NUCLEUS FIELD TRIP REPORT: ECONOMY (DUBLIN)

Deliverable D4.7

DELIVERABLE DESCRIPTION

On 21 to 22 June 2016, seventeen consortium members of the NUCLEUS project visited Dublin, Ireland for the fifth NUCELUS field Trip. The purpose of the trip was to explore the role of the economy in the practice of Responsible Research and Innovation (RRI). The specific aim of the field trip was to explore the interactions between RRI and the economy, one of six 'cells' in the NUCLEUS network. This report presents the insights gathered through the field trip interviews and considers their implications for the implementation of RRI.

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PROJECT

NUCLEUS is a four-year, Horizon 2020 project bringing Responsible Research and Innovation (RRI) to life in universities and research institutions. The project is coordinated by Rhine-Waal University of Applied Sciences. For more information, please visit the NUCLEUS website, follow our social media, or contact the project management team at info@nucleus-project.eu.

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EXECUTIVE SUMMARY

On 21 to 22 June 2016, seventeen consortium members of the NUCLEUS project visited Dublin, Ireland for the fifth field trip. The purpose of the trip was to explore the role of the economy in the practice of Responsible Research and Innovation (RRI). The specific aim of the field trip was to explore the interactions between RRI and the economy, one of six 'cells' in the NUCLEUS network. The field trip consisted of a series of interviews which aimed to provide the consortium with insights into the barriers and best practices for embedding Responsible Research and Innovation (RRI) practices in the Irish innovation ecosystem. The learning outcomes from the trip were formulated into recommendations for consideration in the next phase of the NUCLEUS project, the RRI Implementation Roadmap. This roadmap will be developed and embedded in the form of '30 RRI test beds' across different locations during the subsequent phases of the project.

The field trip was led by Dublin City University and was supported by the consortium partners from the University of Aberdeen, Science City Hannover, City of Bochum, South African Agency for Science and Technology Advancement (SAASTA) and Rhine-Waal University.

Thirty-five semi-structured interviews took places over the two-day period with senior representatives from the university, research agencies, social enterprise, policy makers and industry. The data from these interviews revealed the following themes in relation to RRI and the economy:

- RRI is a generally an unfamiliar term, but the concepts it represents are familiar.
- Many successful collaborations between industry and academia exist, however, there are challenges. Industry works at a much faster pace than academia, and has a commercial focus viewing its primary responsibility as making profit. Industry might have the willingness, knowledge and skills to deliver societal focused projects, but it must make business sense to engage.
- Each sector has different needs. How each sector will manage RRI will, therefore, be different.
- The interviews revealed that in some sectors there is an emerging trend of 'injecting-in' research and innovation capacity by acquiring it.
- Research institutions are often steered towards delivering research which is driven by industry investment and are required to develop and deliver a commercially focused product or service. The funding proposals and impact assessment reflect this.
- Public engagement is woven into the funding proposals and researchers are required to participate in communication and public engagement outreach activities. Employees from the industry partners involved in this field trip were

active in delivering engagement activities. Engagement for industry and researcher institutions, however was predominantly downstream in focus.

- Hackathons provide a unique platform for collaborative problem solving. While these platforms are very successful in driving solutions to certain issues, the existing model is commercially orientated. Hackathons in DCU ALPHA predominantly consists of male participants.

Based on the data emerging from these interviews and the reflections from the field trip participants, the following recommendations should be considered for the development of the roadmap and NUCLEI:

- Reconsider the use of the term RRI so the language and interpretation of the term is common to all engaged societal actors.
- Appoint relationship managers to act as brokers between industry, civil society, academia and policy makers.
- Develop systems and processes to protect key intellectual property rights, data and personnel.
- Make responsible practices an integral part of how research impact is measured.
- Assess the obstacles that result in academia working at a slower pace than industry.
- Create a systematic approach for sustained collaboration amongst all RRI actors.
- Introduce research and development vouchers that incentivise and support SME's in investigating and developing solutions that deliver societal benefit.
- Expand the remit of hackathons as a collaborative problem-solving platform to address societal challenges.

During the interview process, the following programmes and structures were discussed. The field trip participants highlight these as best practice examples for NUCLEUS. These include:

- **Science Foundation Ireland's (SFI) challenge-based funding model** (SAEI 2015). This is a solution-driven model for collaboration and engagement with the industry, academia and civic communities aims to identify and solve current and future societal research challenges.
- Dublin City University has developed a '**Community Knowledge Exchange'** (DCU 2016) which brings together social enterprises and researchers around topics that are common to both. An appointed Community Knowledge Exchange broker identifies the researcher(s) that can best support the external community partner and their research goals.

- IBM runs a Social Good Fellowship which is an opportunity for graduate or postdoctoral students to develop research that has direct societal benefits with the company. IBM Ireland also launched a collaborative research unit with University College Dublin (UCD) aimed at Advancing Cognitive and Sustainable Cities Research Capabilities (UCD 2015).
- DCU ALPHA, the universities commercial innovation campus, has an appointed **Community and Business Development Manager**. This role is focused on the long-term investment and support of industry-academic research collaborations.
- **DCU ALPHA** regularly host **problem orientated hackathons** which bring together a mix of actors to address certain issues over a short-term period.

CONTENTS

1   INTRODUCTION

On 21 to 22 June 2016, seventeen consortium members of the NUCLEUS project visited Dublin, Ireland for the fifth field Trip. The purpose of the trip was to explore the role of the economy in the practice of Responsible Research and Innovation (RRI). The specific aim of the field trip was to explore the interactions between RRI and the economy, one of six 'cells' in the NUCLEUS network. The field trip consisted of a series of interviews which provided the consortium insights into the barriers and best practices for embedding Responsible Research and Innovation (RRI) practices in the Irish innovation ecosystem. The report will formulate these findings into recommendations for consideration in the next phase of the NUCLEUS project, the RRI Implementation Roadmap.

As the field trip took place in Dublin, Ireland, there are a number of factors that should be contextualised and considered in advance of presenting the findings. These factors are outlined below.

1.1   IRISH DEMOGRAPHICS: A SNAPSHOT

According to the statistics released in 2016, Ireland has a population of 4.7 million, with

27.5% of the population residing in the nation's capital, Dublin. In addition, Ireland has a relative low dependency ratio with over half of the nation under the age of 35. It is forecasted a rise in school leaving population is set to continue to until 2030 (CSO 2013).

1.2   HIGHER EDUCATION IN IRELAND: AN OVERVIEW

Higher Education in Ireland is provided by 7 universities, 14 Institutes of Technology, 5 colleges and 10 smaller colleges. Figures released in 2015, indicated that the annual investment in HEIs core activities in Ireland amounts to €2.7 billion. The state funds approximately 74% of this (Department of Education and Skills 2015).

The Higher Education Authority (HEA) is the statutory planning body for higher education and research institutions in Ireland. In addition to holding advisory powers and funding, it is responsible for providing funds for research and educational services.

From the late 1990's, Irish governments became more focused on developing and implementing science and technology policies and took the decision to allocate public investment in research into the Higher Education system (Department of Education and Skills, 2015). This investment included a targeted approach aimed at building the Irish research infrastructure through the creation of:

- Science Foundation Ireland, The Research Councils,
- The Programme for Third Level Institutions
- Enterprise facing supports through Enterprise Ireland

Since the economic crisis in 2008, there has been important developments in relation to the public funding in Higher Education Institutions and research and innovation policy. Universities form part of the nexus that drive economic and social value. For this reason, higher education institutions and R&D played a critical role in Irelands building Ireland's Smart Economy.

The framework for "Building a Smart Economy" was published by Irish Government in 2008. This document outlined the actions required for sustainable economic renewal. Universities and the role of R&D were central to achieving the economic revival. The objective outlined has strong emphasis on commercialisation and job creation as a means of rebuilding a sustainable economic environment. As the report states:

> The objective is to make Ireland an innovation and commercialisation hub in innovative R&D intensive multi-national while also being a highly-attractive incubation environment for the best entrepreneurs in Europe and beyond. This will be the successful formula for the next phase of the development of the Irish economy and for delivering quality and well-paid jobs (Department of the Taoiseach 2008).

Job creation also featured strongly in the report entitled National Strategy for Higher Education 2030 (HEA 2011). In this document, the objectives of Higher Education Institutes in Ireland were framed in the context of the Government objectives for delivering a Smart Economy. The Higher Education system was tasked with playing a critical role in rebuilding an innovative knowledge-based society that will provide 'sustainable employment opportunities and good standards of living for Irish citizens' (HEA 2011).

As Ireland emerged from economic crisis from 2011, efforts to further shape the Irish research and innovation landscape resulted in a prioritisation of research investments into 14 targeted areas which were likely to yield the most economic and societal impact The priority areas identified in the strategic report include ICT, Health and Medical Technologies, Sustainable Food, Energy, Manufacturing & Materials, Innovation in Services and Business Processes. This measure supported policy makers to see the visible impact of public funded research on economic and business performance and job creation. As a result, research grants proposals placed stronger emphasis on delivering evidence that supports governmental objectives of job creation and business performance. Higher Education institutions also placed an increased focus on

collaborations between institutes as well measures to promote knowledge transfer of research into commercial business ideas. These actions are supported by measures to create a new regulatory and taxation regime for intellectual property (IP) (DJEI 2011).

Ireland's most recent Strategy for Research and Development, Science and Technology (SSTI), entitled Innovation 2020, complements other government policy reports and emphasises the national plan to keep the recovery by focusing on rebuilding a sustainable economy which supports full employment through the implementation of a shared vision by all key actors. The report sets out a vision focusing on 'excellence, talent and impact' in Irish Research and Development. As noted on the Global Innovation Leader strategy, by 2020, Ireland, with assumed public and private funding commitment of 2.5% GNP, will have the following research infrastructure and supports in place.

