Innovation systems and the role of small and specialist Higher Education Institutions

Consortium for Research Excellence Support & Training

CREST

Distinction and Diversity in Higher Education

GuildHE


Consortium for
Research Excellence
Support & Training
CREST


Distinction and Diversity
in Higher Education
GuildHE


OECD
BETTER POLICIES FOR BETTER LIVES


LEED
BUILDING MORE & BETTER JOBS

Innovation systems and the role of small and specialist Higher Education Institutions

Edited by
Rachel Brockhurst, Alisa Miller
and Andy Westwood

CREST/GuildHE
Woburn House
20 Tavistock Square
London WC1H 9HB

T: +44 (0)20 7387 7711
F: +44 (0)20 7387 7712
www.crest.ac.uk

Designed by
HDR Visual Communication Ltd.
www.hdr-online.com

Contents

Introduction and Executive Summary

Andy Westwood

This GuildHE-led project explores the ways in which small, specialist and locally facing HEIs embedded in international research and innovation systems can increase and sustain their contributions to regional and sectorial economic growth. This is undertaken at a time when the way in which Government supports the innovation and research potential of micro-business and SMEs is undergoing a substantial recalibration towards a more 'activist' or 'interventionist' approach, as specified in the *Innovation and Research Strategy for Growth*, published in December 2011, as further refined by Sir Andrew Witty's Review of *Universities and Growth* [2] and since reinforced by many ministerial speeches.[3]

HEIs working with public and private partners in specialist sectors, including food security, the creative industries, health, and social innovation, have a unique potential, enabled in part by new technologies, to collaborate with diverse bodies of users: students and graduates, business and providers of public services. Through translational downstream research, small and specialists are also especially well positioned to take advantage of a significant 'missing link' between blue skies research and innovative applications in local and national industry, to which they often have long-standing links. Their strategic compatibilities and shared goals with sectors reliant on highly skilled graduates mean that collaborations can be particularly fruitful.

The 'definitions' of HE activity described in the *BIS Economics Paper No 15*, published in support of the Government's *Innovation and Research Strategy for Growth*, describe how small and specialist institutions work to support growth in regions where access to research and innovation knowledge is limited, and / or in sectors where their expertise is particularly required:

- 'Universities create capabilities in teams and individuals, both in terms of particular areas of expertise as well as wider abilities to identify and address problems; that is, they are a major channel of investment in high-level skills';
- 'Universities maintain knowledge bases via teaching, via data storage and transmission, and via the maintenance of libraries and databases';
- 'Universities develop new forms of problem-solving and search heuristics that enable firms to address new problems in new ways; that is to say, they not only solve problems, they develop new ways to address them';
- 'Universities engage in reactive problem-solving via a wide range of formal and informal collaborations with firms. This is often done via informal contacts rather than formal collaboration agreements, and therefore does not normally show up on the usual indicators for university-industry interaction.' [4]

However, with the loss of a number of stable sources of funding (for example, Regional Development Agencies (RDAs) and Higher Education Innovation Fund (HEIF)), and the subsequent depletion of institutional resources devoted to engaging with key stakeholders in low-growth regions, the need to consolidate capacity and identify new methods for how HEIs can work to meet the economic and social challenges facing private and public partners becomes ever more important and pressing. With limited resources available to identify the best methods of working in a changing environment, small and specialist institutions may falter in terms of capacity and networks in regions and disciplines where their contribution to the local knowledge economy is vital.

We see funding instruments such as the Catalyst Fund (formerly the Strategic Development Fund), and the HEIF model espoused in the recommendations made by the Witty Review, as necessary to 'bridge the gap' left by these significant adjustments to localised investment, which in turn help enable small and specialist institutions to find new self-sustaining, productive, and dynamic ways to engage with business and enterprise.

The project therefore explores the best methods and datasets that capture such activities and contributions, and identifies the processes, policies and support mechanisms that might underpin future delivery models. It therefore makes recommendations accordingly by:

- identifying key activities and capabilities within small and specialist HEIs that fit strategically with the missions of both the HEIs and collaborators;
- considering a range of alternative delivery models that maximise activity and sustain capacity for business engagement (some of which was previously funded through RDAs and HEIF);
- determining the most appropriate recording mechanisms to effectively monitor and capture activities in order to identify best-practice and demonstrate the impact of investment, recommending datasets / metrics for assessment of ongoing and future contributions to the growth of sectors and the local and national economy;
- identifying relevant best practice from similar institutions, sectors and locations nationally and internationally (for self-sustaining networks, etc.);
- making recommendations to HEIs and HEFCE and other bodies about suitable models and policies going forward.

Through a selection of case studies drawn from small and specialists in the UK and in the OECD nations, we identify best practice in engagements with micro-business, SMEs, and the public sector, working in particular localities and regions, to drive innovation and increase impact through direct collaboration in:

- teaching, learning and research
- expertise and consultancy
- curriculum and skills development
- graduate talent
- networks
- facilities

The case studies are presented within 6 themes relevant to current political, social and economic concerns: Enterprise and innovation in HEI strategies; Regional agendas for growth; Global links as a result of smart specialisation; Smart, creative and sustainable business; Health and wellbeing agendas – grand challenges and emerging priorities; and Cultivating entrepreneurship.

An economic assessment is included in Chapter VIII to provide a reflective analysis of the case studies presented, and we conclude with a best-practice toolkit to enable better demonstration of impact through evidence. The opening chapter which follows establishes the overarching themes and contexts, which have both guided and necessitated this report.

1 Department for Business Innovation & Skills (BIS), *Innovation and Research Strategy for Growth*, London, December 2011

2 Witty, Sir Andrew, *Final Report and Recommendations – Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth,* London, October 2013

3 For example, Rt. Hon. David Willetts, *Bledisloe Memorial Lecture 2013 on Science, Technology and Agriculture,* Royal Agricultural University, 31 October 2013 (published 15 November 2013: https://www.gov.uk/government/speeches/bledisloe-memorial-lecture-2013-on-science-technology-and-agriculture accessed 04/03/2014)

4 Department for Business Innovation & Skills (BIS), *Economics Paper No. 15, Innovation and Research Strategy for Growth,* London, December 2011, p.81

Overarching themes and contexts: Local, regional, national and international

A. UK Political and Economic Context c. 2008 to 2012

As the Coalition Government implements its *Innovation and Research Strategy for Growth*, its ultimate objective, to encourage national growth and the rebalancing of the economy, will be achieved by 'creating a more open and integrated innovation ecosystem'.[5] This means moving away from innovation framed as an 'elite', largely technology- or technically-driven process, engaged with a narrow set of established sectors and activities, to a much broader understanding, wherein many more skills, sectors, geographical locations, and activities inform the nation's strategy. This more diverse and open innovation system will rely on 'harnessing new knowledge wherever it comes from'.[6]

However, it is important to acknowledge that this project has taken place against a backdrop of reduced public spending and slow (and periodically negative) economic growth, especially in particular areas of the country. The twin challenges of catalysing more economic activity and doing so on the most cost-effective basis are clear. This is reflected both in Professor Tim Wilson's report of university and industry collaboration[7] and in Professor Ian Diamond's recent report[8], with its focus on achieving efficiencies in the sector by simplifying internal processes and data management, and how these play into improving and sustaining strategic partnerships and shared services. This evidence base and policy focus has been further supported through the work of Sir Andrew Witty, who led a Department for Business, Innovation and Skills (BIS)-sponsored review into the links between Higher Education and local growth. The Witty and Wilson Reviews, in particular, speak to a new, or at least a renewed, interest in agreeing an active industrial strategy.

