



Creative Industries Innovation: Overview Report

Report for Scottish Funding Council

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1. Introduction

The Creative Industries (CI) are rightly regarded as an important driver of future economic success and are, in many respects, pioneering sectors of the economy. Driven by the development and exploitation of new ideas and intellectual property, they are one of the original knowledge-based industries and continue to introduce disruptive technologies and business models in fast moving, complex and highly competitive markets. As a result, the CI rely heavily on a steady supply of creative and highly skilled workers, new ideas, and technological and creative innovation to stay ahead of the pack.

The Further and Higher Education (FE/HE) sectors have an obvious and critical role to play in this, however, the innovation support landscape for the CI remains challenging. Demand for innovation support is uneven, and the diversity of the sector mitigates against '*one size fits all*' approaches, not least because the nature of the innovation process in many CI businesses does not fit with established thinking.

In recognition of these challenges, the Scottish Funding Council (SFC) and its partners initiated a programme of research into collaborative innovation between HE, FE and the CI. The research was split into three work packages, outlined below, and is intended to inform an Action Plan for Innovation in the Creative Industries. This report provides a summary overview of the main findings and key issues.

Research Programme

The overarching aim of the research programme was to understand better the relationships between education, the CI and innovation. More specifically, the objectives of the three work packages were as follows:

- **Work Package 1:** to undertake a review of activity between colleges, universities and industry to support innovation in the CI; and to make proposals for sector-specific mechanisms to stimulate creative innovation and ease the process of bringing products and services to market;
- **Work Package 2:** to work with industry, academic institutions and intermediaries to review the post-study destinations of Scotland's creative graduates. To report on what is known about the destinations of these

graduates and to examine how we might better assess the innovation impact of these graduates in both the CI and other sectors; and

- **Work Package 3:** to review models and methods that have emerged internationally to support the innovation impact of creative graduates; and identify and review those models that seek to draw on the strengths of academics and graduates from the creative disciplines to provide explicitly instrumental benefits to challenges and opportunities in other sectors.

Research Approach

Throughout, the intention was to establish a robust evidence base from which to identify future opportunities. As a result, each of the three work packages adopted slightly different approaches with some common features:

- all sought to make use of existing evidence through analysis of existing data sources and wider reviews of the available research literature;
- each work package also involved elements of primary research including consultation with key contacts in HE, FE, industry and public sector stakeholders; survey work with industry and with creative graduates; and case study analysis (Work Package 3 only); and
- the findings were tested and explored at a workshop involving representatives of HE, FE and industry.

Further details on the study methods can be found in the individual reports.

Report Structure

The report is structured into four sections:

- **Industry Context:** exploring some of the characteristics of the CI and the issues affecting demand for innovation;
- **Role of HE and FE:** highlighting the ways in which HE and FE support innovation within and beyond the CI;
- **Multidisciplinary Innovation:** identifying the role of creativity in multidisciplinary collaborations in different contexts; and
- **Summary Discussion:** setting out the main issues emerging from the research and the implications for future practice.

2. Industry Context

Characteristics of the Creative Industries

According to the Scottish Government, CI are those which have their origin in individual creativity, skill and talent. They also include industries which have the potential to create wealth and jobs through the development, production or exploitation of intellectual property. The sector comprises 16 sub-sectors within seven ‘cultural domains’, **Table 2.1**.

Table 2.1: Creative Industries - Domains and Sub-Sectors

Cultural Domains	Sub-Sectors
Visual Art	<ul style="list-style-type: none"> • Advertising • Architecture • Crafts and antiques • Design • Fashion and textiles • Visual arts
Performance	<ul style="list-style-type: none"> • Performing arts
Audio-Visual	<ul style="list-style-type: none"> • Computer games • Film and video • Music • Photography • Radio and TV
Books and Press	<ul style="list-style-type: none"> • Writing and publishing
Heritage	<ul style="list-style-type: none"> • Libraries and archives
Digital Industries	<ul style="list-style-type: none"> • Software and electronic publishing
Cultural Education	<ul style="list-style-type: none"> • Cultural education

Source: Scottish Government

The CI are identified as a growth sector for Scotland, and have long enjoyed a high degree of policy support and focus. Almost 74,000 people work in more than 15,000 CI businesses in Scotland¹, and while the recession hit the sector hard, recent data suggest a return to growth in employment, businesses and output.

However, this growth is unevenly distributed across the 16 sub-sectors. The more technology driven parts of the sector (such as software and electronic publishing) continue to show strong growth rates, while others are facing longer term challenges (e.g. publishing).

¹ Scottish Government Growth Sector Statistics, 2017

The CI remain dominated by sole traders and micro businesses – 95% of CI businesses have fewer than 10 employees. Many areas remain strongly reliant on freelance labour, and research has consistently identified the CI as undercapitalised and lacking resources for external innovation and R&D activities. However, the workforce is highly educated, with high proportions of graduates.

Innovation in the Creative Industries

Innovation and creativity are often confused, but are not the same. While creativity is the process through which something new is developed, innovation is more focussed on the realisation or application of those new ideas. Moreover, because something is developed through a creative process (e.g. a new design, film or performance) does not mean that it is innovative.

The research identifies three areas of innovation in the CI:

- Technology Innovation;
- Business Model Innovation; and
- Creative ('Aesthetic' or 'Soft') Innovation.

These are not mutually exclusive categories, and successful innovation in the sector typically involves all three areas. Indeed, it is the interaction between these types of innovation that partly defines the CI, and this multi-disciplinary focus is the primary driver of innovation in the sector.

Innovation processes also tend to be open, collaborative and iterative, rarely conforming to linear models of product development and science commercialisation. Instead, the innovation process in the CI is both complex and poorly delineated, and many in the sector do not identify with terms such as innovation and R&D and thus rarely differentiate these processes from, say, a creative process.

It is also worth noting that much of the debate around innovation is framed in economic terms which assume an economic motivation for innovation activity. This is not always the case in the CI, in which the creation of social and cultural value are also drivers. This raises the issue of how to measure innovation in the creative sector. Certainly, traditional measures of R&D and innovation fail to capture adequately soft innovation. R&D and patent measures focus on science and technology innovation, and do not take account of aesthetic innovation. One

implication of this may be that innovation in the creative sector may be underestimated and under-reported.

It is also worth noting that a large and growing proportion of creative workers are employed in organisations not within the CI sector.

Creative input is a key driver of wider innovation, and exists along the value chain in many industries, from the input of design at the product development stage through to the use of branding, media, and increasingly social media to mediate customer relationships.

These are value adding functions which again underline the importance of multi-disciplinary innovation:

“the (embedded) creative workforce is involved in addressing the interaction, translation and synthesis of knowledge between and among scientific/technical, creative/cultural and business/entrepreneurial disciplines, and also between different sub-disciplines within each...the processes of knowledge transfer and synthesis for innovation require a range of high level capabilities underpinned by transdisciplinarity, social networking capability and creative entrepreneurship”².

How Innovative are the Creative Industries?

The primary indicator used as a proxy for innovation activity is Business Enterprise Research and Development (BERD), which we consider to be an insufficient measure, as it captures only one of the inputs to innovation (investment). It is also based on the concept of R&D, which is typically defined within a scientific framework.