- "Excellent research performed in strategically important areas with relevance and impact for the economy and society.
- A strong, innovative and internationally competitive enterprise base, growing employment, sales and exports.
- A renowned pool of talent in Ireland's public research system and in industry, which maximises exchange of talent and knowledge between the two.
- A coherent, joined-up innovation ecosystem, responsive to emerging opportunities, delivering enhanced impact through the creation and application of knowledge.
- An internationally competitive research system that acts as a magnet and catalyst for talent and industry" (Interdepartmental Committee on Science, Technology and Innovation 2015).

1.3   IRISH ENTERPRISE: AN OVERVIEW

In addition to being considered one of the most open economies in the world with ease of access to US, European and Middle Eastern markets, Ireland has a strong reputation for talent, technology infrastructure, a connected business ecosystem as well as the 12.5% corporate tax rate. These elements have proven to be a successful mix for attracting FDI investment from a range of diverse industry sectors as well as having a thriving start-up culture (IDA 2016).

Ireland has a strong base for high-growth multi-national companies. Nine of the top ten US technology companies have a presence in Ireland. These companies include Facebook, IBM, Ericsson, Yahoo, and PayPal. Since 2010, it has been reported that over 100 High Growth global companies have been established in Ireland, with the support from the Irish Development Agency (IDA).

While many major multi-national organisations have a strong presence in Ireland, 99% of the companies operating in Ireland are Small to Medium Sized Enterprises (SME's), employing less than 250 people (IDA, 2016) Ireland is highly regarded as a start-up friendly environment and has long been praised for its capacity to encourage and support entrepreneurship.

1.4 CORPORATE SOCIAL RESPONSIBILITY IN IRELAND

The term "Corporate Social Responsibility (CSR)" has increased in prominence amongst those in the industry and, more recently, policy makers in Ireland. The concept of CSR, which is also frequently referred to as corporate citizenship, responsible business and corporate social value. The European Commission defines CSR as 'the responsibility of the enterprises for their impact on society' (European Commission 2016).

The practice of "giving back" to communities has occurred on an informal basis for many years within many companies, both big and small. Examples of such initiatives include philanthropic donations to local sports clubs and volunteerism to support educational initiatives across the country. More recently, and since the emergence from the economic recession more and more companies are embracing a more strategic and formalised approach of embedding CSR practices into their business strategy.

Most businesses are profit seeking organisations. In addition to having positive shared impacts on the wider community, the strategic management of an organisations societal, environmental and economic impacts has attributed to the introduction of CSR linked positive impacts on business performance and competitiveness by introducing benefits such as improved stakeholder management, improved business reputation, attracting, retaining and motivating a high skilled workforce.

The adoption of CSR in Ireland has been championed by Business in the Community Ireland (BITCI) and by the American Chamber of Commerce for many years. From 2011, the Irish government began formally endorsing the voluntary adoption of CSR by Irish enterprises for the reason cited as playing a role in contributing to Ireland's economic recovery: when enterprises go beyond what is required by legislation, positive impacts can be felt across the local and wider communities in which they operate (DJEI 2014).

In April 2014, further momentum was created with the publication of the first National Plan on Corporate Social Responsibility. This key objective of this plan focused on the development of a CSR Hub and Stakeholder Forum, in an effort to further support both SME's and multinational companies maximise their collaboration with all key stakeholders (DJEI 2014).

1.5 DUBLIN CITY UNIVERSITY

This section provides some background on the field trip host partner, Dublin City University and outlines its current research strategy.

1.5.1 ABOUT DCU UNIVERSITY

DCU is a young, dynamic and ambitious university with a distinctive mission to transform lives and societies through education, research and innovation. Since admitting its first students in 1980, DCU has grown in both student numbers and size and is now Ireland's fastest growing university, with over 16,000 students and 1,600 staff, across 3 academic campuses. DCU currently delivers more than 200 programmes across its five faculties – DCU Institute of Education, Humanities and Social Sciences, Science and Health, Engineering and Computing and DCU Business School. DCU offers an international campus experience, with over 2,600 students representing 108 countries.

DCU describes itself as the 'University of Enterprise' and has special ties with the industrial sector and with innovation. DCU's enterprise focus is reflected in its strong industry-academic collaborations and successful execution of licences arising from its intellectual property portfolio. DCU's excellence is recognised internationally and it is ranked in Times Higher Education's 'Top 100 under 50'. DCU is also the only Irish university to be represented in the prestigious European university network, The European Consortium of Innovative Universities (ECIU).

Research is a high priority at DCU, with the focus on global grand challenges, such as healthcare needs, sustainable development, multicultural societies, and conflict resolution. DCU's research strategy aims to transform lives and societies through education, research and innovation. DCU has built a strong reputation as a research-intensive university of enterprise and remains focused on translating knowledge into

economic and societal benefits. In line with this goal, DCU's current research and development strategic plan is entitled: 'Transforming Lives and Societies'.

To achieve this vision, DCU has oriented its research and development efforts on four externally facing research areas, or 'Hubs', that are of national and international importance (please refer to Figure 1). The 'hubs' include:

- Health technologies, and the healthy and ageing society.
- Information technology and the digital society.
- Sustainable economies and societies.
- Democratic and secure societies.

As illustrated in Figure 1, these four research areas are further enhanced and supported by three cross-cutting platforms: the Societal Impact Platform (for human and social insights into science and technologies); the Business Innovation Platform; and the Science and Technology Enhancement Platform.
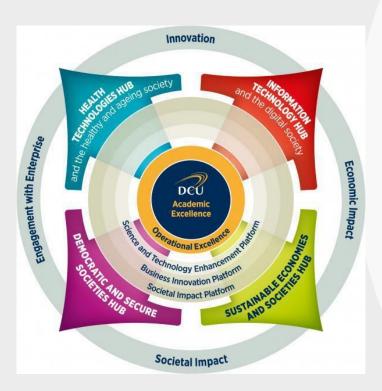

Figure 1 DCU's research and innovation matrix

The Societal Impact Platform (SIP) facilitates knowledge exchange across disciplines-such as the inclusion of SMEs, NGOs and AHSS researchers in largescale internationally-funded research and innovation projects, as well as developing smaller-scale community-

based research projects. In its strategic objectives, it will use internationally recognised methods of internal validation of Responsible Research and Innovation (RRI).

The Societal Impact Platform (SIP) assists research teams and consortia integrate RRI approaches into their work. For this reason, the goals of the NUCLEUS project closely align with this platform. The key objectives of the Societal Impact Platform are:

- To evaluate and advise DCU Research and Enterprise hubs and the DCU research community in general on social issues and societal impact associated with their research proposals.
- To increase public engagement with DCU research and innovation, through 'outreach' programmes, the Innovation Campus and other science/society interaction.
- To identify and facilitate where the humanities and social sciences can partner with the physical sciences in H2020 and other research opportunities emerging through the Hubs, and aligned with international academic, administrative, industry and civil society networks.

This strategic focus, combined with the university's strong track record of engagement, collaboration and delivery with a wide variety of partners from academia, SME's, large national and international corporations, social enterprises, public bodies and charities, provides the ideal platform for NUCLEUS participants to gain an understanding of a research and innovation ecosystem and the role a university like DCU plays in the creation of interactions with societal and economic actors.

1.6   RATIONALE FOR DUBLIN FIELD TRIP

To support NUCLEUS researchers track what we might call 'dendrites' from DCU research out into the RRI & Economy Cell, 6 strands were identified where RRI may be an appropriate part of the research-industry nexus. These were developed by the field trip organisers as a means of segmenting interviews into focused areas which reflect the interaction and role of the university with society and economy. Interviewees for the field trip were selected on the basis that they conformed to the one or more of the strands listed below.

- **HEIs and Social Enterprise** - the concept of social enterprise is growing within and outside university systems, where the central innovation product or service has an ethical, community-based or green mission at its core as well as 'bottom-line' of commercialisation;

- **CSR meets RRI** – larger companies in particular have adopted a spirit of 'giving back', either to the local area or to the entire planet.
- **HEIs, institutionalised engagement and RRI** – for the benefit of the RRI Roadmap, an understanding of how contemporary universities - perceived as threat from under market forces – can realistically engage with industry and society in tandem, while keeping academic freedom and an ethos of scholarliness.

- **Student attributes for enterprise**- the core 'business' of a university remains education. Can the next generations who are expected to be the business leaders of tomorrow carry with them principles of RRI, to create an inevitability of RRI in society?
- **Science policy and RRI (in the context of national competitiveness**) – the crucial structural factor to embed RRI across the research ecosystem to see if, and where, RRI can be taken up or embedded within a policy system of a small, open economy recovering from the worst financial crisis in generations, and in a culture where national and global competiveness is a main policy driver;
- **Creative innovation in the city**: hackerspaces, makerspaces, Science and the City: these are the terms of a new urban culture of creative-design-technological spaces.

1.7   SCHEDULE AND DETAILS

The field trip followed a two-day standard NUCLEUS field trip structure with thirty-five interview sessions spread over two or three parallel sessions during the two-day period (please refer to Appendix B for the programme schedule).

1.8   FIELD TRIP

INTERVIEWS

The interview sessions were structured into three parallel sessions, for most interviews, with 5-6 researchers taking part in each one. Thirty-five representatives were interviewed overall. This format was implemented in an effort to create an environment conducive for discussions and to gather as much information as possible over the two-day period. In the final session, the entire group gathered together to reflect on the main points arising from the trip. Each participant also submitted a document following the trip which captured the reflective thoughts on the barriers, opportunities and other key points arising from the trip.

