for each ECIU from Nov 2019 – July 2022

| | No. of joint Horizon projects containing two or more ECIU partners (Nov 2019 – July 2022) | Total no. of Horizon projects per institution (Nov 2019 – July 2022) | % ECIU partner collaboration (Nov 2019 – July 2022) | No. of joint Erasmus KA2 projects containing two or more ECIU partners (Nov 2019 – July 2022) | Total no. of Erasmus KA2 projects per institution (Nov 2019 – July 2022) | % ECIU partner collaboration (Nov 2019 – July 2022) |
|------------------|---|--|---|---|--|---|
| TWENTE | 6 | 57 | 11% | 1 | 9 | 11% |
| TAMPERE | 3 | 30 | 10% | 3 | 26 | 12% |
| UAB | 5 | 59 | 8% | 3 | 23 | 13% |
| AALBORG | 7 | 61 | 11% | 2 | 20 | 10% |
| TRENTO | 4 | 54 | 7% | 1 | 4 | 25% |
| LINKOPING | 2 | 27 | 7% | 0 | 7 | 0% |
| AVEIRO | 3 | 27 | 11% | 4 | 37 | 11% |
| DUBLIN | 1 | 18 | 6% | 2 | 24 | 8% |
| HAMBURG | 3 | 11 | 27% | 0 | 2 | 0% |
| KAUNAS | 4 | 11 | 36% | 3 | 28 | 11% |
| STAVANGER | 1 | 6 | 17% | 5 | 13 | 38% |
| INSA | 1 | 6 | 17% | 0 | 1 | 0% |

Table 3 Comparison of joint EU-funded projects with ECIU partners vs total number of EU-funded projects per institution Nov 2019 – July 2022

4.3 Awards related to SDGs and societal challenges

The EICU University aims to foster a challenge-based approach to solving real issues faced within society, particularly in the context of UN SDG 11 'Sustainable cities and communities' during the pilot phase. This is reflected in the proposed metrics and aims to identify the proportion of research collaborations across the network that focus on the SDGs. However, the online tools used for the analysis of Horizon and Erasmus+ do not provide specific filtering options or 'tags' for SDGs. For example, the Horizon framework considers climate change and sustainable development as cross-cutting issues relevant to all areas of the programme⁷. (The Horizon Dashboard provides indicator data on cross-cutting issues however in the case of Sustainable Development only the EU financial contribution is provided). Similarly, the Erasmus+ programme sets out climate change and sustainable development as a key priority, with the programme being an important instrument for building knowledge, skills and attitudes in these areas⁸.

As a result, the relevant ECIU metric (Table 1, #5) was refocussed to look specifically at the proportion of projects addressing the four SDG 11 thematic areas identified within the ECIU long-term research strategy: Energy & sustainability; Transport & mobility; Circular economy; and Resilient communities⁹.

Manual analysis of project titles is therefore required to identify awarded projects strongly aligned to ECIU priorities. Focussing specifically on projects awarded since Nov 2019:

- 6/15 joint Horizon projects (40%) contain keywords linking to ECIU SDG 11 priority areas or Smart Regions. This includes the SMART-ER project, a H2020 'Science with and for Society' award to support the research dimension of European University alliances.
- 4/11 joint Erasmus+ KA2 projects (36%) contain keywords linking to ECIU SDG 11 priority areas.

The word clouds generated from awarded project titles in Figures 8 & 9 further emphasise the overall levels of relevance of joint funding activity across the network towards SDGs as well as ECIU objectives.

⁷ [Climate action and sustainable development - H2020 Online Manual \(europa.eu\)](https://ec.europa.eu/eurostat/web/eurostat-manuals/-/sdg-2020-manual_en)

⁸ [Priorities of the Erasmus+ Programme | Erasmus+ \(europa.eu\)](https://ec.europa.eu/erasmusplus/en/priorities)

⁹ [ECIU UNIVERSITY - Long Term Joint Research Strategy \(dcu.ie\)](https://www.dcu.ie/long-term-joint-research-strategy/)

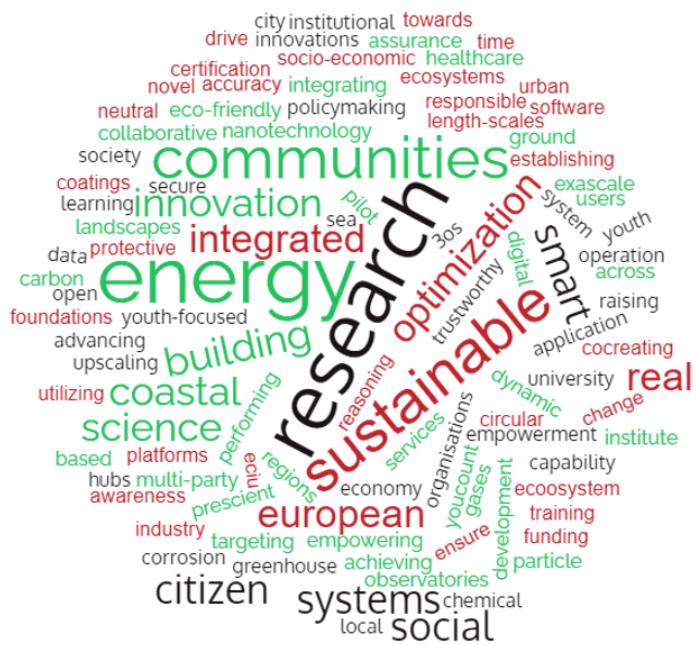


Figure 8 Word cloud of joint H2020/HEU project titles illustrating the frequency of ECIU priorities mentioned

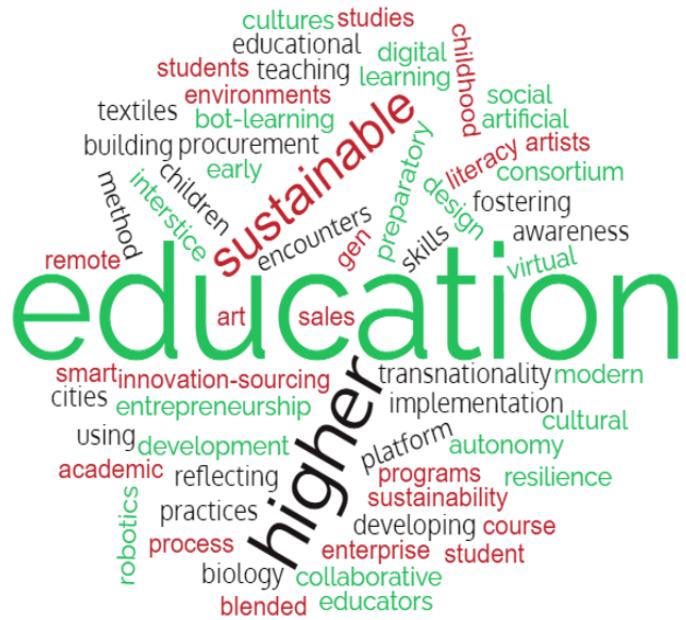


Figure 9 Word cloud of joint Erasmus+ KA2 project titles illustrating the frequency of ECIU priorities mentioned

4.4 External stakeholder engagement

Central to collective progress towards tackling societal challenges is the involvement of all relevant stakeholders in the execution of projects and the embedding of the quadruple helix approach within education, research and innovation. The level of stakeholder engagement in externally funded projects will therefore serve as a reflection of the success of ECIU University in integrating all actors within and between regions. It should be noted however that **in the current report data may be biased towards high stakeholder involvement based on the nature the EU funding programmes**

analysed and the requirements of their calls. Nonetheless, it will be useful for ECIU University to understand the relationships which already exist and which may be further built on in future.

For H2020/HEU projects, organisation types are categorised as:

- Higher or secondary education establishments
- Research organisations
- Private for-profit entities (excluding Higher or Secondary Education Establishments)
- Public bodies (excluding Research Organisations and Secondary or Higher Education Establishments)
- Other

The participation of Small and Medium Enterprises (SMEs) is also specifically captured within Horizon data in recognition of the need for stimulating the innovation dimension of the programme.

The number of H2020/HEU projects awarded since Nov 2019 partnering with external stakeholders (outside of other higher education or research organisations) is shown in Figure 9.