The other main source of information on firms’ innovation activities is the UK Innovation Survey (UKIS), which offers coverage of a wider range of innovation activities than R&D.

Previous analyses of UKIS data suggest that the CI are innovative relative to the wider economy.³ Our own analysis of the most recent data confirms this broad conclusion, albeit with some caveats relating to data limitations.

This is consistent with the BERD data (limitations notwithstanding). Businesses in the CI sector in Scotland spent a total of £139m on enterprise research and

² *Creative Work Beyond the Creative Industries: Innovation, Employment and Education*, Hearn, G et al, 2014

³ *Hidden Innovation in the Creative Industries*, Miles, I. and Green, L. (Nesta, 2008)

development in 2015, which accounts for 16% of all Scottish spending on enterprise research and development. This is higher than the sector's percentage share of employment or GVA, suggesting a higher than average level of BERD. CI BERD spending has been on an upwards trend over the last five years.

Taken as a less than satisfactory proxy measure, the BERD data also suggest higher than average levels of innovation within the CI in Scotland. What this does not tell us is what parts of the CI are the largest BERD spenders. In light of the R&D definition, it is likely that the BERD spend will be concentrated in the high technology areas, in particular in digital industries (e.g. software and games).

Demand for Innovation Input

Analysis of data provided by Scottish Enterprise (SE), Highlands and Islands Enterprise (HIE) and Interface provides some instructive findings regarding CI demand for innovation support.

First, it is clear that demand is there, particularly from the more digital ends of the CI spectrum. Secondly, the demand tends to be for small, short term projects, with far less evidence of larger projects requiring greater commitment of resources on the part of the companies. This is consistent with the industry characteristics highlighted above. The Interface data show that a wide range of HEIs are involved in working with CI organisations, and across a very broad range of disciplines. Indeed, creative disciplines were less represented, with CI companies tending instead to seek input from other areas. Again, the majority of this is small scale, supported by Innovation Vouchers, with less evidence of follow through to longer term collaborations.

Summary

There are perhaps four important points to take from the above summary:

- the CI are very diverse in terms of their scale, economic performance and growth rates, and even in relation to their motivations (economic, social and cultural);
- innovation in the sector is complex and multi-faceted, requiring the combination of creativity with technological expertise and business skills;
- taken as a whole the CI tend to be more innovative than the wider economy, but this may be more concentrated in the digital ends of the industry; and
- there is evidence of demand for innovation support, but this may be relatively unsophisticated, requiring high levels of intervention. It is also, again, very diverse, drawing input from a broad range of disciplines.

3. The Role of Higher and Further Education

Overview

The ways in which HE and FE interact with the CI are many and varied, resulting in a complex and less than transparent mosaic of activity. At the risk of oversimplifying, these activities can be broadly described in three main categories:

- development of innovative **people** through HE and FE courses at undergraduate and postgraduate levels;
- the generation of new ideas and technologies through **research** activities, some of which may find application in the context of the CIs; and
- interaction with industry that supports the development and **transfer of knowledge** and expertise into commercial application – commonly known as knowledge transfer or knowledge exchange (KE).

The research combined data from available sources with input from HE and FE representatives to build as comprehensive a picture as possible, but we would caution that the analysis is limited by the coverage of these sources.

Specific issues are highlighted in greater detail in the individual reports, but at a general level there are two main issues:

- the sheer diversity of the activities undertaken by FE and HE in supporting and engaging with the CI is such that no single source of information comes even close to capturing it all; and
- there is a marked lack of information that assesses in any robust sense the impacts from HE/FE activities in this area.

Also, interaction between FE/HE and the CI often take the form of informal, small scale transactions that may deliver benefits over an uncertain time frame. Capturing these effects is obviously challenging, and institutions generally lack the required resources.

People and Talent

HE and FE are crucial feeders of the CI in Scotland, and there is widespread interest in CI-related courses in both HE and FE institutions.

Almost all institutions offer something within the courses defined as being relevant to the CI (which does include computer science courses in light of the importance of digital technology).

Looking first at FE, there has been a 58% reduction in FE student numbers in CI relevant subjects over ten years (a drop from just over 100,000 in 2005/6)⁴.

However, much of this can be explained by the shift in funding away from part-time to full-time study. The largest decreases are in Information Technology and Information courses, and HNC equivalent qualifications. It is also important to note that 68% of FE leavers move into further study/training, with many articulating onto HE study.

In HE there has been a 12% growth in undergraduates in CI-related subjects in the last four years (an increase from 7,920 in 2011/12 to 8,025 in 2015/16). These increases have been mainly in Creative Arts and Design and Computer Science courses. There was a small decline (5%) in HE postgraduates over the same period⁵.

Clearly, there are far more CI-related (HE) graduates than there are employment opportunities and, according to data collected six months post graduation⁶, approximately two-thirds of these graduates find employment out-with the CI. Similarly, approximately two-thirds of HE graduates finding employment within the CI did not study a CI-related subject.

Therefore, the relationship between subject and employment is not direct or clear cut (which is equally true of many areas of the economy). The **multidisciplinary** nature of the CI workforce is consistent with the literature identifying the competitive advantage for companies that combine skills in art and science – so called ‘fusion skills’⁷.

⁴ Data from the Infact database, provided by SFC

⁵ HESA data provided by SFC

⁶ the Destination of Leavers from Higher Education (DLHE) is a survey of graduates’ destinations six months after graduation. Data are collected by HEIs and collated by HESA.

⁷ *The Fusion Effect: the economic returns to combining arts and science skills*, Nesta, 2016

Importantly this is true for CI companies, but also for those in other areas of the economy (e.g. technology sectors), illustrating the role of the creative graduate in wider innovation activity.

However, as found in Work Package 2, the evidence base to examine the role played by creative graduates in the wider innovation context is limited. Graduate destination data are subject to numerous limitations and do not provide the kind of detail which would allow such an assessment. While there is evidence that creative courses do help to develop the attributes and skills that support innovation, the extent to which creative graduates are applying these in different industries is not known.

Work Package 3 found creativity to be a common input to innovation activity across the case study examples of multidisciplinary initiatives. Importantly, that creative input, whether via graduates, researchers or businesses, was not the sole or even the main driver. Instead, it was one of many inputs alongside science, technology and business skills and knowledge, and the eventual outputs of these projects were rarely intended to support innovation in the creative sector – more often they were focused on societal challenges or wider business opportunities. The agenda is one of **applied creativity** as a valued input to the innovation process.

The research also found a strong link between **innovation** and **entrepreneurship** and interest amongst HE and FE providers in ensuring that entrepreneurship and enterprise skills were firmly embedded in courses. This is driven partly by the need to prepare creative graduates for the often precarious labour markets in which they may work, but also by the need to support business creation (the growth in CI business numbers suggest a strong business start-up tendency in the sector). However, a longitudinal study of creative graduates in the UK⁸ found that while they rated their education highly in terms of developing creative and innovation skills, they rated it lowest for enterprise and entrepreneurship skills, an area that is perhaps worth further scrutiny.