An interview lead was appointed in advance of the session and a note-taker was assigned prior to the interview commencing. These roles were rotated for each interview.

1.8.1   INTERVIEW PROMPTS

The following questions were used as prompts for each interview sessions. Interviews with DCU research units and the hubs had a slightly different set of standard questions to the ones which involved external stakeholders. In addition to the questions listed below, interviewers were encouraged to ask any questions they felt appropriate. In practice, while each interview was based on the same set of questions, the conversation and many questions turned out to be more diverse and wide-ranging.

Interview prompts: DCU Research units and hubs:

- Thinking about your institution, how do you see a role for you with respect to Responsible Research and Innovation (RRI)?
- How do you or does your institution interact with other organisations in research and innovation projects, with particular emphasis on and 'translation' for jobs, commercial products, services and enterprise etc. (local, regional, national, international)?
- How can a local or national economy benefit from what you know of RRI? Might there be barriers in both directions: could there be enterprise /industry barriers to RRI, or in what ways could RRI itself be a barrier to enterprise?

Interview prompts: Non University/Industry/Policy:

- Thinking about your institution, what role is there for you in the governance of research and innovation?
- How do you, or your institution interact with other organisations in research and innovation projects, with particular emphasis on 'translation' for jobs, commercial products, services and enterprise etc. (local, regional, national, international)?
- How do you see a role for you with respect to Responsible Research and Innovation (RRI)?
- How can a local or national economy benefit from what you know of RRI? Might there be barriers in both directions: could there be enterprise /industry barriers to RRI, or in what ways could RRI itself be a barrier to enterprise?
- Although the questions mentioned above framed the meeting to a certain extent, the participants were also encouraged to ask any questions they felt appropriate and, in practice, the questions were more diverse and wide-ranging.

1.9   INTERVIEWEES

The names of the interviewees that participated in the field trip and the programme schedule can be found in Appendix B. Due to some last minute changes, this list varies slightly from the printed schedule issued to participants and referenced in Appendix B. Full details in relation to the organisation of those listed can be found in Appendix C.

2   RRI AND FIELD TRIP INSIGHTS

Field trip participants provided written summaries of their observations and reflections and the note taker from each session provided the notes to the report writer. Statements were populated into a Microsoft Excel Sheet and following a process of coding and grouping thematically, several concepts began to emerge. The sections below outline and discuss these key concepts. Local schemes that supported RRI implementation by interviewees in relation to the field trip theme RRI and economy are also highlighted below.

2.1   RRI: AN UNFAMILIAR TERM

The difference in the use and interpretation of language between industry and academia was discussed several times over the course of the field trip interviews.

In many of the interviews, particularly those with industry, employer representative bodies and policy makers, it became apparent RRI was an unfamiliar term. In a small number of cases, interviewees had heard of the term but were unsure of its meaning. Despite the general lack of familiarity with the term "Responsible Research and Innovation" (RRI), however, most interviewees were familiar with the basic concepts and goals of acting responsibly and creating social value. Industry managed the activities of responsible engagement under the Corporate Social Responsibility or Corporate Citizenship functions. When asked "what do you think RRI means?" one industry interviewee said 'it must be something to do with communication', while another interviewee representing industry stated, 'because of the word responsible, it must be linked with "not-for-profit", "sharing economy".

The term was more commonly used in academia, although some academic based interviewees but were still unclear as to what RRI actually involved. One interviewee said 'I hadn't heard of it before this, I had to Google it but when I did, I recognised the language and activities'.

2.1.1   POTENTIAL SUPPORT AND STRUCTURES THAT COULD SUPPORT RRI

Representatives from Community Ireland (BITCI) and The American Chamber of Commerce participated in the field trip interviews. There is scope to work with similar industry networked organisations to identify similarities, between academia and industry, in the use and interpretation of RRI language.

2.1.2 BARRIERS TO EMBEDDING RRI

Field trip participants raised the following concerns in relation to lack of widespread understanding of the term RRI:

- If NUCLEUS aims to create, inclusive, sustainable, collaborative relationships that actively engages all key stakeholders, then it is important to speak a language that is common to all those involved in the process.
- A clear and direct paradigm can be a good opportunity for economy and society to work on CSR and better societal engagement while incorporating both industry and societal needs and values towards economic prosperity.
- The use of language that is not common to policymakers and industry risks could further reinforce the stereotype that researchers speak a different language and are disconnected from the wider community.
- Representatives from industry, that were actively involved and managed the organisations' 'Corporate Social Responsibility' departments, did not feel adept in engaging in the conversation about RRI. As the NUCLEUS project unfolds, universities will potentially engage with these representatives. Finding a language common to all will be essential to realise the long-term objectives of the NUCLEUS project.

2.2 INDUSTRY-ACADEMIA ENGAGEMENT

During the field trip it was clear that strong connections between industry and academia existed. Challenges do exist however. The interviews also revealed ways industry-academia partnerships could become further orientated towards RRI. Sections 2.2.1, 2.2.2 and 2.2.3 outline the data collected on this topic. This data is categorised into the following themes:

- Motives: profit making versus 'for the greater good'.
- The drumbeat of industry and academia.
- Integrating different lexica: relationships and systems.

2.2.1 MOTIVES: PROFIT MAKING VERSUS 'FOR THE GREATER GOOD'

Conversations with industry representatives during the field trip suggested that as commercial entities, the primary responsibility of enterprise is to make profit. If resources are constrained, an organisation will assess if the proposed research is core to what they do. While the company might have the knowledge and underlying desire, expertise and willingness to focus on research and develop research opportunities that concentrate on delivering societal benefits, it tends to be a secondary goal. One interviewee said, 'we are not doing them (EU projects) because it is not a nice thing to do

but because it must make business sense to do it'. This interviewee then posed the following question for the interview panel, 'how do we get science and technology deployed for the benefit of society and make money from it?' This needs to be considered if more companies are going to out rightly engage in this type of R&D.

Societal benefits such as creation of jobs, wealth etc. were cited, however, as a secondary benefit which resulted when enterprises were innovative, competitive and profitable.

In start-ups and research centres that are governed or are linked with industry via funded programmes, impact is often measured on the delivery of commercial or profit making capacity. This bureaucratic system linked with research funding and reporting resulted in stifling the goals of building research that focuses on benefitting society.

During the interviews, it also emerged that companies are acquiring or outsourcing the research and development function as means of remaining both innovative and competitive. This was more prevalent with smaller organisations, such as SME's and micro-companies, where data or research is acquired or outsourced, often from lower cost markets, such as India and Asia.

In the context of the NUCLEUS project, one interviewee mentioned that there are not only differences between aligning science with external partners for the greater good, but there are differences between different industry sectors. This factor should, therefore, be considered as the NUCLEI develop a model for engagement.

2.2.1.1 Local Schemes and Structures that Support RRI

While there was a predominant commercial focus associated with making a responsible impact, the interviews revealed excellent examples of schemes which aim to directly support the systematic embedment of RRI in the economy. During the interviews the following schemes and structures were discussed:

- BITCI and The American Chamber of Commerce can provide guidance how to create case studies on the economic benefits which translate from acting more responsibly.
- IBM currently run a Social Good Fellowship which is an opportunity for graduate or postdoctoral students to develop research with the company that has direct societal benefits.
- In 2015, IBM Research-Ireland launched a collaborative research laboratory with University College Dublin (UCD 2015).

- Science Foundation Ireland (SFI) will launch a challenge-based funding model from 2017. This model aims to facilitate strategic collaborative engagements between industry, academia and civic organisations.
- Science Foundation Ireland (SFI) developed an Impact Framework in partnership with a network of similar sized countries at the similar stage of economic development under the Small Advanced Economies Initiative (SAEI 2015; SFI 2016). The framework is centred on enabling holistic consideration of multiple aspects of impact beyond those that are commercially grounded. This framework recognises impact across a multiple areas including those that can affect economies, social, human and natural capital.

Figure 2: Science Foundation Ireland Impact Framework (SFI 2016)

The framework consists of the following eight impact pillars:

- Economic and commercial
- Societal
- International engagement
- Impacts on public policy services and regulations
- Health and wellbeing
- Environmental
- Impact on professional services
- Impact on human capacity

Three themes cut across all of the eight impact pillars. These themes are:

- Creating new products, processes, policies and behaviours.
- Improving efficiency and efficacy of existing practices/policies or behaviours.

- Building resilience, sustainability and reducing risk (in relation to the economy, natural environment, health or wider society).

The latter two themes are often underrepresented in research reporting structures, a point raised by researchers during the Dublin field trip. This framework, however, positions these broader societal impacts as an integral part of the research process and progress reporting. The publication outlines the rationale for highlighting a range of potential impact areas:

> The main objective of highlighting the wide variety of potential areas of impact from the start is to encourage researchers and those designing research programmes and funding mechanisms to consider the variety of ways in which the results may benefit or affect parts of society. There is not an expectation that researchers will have a perfect pathway and fixed process for delivering impact at the start of a project or centre, and during the programme new discoveries may result in unexpected outcomes; flexibility in the monitoring to accommodate this is therefore appropriate (SAEI 2015, pg. 10).

This framework clearly aligns with the goals of the NUCLEUS project and was highlighted during the field trip as an excellent example of a systematic approach for embedding RRI focused research processes in the respective consortium locations.