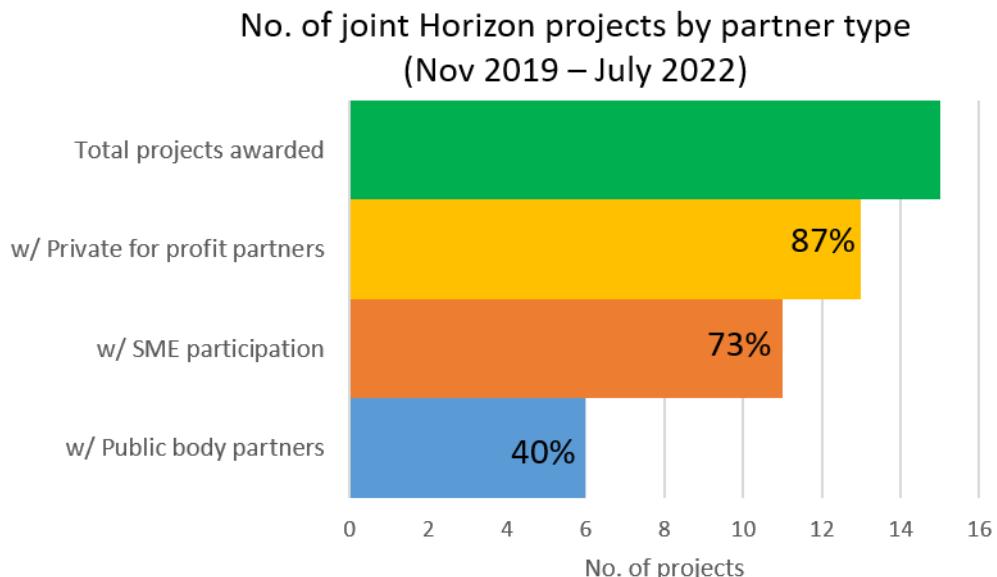


Figure 9 Proportion of H2020/HEU awarded grants with external stakeholders as project partners

In the case of Erasmus+ KA2 projects, the partner organisation types follow slightly different classifications:

- Higher education institution (tertiary level)
- School/Institute/Educational centre
- Research Institute/Centre
- Large enterprise
- Small and medium sized enterprise
- Local public body
- National public body
- Non-governmental organisation/association/social enterprise
- Social partner or other representative of working life (chambers of commerce, trade union, trade association)
- Other

The number of awarded E+ KA2 projects since Nov 2019 partnering with external stakeholder is given in Figure 10.

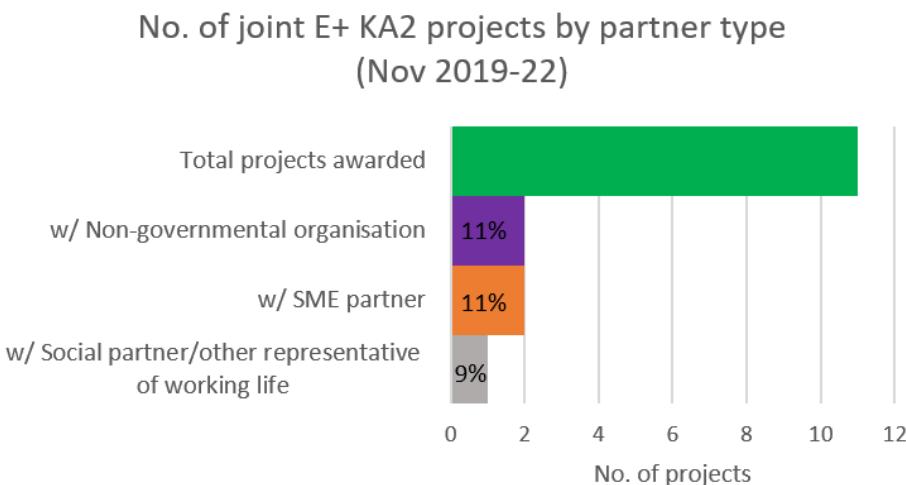


Figure 10 Proportion of Erasmus+ KA2 awarded grants with external stakeholders as project partners

Citizen Science and societal engagement

Facilitating citizen science practices is a particular focus of ECIU University research activity. Citizen science specifically is not available as a filtering option or tag within the Horizon dashboard, however manual review of project titles and Pillar descriptors, such as 'Science with and for Society' can allow the identification of joint Horizon projects that utilise a CS approach/focus. In this way, **3/15 joint Horizon projects awarded since Nov 2019 were identified to involve a significant citizen science element (20%)**.

More broadly, the Horizon Dashboard does report projects with any societal engagement element, based on the number of projects which flag Responsible R&I¹⁰. Currently, only H2020 data is reported, thus of the joint H2020 projects since Nov 2019, 4/13 projects (30%) include societal engagement activities.

¹⁰ <https://op.europa.eu/en/publication-detail/-/publication/ee9bacdf-fdad-46eb-8cd8-32879e310191/language-en>

5. Joint outputs (publications) with ECIU partners

Joint engagements across the network can also be measured in terms of outputs arising from research or other collaborative activities and several ECIU metrics are derived from output indicators. As previously highlighted in Section 3, data available from SciVal is considered from the purpose of this initial pilot. However, ECIU University also aims to recognise equally the merit of the large variety of outputs that can arise from collaboration across the network beyond what can be currently captured within SciVal, and as such their roll-out will be explored further in the next deliverable A2.3 O4.

The data collection protocol for SciVal is available in Appendix II, with all outputs published between November 2019 and July 2022 analysed (noting the limitations of this approach outlined in Section 3). It was decided to apply **an additional cut-off of publications with <= 20 authors as a means of representing the closest collaborations across the network**. At present it is not possible to link publications to specific projects or funding, SciVal only supports awarded grant metrics for countries and institutions. As such, the wording of relevant metrics have been adjusted accordingly (Table 1, #4, #7).

The summary of joint outputs is shown in Table 4. Notably, only a small proportion of publications contain 3 or more ECIU partner institutions affiliated within the author list, and – while not specified as a metric in itself - may still be of interest in monitoring the impact of ECIU University in establishing deeper multi-lateral connections going forward.

Of specific interest to ECIU University are output metrics related to SDGs and Open Access (Table 1, #4, #7) SciVal provides Open Access filters to allow the classification of publications based on this criterion. Specific SDG tags are also available within SciVal to allow direct association of outputs contributing to one or more SDGs, where applicable.

| | |
|---|-----|
| Total no of joint publications since Nov 2019 | 668 |
| % publications with 3 or more ECIU partners | 2% |
| % Open Access | 70% |
| % addressing SDGs | 33% |

Table 4 Summary of SciVal data for joint publications with two or more ECIU partners as affiliated institutions published since Nov 2019 up to the current date (July 2022)

Further breakdown of the data provided in Table 4 is also available. Figure 11 shows the total number of joint publications by type with peer-reviewed articles making up the majority of outputs captured by SciVal (482, 72%), followed by review articles, conference papers and book chapters.

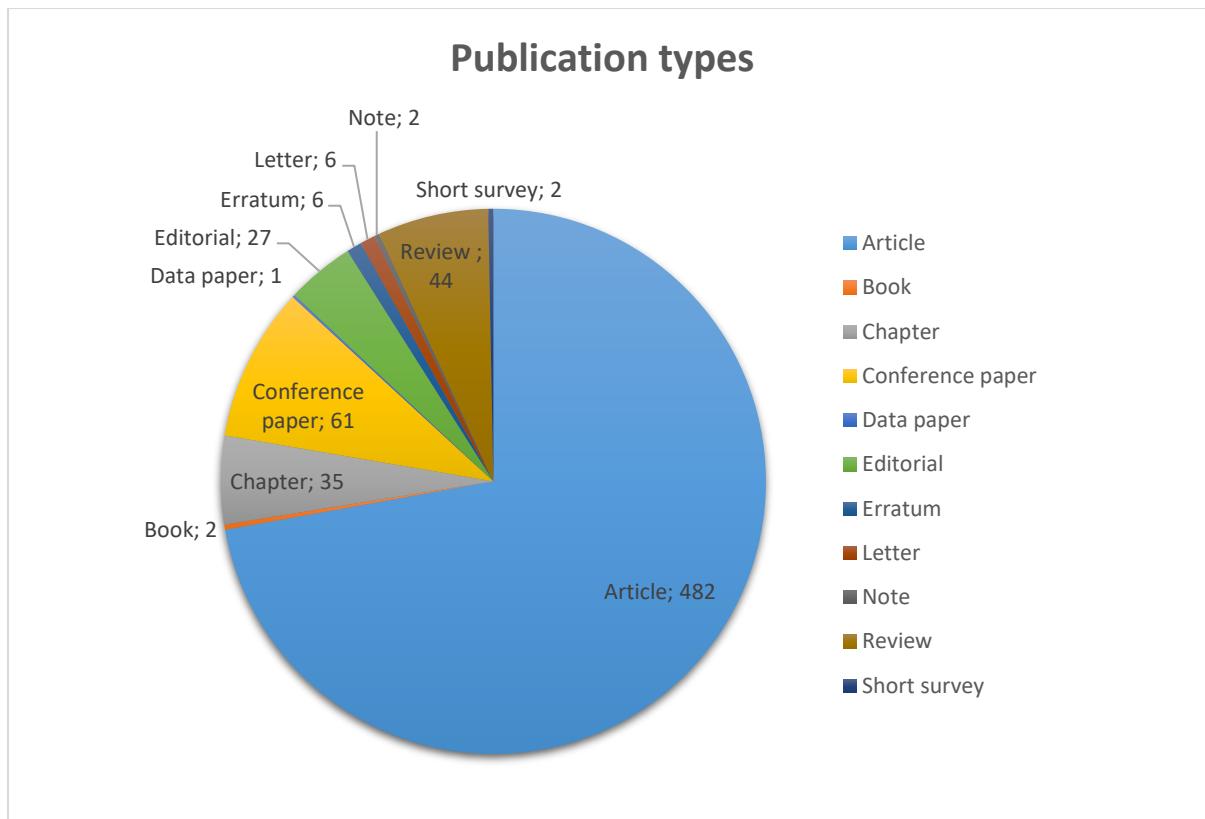


Figure 11 Breakdown of joint outputs with two or more ECIU partners by publication type

Openness is a key feature of ECIU University and Open Access refers to the ability of readers to freely access research publications. Numerous access types are available:

- **Gold Open Access:** research outputs that are publications in an open access journal,
- **Green Open Access:** research outputs that are publications in a journal that are also available in an open access repository,
- **Hybrid Open Access:** research outputs that are publications in a subscription journal that are open access with a clear license,
- **Bronze Open Access:** research outputs that are published in a subscription journal that are open access without a license (meaning articles are free to read but no permission is given for redistribution or reuse)¹¹.