It is worth pausing briefly to consider how and why we have arrived at this point. Only a few years ago, the thought of an active industrial policy on behalf of either Labour or a Conservative (or a Coalition) government was fairly remote. Neither Tony Blair nor Gordon Brown – and certainly not David Cameron – have had much time for an active, interventionist state in a free market economy. As the world was turned on its head in 2008 in the wake of a global financial crisis, orthodox economic thinking as to how Governments respond to severe and prolonged market downturns experienced its first significant challenge for nearly forty years.

The story of a modern industrial policy really begins with its abandonment in the late 1960s. There followed four decades of a free market, monetarist, and inactive state, an approach that underpinned the Heath, Thatcher, Major and Blair governments. Even Gordon Brown – instrumental in the continuation of this orthodox economic policy as Chancellor – appeared to be no great fan of active intervention. However, shortly after his succession to No 10, the foundations for a new approach were being laid. On his first day as Prime Minister, Brown reorganised the offices of state and created the Department for Innovation, Universities and Skills (DIUS) – an attempt to bring together those aspects of Government policy that could potentially catalyse a more productive economy in the UK. It also built on a series of strong Labour interests developed over the course of its time in government; investment in UK science funding had nearly tripled under Labour, as had

higher and further education funding in that same ten year period. This combined department also allowed Brown to integrate some of his most cherished policy agendas; skills, science and higher education had all been subjects of major independent reviews in the Treasury (Leitch, Sainsbury, Lambert etc.) during his time as Chancellor.

A more active role for the state in industrial policy rapidly took shape at DIUS. Published in March 2008, *Innovation Nation*[9] outlined how public procurement, regulation, and policy – alongside investment in science and research – could help to make markets and shape the broader economy. Soon after its publication DIUS developed the notion of 'strategic skills' – aligning skills investment behind strategic projects and sectors, including construction and bioscience, and in projects like Crossrail and the Olympics. At the same time, Peter Mandelson, newly returned from Brussels to the Department for Business Enterprise and Regulatory Reform (BERR) in the cabinet reshuffle of 2008, began to talk about a new industrial activism and a clear role for the state:

> *'A capable, strategic state – one that works with markets and enables us to get the most out of globalisation. Part of that is about building a fair society socially equipped to create more winners from globalisation. Part of it is about putting in place the conditions that will help British business succeed in a global economy – and this I called market-based industrial activism…Government can and must complement market dynamics to get the best outcomes for our society and economy … by all government policies –regulation, planning policy, migration policy, transport policy and a range of others – as well as the way government spends money and encourages innovation and entrepreneurship. The central point about industrial policy is how successfully it aligns all these relevant policies to target and deliver industrial outcomes.'*[10]

Together, DIUS and BERR produced the *New Industries, New Jobs* (NINJA) white paper on 20th April 2009 – two days before that year's Budget. A NINJA Capital Fund of £750 million was summarily announced in the Budget on 22nd April 2009:

> *'By making key decisions, buying goods and services and regulating, Government shapes and creates future markets, new business opportunities and the demand for skilled jobs. That is why our new activism will focus our skills system, the knowledge in our universities and the way we support research through our record investment in science to meet the demands and opportunities Government creates when it acts in other areas of the economy. Britain has the skills, resources and knowledge to retain and strengthen its position as a world economic power. The Government's job is to do everything it can to enhance these strengths and create new jobs and business for the future.'*

In both *Innovation Nation* and *New Industries, New Jobs,* BERR and DIUS began to set out the key sectors and industries that would both rebalance and support a fairer and more productive economy. Following further unrest in the Labour party and a failed attempt to unseat Gordon Brown, Mandelson took the opportunity to consolidate

both the story and the departmental infrastructure that underpinned it. On the 5th June 2009 the Department of Business, Innovation and Skills (BIS) was formed – merging BERR and DIUS. With budgets for science and innovation, and further and higher education alongside the regional structure and funds provided through RDAs, this was a significant department with the sixth biggest budget in Whitehall. The framework for Labour's industrial policy was now in place.

BIS remained intact after the formal establishment of the coalition government formed by the Conservative and Liberal Democrat parties after the 2010 General Election. Shortly after being appointed as Secretary of State for Business Innovation and Skills as part of the coalition deal, Vince Cable described it as the 'department for growth'. The Coalition document published in the first week after the new administration took office set out some overriding principles that formed the basis of the agreement between the two political parties and the approach of their government. Economic growth was – and remains – a key element:

> *'The Government believes that business is the driver of economic growth and innovation, and that we need to take urgent action to boost enterprise, support green growth and build a new and more responsible economic model. We want to create a fairer and more balanced economy, where we are not so dependent on a narrow range of economic sectors, and where new businesses and economic opportunities are more evenly shared between regions and industries.'*[11]

The themes of a rebalanced economy – both sectorially and geographically – and a private sector-led growth model, all less dependent on government debt, also featured centrally in David Cameron's first major speech as Prime Minister a few days later. It was then that the new Coalition Government's framework for growth began to become a little clearer. In his speech Cameron focused, in notable order, on the following headline areas:

- Cut the deficit quickly – thereby improving and stabilising macro-economic conditions;
- Cut regulation, bureaucracy and red tape, reduce the size and role of the state in the economy and in society;
- Support new business growth – following a private sector enterprise model;
- Rebalance the economy – sectorially and geographically.

To illustrate this final point he asserts:

> *'That doesn't mean picking winners, but it does mean supporting growing industries – aerospace, pharmaceuticals, high-value manufacturing, hi-tech engineering, and low carbon technology. And all the knowledge-based businesses including the creative industries.'*[12]

Two years later, speaking at the launch of the Growth Strategy, David Cameron alluded to two levels of innovation: the large growth sectors of the future (life sciences, alternative technology) and also the innovation that is delivered to the economy through SMEs reliant on entrepreneurship, citing evidence that one in twenty companies are responsible for half of new job creation.

'Getting behind tourism, green energy, pharmaceuticals, advanced manufacturing, aerospace, the industries of the future – all this is crucial. But it would be a big mistake if we stopped at those big ticket industries. Because if you look at where growth has come from in recent years, you see that it's the small, innovative companies that hold a lot of the potential.'