2.2.1.2 Barriers to Embedding RRI

In respect to embedding RRI in the next phase of the NUCLEUS project, the NUCLEI, the following barriers were identified in relation to this theme.

- Social enterprise is often not viewed as contributing to the economy. It is not linked or associated with the creation of jobs etc.
- Outsourcing research and development or 'injecting in' acquired knowledge or processes to appear more responsible raises ethical concerns in relation to the value and understanding associated with the key principles of RRI. This can also raise wider ethical concerns and undermine the ethos of RRI.

2.2.2 THE DRUMBEAT OF INDUSTRY AND ACADEMIA

Industry operates at a much quicker pace to academia. This difference in pace, or drumbeat, as referred to in one of the interviews was a common theme in the interviews.

One interviewee highlighted 'innovation in industry is ten years ahead. Technology is so progressive that industry cannot afford to slow down to the pace that academia can work at'. A common theme emerging from the interviews was the disparity in the pace that industry and academia worked.

While one organisation claimed that the problems cooperating with publicly funded institutions are becoming less and less, the complexities and time required to apply for funding at national and EU level, in particular, were considered a drawback for industry to engage. With the fast paced nature of enterprise, it became apparent that some companies build on innovative capabilities by merging elements together e.g. taking technology and injecting in elements that are developed or are in the process as opposed to engaging research and development projects from the outset, which usually take considerable investment of time and resources. Schemes, such as the Industry Fellowship Scheme (SFI, 2016) which aims to support academic partnerships, has received less than expected take-up. One of the primary reasons cited for this, was the inability of such schemes to deliver projects at the pace at industry worked at.

2.2.2.1 BARRIERS TO EMBEDDING RRI

The speed and pace at which industry is forced to create innovative developments is unprecedented. Academic researchers are not producing work or research support at a quick enough pace to meet the demands from industry. This operational difference has already posed challenges for creating successful academia-industry collaborations and will could play a critical role in future success of embedding RRI into our economy and society.

2.2.3 INTEGRATING DIFFERENT LEXICA: RELATIONSHIPS AND SYSTEMS

While there are several positive outcomes derived from the existing collaborative frameworks between industry, academia and funding bodies, the data from the sessions highlight some practical challenges as well as suggestions for solutions.

One interviewee mentioned that the system can be stifling given that researchers spend the majority of their time writing proposals, with someone from a 'great height determining the outcomes'. When successful in winning a bid, researchers then have to provide metrics on an ongoing basis, with quantifiable impacts as a primary focus. As a result, researchers were often steered into being scientific project managers of scientific commercial products as opposed to being excellent scientists.

Big companies however were cited as having 'big political muscle', leading to situations where compromises are made to support the achievement of business goals. The field trip revealed that smaller companies, which make up 99% of Ireland's enterprise sector, can find the bureaucracy of such systems and processes difficult. A framework which facilitates freer movement between sectors and SME's was suggested as a solution. Creating industry and academic partners that were based in relatively close geographical proximity was also raised.

There is financial support available. Enterprise Ireland offer grants, to the value of €5,000, to SME's that want to explore a business opportunity or conduct research. These are called Innovation Vouchers. They are strongly linked with the direct economic and commercial benefit. For example, the list of ineligible activities that these vouchers cover is: 'activities unlikely to result in commercial enterprise or business capable of generating jobs and/or exports' (Enterprise Ireland 2015).

Interviewees believed that a framework which fosters trust between industry-academic partners was considered critical for a successful research process and outcomes. This can be a challenge as most universities are required to manage industry-research relationships through a commercial unit. One industry representative mentioned that the successful relationships require protection of key intellectual property (IP), and collaboration in relation to sharing data and personnel. In cases where academic-industry research collaborations were set-up effectively, it was considered a win-win for all involved. Industry-academic collaborations were an opportunity to not only solve critical problems, but each side developed new skills and way of thinking. By working with industry, researchers gained a more commercial approach while the industry ideas were challenged throughout the process.

The interviews also revealed that industries require full information on a project they are investigating and often, universities do not have access to this vital information. Rather, the government, local authority or civic organisations might hold this information.

Introducing incentives aimed at encourage sustained collaboration between key societal actors, beyond the research contract, was also raised. An industry interviewee mentioned, 'it comes down to understanding the relationship that an industry has with the university sector. Understanding what each university does, who is good at what, existing capabilities, understanding the politics; and university could say the same about industry'. Having an appointed business development person to act as a broker between industry and academia was raised on several occasions. Research centres with head and business development person were perceived as being 'good research centres' by industry representatives.

2.2.3.1 Local Schemes and Structures that Support RRI

During the Dublin field trip, the appointment of a Community and Business Development Manager at DCU Alpha (DCU's innovative campus) was identified as a supporting the embedment of RRI. This role involves liaising, connecting and supporting researchers and industry partners test and develop new ideas. This position highlights the focused long-term investment in managing collaborative relationships.

2.2.3.2 Barriers to Embedding RRI

- RRI should not be perceived as a further bureaucratic barrier to innovation. This could be the result, however, if the steps to further support collaboration between industry, of all sizes and sectors, and academia is not carefully considered.
- Each stakeholder in a collaborative partnership has vested interest. Balancing the interests of involved parties is critical in overcoming potential barriers in embedding RRI practices successfully.
- The reporting metrics and deliverables linked with research funding grants play a fundamental role in how research will be carried out. Embedding RRI into HEIs funded programme grants and national policy papers could play
- Due to reduced funding, resources at third level are often focused into the development of structures rather than into building relationships that will support the development of critical relationships between economy and society.
- Given the scale and size of many universities, coupled with the departmentalised structure of many universities, industry and policymaking representatives can find it difficult to establish who the key point of contact is.
- Universities generally align work to the academic calendar months while industry working calendar runs from January – December.

As each industry and sector have different needs, there is no 'one shoe fits all' for RRI. The innovation ecosystem is complex and varies from country to country and is impacted by national and global economic circumstances, as evidenced in Ireland. RRI cannot be solely driven by funding opportunities, if the correct incentives and implementation are not used, then projects will fail.

2.3 PUBLIC ENGAGEMENT IS PREDOMINANTLY DOWNSTREAM, BUT CHANGES EVIDENT

The series of interviewees provided field trip participants with a host of excellent public engagement examples. Although some examples of upstream public engagement were evident, the primary focus of engagement from those interviewed was downstream.

In industry, Corporate Social Responsibility (CSR) was notably removed from the research function, although communication links existed between the CSR and the research teams. In some cases, the main research function was not based in Ireland. The focus on the CSR or Corporate Citizenship functions was primarily on responsible business practices or shared value practices. Social issues for CSR were still strategic but more 'on the ground'. Although industry partners were very open to working with universities, the current motivation for engagement with third level institutions and local citizens was centred on engaging employees in outreach activities. The primary focus of these outreach activities is to share career story aimed at ultimately fastening the company talent pipeline with STEM (science, technology, engineering, maths) professionals.

Public engagement work is considered imperative to what the research institutions do. It is a requirement for researchers funded by SFI. Researchers are expected to 'bring the research they do and the way they do it into the public'. Engagement and communication with the public generally consisted of involvement in outreach activities, including showcasing products at public events. Other public engagement activities include sharing information and results with the media. One representative mentioned that despite the compulsory nature of researcher involvement in public engagement and outreach activities, the PhD students do not see the advantages of taking part.

DCU ALPHA regularly hold hackathons which are a problem solving fairs which bring together researchers, industry partners and, on occasion, sponsors, to address certain issues over a weekend. For this particular model, DCU Alpha acts a mediatory between the university and other actors. No intellectual property agreements are issued. Given that Ireland is a small country, social control is considered robust enough to prevent abuse of the hackathon space. In fact, the interview revealed when participants were asked to sign legal documents, it deterred hackers from engaging.

2.3.1   LOCAL SCHEMES AND STRUCTURES THAT SUPPORT RRI

The field trip highlighted systems and structures existing in Ireland that support RRI and upstream engagement.

- Dublin City University has developed a 'Community Knowledge Exchange' (DCU, 2016) which brings together social enterprises and researchers around topics that are common to both. An appointed Community Knowledge Exchange broker identifies the researcher/s that can best support the external community partner and their research goals.

- The SFI Impact Framework (SFI, 2016) referenced in 4.1.4 is an excellent local example of developing research with and for the benefit of both economy and society, dependent on inclusion of civic society and related groups.
- Hackathons are problem-orientated fairs which bring together academics and industry partners to address certain issues over a short time frame. Although the current model run by DCU ALPHA is focused on solving commercial challenges. This model could be expanded to include the grand societal challenges and should be further explored for the next phase of the NUCLEUS project, the development of NUCLEI.

2.3.2 BARRIERS TO EMBEDDING RRI

- Public engagement is generally a precondition linked with research grants. Despite researchers being actively engaging in the process, the lack of impact felt by the downstream nature of public engagement is reported.
- Public engagement is often woven in with marketing agenda of profit making organisations driven by an agenda to build corporate reputation.

3   IMPLICATIONS FOR THE RRI ROADMAP IMPLEMENTATION

The NUCLEUS field trip participants put forward the following recommendations for consideration and for the RRI roadmap implementation and below.

Barrier: The language of RRI is inaccessible to stakeholders outside of academia.

- **Suggested Solution:** Use terms that are more accessible and commonly used in amongst all participating stakeholders. Failure to speak language that is common to all stakeholders could jeopardise the success of the project and further isolate the universities from other community actors.

Barrier: It is difficult to establish relationships between industry and researchers.