Finally, it is also worth noting the importance of more **technical skills** in advancing innovation performance. Innovation is about the creation of new ideas, but it is also about their application, and some commentators have argued that over emphasis on higher as opposed to vocational education has affected Scotland's innovation performance through under investment in technical skills. This may be an opportunity for FE.

⁸ *Creative Graduates, Creative Futures*, Ball, L. et al (2010)

New Ideas and Knowledge

The creation of new ideas and knowledge is the function of **research**, which is mainly but not exclusively the territory of HE. In seeking to establish the extent of CI relevant research, we are faced with two challenges. First, as noted above, the CI seek innovation inputs from a very wide range of academic disciplines. Thus, while we can identify the extent of research activity in creative disciplines, an unknowable proportion of research in other disciplines could also contribute. Secondly, gathering detailed information on the subject matter and outputs of research activities can be difficult without access to journal subscriptions, and in any case would be a significant undertaking in its own right.

As a result, ascertaining the proportion of research activity, even within creative disciplines, which could contribute to innovation in the CI is a considerable challenge.

With these caveats in mind, the research found that almost all Scottish HEIs are actively involved in CI-related research activity to a total value of £40m in 2017/18 (5% of the total value of external research funding in Scotland). This is largely dominated by the research intensive institutions, even if CI-related disciplines account for a small proportion of their overall research activity. According to the 2014 Research Excellence Framework (REF), 68% of the submitted CI-related research was found to be world leading or internationally excellent.

There are also a number of research centres focussed on CI-related research, including some permanent facilities and more time limited initiatives - usually funded by the Research Councils through programmes such as the Arts and Humanities Research Council's (AHRC) Creative Economy Hubs programme.

However, while we can identify a range of research activity (and active researchers) across the Scottish HE base, there is no evidence to demonstrate the impacts of this research on the CI. Even the REF, which has increased the focus on the impacts of HE research activities, does not provide sufficiently detailed, consistent or accessible information in this respect. While some specific initiatives do have some impact data, there is no systematic evidence base on which to draw wider conclusions about impact or effectiveness.

Nevertheless, what the research data do tell us is that there is considerable investment of money and resources in CI-related research, and a foundation of expert knowledge on which to build.

There is also, as noted above, evidence of appetite on the part of the CI to access this knowledge, even if there are barriers to companies doing so (as discussed below).

Both are positive findings, but it is the application of research outputs that will drive the impacts of HE research activity within the CI – the KE agenda.

Knowledge Exchange

KE is a key policy priority. However, much of the debate around the role of HE in supporting innovation has focussed on a narrow range of activities relating to the commercialisation of research and knowledge through spin-outs, licensing and patents.

More recently, there has been growing awareness and evidence of the **multi-faceted role of universities** in interacting with industry, highlighting that commercialisation activities are, in fact, only a small part of the picture. Indeed, the funding councils in Scotland and the UK now recognise a range of KE methods, including consultancy, collaborative research, courses for business and the community, contract research, spin-off activity and income, licensing, regeneration programmes and provision of facilities and equipment.

This wider definition of KE also moves beyond KE as the sole preserve of HE, as FE also has a role to play here through, for example, Continuing Professional Development (CPD) and training for businesses, consultancy and access to facilities.

In a baseline survey of KE activity in the CI, the Creative Industries Knowledge Transfer Network (CIKTN) found that the relative uptake of different forms of KE was highest for consultancy and collaborative research, and that many of the most valued mechanisms supporting KE processes represent personal or experiential knowledge exchanges⁹.

The survey also identified issues with language and terminology – knowledge transfer/knowledge exchange as a term is not well understood – as well as a number of barriers to effective knowledge transfer in the CI. These include:

- lack of awareness of KE and its benefits among creative businesses;

⁹ *Unlocking Knowledge Transfer Report 1/3 Baseline*. Creative Industries Knowledge Transfer Network (2009)

- lack of mutual understanding (between CI and academia);
- unclear channels of access to appropriate expertise; and
- availability of resources and funding (particularly within SMEs), and the ‘siloes’ nature of funding to creative SMEs inhibiting inter-disciplinary projects and collaborations.

Other commentators have also noted issues relating to **scale and capacity** within the CI. Creative businesses are small and typically lack the resources, financial and human, to dedicate to building and maintaining collaborative relationships with academics¹⁰.

Timescales can be another issue. The needs of creative SMEs are often for quick solutions, reflecting the pace of the industries, and this is not always easily accommodated by academic processes⁹.

This kind of work may also not be of primary interest to academic researchers under pressure to publish and input to the REF. Indeed, it could be argued that FE is better placed to provide this kind of support.

However, it is striking that almost all of the policy debate and research around KE is focussed on the role of HE to the exclusion of FE. While one might argue that FE does not have a research base, this would be to consider KE in terms of research commercialisation and not as genuine exchange of expertise (or even the co-creation of new knowledge).

What is true is that FE, at least in Scotland, is not funded to undertake KE – colleges are funded only for teaching. As financial pressure continues on the FE sector, it is increasingly difficult to find the resources to provide wider innovation support beyond the training, CPD and consultancy that is already provided on a more commercial basis.

Detailed examination of KE activities between HE/FE and the CI is again constrained by the lack of sufficiently detailed data. The SFC collects information on **KE income** in HE by type of interaction as part of the knowledge transfer metrics that informed the distribution of the previous Knowledge Transfer Grant (now the University Innovation fund (UIF)).

¹⁰ *Creative Futures: Building the Creative Economy through Universities*. Atton C., McCleery, A., Mabweazara, H, and Ward, S. (Million+, 2008)

However, this is a measure only of the income generated by different kinds of interaction. It does not provide any information about the external partners involved, nor about the impacts of the KE activities.

In response, as part of Work Package 1 we issued a data request to all universities to seek data on their interactions with the CI. The response rate was very low (four out of 19 HEIs provided data). This should not, however, be interpreted as a lack of interest or willingness to take part (all HEIs participated in the research), but rather is a reflection of the lack of data held by the institutions.

As noted earlier, many of the interactions between academics and CI organisations are small scale and informal and, as such, rarely attract the attention of the central support functions (such as the research and commercialisation offices).

Relationships with external partners are not typically managed centrally, and few universities have CRM systems for tracking interactions with external partners. As a result, the HEIs do not routinely collect data on their external interactions with the CI (or indeed with any other sectors).

Sector-wide data on KE activities are also collected in the **Higher Education Business and Community Interaction Survey (HE-BCIS)**. It is a mandatory survey for all UK HE providers in the UK (from 2011/12 in Scotland, however, data was voluntarily supplied in previous years) and measures the volume and direction of interactions between HEIs and business and the wider community.

Data are presented at an institution level, however, there is no breakdown available by subject discipline or by sector beyond a single question (which has been discontinued for the most recent releases) about what sectors the universities work in, and which does not have CIs as an option.

The data are useful only as a broad context for HEIs' KE activities in Scotland, and do not provide any detail on interactions with the CI (or other sectors).

The **University Innovation Fund**, which has replaced the previous Knowledge Transfer Grant and Knowledge Exchange Grant, is provided to Scottish universities to support their KE activities. The funding supports HEI infrastructure and capacity to engage in KE and innovation in support of SFC's strategy and the Scottish Government's Economic Strategy.