In Vince Cable's first major speech, he started by telling the audience that they may have noticed that he was not Peter Mandelson:

'By bringing together university policy, skills policy, business, regulation and competition policy, science and research policy, it has become in effect, the department for economic growth. When Ed Balls used the phrase post-neo classical endogenous growth theory he was, unwittingly, explaining the rationale for my department... It is, in any event, a major economic department, complementary to the Treasury. A key measure of the success of this government is that both succeed. We cannot have sustainable growth without fiscal stabilisation. And fiscal stabilisation will only be successful if it leads to growth.'[13]

Then came the obligatory statement on 'picking winners' and the real detail of the BIS approach under his stewardship.

'The debate about industrial policy always raises the spectre of 'picking winners'. But in a globalised economy it's time to move this debate on a bit – be clear about what this means. Because, in some ways, we have to be picking winners. We have to make choices about allocating the training budget, or funding certain kinds of science or research, or promoting science, technology, maths or engineering degrees for higher education. We have to make some strategic choices. We can't avoid that. But the 'winners' in this sense are the skills we judge we will need for the future, and the sectors they support. Because while we can't divine the future, we can recognise in a broad sense what Britain is good at and likely to become good at, and the areas where the changing nature of the global economy make it futile for us to try to compete – our comparative advantage in economic jargon. We can and must allocate scarce public resources on the basis of this evidence.'[14]

Cable did however distance himself from the micro-level intervention that characterised the spending of the £750 million NINJA fund established in the 2009 Budget and committed to a number of projects, firms, and key constituencies in the run up to the election:

'What we shouldn't be doing is trying to micromanage the economy at the level of individual companies or so-called national champions: trying to supersede the judgement of markets.'

As the Coalition Government has continued, the attempts to stimulate economic growth have intensified, and the nature of intervention, or prioritisation, of key sectors and technologies has also developed further. Significantly, this has involved more spoken and financial support from the Treasury and from the Chancellor of the Exchequer, George

Osborne, perhaps indicative of a different approach to that seen under the latter years of the Labour government.

In a speech to the Royal Society in late 2012, George Osborne defined the role of the Government as an 'identifier' of 'Britain's strengths' and proposed 'eight future technologies' that Britain should invest in, support, and develop:

> *'I am clear about the role of government. It is not government who creates the scientific innovation, or translates into growth. But we can back those who do. And as a government and as a scientific community we need to be willing to identify Britain's strengths and reinforce them. We do not claim to be able to predict them with 100% accuracy. But we need some sort of assessment [...] Today I want to begin a debate about eight future technologies where we believe we can be the best - where we already have an edge, but we could be world-leading [...] The list put together by my colleague David Willetts draws on the advice of science community, the research councils and the Technology Strategy Board - and I would like Government to work with you to build a consensus that these are the right goals.'*[15]

The eight key 'technologies' were identified as:

- the Big Data Revolution and energy-efficient
- computing;
- Synthetic Biology;
- Regenerative Medicine;
- Agri-Science;
- Energy Storage;
- Advanced Materials;
- Robotics and Autonomous Systems;
- Satellites and commercial applications of Space.

Both the Treasury and BIS have gone further in complementary areas and have picked a number of sectors in which to concentrate their investment and support via state-resourced sector industrial strategies. *The Plan for Growth*[16] published in 2011 set out support for healthcare and life sciences, advanced manufacturing, construction, digital and creative industries, retail, professional and business services (including further and higher education), the space industry and tourism. The Budget for 2013 also confirmed funding of at least £1.6 billion for the Government's Industrial Strategy, aiming to:

> *'maintain and enhance the UK's global position in eleven key sectors: automotive, aerospace, life sciences, agri-tech, professional business services, information economy, construction, education, nuclear, oil and gas, and offshore wind'.*

According to published BIS economic analysis, these are all sectors 'where societal drivers indicate there is likely to be significant increasing domestic and global demand; where UK business has the potential knowledge and skills to exploit new market opportunities (i.e. the UK has a comparative advantage in global markets in virtually all these areas); and where a sector-based approach has a clear role'.[17]

The Government continues to work with industry to create sector strategies that identify long-term

opportunities and address barriers to growth. Each strategy sets out actions for both industry and the Government, such as bridging skills gaps or strengthening supply chains. The Government plans to strengthen sector councils as long-term platforms for engagement with business, with the aim of ensuring that policy making is informed by business needs.

The Coalition Government has also been increasingly interested in shaping the economy at a local or regional level. Whilst one of the initial dividing lines between the Coalition and the previous Labour Government's approach focused on the abolition of the Regional Development Agencies – the primary bodies tasked with stimulating and supporting regional economic growth – their interest in local economic policy has intensified over the 2010-2015 Parliament.

The most significant institutional aspect of this has been the setting up and development of Local Enterprise Partnerships (LEPs). Initially envisaged as a loose alliance of local businesses coming together to identify and act on key local economic issues at whatever geographical level was appropriate, LEPs have gradually assumed more significance as well as more resources and responsibilities. Several Government commissioned reports and reviews have identified them as significant and called for greater resource and an enhanced role – not least in respect of higher level skills, research and local industrial policy. *No Stone Unturned* – a review of local economic growth led by Lord Heseltine[18] recommended a major devolution of powers and resources to local authorities and to LEPs. Both Sir Tim Wilson and Sir Andrew Witty have looked more closely at the specific role of universities and their relationships with LEPs.

David Willetts spoke of these links in his speech at the Universities UK's conference on 3rd April 2014, and has written to HEFCE to ask how the expansion of places, announced in the Autumn Statement in 2013, might support the development of new university campuses in 'cold spots' across the country. Key to this, he describes the potential and need for higher education to drive local economic growth and impact, as in the case of universities like Lincoln and Worcester:

> *But fuelling growth is not just about clusters, it also means reviving great towns and cities. A university can be the heart that pumps new life into a town or city... And renewing a city isn't all about obvious cash returns. The University of Worcester has broken new ground in really bringing its community onto its campus. Its inspirational new library, the Hive, is the first joint university and public library in Europe. It is a fabulous resource for students and researchers. But it is also pulling in people - and especially disadvantaged young people - from outside in a quite remarkable way.*
>
> *I have today written to HEFCE to look at how we do everything possible to encourage new higher education institutions in obvious 'cold spots' like Yeovil and East Anglia. With student number controls being wiped out the government wants to see more higher education campuses being set up across Britain. Recently the coastal local enterprise partnerships (LEP) have flagged up a number of seaside areas which are seriously lacking higher education opportunities. They should embrace this opportunity. I want*

HEFCE to work with universities, further education (FE) colleges and LEPs to develop plans for university campuses where they are most needed.'[19]

As this study sets out, the small and specialist HE sector has many excellent working partnerships, particularly in these priority sectors, including:

- the creative industries ('the fastest growing sector of the UK's economy') relying on the creative skills and business practices fostered in specialist art institutes and arts and humanities departments, where the emphasis is on creating new work and markets, and engaging with practitioners at every stage of the curriculum;
- 'economically important sectors' such as agri-food and animal science, in which specialist land-based institutions play a vital role
- translational research in the life sciences (for example, the University of Worcester National Pollen and Aerobiology Research Unit, which works with businesses to test prototypes based on 'pure' research undertaken in research-intensive HEIs);
- advanced manufacturing (for example, Glyndŵr University's European-funded work on components for the European Southern Observatory, as well as research into the development of solar technology in construction at the Centre for Solar Energy Research in partnership with in-house and local micro-business and SMEs).