- **Suggested solution:** In this field trip, the appointment of an individual that would act as a liaison and/or 'broker' between industry, government and university was advised.
- It was deemed important, for industry representatives that this person could speak the language of industry and could engage with them on a similar level.
- It was advised that this person, remains outside the researcher-funder relationship and could 'match' needs of industry with research support.

- To fully embed RRI, this broker should also engage and represent civil society and related groups.

Barrier: Research institutions are not utilising existing structures and relationships.

- **Suggested Solution**: It is recommended that each NUCLEUS partner conducts a structure and relationship audit. Undertaking a form of audit, mapping or analysis of the structures and relationships that exist is an important starting point in guiding the implementation of RRI practices.
- The data emerging from this exercise will also act as a useful tool in the self-evaluation of progress made as the project unfolds.

Barrier: Industry concerns, over Intellectual Property, hamper collaborations with academia.

- **Suggested Solution: T**he interviews highlighted that, in order for industry to efficiently and effectively engage with universities, systems and processes which protect key IP and support the management of shared data and personnel, should be in place from the start of industry-academia research collaborations.

Barrier: Responsible practices are not an integral part of how research impact is measured.

- **Suggested Solution:** Incorporate RRI into all aspects of the university programmes and job specifications.
- Develop systems which ensure RRI is fully endorsed by management at all levels and embedded into all relevant systems and processes.
- To bring about systematic change, RRI principles must also be an integral part of the funding proposal and impact measurement system.
- As referenced in section 4, Science Foundation Ireland has developed a best practice Impact Framework with the Small Advanced Economies Initiative (SAEI 2015, SFI 2016). It is recommended that this framework be further investigated as a best practice example.

Barrier: The fast paced nature of business development and delivery could inhibit industry engagement with RRI practices.

- **Suggested Solution:** Further investigation and outlining the causes for divergence and slower pace is recommended. Conducting interviews with local stakeholders

from academia and industry will provide useful detail on the main causes for the disparity of pace between the two actors.

Barrier: Collaboration between universities and societal actors, including industry, rarely continue beyond the lifecycle of the project

- **Suggested Solution:** To encourage sustained engagement, it is recommended that the appointed business development manager meets with external stakeholders to identify their needs. This person will not only act as a broker, but a conduit to ensuring engagement is sustained beyond the life cycle of one research project.

Barrier: There is a lack of monetary incentives and support for small and medium enterprises to conduct research that addresses societal issues.

- **Suggested Solution:** As noted in section 2.1.5, Innovation Vouchers are issued by Enterprise Ireland to support SMEs investigate research problems or develop a product prototype. It is advised that a version of these vouchers be issued which focus on supporting SMEs conduct research that addresses societal challenges.

Barrier: There are few opportunities for industry, academia and other stakeholders to meet.

- **Suggested Solution:** DCU Alpha regularly run problem-orientated hackathons. These platforms provide a unique opportunity for a diverse range of actors to join together to solve certain issues. While the focus on the existing hackathon currently is quiet commercially driven, it is recommended that the remit of this model be expanded so societal issues can also be addressed.

4 FIELD TRIP PROCEEDINGS

4.1 SCHEDULE CHANGES

Two interviewees cancelled their participation in scheduled session for personal reasons on the morning they were due to participate. In both cases, groups joined an alternative group for scheduled interview session.

4.2 TRANPORT

Public transport options from Dublin City University to the city centre are limited, given the universities location. Ensuring efficient transportation from one interview location to the next, particularly for those meetings off campus, was essential. Taxis were pre-booked to transport interview groups to various interview locations. This ensured taxi the most efficient and comfortable means of transporting the participants to the off-site interview locations. Where possible, participants walked to the next interview location.

4.3 MANAGEMENT OF DIARIES

In an effort to facilitate the willingness of the interviewees to participate and to give participants access to a diverse range data sources, some sessions were limited to thirty minutes.

4.4 IMPLICATIONS FOR FUTURE FIELD TRIPS

To retain:

- The programme, although quite busy, received positive feedback from participants noting that they 'experienced some great, productive, open discussions about the relationship between RRI and the economy during the trip'.
- The notes from each session were saved on a USB drive by the report writer, during the closing reflection session, and were saved immediately on a hard drive. This lowered the risk of losing the data following field trip participants' departure from the site location.
- Each of the groups for the parallel sessions has a dedicated chaperone who was fully briefed on the programme schedule and, where possible, had a relationship with the interviewees. The chaperones were critical in supporting the logistics surrounding the transportation of each of the three groups and as a support to the field trip participants.
- The notes from each session were captured by the report writer during the closing session. This proved extremely helpful.
- Each of the groups for the parallel sessions has a dedicated chaperone that was fully briefed on the programme schedule and, where possible, had a relationship with the interviewee directly or had previously worked with the stakeholder in question.
- Communication in relation to the Field Trip logistics during the trip was disseminated via a WhatsApp group. This proved a useful means of immediately communicating with the group at large and to highlight any minor schedule changes and updates.

For Consideration:

- As professional researchers, the field participants are required to remain objective in the data collection process and is essential to protect the identity of the individuals interviewed following the interview process.
- It is advised that field trip participants are provided with an overview of the macro economic challenges prior to attending the field trip. This is to enable the easier contextualisation of the data to each participating institute.
- While it free-flowing and responsive conversation, between interviewers and interviewees, is encouraged, in cases where interview time is limited, deviating too far for the standardised questions is not advised. In these circumstances, it is essential that the interview lead is aware of the time and manages the interview focus. This will help support the validation of research findings.
- To support ease of accessing, tracking and analysing the evaluation documents, it is recommended that the digital version of the evaluation forms and the reflection sheets are issued to field trip participants. As the consortium website continues to introduce new measures to support consortium members, these forms could be shared in the resource section for participants to access.

5   CONCLUSIONS FROM THE DUBLIN FIELD TRIP

The aim of the Dublin field trip was to explore the interactions between RRI and the economy, one of six 'cells' in the NUCLEUS network. This report aimed to outline the main themes that emerged from this data gathering exercise and put forward best practice processes and programmes that could support and inform the subsequent stages of the NUCLEUS project.

Data was gathered by the seventeen field participants during the thirty-five scheduled interviews which took place on Monday 21st and Tuesday 22nd June 2016. These interviews provided the field trip participants with sufficient data to give insight into the main barriers and best for embedding Responsible Research and Innovation (RRI) practices into partner institutions.

The learning outcomes from the trip were formulated into the following recommendations for consideration during the next phase of the NUCLEUS project, the RRI Implementation Roadmap. The key recommendations include:

- Reconsider the use of RRI.
- Appoint relationships managers/knowledge brokers.
- Audit and map out existing structures and relationships.
- Develop systems and processes to protect key IP, data and personnel.

- Make responsible practices an integral part of how research impact is measured; Assess the pace inhibitors.
- Create a systematic approach for sustained collaboration.
- Introduce Societal Innovation vouchers for SME's.
- Expand remit of hackathons to solve societal challenges.

During the trip several best practice approaches to embedding RRI were identified and should be further explored to support the development of the RRI Implementation Roadmap and the 30 RRI test beds. The best practices examples include:

- The Impact framework driven in Ireland by Science Foundation Ireland as part of the Small Advanced Economies Initiative (SAEI 2015; SFI 2016).
- The research collaborative laboratory with IBM Research Ireland and University College Dublin (UCD 2015).
- DCU Community Knowledge Exchange (DCU 2016).
- Appointment of the DCU APLHA Business Development Manager.
- DCU ALPHA hackathons as problem-orientated and solution-driven platforms.

APPENDIX A: FIELD TRIP PARTICIPANTS

The field trip participants consisted of the following 17 NUCLEUS Consortium members:

Affiliation	Participant(s)	Role/Function
Dublin City University	Padraig Murphy	Societal Impact Platform, Celsius Research Group
Dublin City University	Caitríona Mordan	Project Officer, RRI
Rhine-Waal University	Alexander Gerber	Head of Science Communication Department
Rhine-Waal University	Annette Klinkert	NUCLEUS Administrative Project Manager

Rhine-Waal University	Robin Yee	NUCLEUS Dissemination Officer
Rhine-Waal University	Linda Van Dijk	NUCLEUS Financial Project Coordinator
Science View	Menelaos Sotiriou	Director of Science View
University of Aberdeen	Heather Doran	Project Officer
Bielefeld University [L SEP]	Stefan Fuchs	Project Assistant
City of Bochum, University	Catherine Gregori	Head of Science, City Bochum
Ruhr University Bochum	Annika Döring	Corporate communications department
South African Agency for Science and Technological advancement (SAASTA)	Jabu Nakueri	Managing Director
South African Agency for Science and Technological advancement (SAASTA)	Shadrack Mkansi	Manager SAASTA
European Science Events Ass	Jan Riise	Director of EUSEA
Ilia State University	Nino Dvalidze	Vice Rector of International Relations
Science City Hannover	Theda Minthe	Head of Science, City Hannover
Université de Lyon [L SEP]	Florence Belaen	Manager Service Science et Société – CCSTI du Rhône

APPENDIX B: FIELD TRIP SCHEDULE

MONDAY JUNE 20

09:00 – 10:00 Introduction and orientation   Location: DCU HG19 Nurses Building

NUCLEUS   **Overview of RRI and the Economy**
Alex Gerber and Annette Klinkert   *Padraig Murphy*
▸ Recap of NUCLEUS project aims   ▸ Overview of agenda
▸ Reporting, evaluation requirement   ▸ Objectives of Dublin trip
▸ Dublin field trip agenda   ▸ HEIs and social enterprise
                                                                   ▸ Interview groups and methodology
                                                                   ▸ HEIs, institutionalised engagement and RRI
                                                                   ▸ Student attributes for enterprise

10:00 – 11:00 WORLD CAFÉ: Location: DCU HG19 Nurses Building
Responsible innovation and profit – are they mutually exclusive?