Allocations are made on the basis of previous funding awards, and each HEI was invited to make a submission to the UIF outlining its KE plans and priorities.

A review of the content of these submissions for 2016/17 found that:

- seven institutions made no mention of the CI. Some of these should be unsurprising (e.g. SRUC), while other universities may not have mentioned it but do have activity in CI-related areas even if the CI are not a stated sectoral priority (e.g. Glasgow Caledonian University, University of Aberdeen); and
- 12 institutions did identify the CI as a priority sector for KE activities. The CI are the main area of focus for some specialist institutions (e.g. The Glasgow School of Art and The Royal Conservatoire of Scotland), while for others CI is one of a number of priority areas. However, for some the main forms of interaction are through their own cultural activities and facilities (e.g. the Byre Theatre is managed by the University of St Andrews) rather than direct engagement with CI businesses.

In our consultations with HE and FE personnel, we found a general split between two types of approach:

- those institutions, often the large research intensives, which stated that as civic universities they will work with any interested business and engage in line with their expertise rather than any priority sectoral targeting; and
- those institutions that do identify sectoral priorities for KE and external engagement, many of which identified the CI.

For most, however, there is an extent to which their mode of engagement is reactive, due mainly to the diverse and fragmented nature of the CI and the lack of larger players with which to engage on a longer term or more strategic basis. As a result, few considered the CI to be a major source of business and there was limited appetite for large scale sector specific intervention.

Such outreach as does take place is often linked to specific research projects or initiatives where it can be funded from external sources. Otherwise, Interface remains a key source of possible CI interactions for many HEIs.

As noted above, the demand from the CI for academic input tends often to be for non-CI disciplines. We also found that creative disciplines were often working with

non-CI businesses, particularly through design departments, applying creativity in wider contexts. This was again confirmed by the experience of many of the international case studies and some of the HE consultees saw further potential in this area of applied creativity.

In addition to the more reactive provision of innovation support via enquiries from Interface and direct to HE/FE institutions, the research identified a number of more specific projects targeting collaborative innovation with parts of the CI. Most have been supported by external funding and some have been subject to independent evaluation, but again the evidence base here cannot be considered comprehensive or systematic.

The study also examined evaluations of major KE funding streams including, the Deepening Employer Engagement Programme, SPIRIT and the Knowledge Transfer Partnership Programme (all SFC funding) and also SEEKIIT (Scottish Government funded programme supporting KE projects in universities) but none made any mention of the CI.

KE projects are often evaluated as part of the consideration for future funding, and indeed some funding sources (such as ERDF) state this as a requirement. As a result, evaluation typically takes place before the projects are completed, and invariably concludes that it is too early to assess all of the resulting impacts (given that the impacts of innovation support do tend to take longer to be realised). One of the consequences of this is that the evidence base is often based on forecast future impacts.

A review of existing evaluations of CI-related KE projects (across the UK, not just in Scotland) also found that value for money from such interventions tends to be quite low compared to available benchmarks. Cost per net job created can often be quite high unless the forecast future impacts are taken into account, which should be subject to some optimism bias. The argument is then made that these are typically high value jobs, which is consistent with the higher than average earnings in the sector (even if this is unevenly distributed across different parts of the CI).

We would also note that many of the projects experienced greater difficulties with demand than first envisaged in a number of respects:

- some found it difficult to sustain the engagement of CI companies if short term benefits could not be achieved;

- sometimes it proved easier to engage cultural organisations and the arts community than more commercial businesses; and
- the absorptive capacity of CI businesses was almost always over-estimated, and projects sometimes had to provide additional support to address this.

Finally, and despite the demand side issues above, many of the projects were found to have delivered real benefits, and these were typically those that:

- invested time and effort in building relationships with the CI and in developing a sense of community around the innovation project;
- invested time and effort in building interest amongst academic collaborators and worked across a range of disciplines, including non-creative disciplines (although this was not always easily accommodated at an institutional level);
- had knowledge of the CI and the markets in which they work, giving project staff credibility with the sector;
- were demand-led but flexible insofar as companies would identify the initial focus for the project but that this could adapt through the interaction and collaboration process (the final projects were not always the same as those that started); and
- had resources to commit to projects in the form of funding and company support to address known barriers to engagement relating to limitations in company resources and capacity.

Summary

Before drawing any conclusions it is worth reiterating the issues with the evidence base. There is a marked lack of detailed evidence with which to examine the two key research questions posed by Work Packages 1 and 2. Thus, we do not know:

- the full extent of the innovation support provided by HE and FE to the CI in Scotland;
- the impacts of these interactions and collaborations;
- the detailed destinations of those graduating from CI-related HE and FE courses; and
- the extent to which creative graduates are making a contribution to innovation performance.

However, based on the evidence that is available, and the primary research undertaken, we can identify some broad findings:

- HE and FE are actively engaged with the CI both through course provision and direct company engagement;
- education in CI-related subjects is widespread and at HE level is growing, producing graduate talent undertaking work in CI and non-CI occupations;
- interaction between HE/FE and the CI is similarly widespread and there is strong research interest in the CI across HEIs;
- interaction with the CI takes place across a broad range of disciplines and there is an apparent tendency for CI to seek input for non-CI disciplines, and for creative disciplines to work with non-CI businesses (e.g. applying design expertise);
- many HE/FE institutions, while interested, do not view the CI as a major business opportunity, and there is limited appetite for an Innovation Centre style intervention; and
- the role of creativity in innovation was widely acknowledged, both through the flow of people into the economy (CI and non-CI) and through the application of creative skills and knowledge in diverse industry contexts.

4. Multidisciplinary Innovation

Work Package 3 within the research programme examined a different area of activity that related less directly to supporting CI, but focussed on the role of creative input within wider innovation contexts. The study identified and reviewed 11 examples of innovation projects, organisations and initiatives that combined expertise from multiple disciplines, within and outwith HE/FE structures, and facilitated collaborative working across a range of partners including universities, industry, public and third sector partners¹¹. Summaries of the projects are provided as an appendix.

The 11 case studies were drawn from a longer list of 26 international examples, and while they were each different in focus, scale and objectives, they fell into one of three broad categories:

- those employing a **permanent multi-disciplinary research team** to address issues brought forward by business, government or society, and operating mainly as an independent research unit/institute;
- those fulfilling a **brokerage and facilitation role** and providing meeting and experimental space and putting together teams of academics, students, businesses, other professionals, and the general public; and
- units organising **cross-departmental or cross-faculty collaboration** projects or courses within an institution (educational or government), reaching out to the general public and industry depending on projects.

There is no strict differentiation between the three models (particularly between the second and third categories) and case studies often overlapped to some extent.

They also shared some common characteristics:

- they all focussed on **innovation activities**, with some targeting social or civic challenges (healthcare, environment, transport, anti-poverty etc.) while others focussed more on industry opportunities (e.g. new product and service development);
- all had a commitment to **human-centred design, service-user** perspective and a creative, **multidisciplinary** approach;

¹¹ A full and detailed account of each of the projects is provided as an appendix to the report of Work Package 3.