Crucially, a number of small and/or specialist institutions also have strong connections with SMEs across sectors and local economies. As Witty suggests in his recent review, this is perhaps just as important in the medium and longer terms.

B. Recommendations: A changing understanding and approach to innovation?

For well over a decade, innovation has been recognised by the UK Government as one of the five drivers of productivity and therefore key to growth. However, the inability to harness innovation has often been considered to be one of the UK's long-standing economic weaknesses.

Under previous governments, innovation policy had been conceptualised as a simple process of investment in fundamental science and research, which would lead to commercialisation by farsighted managers in industry and in the private sector. This understanding has been traditionally supported by supply-side policy initiatives, such as the UK's major investment in science research and facilities over the last decade.

The insights generated by fundamental scientific research are critical to long-term innovation performance but the path they follow from the laboratory to the marketplace is long, complex, and uncertain. The model of an innovation pipeline, where governments can simply pump in more resource at one end and reap the economic benefits from new products and services at some point in the future, is increasingly obsolete.

UK government policy has often failed to capture two important issues about innovation:

- firstly, that innovation does not typically follow a pipeline or linear model. Enabled and accelerated by new technologies, innovation is becoming more open. Organisations are increasingly reaching outside their walls to find ideas – to universities, other companies, suppliers and even competitors. Users are also increasingly innovating independently, or in collaboration with businesses, or in the co-creation of public services;
- secondly, innovation happens – and is essential - in a much broader field of life and business than just in the translation of scientific or technological discovery. Other important sources of innovation include the role of design in developing innovative products and services. Neither should innovation be understood as restricted to the private sector. Increasingly the public sector is called upon (often in partnership with the private and third sectors) to innovate in the design and delivery of public services.

A more evolved understanding of how innovation happens emerged in policy making from 2008 onwards. As described above, in March 2008 the Labour Government published its strategy for innovation in the UK, *Innovation Nation*, which set out a new approach to economic and social innovation with a major shift to demand and user driven innovation, and with it a consolidation of a user-led agenda in both economic and social policy. Specifically, *Innovation Nation* set out the following themes and emphases:

- The UK's long history of industrial, technological and economic innovation;
- The importance of continued large-scale investment in scientific and technological research;
- A recognition that the UK should move from purely supply-side policy making, such as investment in science, research, and university capabilities, to a broader model of supply and demand driven innovation;
- A recognition and understanding that in ICT, technology, and scientific fields, innovation was often led by users and consumers;
- Introduced a much broader definition of – and strategy for - innovation across non-technological sectors, such as the creative economy, the service sector, and in the design and delivery of public services such as health, education and employment policies;
- A clear understanding of the need for users,communities, and local experimentation to take risks in order to develop and build better public policy;
- The need for Government to use all levers at its disposal to encourage both supply- and demand-led innovation including through procurement, regulation, direct investment, and policy creation.

Furthermore, in 2010, when many other areas of public spending were being significantly reduced, the Coalition maintained the level of spending on Science and Research. This has also been confirmed in the Spending Review for 2015-16.[20] The Government's 2011 *Research and Innovation Strategy for Growth* reinforces this commitment, emphasising the need for 'a more open and integrated innovation ecosystem'.

Technology and Innovation Centres across the UK are central to the vision of the Coalition's Growth agenda, moving the focus of investment in innovation in the UK away from dominant sectors and regions. These Catapult Centres, coordinated by the Technology Strategy Board (TSB), are concerned with high value manufacturing, cell therapy, offshore renewable energy, satellite applications, the connected digital economy, future cities, and transport systems.

In George Osborne's speech to the Royal Society in 2013 he further articulated his perspective:

> *'Innovation is not a sausage machine. You don't get it by a plan imposed by government and you can't measure it just by counting patents or even just spend on R&D. It is all about creative interactions between science and business. You get innovation when great universities, leading-edge science, world-class companies and entrepreneurial start-ups come together…Where they cluster together you get some of the most exciting places on the planet. That is where you find the creative ferment which drives a modern dynamic economy.'*[21]

Both the Labour and Coalition approaches to innovation can therefore be characterised by a shift to an active industrial policy, and by a broadening conception of how innovation happens. This is particularly marked by a more developed understanding of supply and demand factors, and by recognition of the need to broaden out the traditional model by looking at more sectors and processes beyond (but still including) science and technology.

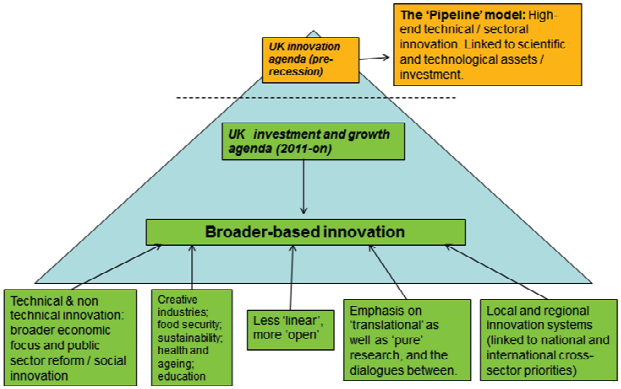
The UK starts from a very strong and globally-competitive position in science and research. However, for economic development – at local or national level – there is a need to move beyond simple linear or pipeline models of organisation which focus largely on the supply side, to a broader-based system that encourages growth. It is also important to move beyond a focus largely on technical or scientific innovation to one that encourages value-added activity across a broader base of sectors and geographical locations.

Conceptually, we must move from a pure supply side model of investment and activity to a supply *and* demand model to encourage greater levels of growth, and, crucially, the development of increasingly innovative SMEs and micro-business with access to research and expertise, fostered by a key and often underutilised player in the innovation ecosystem – HE providers – to allow emerging and existing industrial strengths to flourish and reach their potential.

Achieving this means identifying the key models and institutions that sustain interactions and benefits in localities, and looking at ways in which existing resources might be joined up to the benefit of diverse sectors and locations. The UK HE sector is diverse, as is the UK innovation chain that depends on that sector's ability to enrich national and local research and innovation cultures, and to provide graduates at all levels with the skills required by existing and new businesses.

The following diagram (Fig. 1) demonstrates how policy is shifting from seeing innovation as an 'elite', largely technology or technically-driven process aimed

[Figure 1:] UK Research and Innovation



at particular sectors and activities, to a much broader understanding wherein many more sectors, geographical locations and activities are important.

This requires high level skills and partnerships with HEIs which deliver the specific support and knowledge that businesses need – and, importantly at the local level, it needs to ensure that SMEs and micro-businesses can secure sufficient interaction and scale. This is also crucial to the UK's ability to grow new ideas, as well as new business, with the potential to succeed in both local and international contexts.