Since Nov 2019, a significant proportion (70%) of joint outputs have been published via an OA route. The types of OA publishing utilised is shown in Figure 12, with Green being the most common route at present. It is possible for a publication to be labelled with multiple OA types on SciVal.

¹¹ [Trends for open access to publications | European Commission \(europa.eu\)](https://ec.europa.eu/eurostat/web/open-access/trends_en)

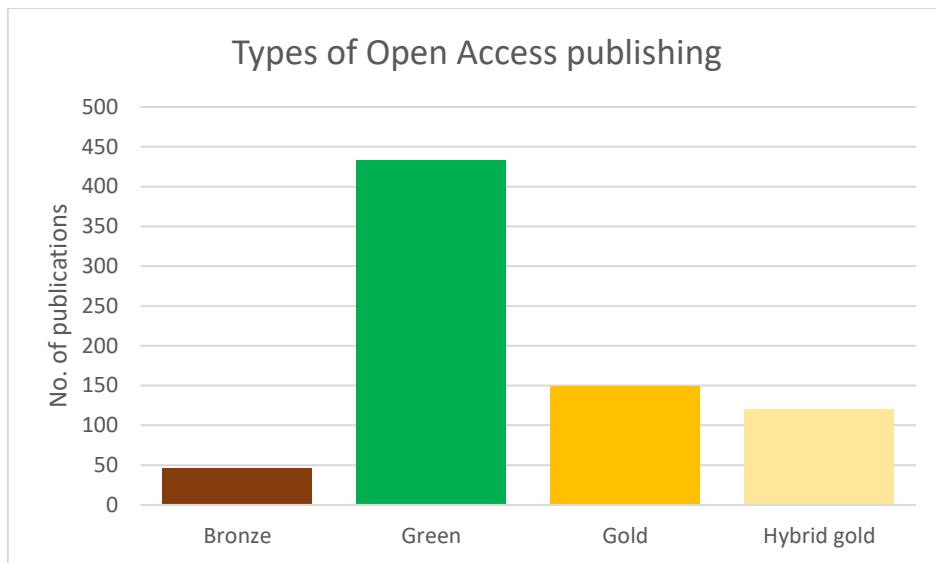


Figure 12 Types of Open Access routes across all joint publications since Nov 2019.

SciVal also offers a clear means of mapping research outputs directly to different SDGs through pre-defined tags, allowing rapid filtering and providing a more comprehensive overview of the network's contribution across all areas (Figure 13). Notably, the highest proportion of SDG-tagged joint outputs contribute towards Goal 3 'Good Health and well-being' (39%), followed by Goal 7 'Affordable and clean energy' (21%). Caution should be taken in the interpretation of this data however given publication patterns can vary significantly across different disciplines. Given the interconnectedness between many of the goals, publications may also be tagged with multiple SDGs.

Overview of SDG-tagged publications (Nov 2019 - July 2022)

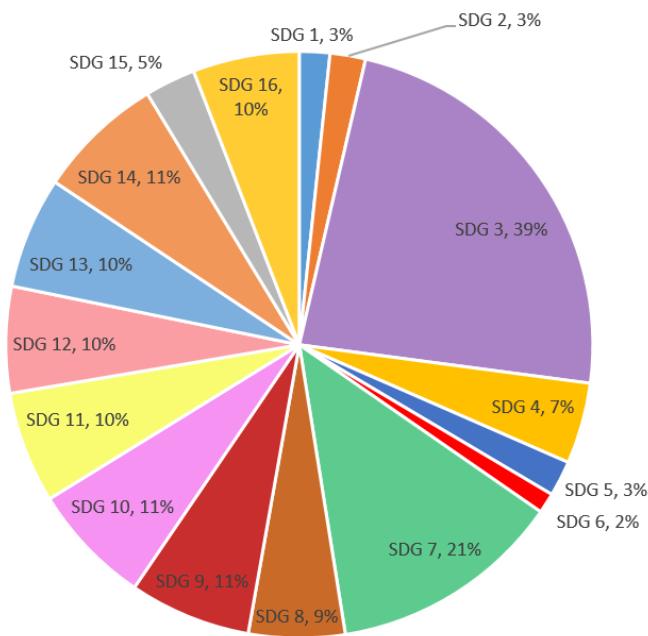


Figure 13 Relative contributions of SDG-tagged publications towards each SDG

6. Conclusion

The piloting of recommended ECIU alternative metrics brings to light various constraints faced in reality in their implementation and integration across the network. Consultation with institutional research offices reveals that the collection and reporting of ECIU-specific data at institutional level does not present a practical solution given the variation in Current Research Information Systems (CRIS) and database management practices across partner institutions, with adjustments requiring significant time and investments that are not feasible within the pilot timeframe. As such, ECIU metrics were examined based on the availability of data at a central level, using common web-based solutions on awarded projects and publications. This pilot therefore provides a mechanism for reporting on a number of **sub-metrics** based specifically around key EU funding instruments (Horizon and Erasmus+) and published research outputs (articles, reviews, book chapter, conference papers, etc.)

Despite the efforts within the pilot to centralise data collection through common sources, this does not alleviate the need for **substantial manual review and analysis**. Specific expertise in the use of these online tools and also in the manipulation of Excel data is therefore essential to ensure accuracy in the reporting of these sub-metrics. In future, it is recommended that a dedicated ECIU data coordinator is appointed for this role or external contract services may be sought.

Given ECIU University is currently at an early stage of its set up and development, the data reported for this pilot provides baseline levels of recent and current collaborations between partner institutions, but does not represent collaborative activity directly linked or attributed to ECIU University at present. The determination of such baseline data, even if limited to particular funding programmes or output types in this instance, will be important for illustrating the success of ECIU University in promoting deeper cooperation across the alliance going forward.

Since its establishment in February 2022, the ECIU Strategic Projects Office offers a mechanism for the tracking of ECIU-driven awards and funding applications from the strategic top-down level. Similarly, the SMART-ER Institute is currently developing a monitoring and evaluation model which will offer insight into the outcomes of specific bottoms-up initiatives within the network going forward.

In reality, ECIU University will need to draw from multiple sources to determine a complete picture of activity across the alliance. These mechanisms and the feasibility of reporting all ECIU metrics will be evaluated further in the upcoming deliverable A2.3 O4 addressing a roadmap for future roll-out. Critically, these considerations will take place in the context of wider developments in the reform of research assessment recently initiated at a European scale as part of the European Research Area (ERA) agenda¹². ECIU University has signed the shared agreement to participate in the reform process and will support the adoption of broader evaluation criteria across the wider research ecosystem.

¹²

https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_era-policy-agenda-2021.pdf

Appendix I: Feedback from institutional reporting experts

| Proposed indicator | Summary of reporting experts survey comments |
|---|---|
| No. of joint research projects that are awarded external funding | <ul style="list-style-type: none"> Full registration of all contract-partners What is the ECIU / SMARTER project? Are 2 ECIU partners in the project enough? This metric is reportable though multiple reports and manual review is required to extract the relevant information Research projects that are awarded external funding will be registered in project accounts in our reporting system. |
| Number of joint research grant applications submitted for external funding | <ul style="list-style-type: none"> Grant applications are tracked, but the system needs to be adjusted to address this issue. "We don't capture partners at application stage so it's not possible to easily report on ECIU University application activity. Would require a system update to either tag projects as ECIU/Smart-ER projects or to capture partners at application stage. Consultant costings and workload considerations would need to be reviewed." Not all submitted applications are registered. Within this pilot it is possible, but with implemented VRI it will be more difficult additional accounting criteria are required in our IT systems the same as previous Depends on the funder, HE applicants can be tracked by the Research Services Joint ECIU/SMART-ER research grant applications will be registered and could be reported. What is the definition of "joint applications? Is it enough if there are 2 ECIU partners in the application (e.g. when there are 8 partners in the application)? |
| No. of joint research projects submitted for external funding that receive a score above threshold | <ul style="list-style-type: none"> The current system need to be adjusted for this purpose. We don't have a means of identifying ECIU/SMART-ER applications unless we adapt our grant management system. The score for each application would then need to be sourced from the funding agency. The scores of research projects are not registered Privileged information of applicant We do not register that type of information |
| % of research projects focusing on energy and sustainability | <ul style="list-style-type: none"> A new completely new reporting systems will be needed. Classification of all our research projects into fields like energy and sustainability Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. the same as previous and this indicator requires some keywords or programme of the project tagging as 'energy' or 'sustainability' Manual review of the projects, depending on number, may be feasible to see if they fall into these areas |