- all included **creative input** via students/graduates, CI organisations/ practitioners and/or creative disciplines within the academic community, but this was always one of a number of discipline inputs, and the purpose was usually not to support innovation in the creative industries – the projects focussed more on the application of creativity in wider contexts;
- **collaborative working** was at the heart of the projects, and was actively facilitated and supported. The case study examples all invested considerable time and effort in building the right collaborative teams and supporting the process rather than leaving this to chance. Although resource intensive, this was felt to significantly improve the process and its outcomes; and
- many projects were structured to deliver **multiple benefits** and impacts for different kinds of participants (students/graduates; public sector and government, industry; universities etc), all of whom approached the work with different objectives.

Rationale and Development

The projects examined were developed on the basis of a belief in models of **open innovation**, whereby insights are generated through the combination of different perspectives involving multiple partners. The starting position was therefore one of seeking to find new perspectives and develop different approaches to innovation, hence the multidisciplinary focus.

Not all were hosted or led by universities (although some were) but some had emerged from government departments (local and national) or independent organisations. Public funding in one form or another was a consistent feature, and all depended on a supportive institutional framework.

For many, leadership was important, often in the form of visionary and charismatic individuals able to champion the initiative and build support in the early stages.

Objectives

Few of the projects described their objectives solely in economic or economic development terms. Instead, most tended to focus on social objectives framed in terms of delivering public good through innovative solutions to civic, social or industry challenges. Other objectives were typically expressed in relation to supporting multidisciplinary innovation, promoting creative thinking and culture

change. There was awareness in many cases that economic benefits would be a consequence, but these were usually not the primary driver, and were therefore rarely measured.

Activities

The range of activities undertaken by the 11 case studies was similarly diverse, but included combinations of:

- idea development through collaborative processes and engagement with customers and the wider public;
- collaborative R&D projects to address social or industry challenges, including for some the development of commercial IP;
- education and training activities, with a strong focus on innovation and entrepreneurship; and
- dissemination of knowledge and public engagement in various forms (some creative) with diverse audiences including industry, academic and public audiences.

For some, projects and ideas were sourced from industry and developed in collaborative teams, while others took policy priorities as the starting point e.g. the challenges facing a modern city. Most made use of facilitated techniques to develop ideas and these drew on participants from across industry, academia, public sector and the wider public.

Funding and Scale

As noted, public funding was an important element of all of the selected case studies. Not all of this was in the form of substantial core revenue funding. Much was also sourced in more competitive environments, for example through research funders or via European programmes. Industry contributions were also a feature. For example, two of the projects benefitted from significant initial investment and support from Nokia, which then enabled them to engage SMEs on the back of the credibility that their industry sponsor conferred. Another was formed at the time of the internet boom and private companies hungry for new ideas were a strong source of early income. Some have been able to shift from a predominately publicly funded model to one that is now largely funded through income generation and private sector funding, although this takes time to achieve.

The initiatives also varied in scale, with some of the longer established projects/ organisations growing considerably over time. Few were established as large concerns from the outset, with the preferred model tending to be more one of starting small, demonstrating value and building on success.

Creativity as Input not Output

All of the projects had a strong focus on the role of creativity as an input to the innovation process. In particular, design and digital media/technology were strongly represented, perhaps reflecting the wide applicability of these disciplines. Critically, creative input sat alongside expertise in science, technology, business and social sciences as part of multidisciplinary propositions, and this was consistently identified as important. Most of the case studies were focussed on innovation in a broad sense, and few actively targeted the CI as a beneficiary sector. These are not projects formed with the intention of supporting innovation within the CI – they are instead focused on creativity as an input to innovation in a wide range of contexts.

Creativity and the input of creative graduates was also important for many of the projects in helping to support public engagement and dissemination by supporting more creative and appealing ways of demonstrating often scientific outputs.

Impacts

Only a few of the projects were able to provide clear quantitative information on the impacts of their activities, and few were collecting this information, mainly because funders were not requesting that they do so. Instead, reporting as often in the form of case studies along with some output and outcome data (e.g. numbers of organisations engaged; attendances at events; licences bought by companies etc). For some, success was judged more on the basis of their sustainability and/or growth through the ability to access further funding and income. Some also highlighted important outcomes such as the development of new start-up companies and/or HE spin outs, as well as more qualitative effects relating to their public good ambitions (e.g. influencing policy and public service development).

Although all projects vetted the likely viability of project ideas in terms of their future fundability, realism and applicability, most resisted an ex-ante appraisal of likely economic outcomes or impacts, preferring instead to embrace a degree of uncertainty and risk considered to be inherent in multidisciplinary innovation projects.

Summary

The study collected useful information and insights on a range of international multidisciplinary innovation initiatives, and considered their applicability to the Scottish context.

The projects are all different but share a commitment to multidisciplinary innovation with creativity as a central input. In this respect they confirm the role of creativity in the innovation process, and provide useful pointers about how to structure and manage this input.

A number were operated within university structures, furthering the objectives of the institution via teaching and research activities as well as commercial relationships with industry. In addition, a further strength often was the facilitation of public engagement activities through the creative disciplines for other faculties (e.g. science). However, their position as a 'neutral space' for innovation focusing on business needs and economic development is debatable given institutional interests in developing fundable research.

Two of the projects were located within government structures, and related quite strongly to policy issues and priorities in terms of service improvements and addressing civic issues, one at national level and the other at a civic level. Both are interesting, and demonstrate a political will to seek novel solutions to often intractable challenges.

There were also two more independent organisations – one a science museum and one an independent organisation. These were also the longest established, and both valued their independent status and position as state-of-the-art research organisations.

However, most projects in the study positioned themselves as 'honest brokers' between the various sectors and disciplines, thereby offering a 'neutral space' (often in the actual physical as well as in the organisational sense). Usually they were funded by a consortium of multi-disciplinary and cross-sector organisations and working with a range of academic and research institutions to draw on a wider field of inputs.

It is difficult in the absence of impact data (and on the basis of such diversity) to comment on the relative effectiveness of these different models, but there is an undoubted appeal in all of them depending on what is to be achieved.

Much, therefore, depends on the purpose and objectives of any multidisciplinary initiative. If an industry driven model focussed on economic development gain was the preferred approach then some of the case studies within the 'honest broker' model would offer useful learning about how these can be delivered. If, on the other hand, a more social/civic model was adopted, then some of the independent examples or those with a stronger lead by a local authority or government would be more useful to consider. Alternatively, if the aim would be to support academic institutions in improving their abilities in public engagement or enhancing the innovative capability of their graduates for the benefit of the industry in future, then some of the more university-based examples would offer much learning.

None, however, offered a model exclusively focusing on enhancing innovation within the CI – they were more focussed on enhancing innovation in a wider sense albeit with a central role for the CI and for individual creative practitioners, which is consistent with the original brief.

In financial terms, no case study was able to self-fund or be independent of public finance. Only the longest established examples managed to increase their private sector income slowly over time. However, the majority of examples relied heavily on competitive tendering for public funding with the exception of those that were integrated into local and central government structures.