C. The Witty Review

In 2013 Sir Andrew Witty led a review into the relationship between universities, Local Enterprise Partnerships (LEPs), and local / regional economic development. Indeed, the relationship between universities and business in the name of improving economic growth has been a well-reviewed area in recent years: reviews by Richard Lambert in 2003[22] and Professor Sir Tim Wilson in 2011[23] were both commissioned in times when politicians thought that universities could and should be doing more to improve both national and local economies.

Witty breaks with the most recent reports and the economic thinking of much of the last four decades by advocating a series of targeted interventions. This is industrial policy writ large. For some, it represents the latest and most detailed recipe for government brokering in key areas of the economy, for others the latest doomed attempt to 'pick winners'. He advocates 'an enhanced third mission' right across the higher education sector:

> *'The full diversity of institutions have a role to play, from local small and medium-sized enterprise support and supply chain creation, to primary technology leadership and breakthrough invention. Incentives should be strengthened to encourage maximum engagement from universities in the third mission alongside research and education.'*[24]

Witty argues for more assessment of impact in future Research Excellence Frameworks (REF), complemented by a reformulated Higher Education Innovation Fund (HEIF) programme that clearly incentivises and supports working with innovative SMEs; these emphases echo the intentions of the European Commission in its plans for the revamped Framework Programme for Research and Innovation, *Horizon 2020*, which was formally announced in December 2013. Witty says that HEIF should be big enough to fund all good claims to innovation, and adjusted so that HEIs

that receive no formula funding are not excluded from applying for funds again within an extended period of time, currently four years. Those HEIs that miss out should have the opportunity to 'up their game' the following year, with the aim of increasing competition.

Witty thus contends that HEIs in the UK must assume an explicit responsibility for facilitating economic growth, and that all HEIs should be provided with stronger incentives to embrace this 'enhanced Third Mission'. From working together to develop and commercialise technologies which can succeed in international markets, to partnering with innovative local SMEs, public service providers and the third sector, Witty states that:

> *'universities have extraordinary potential to enhance economic growth. Incentives should be strengthened to encourage maximum engagement in an enhanced Third Mission alongside Research and Education, and universities should make facilitating economic growth a core strategic goal. Universities should report their Third Mission activity, for inclusion in an annual report to the Government which also identifies impediments to this activity, with recommendations as to where the Government could act to remove these. Each year the Government should publish its response to these reports and recommendations.'*[25]

As Witty suggests, the specific role of universities in collaborating with innovative SMEs must be a key part of national and LEP policy:

> *'The future growth of the UK economy will in large part come from fast growing SMEs, but – while on most indicators the UK's innovation performance is above the EU average – our performance in terms of the proportion of SMEs are that are innovative is relatively weak. Universities offer SMEs varied and substantial benefits, but many SMEs lack resources for external engagement and the quality of support available from the local university is key…Universities should be pro-actively encouraged to seek out potentially innovative SMEs and to support them with technology, expertise, talent and know-how. The process should aim to increase the visibility of innovative SMEs to potential partners, suppliers and investors. Universities will need to work with appropriate local partners to do this to exploit others' capabilities and avoid duplicating existing provision.'*[26]

At present too little attention (as well as policy and funding) is given to this important task, as demonstrated in the diagram below (Fig. 2) from a recent analysis of Knowledge Exchange activity and HEIF.[27]

LEPs do provide important potential for supporting growth in key areas. However, this report suggests that the sector, policy makers, and industry (and the Witty Review) should be wary of focusing too exclusively on LEPs' involvement in driving local growth. Whilst some are strong and growing in capability and influence, others remain static and in some places they are either weak or non-existent. They tend towards variability in geography, knowledge, and capacity, and are not necessarily drawn across coherent economic regions or sub-regions. Relationships with key stakeholders and current and potential high-value growth

Figure 2: Strengthening the underlying innovation conditions. Source: HEIF 2011–15 stratagies, PACEC analysis

sectors cannot be guaranteed and may simply be too diverse to be either appropriate or effective.

This acknowledged, Witty still recommends putting 'universities at the heart of Local Enterprise Partnerships, collaborating across the country'. According to his review, 'Universities offer LEPs a valuable resource, both as sources of local comparative advantage and in the practical task of developing plans'. Specifically, he looks to the following key links between LEPs and universities:

- LEPs have up to €1 billion of European Structural and Investment Funds to invest in innovation. They should look to direct a large share of innovation funding towards excellent universities and research centres in order to nurture sustainable growth founded in comparative advantage, including through universities supporting innovative SMEs in their localities. LEPs should do this within frameworks which relate funding to economic outcomes. They should collaborate, and support university collaborations, beyond their own areas wherever these will deliver an economic or research benefit.
- Where there is a university presence in the locality this should be reflected in the composition of the LEP, so that the contributions universities are making can be integrated into LEPs' leadership of local economic development. All LEPs with universities in their areas should have a university presence on the LEP Board.
- Ministers should write to the chairs of all LEPs with universities in their areas setting out the expectation that these LEPs should have a university presence on the Board. Where a LEP is participating in an Arrow Project led by a university in its area then it may well be appropriate for the university to provide co-chairmanship of the LEP. University members should be prominent in, and may often chair, LEPs' Innovation or R&D and Innovation sub-committees.
- Universities should also play a prominent role in Enterprise Zones and Growth Hubs, where applicable. Local authorities provide much of LEPs' delivery capability, and the Government's measures to encourage orientation of them to the pursuit of growth in their participation in LEPs are welcome.[28]

Universities and other higher education institutions should play a key role where LEPs are well established, but

Figure 3: Local multiplyer effects

should also be supported where they are not. In both cases they represent important institutions that can provide capacity, knowledge, networks, and leadership, as well as performing a vital institutional 'anchor' role around which activity can be focussed. At the local level even small or specialist institutions will in turn create a local multiplier effect: circulating and growing income, human capital, and entrepreneurship, and locking these into local capacity and economic growth. This focus on 'local multiplier effects' within localities and within diverse ecosystems is visualised in the diagram opposite (Fig. 3).

There exists a need to identify best practice and potential alternative funding and delivery models for such a sustainable, strategic role for HEIs. The return on activity will not always be immediate, and in many ways its optimal return will be longer term. It is therefore important to take a long-term approach to effective partnerships, rather than, for example, focussing narrowly on spending and performance management. In practice, this means:

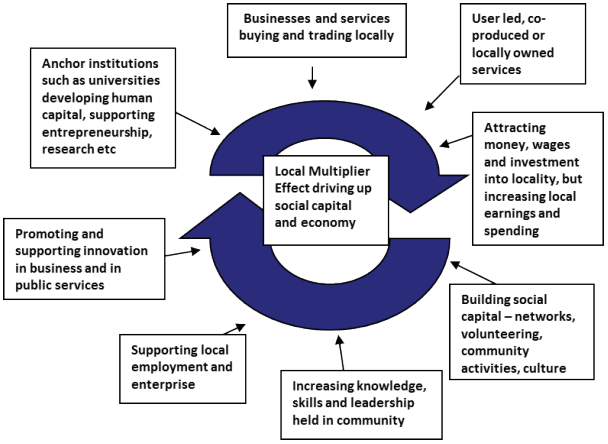
- looking at leveraging funding from R&D tax credits, innovation vouchers, interactions with the Small Business Research Initiative, the TSB, the Design Council, graduate initiatives like UnLtd etc.;
- enterprise support, achieving scale for micro-business and SMEs;
- innovative, creative business partnerships and practices informed by specialist HE-led research and innovation.