| | |
|--|---|
| | <ul style="list-style-type: none"> • If the project name, ID is known yes • What is the baseline indicator - which projects are included - funded through ECIU/SMART-ER or carried out on SD11 topics in general (with or without ECIU partners)? • This information will be registered in project accounts (SDG 7). |
| <i>% of research projects focusing on transport and mobility</i> | <ul style="list-style-type: none"> • As per previous • Research projects will be registered in project accounts, but unsure if "transport and mobility" will be tagged. |
| <i>% of research projects focusing on circular economy</i> | <ul style="list-style-type: none"> • As per previous • Research projects will be registered in project accounts, but unsure if "circular economy" will be tagged. |
| <i>% of research projects focusing on resilient communities</i> | <ul style="list-style-type: none"> • This type of data is not yet being collected by our university. We as local core team would have to start such a data collection. • Research projects will be registered in project accounts, but unsure if "resilient communities" will be tagged. |
| <i>Impact case studies</i> | <ul style="list-style-type: none"> • We don't have a system for capturing case studies. A framework would need to be agreed and resources allocated to gathering the case study data. • There is no system for registration, and no registration • This information will be based on the information given by researchers. • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • This is tracked, but with a certain degree of ad hoc activities. • Need unified definition of the "impact case". We prepare impact case descriptions for research assessment reports (national). |
| <i>% of Open Access publications derived from joint projects relative to overall number of publications, including Diamond, Gold, and Green Access routes</i> | <ul style="list-style-type: none"> • If we do not report on the overall number of publications derived from SMARTER projects, then this indicator is not possible. Definition needed for "SMARTER project". Should the publication be attributed to a project? • Possible to get for every researcher, not for a SMART ER institution • "The difficulty here is knowing that the publications are derived from Smart-ER projects. We currently have no easy way to attribute outputs to specific awards or projects. If these are determined, the openness of these outputs can be analysed via the tool Unpaywall (although only if DOIs for the outputs are available). If publication sets within Scopus or SciVal are being used, open access metrics will be available within these tools." • If the ECIU/SMART-ER projects are clearly separable from our other projects • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • Determining the OA percentage would probably mean extra work <p>This information can be identified and reported.</p> |

| | |
|---|---|
| <p>% of joint research projects with openly available data sets</p> | <ul style="list-style-type: none"> • The data sets are not yet centrally accounted for by KTU (eLABA), so the data would be unreliable. • Feedback from NORF is being sought with regards to best practice tools in terms of capturing open data. SciVal have created a new predefined research area that details articles with linked OA datasets (those available within certain repositories). We could, for now, utilise this dataset, limit it to DCU outputs and then review for any researchers linked to ECIU University projects. • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • Established research projects have no structured information in current reporting system regarding if data sets are openly available or not. • But it will be necessary that researchers acknowledge <p>Would suggest to use a general indicator of number of data sets meeting FAIR principles (counting data sets, but not the projects).</p> |
| <p>No. of webinars and public lectures discussing joint research projects</p> | <ul style="list-style-type: none"> • A new completely new reporting systems will be needed. • "Would need to be self-reported by organisers - not collated centrally • Probably possible to register this in our information systems, but in practice, this is not done in this way. • This data is not being collected by our university. We as local SMART-ER core team would have to start such a data collection. <p>Content of lectures, seminars, webinars, etc. is not inspected and reported in KTU. If this is related to project based activities, we still do not have that statistics.</p> |
| <p>No. of joint research funding applications involving citizen science submitted for external funding</p> | <ul style="list-style-type: none"> • A new completely new reporting systems will be needed. • We don't have a means of identifying ECIU/SMART-ER applications unless we adapt our grant management system. We also have no means of identifying if citizen science is planned for within the project (this applies at award stage also) • Introduction of specific registration of Citizen Science • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • To date, we have not accounted for such applications. Possible to implement through KTU project ideas register/descriptor system. • Research content and methodology usually not known to external parties, e.g. Research Services • Joint ECIU/SMART-ER research funding applications will be registered at UiS and could be reported, but assumes "citizen science" to be tagged. |
| <p>No. of joint funding applications (external) co-created with an industry partner</p> | <ul style="list-style-type: none"> • We don't have a means of identifying ECIU/SMART-ER applications unless we adapt our grant management system. As we don't capture partners at application stage this also means we don't have reportable data on applications with industry partners. • To date, we have not accounted for such applications. Possible to implement through KTU project ideas register/descriptor system. |

| | |
|--|--|
| | <ul style="list-style-type: none"> • Current system need to be adjusted. • Not all submissions are registered. Industry partner are registered. • Maybe, depends on the funder • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • Current system need to be adjusted. • Not all submissions are registered. Industry partner are registered. • Maybe, depends on the funder • Unsure if this data is being collected by our university. We as local core team would have to start such a data collection. • Projects will be registered in project accounts, also projects co-created with partners (including industry partners). |
| No. of joint funding applications (external) co-created with public administrations | <ul style="list-style-type: none"> • A new completely new reporting systems will be needed. • We don't have a means of identifying ECIU/SMART-ER applications unless we adapt our grant management system. As we don't capture partners at application stage this also means we don't have reportable data on applications with public admin partners. • Public administrations are not a separate category in our classification until now. • To date, we have not accounted for such applications. Possible to implement through KTU project ideas register/descriptor system. • Projects will be registered in project accounts, also projects co-created with partners (including public administrations). |
| No. of joint funding applications (external) co-created with an NGO | <ul style="list-style-type: none"> • A new completely new reporting systems will be needed. • We don't have a means of identifying ECIU/SMART-ER applications unless we adapt our grant management system. As we don't capture partners at application stage this also means we don't have reportable data on applications with NGO partners. • NGO's are not separated in our existing classifications • To date, we have not accounted for such applications. Possible to implement through KTU project ideas register/descriptor system. • Projects will be registered in project accounts, also projects co-created with partners (including an NGO). |

Table 5 Survey feedback from institutional reporting experts

Appendix II: Data collection protocols

1. Awarded projects with two+ ECIU partners

1.1 Horizon 2020/Europe

1. Go to the Horizon dashboard homepage: [Funding & tenders \(europa.eu\)](https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/horizon-dashboard)
2. Select 'Organisation Profile' in the mid left-hand-side (Figure 13)

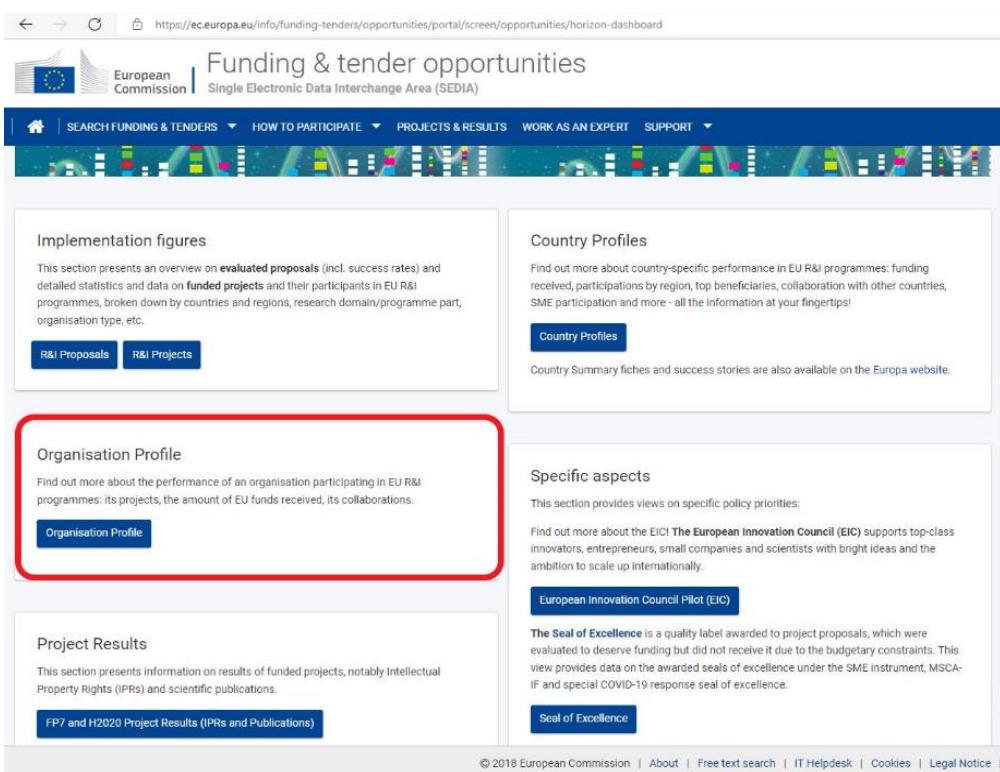


Figure 13 Horizon dashboard homepage

3. This will open the '*R&I Programmes - Key Figures*' interactive sheet. This provides an overview of country and organisation participation in FP7, H2020 and Horizon Europe funding instruments.
4. To identify and analyse the projects with two or more ECIU partners, click the 'Sheets' dropdown menu on the top right-hand side. All available sheets related to organisation profile will be displayed. Select '*R&I Programmes – Project List*' (Figure 14).