TABLE 1	TABLE 2	TABLE 3
RRI and Science Policy; **CSR meets RRI**	**HEIs and Social Enterprise** *Emer Ní Bhradaigh* Lecturer in Entrepreneurship, DCU	**University and Research Support** *Laura Clifford* Commercialisation Support Officer

Tea/coffee will be served during this session.

11:00 – 11:30 Form interview groups and depart for interview locations

FIELD TRIP INTERVIEW SESSION #1

MONDAY JUNE 20

FIELD TRIP INTERVIEW SESSION #1

GROUP 1	GROUP 2	GROUP 3
HEIs and Social Enterprise DCU Main Campus, HG19	**HEIs, Institutionalised Engagement and RRI** Formal Boardroom, INVENT, DCU	**Science Policy and RRI; CSR meets RRI** Small Boardroom, INVENT
Deiric O'Broin, Chair, DCU Civic Engagement Forum and Chief Executive of NorDubCo	*Richard Stokes,* INVENT CEO and DCU Director of Innovation	*Laura Clifford,* Commercialisation Support Officer, DCU
Joanna Ozarowska DCU in the Community	*Maria Johnston* Operations & Enterprise Development Manager, INVENT	Industry Representative
Michelle O'Donnell Keating Social Entrepreneurs Ireland	*Peter Olwell* IP Operations Manager, INVENT, DCU	
Lead: *Menelaos Sotiriou* Team: *Shadrack Mkansi, Linda Van Dijk, Jabu Nukeri, Stefan Fuchs* Chaperone: *Padraig Murphy*	Lead: *Theda Minthe* Team: *Heather Doran, Alex Gerber, Catherine Gregori, Jan Riise* Chaperone: *Katya McDonagh*	Lead: *Robin Yee* Team: *Florence Belaen, Annette Klinkert, Annika Döring, Nina Dvalidze* Chaperone: *Barbara Gormley*
13:00 – 14:00 **Science policy and RRI; CSR meets RRI** *Garry Connolly* Founder and President, host in Ireland	**13.30 – 14:00** *Samantha Fahy* Manager, Sustainability DCU, DCU community garden	Join GROUP 1 for lunch in foyer HG @12:30 and enter HG19 for talk with Garry Connolly

LUNCH WILL BE SERVED FROM 12:30 ONWARDS

FIELD TRIP INTERVIEW SESSION #2

GROUP 1	GROUP 2	GROUP 3
CSR meets RRI	**HEIs, Institutional Engagement and RRI: What learning and what impact is there for education and outreach?**	**Science policy and RRI; Dublin City Council; Green Enterprise**
Abbott Laboratories Irl Ltd, Liffey Valley Office Campus, Quarryvale, Dublin D22 XOY3	DG11, DCU Glasnevin Campus	The Grainstore, Digital Exchange, Crane Street, Dublin 8.
14:15	14:15	14:15
Sinéad Hickey, CSR Manager, Abbott Laboratories Ireland	*Fergus McAuliffe*, Education, Public Engagement and Communications Manager, iCRAG	*Joanne Rourke*, Waste Prevention Officer in the Eastern Midlands Waste Regional Office
Deirdre Kennedy, Corporate Citizenship and Corporate Affairs, IBM Ireland	*Aoibheann Bird*, Education and Public Engagement Manager, INSIGHT	*Gerry Macken*, CEO, The Digital Hub
Gal Weiss, Contracts Manager, IBM Research-Ireland		
Lead: *Stefan Fuchs* Team: *Jabu Nukeri, Florence Belaen, Annette Klinkert, Florence Belaen, Alex Gerber* Chaperone: *Caitríona Mordan*	Lead: *Shadrack Mkansi* Team: *Heather Doran, Annika Döring, Theda Minthe, Jan Riise* Chaperone: *Katya McDonagh*	Lead: *Nino Dvalidze* Team: *Menelaos Sotiriou, Linda Van Dijk, Catherine Gregori, Robin Yee* Chaperone: *Padraig Murphy*

16:00 – 17:00   Free time to relax/freshen up.

17:00   Depart DCU for Smithfield, Dublin 7, for Jameson Distillery tour (for those interested)

17:30   Jameson Distillery Tour – 45 minutes
NUCLEUS team networking

19:30 – 22:00   Food in L. Mulligan Grocer, Stoneybatter, Dublin 7, followed by live traditional Irish music in Cobblestone Pub, Smithfield, Dublin 7.

TUESDAY JUNE 21

09:00 - 09:30   Address by Brian McCraith, DCU President   Location: Auditorium, DCU ALPHA

FIELD TRIP INTERVIEW SESSION #3

GROUP 1	GROUP 2	GROUP 3
Science Policy and RRI (in the context of national competitiveness) IDA Ireland, Wilton House, Wilton Place, Dublin 2.	**HEIs, Institutional Engagement and RRI: Student attributes for industry. Where CSR meets RRI** Ideas Lab, DCU Innovation Campus, Old Finglas Road, Glasnevin, Dublin 11.	**HEIs, Institutionalised Engagement and RRI** Irish University Association (IUA). 48 Merrion Square, Dublin, 2.

GROUP 1

10:00 *Keith Fingleton,* Chief Technology Advisor – Financial Services

10:30 *Jonathon Small,* Policy Officer, American Chamber of Commerce

12:15 *Paul Sweetman,* Director ICT Ireland, IBEC

(GROUP 1 JOINS GROUP 3)

Lead: *Annette Klinkert*
Team: *Stefan Fuchs, Nino Dvalidze, Heather Doran, Jabu Nukeri*
Chaperone: *Caitríona Mordan*

GROUP 2

10:00 *Lorraine Fitzgerald,* CSR Adviser, Business in the Community; Where CSR meets RRI

11:00 *Aisling McKenna,* Director of Quality Promotion and Institutional Research: Students attributes, DCU

11:45 Veolia - RRI, community and economy – circular economy philosophy

12:30 *Terence Bowden,* Community & Business Development, DCU ALPHA. Hackathon series as crowd-sourced innovation model vs. corporate social/institutional

Lead: *Alex Gerber*
Team: *Catherine Gregori, Menelaos Sotiriou, Robin Yee, Annika Döring*
Chaperone: *Barbara Gormley*

GROUP 3

10:00 *Jennifer Brennan,* European Advisor (NCP), Marie Skłodowska-Curie Actions and National Delegate, Excellent Science Pillar, Irish University Association

10:30 *Kate Morris,* Campus Engage Coordinator, *Lewis Purser,* Director, Academic Affairs, Irish University Association

11:45 Group moves to IBEC: *Paul Sweetman,* Director, ICT Ireland, IBEC

Lead: *Jan Riise*
Team: *Linda Van Dijk, Shadrack Mkansi, Theda Minthe, Florence Belaen*
Chaperone: *Stephen Hughes*

13:30 - 14:15 LUNCH

GROUPS 1 AND 2: Science Gallery, Trinity College   GROUP 3: The Mespil Hotel, Dublin 4

TUESDAY JUNE 21

FIELD TRIP INTERVIEW SESSION #4

GROUP 1	GROUP 2	GROUP 3
Creative Innovation in the City	**HEIs, Institutionalised Engagement and RRI**	**Science Policy and RRI**
Crann, Trinity College Dublin, College Green, Dublin 2	Formal Boardroom, INVENT Building, DCU	Science Foundation Ireland, Wilton Park House, Wilton Place, Dublin 2
	(This session will run until 16:15)	
15:00 *Jane Chadwick,* Education and Learning Manager, Science Gallery Dublin	*Regina Connolly* Acting VP Research and Innovation, DCU	*Margie McCarthy,* Head of Education and Public Engagement, Science Foundation Ireland
	Fiona Brennan DCU Research Innovation Service. Research Integrity and Research Ethics Committee policy development and support	*Lisa Murphy,* Senior Strategy Analyst at Science Foundation Ireland
	Noel O'Connor Director, Information Technology and the Digital Society Hub	
	Katya McDonagh Societal Impact Platform and Community Knowledge Exchange	
Lead: *Annika Döring* Team: *Nino Dvalidze, Jabu Nukeri, Stefan Fuchs* Chaperone: *Stephen Hughes*	Lead: *Heather Doran* Team: *Robin Yee, Alex Gerber, Shadrack Mkansi, Catherine Gregori* Chaperone: *Katya McDonagh*	Lead: *Theda Minthe* Team: *Linda Van Dijk, Menelaos Sotiriou, Florence Belaen, Annette Klinkert* Chaperone: *Caitríona Mordan*

16:00 – 16:30   Depart and transfer to DCU

16:45 – 18:30   NUCLEUS Trip reflection and close

APPENDIX C: LIST OF INTERVIEWEES

Session: World Café – Guests

- Emer Ní Bradhraigh - Lecturer in Entrepreneurship, DCU. Representing Social Enterprise perspective.
- Sue O'Neill - Marketing Manager, DCU Hubs (replaced Laura Clifford due to illness). Representing Industry perspective.
- Katya McDonagh– Societal Impact Platform and Community Knowledge Exchange, DCU. Representing University Administration perspective.