D. The role of anchor institutions

Whilst other methods of HE funding (QR, Research Councils, etc.) are not allocated with the direct aim of stimulating the innovation clusters of localities and regions, funding (including HEIF) directed specifically at KE activity, administered in partnership with the TSB, the Design Council, Catapult centres, LEPs, and European and international funding bodies, to name a few possibilities, appears to possess the most potential to make the most of 'diverse innovative assets' for sustainable growth.

A broader model of partnership is important for 'anchoring' or catalysing local economic clusters with the potential to stimulate growth and bring high-level jobs to diverse – as opposed to increasingly concentrated – localities.

Here, smaller, specialist, and locally-facing HE providers play an important role; they also represent an under utilised national resource. All institutions attempt to maximize partnerships and the transferable value



of knowledge resources, but smaller, specialist HEIs with local and regional orientations working within complementary international networks play an essential role as catalysts to local or regional growth. They achieve this through:

- graduate talent, entrepreneurship, and start-ups;
- a local focus within partnerships involving larger universities;
- expertise around the needs of SMEs and micro-business with respect to issues of scale, sustainability, and resource;
- translational research (benefiting the complex UK research and innovation supply chain);
- working with public and private partners in specialist sectors (e.g. food security, the creative industries, health and social innovation);
- co-creating innovative curricula and promoting graduate entrepreneurship and employability in key sectors at the sub-national level with local employers;
- expertise and consultancy (including working with microbusinesses and SMEs);
- collaborating with diverse bodies of users at the local level;
- networks and identifying best practice for the future;
- provision of facilities for local business and community use.

This catalyst role has been emphasised by BIS in its *Economics Paper No 15 Innovation and Research Strategy for Growth*. It speaks particularly to the strengths of smaller, specialist and locally-facing institutions, and how they work to support growth in regions where access to research and innovation knowledge is limited, and / or in sectors where their expertise is particularly required:

- *'Universities create capabilities in teams and individuals, both in terms of particular areas of expertise as well as wider abilities to identify and address problems; that is, they are a major channel of investment in high-level skills';*
- *'Universities maintain knowledge bases via teaching, via data storage and transmission, and via the maintenance of libraries and databases';*
- *'Universities develop new forms of problem-solving and search heuristics that enable firms to address new problems in new ways; that is to say, they not only solve problems, they develop new ways to address them';*
- *'Universities engage in reactive problem-solving via a wide range of formal and informal collaborations with firms. This is often done via informal contacts rather than formal collaboration agreements, and therefore does not normally show up on the usual indicators for university-industry interaction.'*[29]

Some examples of the way in which some small and specialist HEIs serve as economic anchors:

- Royal Agricultural University's work with local government and business in Gloucestershire to support rural enterprise in the region. This includes: a collaborative project with South West Food and Drink Ltd looking at ways of producing an integrated strategy

for the development of sustainable food supply chains, and addressing issues of waste reduction, quality, and efficiency; and the innovative 'First Milk Academy', begun in 2007, which focussed on providing a learning and development facility to assist members to improve their business performance;

- Norwich University of the Arts' work in conjunction with large and small media companies in Norwich and North Norfolk. This Knowledge Exchange (KE) activity supports innovative communication solutions and improvements to the design of interfaces; provides local businesses with access to training and resources held by the University; and also facilitates students at all levels to gain hands-on experience at the coal-face of communication research and development;
- Harper Adams University's Precision Farming Research Centre. This centre, one of the first initiatives to receive support from the HEFCE Catalyst Fund, based in Shropshire, has created over 150 jobs, and sits alongside the university's commercial and research driven dairy unit with its emphasis on sustainable and environmentally-aware food production practice. Both are supported by the University's commitment to collaboration with agri-business partners. The
- Open Fields' repository provides another example of innovative approaches to issues in the rural economy. It is an accessible, open-source, cross-disciplinary library containing translated, practical research-based information on food, farming, environment, energy and rural business;
- The Centre for Sustainable Design (CfSD) at the University for the Creative Arts in Surrey delivers the first dedicated support in the region for eco-innovation (resource-efficient low carbon innovation) in small businesses. The Centre delivers research and KE on standards and methods for eco-innovation, and supports the development of sustainable solutions and support for companies' strategic development in this field;
- St Mary's University, Twickenham's health enterprise activities are clustered around successful researchcentres, including the Centre for Bioethics and Emerging Technologies, the Endurance Performance Centre, and the Centre for Workplace Health, the latter of which works with diverse partners including the British Heart Foundation, Carphone Warehouse, Sainsbury's, Bovis Lend Lease, Age Concern, St Dominic's Sixth Form College and Thompson Reuters. This high profile and successful Centre, which recently secured additional funding from public and private sources, provides a good example both as a sustainable project and good practice in Knowledge Transfer (KT), generating income and surpluses, and with significant outreach benefits byimproving the effectiveness and efficiency of workforces;
- Diverse local and regional networks in a variety of disciplines: examples include Plymouth College of Art's support network for creative practitioners in the South West, *Artsmatrix*[30], Harper Adams University's Women in Rural Enterprise (WiRE) network[31], and

University for the Creative Art's eco-i-net[32] for eco-innovation entrepreneurs;
- Bishop G**rosseteste University** co-founded Sky Business Centre in Lincoln. The capacity to incubate and support start-ups was previously limited in this regional city. In other regions or localities in the UK such a business incubation hub – built with joint investment from University reserves, HEIF, ERDF and the County Council – might not have a great deal of impact; in Lincoln it has the potential to make a real difference to local resources and growth potential, and to lock both knowledge and investment into the local economy through a 'local multiplier effect'.

No single model for collaboration will work across the diverse range of sectors, technologies and regions with which this report is concerned. To leverage the greatest impact from collaborations between universities, LEPs, and business, any overarching strategy must recognise this diversity and allow adaptation to local circumstances. Identifying the best collaborative arrangements is most effectively achieved at the local level.

Models which currently work for smaller, locally-focussed, and specialist HEIs include collaborative networks bringing together several HEIs to work with external partners, with self-organisation by the HEIs involved – such as the Consortium for Research Excellence, Support & Training (CREST)[33]. Hub and spoke' models of co-working with neighbouring HEIs and other stakeholders within a region have also proven successful. As well as LEPs, this can include local Further Education colleges, NHS, and third sector organisations. This type of collaboration can also greatly enhance local participation in post-compulsory education and training, progression to higher levels of skills-acquisition, and the delivery of specialist skills to local people.

E. Skills and employability

Also central to ensuring long-term innovation is allowing local business access to HE resources with the aim of increasing the employability of graduates, and the skills of employees and employers working in specialist, high-growth areas.