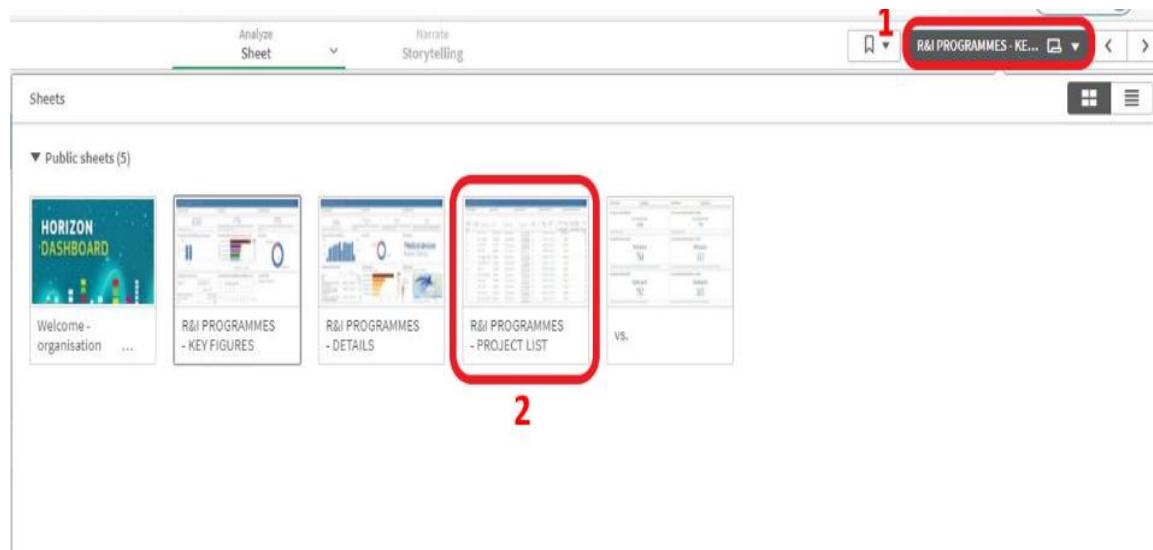


Figure 14 Interactive sheets available under the Horizon dashboard's Organisation Profile

5. Using the pre-defined filters situated across the top of the screen, the joint projects for any particular ECIU institutions can be displayed. Data can be filtered using an organisation's Participant Identification Number (PIC) or legal name. It is recommended to use the PIC code for ECIU partners to ensure the correct institution is selected.

Note: Data needs to be collected for each ECIU partner institution and manually collated to build a picture of all awarded projects across ECIU University.

6. Using DCU as an example, the following filters are applied:
 - a. Framework Programme: H2020 and Horizon Europe. This will display all H2020 awarded projects and any data on awarded Horizon Europe projects currently available. FP7 (Seventh Framework Programme) is not selected as this relates to projects awarded in 2013 and earlier.
 - b. Using the Organisation PIC filter – enter 999892588 in the search bar and click the green tick box to retrieve all relevant DCU projects
 - c. To confirm the correct organisation has been selected, Dublin City University should be listed first under the Organisation legal name filter. All other organisations will appear in grey.
 - d. To identify DCU projects with at least one other ECIU partner use the Collaborative Organisation PIC filter and enter the PICs of all other ECIU partner universities. As before, selection of the correct organisations can then be checked using the 'Collaborative organisation legal name' filter. NOTE: Do not include DCU in the Collaborative Organisation PIC filter or all DCU projects will be displayed.
 - e. The desired data for DCU joint projects can then be downloaded as an Excel file by right-clicking anywhere within the table display or using the 'More' option and selecting 'Download as -> data'.

- f. Repeat steps a – e with each of the ECIU partner institutions as the main organisation.
7. Once project data has been extracted from the Dashboard, desired analysis can take place per institution, per year, etc. To obtain a list of all individual joint projects across the network, the ‘Remove Duplicates’ tool should be used.

1.1.1 Analysing partner types and topic areas in joint Horizon projects

Once a list of joint projects involving ECIU partners has been compiled, the Dashboard functionality can also be used to analyse the types of participants in each project.

1. Go to the Horizon Dashboard homepage: [Funding & tenders \(europa.eu\)](https://funding-and-tenders.ec.europa.eu/)
2. Select ‘R&I Projects’ within ‘Implementation figures’ in the top left-hand side (figure 15)

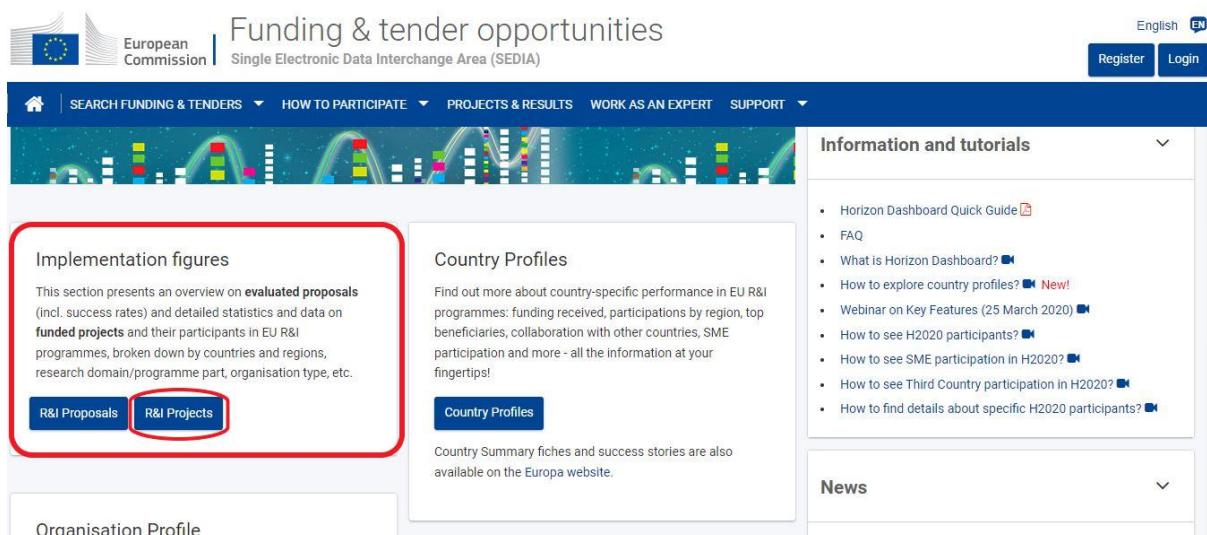


Figure 15 Horizon dashboard access to project information

3. As in Figure 14 above, use the ‘Sheets’ menu on the top right hand side to navigate between available sheets for all R&I projects. Select the sheet titled ‘Self-service BI’ which allows you to build custom tables and visualisations of the project data.
4. As before, use the pre-defined filters to only show data linked to H2020 and Horizon Europe frameworks.
5. The desired Dimensions and Measures can be selected from the left-hand menu options to populate the table. Select ‘Project Number’ and enter the joint projects identified in Section 1.1 to create an ECIU specific table.
 - a. Under Measures, ‘Participation’ shows the total number of project partners/participants and ‘SME Participation’ gives the number of which are registered as SMEs.
 - b. Under Dimensions, ‘Organisation Type’ can be selected to display the types of organisations participating in each project, shown as Legal Entity Type Description within the table.

- c. Under Dimensions, 'Thematic Priority', 'Pillar Description' and 'Topic Description' can be selected to identify research areas of particular relevance or interest.
- 6. Further details including Call Deadline date, Project Start Date and Project Signature Date can also be selected as desired.
- 7. The custom project table can be downloaded as an Excel file by right-clicking anywhere in the table and selecting 'Table -> Download as... -> Data' for further analysis.

| Programme | Project Number | Project Acronym | Project Signature Date | Project Start Date | Legal Entity Type Descr | Participation | SME Participation |
|-----------|----------------|-----------------|------------------------|--------------------|---|---------------|-------------------|
| Total | | | | | | 2 004 | 276 |
| H2020 | 633053 | EUROfusion | 2014-09-30 | 2014-01-01 | Higher or Secondary Education Establishments | 131 | 0 |
| H2020 | 633053 | EUROfusion | 2014-09-30 | 2014-01-01 | Other | 6 | 0 |
| H2020 | 633053 | EUROfusion | 2014-09-30 | 2014-01-01 | Private for-profit entities (excluding Higher or Secondary Education Establishments) | 13 | 5 |
| H2020 | 633053 | EUROfusion | 2014-09-30 | 2014-01-01 | Public bodies (excluding Research Organisations and Secondary or Higher Education Establishments) | 1 | 0 |
| H2020 | 633053 | EUROfusion | 2014-09-30 | 2014-01-01 | Research Organisations | 56 | 1 |
| H2020 | 634013 | PHOCNOSIS | 2015-04-09 | 2015-09-01 | Higher or Secondary Education Establishments | 4 | 0 |
| H2020 | 634013 | PHOCNOSIS | 2015-04-09 | 2015-09-01 | Private for-profit entities (excluding Higher or Secondary Education Establishments) | 6 | 5 |

Figure 16 Awards table built via the Horizon dashboard providing custom details filtered according to Project Number

1.2 ERASMUS+ Key Action 2

1. Go to the Erasmus+ website (<https://erasmus-plus.ec.europa.eu/>), select 'Projects' from the menu options and 'Project lists'.