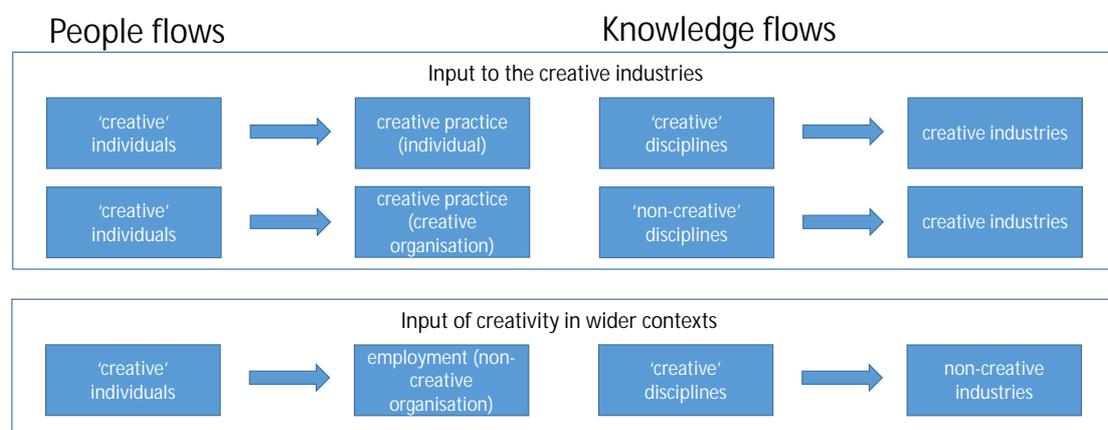
5. Summary Discussion

Strategic Framework

Taken together, the three Work Packages have described a complex landscape of interaction between HE, FE, the CI and other partners in a range of activities that contribute to innovation in different contexts. In many areas, the depth and quality of the available evidence has been found wanting, with the result that SFC and its partners are now faced with the prospect of making decisions about future investment without as firm an evidence base as initially hoped.

Having said this, the research has indicated a number of broad areas that are now worth considering, and identified a framework against which a strategic agenda might be developed. This is shown below, and is based on two main axes:

- the flow of people and knowledge between HE/FE and external parties (including the CI); and
- the external beneficiaries: CI and non-CI.



Turning first to the ways in which interaction between HE, FE and the CI can deliver benefits to the CI themselves, we can examine the top section of the strategic framework in more detail.

People flows



Skills issues:

- Developing creative and innovation skills
- Preparing graduates for precarious labour markets
- Enterprise skills
- Ensuring skills are industry relevant

Knowledge flows



Knowledge exchange:

- Addressing information failures
- Resourcing KE activities
- Connecting FE into the system
- Facilitating longer term collaboration

Skills for Innovation

There is the flow of people first into the education system and then out into employment in the CI (employment outwith the CI is discussed below). Some of these will continue into individual creative practice, but these will be small in number, given the well documented challenges of making a living in this way. The rest will find employment within creative organisations and businesses, some supporting and contributing to innovation activity.

This is essentially a simplified summary of the skills issues that face the CI, and in the current context these have a particular focus on the skills needed to support innovation.

Based on the research these would include:

- creative skills in the specific discipline;
- collaborative and multidisciplinary working;
- enterprise and entrepreneurship; and
- team working and communication.

The current and previous research suggest that provision in creative education in Scotland is good, but that the development of enterprise and business development skills is not as consistent as it might be. The extent to which CI-related courses are developing skills in multidisciplinary working is not known, but there is an argument for this being most effective at postgraduate levels where the individual disciplines skills are already developed.

Here we find the bones of a strategic approach to developing the skills needed to support innovation in the CI, and these (and other) issues are within the scope of the existing *Creative Industries Skills Investment Plan* produced by Skills Development Scotland.

Innovation Support

The right side of the figure summarises the flow of knowledge from creative and non-creative disciplines into the CI. Of course, this summary does a disservice to the complexity of the processes at work, and ignores the reality of KE activities in which the knowledge is often created through the very process of interaction rather than transferred from one party to another.

Nonetheless, it provides a means of illustrating the matrix of interaction across creative and non-creative disciplines that the research identified. The strategic question is then how best to enable more effective interaction such that innovation activity in the CI is supported and enhanced.

Here four main issues arise from the findings:

- there are persistent issues with the sophistication of the demand for interaction coming from the CI, and well documented barriers to effective collaboration between industry, HE and FE.

These include:

- information failures in which the CI lack understanding of the benefits of collaboration and of how to access the right expertise
- barriers relating to limited financial and human resources, and perceptions of mismatched timescales between industry and the academic sectors
- low or variable levels of absorptive capacity in industry to be able to take on board the outputs of collaborative working and follow through with innovative products and services
- the sheer diversity of the CI and the myriad of different needs and priorities across different parts of the sector, which mitigate against a single approach;

extent this already happens in the context of some of the Innovation Centres. There may be more that could be done there in relation to involving creative disciplines (in particular design) in the process, but there may also be potential for something more focussed in this area (and which could be the focus of a bid to the new AHRC Creative Clusters Programme¹²).

Here, the learning from Work Package 3 is useful, and the first step in considering the potential is to give due consideration to the aims and objectives of any multidisciplinary innovation initiative. This is critical, as subsequent choices will depend in large part on the objectives that are defined. Valid questions regarding these choices would include:

- whether the purpose is to be fundamentally economic or social (recognising that this is not a binary choice);
- the thematic or market areas in which the initiative will focus (e.g. healthcare, environmental, civic innovation, digital technology etc.);
- the range of activities to be undertaken, and the disciplines (academic and industry) that will be required;
- the demand for the outputs of the activities, and the extent to which these can accurately be defined and scaled;
- the partners to be involved and the most appropriate 'lead partner' – whether educational institution, public agency or a third party (independent);
- sources of finance and potential income, taking into account the potential of different partners to access different sources of finance; and
- the appropriate scale for the project, particularly in its early stages, as the tendency can be to overestimate the potential for industry income, for example, and set out an ambitious model from the outset rather than starting small and seeking to grow over time.

Data and Evidence

The research programme identified significant weaknesses in the evidence base in a number of areas, including:

- consistent data on the number, scale and nature of interactions between HE, FE and the CI by industry sub-sector and HE/FE departments/discipline;

¹² <http://www.ahrc.ac.uk/documents/calls/creative-industries-clusters-pre-call/>

- data on the impacts of interactions;
- graduate destination data that provide information on the nature of graduates' work (and finer grained detail of the industry and role in which they work); and
- data on the extent of enterprise education in CI-related courses.

While it is easy to recommend that these gaps are addressed, there are potentially significant resource implications of doing so, not least for academic institutions. As noted in the Work Package 1 report, few institutions have CRM systems for tracking external interactions and the costs of developing these would be substantial.

Similarly, in Work Package 2 we have suggested ways in which graduate destination data could be improved, but the benefits of better quality data will need to be assessed against the costs of their collection.

What is important, and achievable, is for any future initiatives to set out clear aims and objectives against which progress can be measured using clearly defined indicators.