Case studies in this area include University for the Creative Arts' partnership with architects Grieg and Stevenson, incorporating research and teaching on the Interior Architecture and Design course with the aim of enhancing digital archiving and communication models, which resulted in a 23% increase in profits for the partner SME. The University of Worcester is working with local organisations, including voluntary and community organisations (VCSOs), to facilitate student engagement with school-age learners, young adults and employers, in fields related to the university's academic specialisms. This work includes: learning through sport (initiative engaging with over 10,000 children and young adults including young offenders and disabled people); theatre in schools (involving 5,000 pupils so far); 'earning while learning' (650 students employed last year including sports coaching in after-school clubs); and delivering extra support for local VCSOs.

The Arts University Bournemouth also supports a major project, funded through HEFCE's Catalyst Fund, to

extend the University's existing strong collaboration with Framestore and the wider visual effects industry. The UK has led global growth in visual effects, and the project aims to help maintain this lead, against strong international competition, through the development of skilled and experienced people. The 'Building the Bridge' project will comprise mentoring of higher education (HE) students by the visual effects industry, professional development of visual effects employees and academic-industry staff exchanges, together with a central employability hub. The 'Ideas Factory' at Norwich University of the Arts has funding from the HEFCE Catalyst Fund and delivers KE and consultancy projects in art, design and media. One example is its graphic design work with Archant, one of the UK's leading regional media businesses, to redesign the classified advertising section for Norfolk's biggest-selling daily newspaper. Students, with academic support, worked with Archant on this live brief as part of an innovative HE course, and were hired by the company for a paid intensive internship which drew on academic support from the university, thus sustaining the HEI-business relationship and retaining talented graduates in the region.

Support for student enterprise at the Royal Agricultural University in Cirencester includes collaboration with a local ale company to further develop the range and retail of the existing alcoholic drink range, 'Muddy Wellies', which is marketed and sold by the university's students and staff. This activity included working as part of UnLtd's social enterprise network and makes use of an effective feedback loop, where profits are reinvested in developing further entrepreneurial opportunities and ideas at the University. Finally, Liverpool Institute of the Performing Arts' partnership with the National Centre for Guidance in Education (NCGE) encompasses translational research on the ways in which performance graduates can contribute to, for example, workforce training and mental health support programmes.

F. The need for diverse, responsive, collaborative models

The UK HE sector is diverse, as is the UK innovation chain that depends on its ability to enrich national and local research and innovation cultures, and to provide graduates at all levels with the skills necessary to consolidate and grow the UK economy. Ensuring that SMEs and micro-businesses have access to the specific support and knowledge they need, and are able to secure sufficient scale through partnerships with HEIs, is likely to become ever more important to the UK's innovation chain and the nation's ability to develop and capitalise upon new ideas and grow new business.

Locating the best models to sustain interactions and benefits to localities, and looking at ways in which existing resources might be joined up to the benefit of diverse stakeholders, is important not only for small, specialist, and regional HEIs, but also to the HE sector more generally, as all institutions attempt to maximise partnerships and the transferable value of knowledge and resources.

Small, specialist, and locally facing HEIs can increase and sustain their contribution to regional economic growth. HEIs working with public and private partners in specialist sectors, including food security, the creative industries, health and social innovation, and have a

unique potential, enabled in part by new technologies, to collaborate with diverse bodies of users: students and graduates, business and providers of public services. They are also engaged in innovating curricula and promoting graduate entrepreneurship and employability in key sectors, and thus play a key role in subnational economic development. Both nationally and internationally small and specialist institutions possess a strong track record of generating translational research, with benefits to the complex UK research and innovation supply chain. This is particularly the case with respect to collaboration between HE and SMEs/micro-businesses; the similarities between small, specialist and regional HEIs and this vital portion of business-innovation sector make them natural partners for research and skills collaborations.

G. The role of translational research

It is not just about world-class science and research. Of course this is and must remain a major strength and asset to the UK. However, it is limiting to prioritise this as the only, or indeed the most important part, of stimulating either local or national growth. Stimulating and / or supporting local economic growth will often depend on other factors: on interaction, information, and communication, for example. Sometimes only small shifts in access to knowledge, capacity, skills, or technology can make a significant difference in a location or sector. This is important in the understanding of local as well as national comparative economic advantage.

Equally it is important to move beyond a *laissez faire* model of science and research and of human capital, wherein institutions and policymakers are uninterested in the utilisation or deployment of research or skills. This is what we mean by a new 'supply and demand' model and a more sophisticated understanding of how innovation happens and how innovation eco-systems can be created and maintained.

This view is often set out as the reason for a steady decline (or sometimes a 'historic weakness') in translational research. In a lecture to the Royal Agricultural University in November 2013, Willetts pointed out that 'successive cuts to research institutes left us with strong upstream pure research, but drastically weakened at the downstream development end. The argument was that near market work shouldn't be done in the public sector, and intermediate research institutes should be privatised.'[34]

It is now an explicit policy intention to rebuild and to support institutions that prioritise such 'downstream' research – especially in partnership with industry:

> *'We are rebuilding links between upstream research and downstream applications. We are protecting important research institutes. And we are maintaining a crucial long term investment in R&D. First, we recognise that if we are to drive innovation and grow our economy we need to do more to promote links between research and industry. This government has invested over £200 million so far in Catapults, elite centres bringing industry and researchers together to bring emerging technologies to market in big*

growth areas. We have leveraged nearly £1.2 billion to date through our new Research Partnership Innovation Fund, which rewards universities for partnering with industry. And we have committed at least £100 million a year more for 2015 to 2016 and 2016 to 2017. We have introduced the Catalyst fund to link up research councils with the Technology Strategy Board. We have invested £250 million in catalysts thus far with more to come. And we have R&D tax credits to encourage business to invest in research. Secondly, because we have learned from the earlier rush to privatise, this government has established new guidelines for use when reviewing the future business model of public sector research establishments.'

In the context of agri-tech, this new or enhanced approach is articulated thus, and coupled with the announcement of the government's intention to launch a £70 Agri-Tech Catalyst.

'Our new agri-tech strategy sets out a vision for the UK to regain its world-leading role in the race for better, more efficient and more sustainable agricultural production. Again, the first important step is rebuilding the connection between basic research and applied science, so that our farmers can access the best agri-tech expertise and use innovative techniques [...] This [the Agri-tech Catalyst] *will help new agricultural technologies bridge the so-called valley of death between the lab and the marketplace. Designed to attract co-investment from industry, the catalyst will target SMEs as well as larger companies. It is being run by the TSB, who are now inviting bids for round 1. The TSB also launched new innovation vouchers last year with a special remit to target SMEs in the agriculture. Secondly, the government has committed to invest £90 million over 5 years to establish a small number of Centres for Agricultural Innovation to support advances in sustainable intensification. These centres will rebuild the applied research capacity and links with industry that was reduced in the past. And thirdly, we understand the importance of investing in agri-science. In 2011 to 2012 the government invested £450 million in R&D on agriculture and food.'*

Specifically in relation to the Royal Agricultural University Willetts developed the role of the HEI in one innovating one key sector still further:

'This sort of excitingly innovative practice will be driven forward by the RAU's new rural centre of excellence on its Cirencester farm. It will enable sharing of knowledge and ideas between those at the front end of agricultural production and applied researchers. This epitomises modern farming as it should be, transferring cutting edge knowledge into the field. And this is exactly the sort of thing we want to embrace with our new agri-tech strategy.'