Figure 17 Homepage of the Erasmus+ projects platform

2. Select and download the project file(s) of interest for manual analysis in Excel. For the metrics pilot the following files were used:
 - ‘Erasmus+ KA2 - Cooperation for innovation and the exchange of good practices (2014-2020) Projects Overview’.
 - ‘Erasmus+ KA2 - Partnerships for cooperation and exchanges of practices (2021-2027) Projects Overview’

Note: There is considerable risk of inaccuracies and human error in the current data collection method. Variations in the spelling of institutional names can occur in the data e.g. UAB, or an institution may be registered as several different organisations as is the case of Tampere University.

3. Manual analysis of the project lists is then required. Without the use of dedicated formulas, conditional formatting was used to identify projects with ECIU partners using the following institution names:
 - UNIVERSITEIT TWENTE
 - DUBLIN CITY UNIVERSITY
 - AALBORG UNIVERSITET
 - UNIVERSIDADE DE AVEIRO
 - UNIVERSITETET I STAVANGER
 - LINKOPINGS UNIVERSITET
 - KAUNO TECHNOLOGIJOS UNIVERSITETAS
 - INSTITUT NATIONAL DES SCIENCES APPLIQUEES
 - TECHNISCHE UNIVERSITAT HAMBURG
 - UNIVERSITA DEGLI STUDI DI TRENTO
 - UNIVERSIDAD AUTONOMA DE BARCELONA/ UNIVERSITAT AUTONOMA DE BARCELONA
 - TAMPEREEN YLIOPISTO
 - TAMPEREEN AMMATTIKORKEAKOULU OY
 - TAMPEREEN KORKEAKOULUSAATIO SR
4. Manual filtering is required to identify projects with two or more ECIU partners. Organisation types are provided for each partner allowing further analysis and conditional formatting to identify joint projects involving external stakeholders

2. Joint publications with two+ ECIU partners using SciVal

Note: SciVal requires an Elsevier.com account or institutional access for its use. The specific modules available within SciVal will depend on the type of access agreed and may vary between institutions.

1. To determine the collaborative outputs between ECIU partners, navigate to the Collaboration module. Under Institutions and Groups on the left-hand side, select ‘Add new’

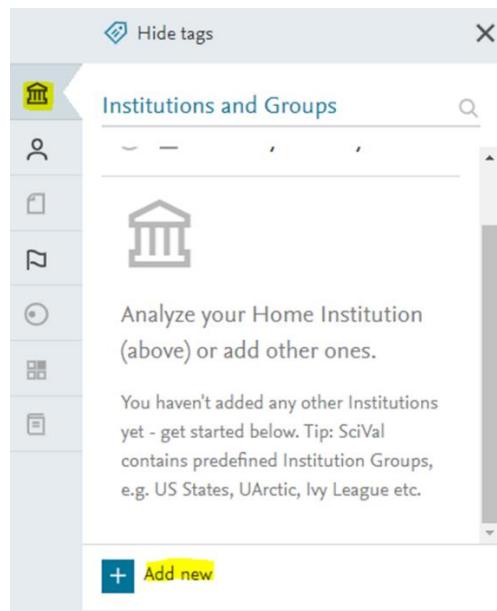


Figure 18 Search tab to add new institutions or groups for analysis under the SciVal Collaboration module

2. ECIU – The European Consortium of Innovative Universities is already available as a Group within SciVal and can be chosen for automatic pre-selection of all ECIU full and associate partner institutions.
3. Filtering options can be selected within SciVal, in this case viewing all co-authored publications between 2019 to >2022 across all subject areas. An interactive matrix table of publications between partners is shown, with other visualisation options also available.

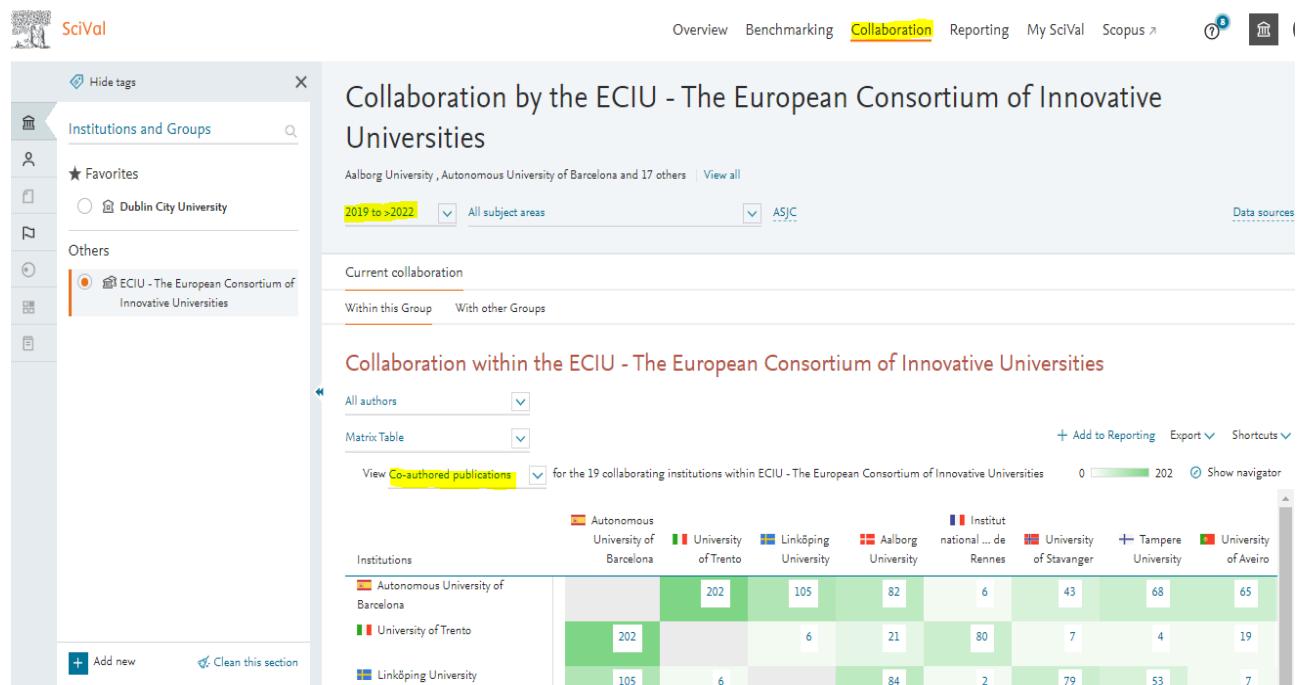


Figure 19 SciVal overview collaboration across ECIU

4. Joint publications must be compiled on a partner-by-partner basis requiring individual download of bilateral publication sets to first obtain a complete list for each institution. In each case duplicates should be removed from the total set.

Publications co-authored by the Autonomous University of Barcelona and the University of Trento

Year range: 2019 to >2022

Export

| Authors | 202 publications  | Authors | Year | Scopus Source | Citations |
|---|--|-----------------------------------|------|-------------------|-----------|
| <input type="checkbox"/> Brau, J.E. | 168 | Aad, G., Abbott, B., Abbott, D.C. | 2020 | Physical Review D | 268 |
| <input type="checkbox"/> Davis, D.R. | 168 | | | | |
| <input type="checkbox"/> Mehta, A.K. | 168 | | | | |
| <input type="checkbox"/> Mir, L.M. | 168 | | | | |
| <input type="checkbox"/> Mohapatra, S.R.P. | 168 | | | | |
| Show more | | | | | |
| | | | | | |
| Institutions | 202 | | | | |
| <input type="checkbox"/> Autonomous University of Barcelona | 202 | | | | |
| <input type="checkbox"/> University of Trento | 202 | | | | |
| <input type="checkbox"/> CNRS | 189 | | | | |
| <input type="checkbox"/> CSIC | 185 | | | | |
| <input type="checkbox"/> Université Paris Cité | 183 | | | | |
| Show more | | | | | |
| | | | | | |
| Publication years | 202 | | | | |
| <input type="checkbox"/> 2022 | | | | | |
| Apply filter | | | | | |
| Options | | | | | |

Combined measurements of Higgs boson production and decay using up to 80 fb⁻¹ of proton-proton collision data at $\sqrt{s} = 13$ TeV collected with the ATLAS experiment
Open Access
> View abstract View in Scopus ↗

Production and processing of graphene and related materials
Open Access
> View abstract View in Scopus ↗

Safety and recommendations for TMS use in healthy subjects and patient populations, with updates on training, ethical and regulatory issues: Expert Guidelines
Open Access
> View abstract View in Scopus ↗

Electron and photon performance measurements with the ATLAS detector using the 2015-2017 LHC proton-proton collision data
Open Access
> View abstract View in Scopus ↗

Combination of Searches for Invisible Higgs
Aaboud, M., Aad, G., Abbott, B.