Session: HEIs and Social Enterprise

- Joanna Ozarowska - Programme Manager, DCU in the Community
- Michelle O'Donnell Keating- Consultant, Social Entrepreneurs Ireland

Session: HEI's, Institutionalised Engagement and RRI

- Richard Stokes- Invent CEO and Director of Innovation, DCU
- Maria Johnston- Invent Operations and Enterprise Development Manager, DCU Peter Olwell- Invent IP operations Manager, DC
- Paddy O'Boyle- Business Development, Information Communications Technology, DC
- Samantha Fahy - Manager, Sustainability DCU, DCU Community Garden

Session: CSR meets RRI

- Sinead Hickey - CSR Manager, Abbott Laboratories Ireland
- Deirdre Kennedy- Corporate Citizenship and Corporate Affairs, IBM Ireland
- Gal Weiss- Contracts Manager, IBM Research- Ireland
- Lorraine Fitzgerald Corporate Social Responsibility Adviser, Business in the Community Ireland (BITCI)

Session: HEIs, Institutional Engagement and RRI: What learning and what impact is there for education and outreach

- Fergus McAuliffe -Education, Public Engagement and Communications Manager, ICRAG
- Aoibheann Bird - Education and Public Engagement Manager, Insight

Session: Science Policy and RRI; Dublin City Council, Green Enterprise

- Joanne Rourke - Waste Prevention Officer, Dublin City Council Gerry Macken - CEO, The Digital Hub Development Agency
- Caroline Viguier - Strategic Initiatives Project Manager, The Digital Hub Development Agency

Session: Science Policy and RRI for National Competitiveness

- Keith Fingleton- Chief Executive Technology Adviser, Financial Services, IDA Ireland Jonathon Small- Policy Officer, American Chamber of Commerce
- Paul Sweetman – Director Information Communication Technologies (ICT) Ireland

Session: HEIs, Institutional Engagement and RRI: Student attributes for industry. Where CSR meets RRI.

- Aisling McKenna – Director of Quality Promotion and Institutional Research, DCU
- Mark Coyne - Best Practice & Innovation Director at Veolia UK & Ireland
- Terence Bowden – Community and Business Development, DCU ALPHA

Session: HEIs, Institutionalised Engagement and RRI

- Jennifer Brenann – European Adviser, Irish University Association (IUA)
- Kate Morris – Campus Engage Coordinator, Irish University Association (IUA) Lewis Purser – Director, Academic Affairs, Irish University Association (IUA)

Session: Creative innovation in the city

- Jane Chadwick – Education and Learning Manager, Science Gallery, Dublin

Session: HEI's, Institutionalised Engagement and RRI

- Regina Connolly – Deputy Vice President, Research and Innovation, DCU
- Fiona Brennan – DCU Research and Innovation Support, Research Integrity and Research Ethics Committee, DCU
- Noel O'Connor – Director, Information Technology and the Digital Society Hub, DCU
- Katya McDonagh – Societal Impact Platform and Community Knowledge Exchange, DCU

Session: Science Policy and RRI

- Margie McCarthy – Head of Education and Public Engagement, Science Foundation Ireland (SFI)
- Lisa Murphy – Senior Strategy Analyst, Science Foundation Ireland (SFI)

APPENDIX D: INTERVIEW ORGANISATIONS – OVERVIEW

NorDubCo

http://nordubco.ie/

NorDubCo was established in 1996 to promote the social, economic and civic development of North Dublin. At the time, a very specific set of challenges faced the region and NorDubCo was configured to address those challenges. NorDubCo has worked to ensure that sustainable economic, social and civic development takes place in the region. In this context, we have worked to create a positive vision for community and working life in the region, a vision that sought to embrace all of the region's communities and with this ethos will continue to inform our work. NorDubCo develops and implements projects that provide benefit to its stakeholders and the wider region. NorDubCo will work to remain a neutral forum for discussion and decision-making between the region's stakeholders and work to ensure our work is relevant, accessible and of practical use to the region.

DCU in the Community

https://www.dcu.ie/community/DCUcommunity/welcome.shtml

DCU in the Community acts as a bridge between the university and its local community. Its mission is "To provide educational opportunities to local people in North Dublin in order to increase participation levels and to promote equality in third level education." Its aim is to broaden access and increase participation in higher education. DCU in the Community: recognises the individual talent of each student and offers a flexible curriculum based on their needs and aspirations. DCU in the Community: acts as a 'drop in centre' for all local learners seeking information and advice in relation to accessing further education options. DCU in the Community: seeks to promote Sustainable Community development and serve as a bridge between the resources of DCU (and the wider higher education system) and the local Community.

Social Entrepreneurs Ireland

http://socialentrepreneurs.ie/

Social Entrepreneurs Ireland supports social entrepreneurs through our Awards Programme, which provides direct support to high-potential emerging social entrepreneurs. Social Entrepreneurs Ireland holds an Annual Awards Ceremony to showcase the work of Ireland's leading social entrepreneurs and to encourage others to become part of the growing social entrepreneurship movement. As well as providing direct support and recognition to our Awardees, Social Entrepreneurs Ireland is working

to build a vibrant and effective ecosystem in Ireland to ensure that the best ideas get the support they need to succeed.

Invent
https://www.dcu.ie/invent/index.shtml

The centre's goal is to support and encourage the translation of innovative research, inspired where possible by our industrial partners, into new or enhanced products and services. Since 2001, INVENT has been helping entrepreneurs and DCU researchers to start new businesses. The purpose built Centre has 2,800 square metres of incubation space for technology based start-up companies. A range of early stage and business support services are available to our client companies and to aspiring entrepreneurs, whether DCU staff or from the wider community.

Using extensive links with industry to help forge business and research partnerships and to market DCU's commercialisation opportunities and research capabilities both nationally and internationally is central to centre's mission. The Invent team works closely with

DCU's Research Support, Science Foundation Ireland and Enterprise Ireland to promote successful commercialisation of DCU research and to encourage and establish R&D links with industry. Invent was developed with the support of DCU, AIB and Enterprise Ireland.

Host in Ireland
http://hostinireland.com/

Host in Ireland is an industry-led initiative designed to raise awareness of Ireland as the home of the hybrid cloud. Our goal is to change and shape global industry perceptions through the provisioning of timely and accurate information. With the support of a growing team of partners, Host in Ireland has harnessed the "power of the collective," fostering an environment of co-opetition where competing companies and organizations come together to achieve common goals through cooperation and collaboration.

Host in Ireland is sustained by the "5 Ps" – Policy, People, Pedigree, Pipes and Power.

Representing the most important aspects of digital asset hosting, Ireland's integration of these five key elements provides a structured foundation for companies of all sizes and markets. With an understanding of how to meet needs across the board, Ireland has the ability to offer companies' the support they need when hosting their digital assets in the EU region.

Insight

www.insight-centre.org

The Insight Centre for Data Analytics is a joint initiative between researchers at Dublin City University, NUI Galway, University College Cork, University College Dublin and other partner institutions. Insight brings together more than 400 researchers from these institutions, with over 40 industry partners, to position Ireland at the heart of global data analytics research.

Supported by Science Foundation Ireland and industry partners, Insight focuses on new ways to capture and understand data from the world around us, make better decisions for people, communities and industry, and create a more informed society in a healthier, more productive world.

IBEC/ICT Ireland

http://www.ibec.ie/ http://www.ictireland.ie/

IBEC is the national voice of business in Ireland. Ibec represents the interests of business in

Ireland and provides a wide range of direct services to its 7,500 member companies. Ibec's vision is to be the most influential, dynamic business representative organisation in Ireland, driving our business agenda in Europe. Leading, shaping and promoting business policy and conditions to drive economic success is central to the organisations vision.

ICT Ireland is the leading representative body for the technology sector in Ireland and is part of Ibec. Its membership is made up of the leading players in the Irish technology sector, as well as many early stage hi-tech companies and telecommunications companies. The vision of ICT Ireland is to make Ireland a global ICT powerhouse. ICT Ireland represents its members to the government, its agencies, regulators, customers and consumers, creating an environment where technology can transform and create a 'connected' society and economy. ICT Ireland is focused on where we can make a difference: influencing policy; improving markets and supply chains; providing information and helping members to grow their business.

Irish University Association

http://www.iua.ie/

The Irish University Association (IUA) is the representation, support and advocacy organisation for matters of shared sectoral concern. The IUA are the collective interface between the universities and the state. IUA support the universities in developing sectoral policies and strategies and we provide some shared services in researcher mobility and internationalisation. We advocate on behalf of the universities to maximise the contribution of higher education in all its dimensions to society and the economy. In all these respects we complement the individual, autonomous efforts of our members.

Campus Engage

http://www.campusengage.ie/

The Campus Engage National Network has been set up to promote civic engagement as a core function of Higher Education on the island of Ireland, by better enabling Higher Education Institutions (HEIs), their staff and students across all disciplines, to engage with the needs of the communities they serve.

DCU ALPHA

http://www.dcualpha.ie/

Co-located with Dublin City University, DCU ALPHA is a commercial innovation campus that promotes the growth of research-intensive businesses that are creating the technologies and services of tomorrow. Occupying a city-central 9 acre site, the campus has played a pivotal role in innovation and scientific research in Ireland, serving as headquarters for Enterprise Ireland, then NSAI and SEAI over its 70 year history. The NSAI Metrology Lab continues to operate onsite.

Repurposed by DCU and reopened in early 2014 DCU ALPHA has quickly attracted a community of like-minded innovative companies. 35 companies employing 350 staff currently operate across the 200,000 sq. ft campus of mixed office, industrial and research space, developing ground-breaking products in connected health, clean energy and IoT technology. Here, indigenous SMEs and start-ups innovate alongside multinationals like Fujitsu, Siemens and Veolia in a collaborative hub, in partnership with a visionary university. For innovative companies that are looking to scale and leverage DCU's research, graduate talent and commercial network, this is the place to be.