They should then be supported by clear and agreed monitoring systems which allow the collection of the right data to track activity, and to assess the outcomes and impacts of those activities.

Summary

Despite the limitations of the available evidence base, a strategic agenda has emerged based around four broad themes and priorities within each, as set out below:

- **skills for innovation:**
 - strong educational provision in creative disciplines at all levels
 - emphasis on collaborative and multidisciplinary skills
 - enterprise and business development skills
 - team working and communication skills;

- **enhancing innovation in the CI:**
 - developing the demand for innovation input/support
 - developing effective means of resourcing collaboration between FE, HE and the CI
 - facilitating larger scale collaborative activity along smaller interactions
 - connecting FE into the innovation system;
- **multidisciplinary innovation;** and
- **improving the evidence base.**

Appendix 1: Work Package 3 Case Study Summaries

ARS Electronica/Living Lab <https://www.aec.at/futurelab/en/>

Location: City of Linz, Austria

Lead Organisation: Ars Electronica

Established: 1996

Main Funders: Mix of local, regional and national government, private sector

Type of Collaboration: private sector, public sector, academia, public

With a key focus on multi-disciplinary collaboration, Ars Electronica Futurelab aims at developing contributions through methods and strategies of applied science. The results of this process lead to new knowledge and experiences of societal relevance in art and science. The Futurelab was created to support the existing science museum to



Source: <https://nowalls.qut.edu.au/qut-ars-electronica-futurelab-academy/>

keep its contents up-to date and relevant to current developments. The Futurelab's work connects directly to industry and business as well as to education. Key fields of interest include media art, architecture, design, interactive exhibitions, virtual reality and real-time graphics.

Key objectives:

- to conceptualise the Intangible;
 - for the museum and its content and events to remain ahead of emerging technologies;
 - to bring scientific innovation closer to the wider community;
 - to deliver and facilitate interdisciplinary R&D projects in partnership with private sector organisations and industry.
-

Laboratorio para la Ciudad

<http://labcd.mx/labforthecity/>

Location: [Mexico City](#)

Lead Organisation: [Mexico City Government](#)

Established: 2013

Main Funders: [City Government](#)

Type of Collaboration: [Public sector, citizens, academia](#)

The Laboratorio para la Ciudad (Laboratory for the City) is Mexico City's new experimental office for civic innovation and urban creativity, the first city government department of its kind in Latin America. The Lab is a space for rethinking, reimagining, and reinventing the way citizens and government can work together towards a more open, more livable and more imaginative city.



² On the rooftop of Laboratorio para la Ciudad in Mexico City, Mexico
Source: <https://medium.com/@kolivernyc/think-global-act-local-1363f0a1f2ec>

The approach does not only focus on delivering better services or offering new channels for engagement, but seeks to reimagine the role of government and how it can contribute to building better cities.

Key objectives:

- to facilitate social and civic development;
- to create new models of development which are better for the planet;
- to be a Think Tank for the local government in the area of citizen participation.

The Laboratorio works across five different topics around which teams are built (architecture, playful city, creative city, pedestrian mobility, participatory budgeting).

The underlying rationale of the Laboratorio is focused on what democracy means, and how governance structure can support a better and fairer democratic system? There is a strong focus on the 'collective good' which is key to all the initiatives undertaken.

There is a further clear focus on practical research utilising the urban and creative skills sets.

WAAG Society<http://waag.org/en>**Location:** Amsterdam, Netherlands**Lead Organisation:** WAAG Society**Established:** 1994**Main Funders:** Public sector, research funding, European, private sector**Type of Collaboration:** Academia, public, business/industry, community

Waag Society—institute for art, science and technology—originated with a particular focus on connecting internet technology to society through digital media. Since its start up 22 years ago, the foundation has developed into a catalyst for events and promoter for cultural and social innovation at local, regional and



Source of picture: <https://Waag.org/en/route-planner>, by Zamito44 2009

national level.

The Waag Society explores emerging technologies, and through cross-sector collaboration provides a central role for art and cultural disciplines in the design of new applications and novel advances in science and technology. WAAG regards the input from artists and designers as crucial to technological and scientific projects contributing with their intuitive and curiosity-driven approach.

Artists and designers are key to stimulate imaginative processes, create unexpected connections. The impacts from their collaborative activities are wide – depending on the project area, including educational, social and economic (through the creation of new products and services).

Key objectives:

- to use technology to change society in a positive way;
 - to join up art, science and technology, education, and to work in a multi-disciplinary manner;
 - to implement 'open innovation' at local, national and European levels; ant
 - to focus on the user, the public and the community.
-

New Factory

<http://www.newfactory.fi/>

Location: Tampere, Finland

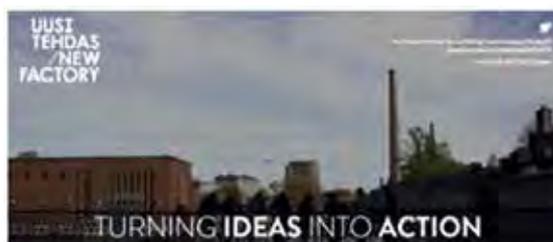
Lead Organisation: Consortium of public, private and academic organisations

Established: 2008

Main Funders: Consortium of public, academic, private sector funders

Type of Collaboration: Academia, private sector

The New Factory is an innovation centre and business incubator that connects entrepreneurs, a number of local universities, students, researchers, mentors, investors and experts from various fields to foster co-creation.



<http://www.newfactory.fi/>

The focus is on business sector needs and bringing multi-disciplinary student teams together to find solutions for existing problems. The New Factory deals with 67-70 projects each year. Within each project, the multidisciplinary student team represents a mix of academic fields, such as technology, business, art and creative industries – a good mix is very important. The process of cross-sector working is facilitated and constitutes a particular focus of the approach. If the student team develops a feasible idea, businesses can purchase the licence for the solution, thereby creating an income stream for the New Factory. 60% of the results have been purchased by companies.

Key objectives:

- to support companies finding innovative solutions;
- to turn good ideas into innovative products, services and business that change the world for the better;
- to support innovation through multi-disciplinary approaches;
- to create entrepreneurial thinking;
- to facilitate collaborative, cross-sector skills and abilities;

Key values are: creativity, curiosity, courage, concreteness, community.

Design Lab

<https://www.utwente.nl/en/designlab/>

Location: Twente, Netherlands

Lead Organisation: University of Twente

Established: 2015

Main Funders: University of Twente and external public and private sector

Type of Collaboration: Academia, business, public sector, society

The DesignLab is a creative and cross-disciplinary initiative at the University of Twente, connecting science and society through design. Faculties and students from all fields work together with companies and governments to implement and develop scientific and technological insights that can be used in finding and shaping creative, innovative and meaningful solutions for complex

societal challenges. Talents from engineering, natural science, social science and the humanities join forces to use their creativity.