Figure 20 Publication sets available for download and analysis between two partner institutions

5. All fields of interest can be selected for export, including Publication type, Open Access and SDG tags.

Export publications

Select the fields you want to include in the export for your selected publications. Last selected options are remembered.

* in publication year

Select all | Deselect all | Reset to default selection

| | | | | | |
|--|--|--|---|--|--|
| <input checked="" type="checkbox"/> Publication basics | <input type="checkbox"/> Publication details | <input type="checkbox"/> Author/Affiliations | <input type="checkbox"/> Publication metrics | <input type="checkbox"/> Scopus Source related | <input type="checkbox"/> Topic related |
| <input checked="" type="checkbox"/> Title | <input checked="" type="checkbox"/> Reference | <input type="checkbox"/> Scopus Affiliation IDs | <input type="checkbox"/> Views | <input type="checkbox"/> Volume | <input type="checkbox"/> Topic Cluster name |
| <input checked="" type="checkbox"/> Authors | <input type="checkbox"/> Abstract | <input type="checkbox"/> Scopus Affiliation names | <input type="checkbox"/> Field-Weighted Views | <input type="checkbox"/> Issue | <input type="checkbox"/> Topic Cluster number |
| <input checked="" type="checkbox"/> Year | <input checked="" type="checkbox"/> EID (Scopus ID) | <input checked="" type="checkbox"/> Number of Authors | <input type="checkbox"/> Impact | <input type="checkbox"/> Pages | <input type="checkbox"/> Topic name |
| <input checked="" type="checkbox"/> Full date | <input type="checkbox"/> PubMed ID | <input type="checkbox"/> Scopus Author IDs | <input checked="" type="checkbox"/> Citations | <input type="checkbox"/> Article number | <input type="checkbox"/> Topic number |
| <input checked="" type="checkbox"/> Scopus Source title | <input checked="" type="checkbox"/> Sustainable Development Goals (2021) | <input type="checkbox"/> Scopus Author ID First Author | <input type="checkbox"/> Field-Weighted Citation Impact | <input type="checkbox"/> ISSN | <input type="checkbox"/> Topic Cluster Prominence Percentile |
| <input checked="" type="checkbox"/> DOI | <input type="checkbox"/> All Science Journal Classification (ASJC) | <input type="checkbox"/> Scopus Author ID Last Author | <input type="checkbox"/> Field-Citation Average | <input type="checkbox"/> Source ID | <input type="checkbox"/> Topic Prominence Percentile |
| <input checked="" type="checkbox"/> Publication type | <input type="checkbox"/> Code | <input type="checkbox"/> Scopus Author ID Corresponding Author | <input type="checkbox"/> Outputs in Top Citation Percentiles, per percentile | <input type="checkbox"/> Source type | |
| <input checked="" type="checkbox"/> Open Access | <input type="checkbox"/> Field name | <input type="checkbox"/> Scopus Author ID Single Author | <input type="checkbox"/> Field-Weighted Outputs in Top Citation Percentiles, per percentile | <input type="checkbox"/> CiteScore* | |
| <input checked="" type="checkbox"/> Institutions | <input type="checkbox"/> Quacquarelli Symonds (QS) | <input type="checkbox"/> Country/Region | <input checked="" type="checkbox"/> Patent citations | <input type="checkbox"/> CiteScore percentile* | |
| <input checked="" type="checkbox"/> Number of Institutions | <input type="checkbox"/> Code | | | <input type="checkbox"/> SNIP* | |
| | <input type="checkbox"/> Field name | | | <input type="checkbox"/> SNIP percentile* | |
| | <input type="checkbox"/> Time Higher Education (THE) | | | <input type="checkbox"/> SJR* | |
| | <input type="checkbox"/> Code | | | <input type="checkbox"/> SJR percentile* | |

Cancel Export CSV Export XLSX

Figure 21 Field options available to include in the export of selected publications

6. Once institutional lists have been manually completed, a master list of publications across the network can be created. Replicate publications in triplicate or higher can be examined prior to their removal to identify outputs with multi-lateral collaboration between ECIU partners.
7. Further analysis and breakdown of the master data can be completed as desired through filtering of Publication types, Open Access and SDG tags etc.

Appendix III: Complete list of joint H2020/HEU projects with two+ ECIU partners

| | Call Deadline Year | Project Title | EU Contribution |
|----|--------------------|--|-----------------|
| 1 | 2014 | Assessing SNOMED CT for Large Scale eHealth Deployments in the EU | €939,717 |
| 2 | 2014 | BioEnergyTrain | €3,697,579 |
| 3 | 2014 | European Circular Energy-Frontier Collider Study | €2,999,000 |
| 4 | 2014 | INdependent Lliving support Functions for the Elderly | €3,383,841 |
| 5 | 2014 | NUCLEUS - New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions | €3,993,633 |
| 6 | 2014 | Advanced nanophotonic point-of-care analysis device for fast and early diagnosis of cardiovascular diseases | €3,593,962 |
| 7 | 2014 | PROcesses for Value added fibres by Innovative Deep Eutectic Solvents | €1,079,551 |
| 8 | 2014 | Between the representation of the crisis and the crisis of representation. How crisis changed the symbolic background of European societies and identities. Implication for policies and policy making | €2,719,238 |
| 9 | 2015 | New technology and strategy for a large and sustainable deployment of second generation biofuel in rural areas | €5,573,644 |
| 10 | 2015 | Strengthening and widening the European infrastructure for social science data archives. | €2,498,187 |
| 11 | 2015 | A DECentralized management Scheme for Innovative Valorization of urban biowastE | €7,755,102 |
| 12 | 2015 | Donor-Acceptor light emitting exciplexes as materials for easily to tailor ultra-efficient OLED lighting | €3,717,199 |
| 13 | 2015 | Global trends in social inequalities in Europe and Latin America and exploring innovative ways to reduce them through life, occupational and educational trajectories research to face uncertainty | €2,205,000 |
| 14 | 2015 | Graphene-based disruptive technologies | €89,000,000 |
| 15 | 2015 | Moving Towards Adaptive Governance in Complexity: Informing Nexus Security | €7,457,761 |
| 16 | 2015 | Martí i Franquès COFUND | €3,924,000 |
| 17 | 2015 | Twining for a Sustainable, Proactive Research partnership in distributed Energy systems planning, Modelling and managEment | €1,047,551 |

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|----|------|---|--------------|
| 18 | 2016 | Implementation of activities described in the Roadmap to Fusion during Horizon 2020 through a Joint programme of the members of the EUROfusion consortium | €678,800,000 |
| 19 | 2016 | FrontierResearchCompetences@CNAP | €627,840 |
| 20 | 2016 | Plastic nanocomposite insulation material enabling reliable integration of renewables and DC storage technologies in the AC energy grid | €5,574,156 |
| 21 | 2016 | Centre of Excellence in IT Science and Technology | €399,168 |
| 22 | 2016 | Lubricant impregnated slippery surfaces | €3,722,017 |
| 23 | 2016 | Next Generation GEOSS for Innovation Business | €9,999,999 |
| 24 | 2016 | Electronics and ICT as enabler for digital industry and optimized supply chain management covering the entire product lifecycle | €26,033,148 |
| 25 | 2016 | The Role of Universities in Innovation and Regional Development | €3,709,815 |
| 26 | 2017 | Coach Assistant via Projected and Tangible Interface | €3,990,200 |
| 27 | 2017 | Energy Systems in Transition | €4,067,522 |
| 28 | 2017 | An international, multi-disciplinary, multi-sectoral training network on ageism | €3,879,541 |
| 29 | 2017 | Graphene Flagship Core Project 2 | €88,000,000 |
| 30 | 2017 | Holistic digital-to-physical prototyping and production pilot for microfluidic MEMS | €7,152,982 |
| 31 | 2017 | Industrial Biotechnology Innovation and Synthetic Biology Accelerator | €5,000,000 |
| 32 | 2017 | Inclusive Robotics for a better Society (INBOTS) | €2,982,974 |
| 33 | 2017 | Smart information, governance and business innovations for sustainable supply and payment mechanisms for forest ecosystem services | €4,019,531 |
| 34 | 2017 | Advanced integrative solutions to Corrosion problems beyond micro-scale: towards long-term durability of miniaturized Biomedical, Electronic and Energy systems | €3,726,379 |
| 35 | 2017 | A Collective Research Impact Framework and multi-variate models to foster the true engagement of actors and stakeholders in Health Research and Innovation | €3,430,500 |
| 36 | 2017 | PrEseRvIng and sustainably governing Cultural heritage and Landscapes in European coastal and maritime regionS | €2,498,999 |
| 37 | 2017 | Project Ô: demonstration of planning and technology tools for a circular, integrated and symbiotic use of water | €9,261,272 |