A city at the forefront of the digital revolution, Dublin is ideally positioned to become a global IoT capital. DCU ALPHA provides optimum conditions for firms involved in bridging the physical and digital worlds. Here, hardware prototyping spaces operate

alongside bio labs and contemporary offices; entrepreneurs socialise with lab technicians and engineers; breakout conversations spawn exciting ideas and creative collaborations.

DCU ALPHA is rapidly building an advanced cluster of companies to which every new tenant adds value. Our vision goes beyond providing physical workspace: as a partner tenant you get access to world-class research facilities, impressive shared amenities (Auditorium, Cafe, Ideas/Meeting Rooms, DCU Sports Campus) and an inspirational collaborative culture. This is no traditional business park, this is an innovation ecosystem that is designed to propel your business growth.

Science Gallery Dublin
 https://dublin.sciencegallery.com/

Science Gallery is an award-winning international initiative pioneered by Trinity College Dublin that delivers a dynamic new model for engaging 15–25 year olds with science.

Science Gallery is a place where art and science collide. A new type of venue where today's white-hot scientific issues are thrashed out and you can have your say. A place where ideas meet and opinions collide. Since opening in 2008, over 2 million of you have visited us in Dublin - ranking us amongst the top ten free cultural attractions in Ireland. We're all about opening science up to passionate debate and want your opinion.

IBM Ireland
https://www.ibm.com/ie-en/

IBM are one of Ireland's leading providers of advanced information technology, products, services and business consulting expertise. IBM are dedicated to helping our clients innovate and succeed through the end-to-end transformation of their business models and the application of innovative technology and business solutions.

IBM has a long history in Ireland, having opened our first office here in 1956. IBM in Ireland today is made up of a diverse workforce of over 3,000 employees working across a broad range of businesses and locations including: IBM Ireland, which has nationwide responsibilities for delivering sales, marketing and services across the Irish market; its Technology Campus in Mulhuddart, Dublin, which hosts IBM's globally integrated international missions, delivers services, manufacturing, research and software development, together with our laboratories in Cork and Galway, for the world market; and our European Sales and Services Support Centres based in Blanchardstown, Dublin, which delivers to the European market.

In July 2010, IBM Ireland opened a Smarter Cities Technology Centre and Research and Development Laboratory. IBM Research – Ireland is part of a global network of 12 IBM Research Labs and is located in Dublin at the IBM Technology Campus where it is now home to state-of-the-art innovations. IBM Ireland operate under a collaborative environment involving IBM scientists, industries and universities. In 2015, it opened a collaboratory with University College Dublin to advance cognitive and sustainable cities research capabilities. IBM Research – Ireland is also involved in many joint projects including research programs established by the European Union (H2020) and pioneering collaborative projects with clients. Its new THINKLab recently opened welcoming deep dive workshops with clients in a dedicated and immersive environment to discuss and design solutions together.

ICRAG – Irish Centre for Research in Applied Geosciences
http://icrag-centre.org/

Ireland has a resource security problem that the Irish Centre for Research in Applied Geosciences (iCRAG) will help resolve. iCRAG will transform applied geoscience research in Ireland, delivering economic impact for a broad range of application areas and industries. Geoscience underpins the discovery of raw materials, water and energy resources that are critical to the world's economy. With increasing demand and diminishing supply, focused innovations in geoscience are of paramount importance globally. Ireland is home to Europe's largest zinc mine, untapped hydrocarbon resources in challenging NE Atlantic deep water environments, and a diverse geological framework with important untapped seabed and groundwater resources. Forming an integrated team of internationally leading researchers and both large- and small-scale industry partners, iCRAG will carry out research to find and harness these resources whilst protecting the environment. iCRAG's overarching objectives are: 1. To significantly de-risk Ireland's offshore and onshore hydrocarbon and mineral resource exploration, thereby increasing exploration activities and also increasing the potential of sourcing a secure supply; 2.To ensure safe and secure groundwater supplies and to address geoscience related 'quality of environment' issues; 3. To engage with citizens and policy makers to explain the nature of resource related industries. iCRAG was established in 2014 by Science Foundation Ireland with funding of €18m along with an additional €8m from industry partners.

Abbott Laboratories Ireland Ltd.
www.abbott.ie/

Abbott is a diverse, global healthcare company using scientific expertise to create and distribute products that address the full range of healthcare needs – from disease prevention and diagnosis to treatment and cure. We discover, develop, manufacture and

market diagnostics, medical devices, nutritionals and branded generic pharmaceuticals that meet increasing demand in both developed countries and other, rapidly growing markets throughout the world. In Ireland, Abbott employs almost 3,000 people across 11 sites. Abbott has six manufacturing facilities located in Clonmel, Cootehill, Donegal, Longford and Sligo and a third party manufacturing management operation in Sligo. It has commercial and support operations in Dublin and shared services in Dublin and Westport. Abbott serves the Irish market with a diverse range of health care products including diagnostics, medical devices and nutritionals. Abbott has been operating in Ireland since 1946. Abbott's people have been driven by a constant goal: to advance medical science to help people live healthier lives. Today, nearly 69,000 Abbott employees around the world share Abbot's passion for "Turning Science into Caring." It's a commitment to focusing on what matters most: life and the potential it holds when we are feeling our best.

The American Chamber of Commerce
http://www.amcham.ie/

The American Chamber of Commerce Ireland is the leading international business organisation in Ireland and is the leadership voice of US companies here. Consistently recognised as the most influential advocacy organisation in the country, the American Chamber's membership includes US companies operating from Ireland, their strategic partners, and organisations with strong bilateral trade linkages between Ireland and the United States.

Business in the Community Ireland
www.bitc.ie

Business in the Community Ireland (BITCI) is the network for responsible business, the only business network of its kind in Ireland. Our vision at Business in the Community Ireland is to have all businesses in Ireland responsible and sustainable and our mission is to harness the power of Irish business to maximise its positive impact on all its stakeholders and society. From providing bespoke advice to some of the most progressive multinational and indigenous companies to helping smaller enterprises navigate and understand CSR, we are the trusted advisers on responsible business practices in Ireland.

Science Foundation Ireland
www.sfi.ie

Science Foundation Ireland (SFI) is the national foundation for investment in scientific and engineering research. SFI invests in academic researchers and research teams who

are most likely to generate new knowledge, leading edge technologies and competitive enterprises in the fields of science, technology, engineering and maths (STEM). The Foundation also promotes and supports the study of, education in, and engagement with STEM and promotes an awareness and understanding of the value of STEM to society and, in particular, to the growth of the economy. SFI makes grants based upon the merit review of distinguished scientists. SFI also advances efforts among education, government, and industry that support its fields of emphasis and promotes Ireland's ensuing achievements around the world.

IDA Ireland
http://www.idaireland.com/

IDA Ireland's main objective is to encourage investment into Ireland by foreign-owned companies. It works as a strategic partner and provides consultancy and support services free of charge to help organisations set-up and grow. IDA's success is measured by the impact of

Foreign Direct Investment (FDI) and IDA-supported companies on the Irish economy.

Dublin City Council
http://www.dublincity.ie/

Dublin City Council is the democratically elected body that governs Dublin City. We are the largest Local Authority in Ireland. It provides a wide range of services and information on housing, planning, water and waste-water treatment.

The Digital Hub
http://www.thedigitalhub.com/

The Digital Hub is an initiative managed by the Digital Hub Development Agency, an Irish state agency set up in 2003. It's the job of the Digital Hub Development Agency to run The Digital Hub and roll out its enterprise and campus development strategy. The Digital Hub Development Agency also facilitates and contributes to urban regeneration and pilots innovative digital projects identified by Government as being of strategic national importance.

Veolia

http://www.veolia.ie/

Veolia is Ireland's leading environmental services company. We provide a comprehensive range of energy, waste and water solutions and are dedicated to carbon reduction, protecting the environment and building the circular economy.

Veolia in Ireland works with its customers to carefully manage scarce resources. Through its expertise in operations, engineering and technology, the organisation reduces the environmental impact of its customer's activities while helping industrial companies, services organisations and the public sector to operate in a more efficient manner.

Veolia knows the world is facing an enormous challenge. Demand for raw materials has seen exponential growth with a fast-expanding global population and rising standards of living. Yet the resources on which we all rely are depleting fast. The circular economy is the industrial revolution for a new generation. A business model that enables the economy to grow, while minimising the amount of virgin resources that are extracted. But the focus is no longer just environmental, it's all about the bottom line. The circular economy saves resources and saves money. A catalyst for 'free growth' that requires no Government or external funding, just a change of mind-set.

Societal Impact Platform - DCU

https://www.dcu.ie/research/strategy.shtml

DCU, as the University of Enterprise, has re-oriented its research to address societal challenges and to further enhance translation from research to innovation. The DCU research and innovation strategy focuses much of its research on four externally facing research areas, or Hubs, that are of national and international importance: health technologies, and the healthy and ageing society; information technology and the digital society; sustainable economies and societies; and democratic and secure societies. These areas are enhanced and supported by three cross-cutting platforms: the Societal Impact Platform (for human and social insights into science and technologies); the Business Innovation Platform; and the Science and Technology Enhancement Platform. The Societal Impact Platform (SIP) facilitates knowledge exchange across disciplines - such as the inclusion of SMEs, NGOs and AHSS researchers in largescale internationally- funded research and innovation projects, as well as developing smaller-scale community-based research projects. In its strategic objectives, it will use internationally recognised methods of internal validation of Responsible Research and Innovation (RRI).

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