Source: <https://www.utwente.nl/en/designlab/>

Key objectives:

- to build on the strategy and strength of the university of Twente regarding its key theme: High Tech Human Touch;
 - to match-make, reach out and connect researchers with partners;
 - to provide a safe space for research, labs, meeting, exhibition space; and
 - to teach people how to collaborate.
-

Media Factory

<http://mediafactory.aalto.fi/>

Location: Helsinki, Finland

Lead Organisation: Aalto University

Established: 2012

Main Funders: Aalto University is the prime funder

Type of Collaboration: Academia and private sector (linked by media sector)

The Aalto Media Factory focuses on developing multidisciplinary media-related research and education, welcoming people from the local area, and reaching out to commercial industry partners and non-profit organisations. Media Factory resources joint ventures, such as research projects, pilot courses and event productions by providing funding, coaching, tools and spaces.



There are a number of 'factories' connected to Aalto University, including the Media, Design and Health Factory. They all provide platforms for collaboration and development outside the usual scope of academic departments and research units joining up with a number of universities and external private and public organisations.

Key objectives:

- to provide access for individuals, businesses, students and academics to media equipment (for free/cheap) and broker contacts to foster innovation;
 - to design inter-disciplinary study programmes; and
 - to offer Open Design student workshops.
-

Demola International Network

<https://www.demola.net/>

Location: world-wide network

Lead Organisation: Demola International

Established: 2008

Main Funders: Network members

Type of Collaboration: transnational academia, private sector and public sector

Demola is an international organisation that facilitates interdisciplinary co-creation projects between university students and companies, either locally or internationally. The operational co-creation concept is geared to solve real challenges and seeks to produce new concepts or prototypes.



Demola is a process that is formatted and facilitated. If the partner company finds the outcome useful, the company can license or purchase the outcome, and take it for further development.

Key objectives:

- to enable creative thinking;
- to create environments and conditions where businesses and students can utilise their complementary skills, thoughts and perspectives;
- for companies to utilise students/academics more effectively;
- to re-learn how to collaborate in a multi-disciplinary way and to grasp the potential of working with different skills and perspectives;
- to support SMEs in getting the best out of collaborating with universities and to learn what universities can do for them;
- to tap into the positive mindsets of young people; and
- for companies to utilise the potential of their staff more fully.

REACT <http://www.watershed.co.uk/studio/projects/react>

Location: Bristol, UK

Lead Organisation: Watershed Persuasive Media Studio

Established: 2012-2016

Main Funders: External research funding sources (AHRC Creative Economy Hub)

Type of Collaboration: Academia, public, private sector

REACT was a four year collaborative project between UWE Bristol, Watershed, and the Universities of Bath, Bristol, Cardiff and Exeter. It was dedicated to getting academia and businesses working together, connecting researchers from the arts and humanities with creative businesses to make new prototype products and services. Public engagement played an important role in most areas of collaboration.



Source: <http://www.stephenhodge.org/portfolio/project/react/>

Key objectives:

- Collaborative projects aiming at developing a prototype or experience which was tested with a public audience (worked across academic disciplines, but not art disciplines as such)
 - To build on the Watershed experience incorporating the critical perspectives of academics and widen the initiative to other sectors, particularly businesses and the public sector
 - There was an ambition to contribute to societal change and change mindsets of people
 - Method was based on open sourcing and dissemination of findings on the website – ‘sharing is open’.
-

Creative Intelligence and Innovation Unit (CIU)

<https://www.uts.edu.au/partners-and-community/initiatives/creative-intelligence>

Location: Sydney, Australia

Lead Organisation: University of Technology, Sydney (UTS)

Established: 2012

Main Funders: Central Government

Type of Collaboration: Academia, students, and industry partners

CIU is an on-campus unit facilitating cross-disciplinary projects. By focusing in teams on high-level conceptual thinking and problem-solving practices, students learn to work across and between disciplines, gaining skills and mind-sets. The aim is that through this process students will become lifelong innovators, entrepreneurs, creative practitioners and change-makers.



Source: <https://www.facebook.com/UTSIInnovation/>

CIU offers opportunities for business, industry and communities to collaborate and form partnerships to contribute to communities locally and globally.

Key objectives:

- to foster creativity as the new frontier for problem solving regarding global matters (food supply, energy use);
 - to harness and integrate existing strengths in creativity, technology, and innovation (creative innovation and creative intelligence); and
 - to pilot and prototype new models of teaching, learning and industry engagement.
-

Mindlab<http://mind-lab.dk/en/>**Location:** [Copenhagen, Denmark](#)**Lead Organisation:** [Danish Government](#)**Established:** 2002**Main Funders:** [Central Government](#)**Type of Collaboration:** [Public Sector, Community, Business](#)

MindLab is a cross-governmental innovation unit which involves citizens and businesses in creating new solutions for society. A physical space provides a neutral zone for inspiring creativity, innovation



Source: <http://mind-lab.dk/en/samarbejd-med-os/>

and collaboration covering areas such as entrepreneurship, digital self-service, education and employment. MindLab is instrumental in helping key decision-makers and employees view their efforts from the outside-in, to see them from a citizen's perspective, using this approach as a platform for co-creating better ideas.

Key objectives:

- to change government culture;
 - to react to the growing interest in the application of service design as a key driver of service innovation, social innovation and user-centred innovation;
 - to help cut across disciplinary and departmental silos;
 - to engage more directly with service users and their needs;
 - to engage in co-design with the users/members of the public;
 - to produce more workable solutions and communicate them better to decision makers increasing the chance of implementation; and
 - to run innovation labs designed to foster collaboration (interaction, dialogue, and development activities).
-

Open Lab
<http://openlabresearch.com/>
Location: California, USA

Lead Organisation: University of California, Santa Cruz

Established: 2011

Main Funders: Research Funding

Type of Collaboration: cross-departmental academia, but also general public and industry

The Open Lab with its Idea Hub is a campus-wide initiative for students, created to spread social and creative entrepreneurship at UCSC. Open Lab is led by the on-campus Centre for Innovation and Entrepreneurial Development (CIED). The Open Lab supports a network of incubation facilities, fellowships, seminars, workshops, and mentorships that provide students space to think critically about the challenges facing society and explore pathways for meaningful intervention.

UCSC OpenLab & Sesnon Art Gallery presents: Black (W)hole exhibition



October 3 - November 23, 2016

Reception: October 5, 4:30-6:30pm at the gallery

"Imagination is more important than knowledge"—Albert Einstein

Workshop: Friday, Oct 7, 1:00-5:00pm

Workshop: Application (UCSC students apply to participate)

Black (W)hole is an immersive exhibition experience designed by The Einstein Collective that combines the arts, data visualization and sonification, and astrophysics. Entering the installation, visitors step into a darkened gallery where a laser star field projects onto their skin. The visitor

<http://openlab.ucsc.edu/>

Participation provides graduate and undergraduate students with the skills and capacity to conceptualise and execute their ideas. Four campus workspaces provide access to hardware and software for hands-on development and innovation in design, manufacturing, communications, and data visualisation.

The initiatives originated due to a demand expressed by students seeking to collaborate across faculties.

Key objectives:

- to foster innovation through cross-sector inputs, and to share insight and knowledge across disciplines for the benefit of all;
 - to enable students to work in a multi-disciplinary manner;
 - to offer a physical space and conducive environment for collaboration;
 - to connect people and facilitate match-making; and
 - to design products, proto types, visualise ideas, digital application installations.
-