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| 38 | 2017 | Physical principles of the creation of novel SPINtronic materials on the base of MULTIlayered metal-oxide FILMs for magnetic sensors and MRAM | €436,500 |
| 39 | 2017 | Scalable privacy preserving intelligence analysis for resolving identities | €4,998,656 |
| 40 | 2018 | AstroChemical Origins | €4,138,453 |
| 41 | 2018 | Building European Communities' Resilience and Social Capital | €4,946,900 |
| 42 | 2018 | Circular Construction In Regenerative Cities (CIRCuIT) | €9,814,613 |
| 43 | 2018 | The European Training Network on Informal Care | €4,091,894 |
| 44 | 2018 | EOSC-Nordic | €5,933,475 |
| 45 | 2018 | A FINancial supervision and TECHnology compliance training programme | €2,500,000 |
| 46 | 2018 | Protecting Personal Data Amidst Big Data Innovation | €3,701,256 |
| 47 | 2018 | SUSTAINABLE ENERGY TRANSITIONS LABORATORY | €4,898,340 |
| 48 | 2018 | Wearable Electroactive Fabrics Integrated in Garments | €3,844,863 |
| 49 | 2018 | WeNet - The Internet of US | €6,587,158 |
| 50 | 2019 | Integrated on-farm Aquaponics systems for co-production of fish, halophyte vegetables, bioactive compounds, and bioenergy | €9,789,884 |
| 51 | 2019 | Developing and Implementing Sustainability-Based Solutions for Bio-Based Plastic Production and Use to Preserve Land and Sea Environmental Quality in Europe | €8,117,530 |
| 52 | 2019 | Intersex- New Interdisciplinary Approaches | €2,727,302 |
| 53 | 2019 | EUROPEAN INVENTORY OF SOCIETAL VALUES OF CULTURE AS A BASIS FOR INCLUSIVE CULTURAL POLICIES IN THE GLOBALIZING WORLD | €2,999,875 |
| 54 | 2019 | Toward Just, Ethical and Sustainable Arctic Economies, Environments and Societies | €5,999,994 |
| 55 | 2019 | Development of a novel wave energy converter based on hydrodynamic lift forces | €3,404,730 |
| 56 | 2019 | Industrial Biotechnology Innovation and Synthetic Biology Accelerator Preparatory Phase | €3,995,065 |
| 57 | 2019 | Towards effective radiation protection based on improved scientific evidence and social considerations - focus on radon and NORM | €18,000,000 |
| 58 | 2019 | Neuromechanical Simulation and Sensory Feedback for the Control of Bionic Legs | €1,072,996 |
| 59 | 2019 | Unleashing future-facing urban hubs through culture and creativity-led strategies of transformative time | €7,998,425 |
| 60 | 2019 | Opera co-creation for a social transformation | €3,751,878 |
| Awarded projects since November 2019 | | | |

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|----|------|---|-------------|
| 61 | 2019 | Assurance and certification in secure Multi-party Open Software and Services. | €4,689,425 |
| 62 | 2019 | Digital Healthcare ECOosystem research and innovation capability building | €899,908 |
| 63 | 2019 | Foundations of Trustworthy AI - Integrating Reasoning, Learning and Optimization | €12,000,000 |
| 64 | 2019 | Targeting Real chemical accuracy at the EXascale | €4,998,848 |
| 65 | 2020 | Eco-friendly corrosion protective coatings based on smart nanotechnology platforms for a circular economy | €570,400 |
| 66 | 2020 | Establishing Citizen Science Hubs in European Research Performing and Funding Organisations to drive institutional change and ground Responsible Research and Innovation in society | €1,499,459 |
| 67 | 2020 | Prescient building Operation utilizing Real Time data for Energy Dynamic Optimization | €7,864,186 |
| 68 | 2020 | Sustainable and Integrated Energy Systems in Local Communities | €5,112,163 |
| 69 | 2020 | ECIU University Research Institute for Smart European Regions | €1,999,053 |
| 70 | 2020 | Sustainable energy system for achieving novel carbon neutral energy communities | €3,491,307 |
| 71 | 2020 | Training in Upscaling particle Systems: Advancing Industry across Length-scales | €4,115,968 |
| 72 | 2020 | YOUCOUNT - EMPOWERING YOUTH AND COCREATING SOCIAL INNOVATIONS AND POLICYMAKING THROUGH YOUTH-FOCUSED CITIZEN SOCIAL SCIENCE | €2,200,000 |
| 73 | 2021 | Pilot Application in Urban Landscapes - Towards integrated city observatories for greenhouse gases | €12,999,999 |
| 74 | 2021 | Socio-economic Empowerment of coastal communities as users of the sea to ensure sustainable coastal development | €5,197,513 |
| 75 | 2021 | 3Os and IP awareness raising for collaborative ecosystems | €999,000 |

Table 6 List of joint H2020/HEU projects awarded 2014 – July 2022

Appendix IV: Complete list of joint Erasmus+ Key Action 2 projects with two+ ECIU partners

| | Call Deadline year | Project Title | EU Contribution |
|----|--------------------|---|-----------------|
| 1 | 2014 | Collaboration and Innovation for Better, Personalized and IT-Supported Teaching | €449,966 |
| 2 | 2014 | PhDs Enhanced for Prospects- Erasmus Plus | €301,450 |
| 3 | 2014 | OnCreate | €447,353 |
| 4 | 2014 | Polycentric inspections of networks of schools | €406,642 |
| 5 | 2014 | Communication for Professionals - Nursing | €259,148 |
| 6 | 2015 | Risk and Security Governance Studies within Baltic – Nordic Academic Community of Practice | €292,110 |
| 7 | 2015 | Strategy For Change | €364,964 |
| 8 | 2015 | KOINOS. European Portfolio of Plurilingual Literacy Practices | €254,629 |
| 9 | 2016 | Students' Mobility Capacity Building in Higher Education in Ukraine and Serbia | €953,974 |
| 10 | 2016 | Observatorio Regional de Calidad y Equidad de la Educación Superior en Latinoamérica | €994,199 |
| 11 | 2016 | Knowledge Alliance on Product-Service Development towards Circular Economy and Sustainability in Higher Education | €999,951 |
| 12 | 2017 | Improving Employability through Internationalisation and Collaboration | €411,200 |
| 13 | 2017 | Learningshift The future of learning | €295,217 |
| 14 | 2017 | European Maturity model for Blended EDucation | €444,056 |
| 15 | 2017 | Accessible Online environment for encouraging autonomous English language learning aimed at people with disabilities | €209,787 |
| 16 | 2018 | ConductIT | €372,725 |
| 17 | 2018 | Building links between education, research and innovation on the foundation of our shared cultural heritage | €449,809 |
| 18 | 2018 | Promoting social responsibility of students by embedding service learning within HEIs curricula | €342,494 |
| 19 | 2018 | Improving the Digital Competences and Social Inclusion of Adults in Creative Industries | €292,338 |
| 20 | 2019 | Collaborative Platform for Teaching Innovation in Higher Education | €169,564 |
| 21 | 2019 | Inclusión social y éxito académico de los estudiantes chinos en la educación superior de la UE / Social Inclusion and Academic Success of Chinese Students in EU Higher Education | €423,925 |
| 22 | 2019 | MultiTraiNMT - Machine Translation training for multilingual citizens | €293,130 |
| 23 | 2019 | UNLOCK: Creativity in HEIs through a game design approach | €999,132 |

The ECIU University

| | | | |
|----|------|--|------------|
| 24 | 2019 | Intercultural Communication and Neighbourness Learning | €304,960 |
| 25 | 2019 | Advancing Equity and Access to Higher Education Through Open and Distance Learning | €993,207 |
| 26 | 2019 | LoCALL: LOcal Linguistic Landscapes for global language education in the school context | €276,472 |
| 27 | 2019 | Mobile Digital Training for Direct Care Workers dealing with Stroke Survivors | €248,128 |
| 28 | 2019 | Developing Research and InnoVation CapacitiEs in Albania and Kosovo | €927,755 |
| 29 | 2019 | DIG-MAN: Integration of digital tools into product development and manufacturing education | €352,971 |
| 30 | 2019 | Inclusive Method based on the Perception of Accessibility and Compliance Testing | €331,110 |
| 31 | 2019 | ECIU University | €5,000,000 |

Projects awarded since November 2019

| | | | |
|----|------|--|----------|
| 32 | 2020 | Development and implementation of a digital student preparatory course for developing academic skills and literacy practices | €328,880 |
| 33 | 2020 | Artificial Biology, Robotics and Art | €324,470 |
| 34 | 2020 | INTERSTICE. Encounters between artists, children and educators | €295,604 |
| 35 | 2020 | Fostering higher education students' autonomy through blended learning | €272,910 |
| 36 | 2020 | SALES PLATFORM STUDIES FOR HIGHER EDUCATION | €363,643 |
| 37 | 2020 | Building resilience through education for Sustainable, Collaborative and Smart Cities | €297,465 |
| 38 | 2020 | Social Enterprise through Virtual Environments and Remote Entrepreneurship | €436,778 |
| 39 | 2020 | BOT-Learning as a modern teaching method of GEN Z | €288,186 |
| 40 | 2021 | PRocurement Educational Consortium for Innovation-sourcing Using Sustainability | €386,046 |
| 41 | 2021 | Reflecting Cultures of Education - Transnationality and Cultural Awareness in Early Childhood Education Programs | €324,442 |
| 42 | 2021 | Sustainable Design and Process in Textiles for Higher Education | €261,093 |

Table 7 List of joint Erasmus+ Key Action 2 projects awarded 2014 – July 2022