H. Policy Recommendations

The policy environment has evolved and changed quite dramatically since this report was commissioned in 2012. Most notably, the Government's interest in active industrial strategy has expanded and deepened. This has in part been helped by the process and the recommendations set out by Sir Andrew Witty as well as by developments in economic policy pursued by the Treasury and by BIS.

The Witty Review sets out some key recommendations for shifting university and business collaboration to a 'third mission' for the sector. This has much in common with David Willetts' desire to grow collaboration in the pursuit of enhancing economic growth as well as to specifically *'rebuilding links between upstream research and downstream applications.'*

Witty looks to a series of so-called 'Arrow Projects' to target collaboration and investment in key sectors. He strongly recommends that HEIF be revisited, refocused and expanded:

> *'HEIF should be big enough to fund all good claims on it. This implies making it substantially larger. I recommend below that it should be increased to £250 million a year. Time will be needed to ascertain whether that is the right level. As long as strong spending proposals are coming forward, and the sorts of returns on investment reported above are being achieved, then adjustments in funding should be upward not downward.*[35]
>
> [...] *In order to strengthen the incentives on universities to engage with innovative SMEs the Government should make an explicit long-term commitment to HEIF, which should increase to £250 million a year. It should be adjusted so that:*
>
> - *Institutions' HEIF strategies show how all local SMEs that could benefit from working with an HEI are enabled to do so*
> - *The five-year allocation period does not entail excluding institutions which do not qualify for more than a year.*
> - *The method of determining institutions' allocations should be reviewed to sharpen the incentive to engage with innovative SMEs.'*[36]

Furthermore, it is also clear that HEFCE's approach to targeting and supporting key activities is evolving. Most notably this has centred around the growth in Catalyst funding – alongside the Research Partnership Investment Fund (RPIF) – which targets high value collaborative activity. Thus far a number of small and specialist institutions have bid for, and won, such funds.

Between the emergence of Catalyst and RPIF, the evolving industrial strategy of Government in key areas and sectors, the recommendations of Witty, and the desire to rebuild 'downstream' research, lies a good policy mix for the future.

This is much more difficult than it sounds. A 'disinterested'[37] supply side model of institutional autonomy, set within a neo-liberal economic framework with high and stable levels of funding, has been a relatively easy place to be in which universities could prosper, as described in the Figure 4, Model A.

Politically, the need for growth has revived interest in demand-side policies and economic thinking: on skills utilisation, sectorial industrial policy, and on applied research. This is an important shift, and a welcome one, but it creates challenges at the institutional and policy level.

There is a need for all HEIs engaged in research and innovation to:

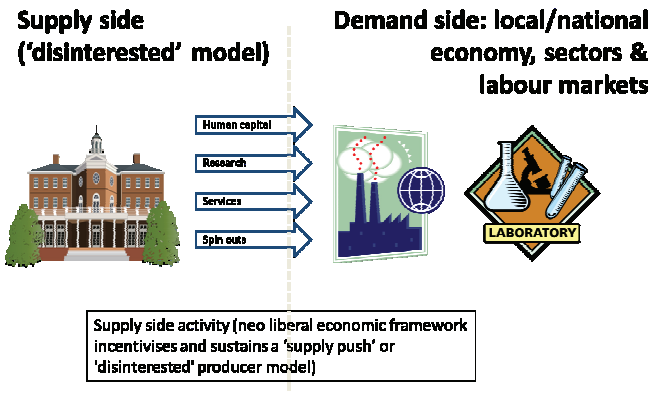
- **Reconsider institutional strategy and purpose** with an eye to their specialist strengths and potential complementary offers;
- **Rethink curricula and approach to teaching and learning;**
- **Rethink approach to applied research in 'open innovation' systems;**
- **Identify key activities, strategies and capabilities,** taking into account the diversity of the HE sector with respect to scale, specialisms, orientations and networks;
- **Consider a range of alternative delivery models** that maximise activity and sustain capacity for business and industry engagement (much of which was previously funded through RDAs and HEIF) and to invest – directly or structurally – in initiatives supporting graduate entrepreneurship.

The size of institutions and the scale of activity in key areas should not obscure the need for new models of institutional activity or strategy. Overall this could be described as moving from a largely 'supply side' model to a 'supply and demand side' model, as visualised in Model B (Fig. 4).

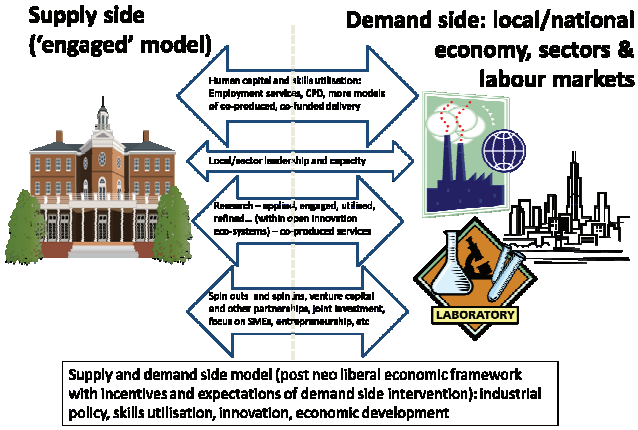
Indeed, it is likely that many specialist institutions may already be closest to such objectives and approaches because they will be directly engaged with the industries and sectors that they serve. To some extent this also applies to HEIs with long histories of working in and with their localities. The case studies in this report reflect this to varying degrees: in their reflection of the need to act locally but relate and engage globally; to constantly analyse, review, and revitalise institutional structures and strategies with an eye to developing and sustaining the

Figure 4: Illustrations of disinterested and engaged models of university-business interaction and innovation

Model A: Disinterested model of university-business interaction and innovation



Model B: Engaged model of university-business interaction and innovation ecosystems



most-effective partnerships; and to maintain and deepen the links between students, staff, graduates, and sector partners.

Overall, the UK's innovation and industrial strategy requires HEIs to re-evaluate how they plan, act, and react to diverse opportunities within and across sectors, all of which help to create the conditions for growth, as well as delivering actual growth. The policy framework that incentivises and catalyses such activity also needs to be generally adopted and maintained. At the same time of course, these shifts must for the foreseeable future take place against a backdrop of reduced public spending and slow economic growth, especially in those areas of the country particularly effected by low and declining growth. The twin challenges of catalysing economic activity in the short, medium, and long-term, and doing so on the most cost effective basis, are clear.

5 Department for Business Innovation & Skills (BIS), Innovation and Research Strategy for Growth, London, December 2011, p. 10

6 Ibid., p.12.

7 Wilson DL, Prof. Tim, A Review of Business-University Collaboration, London, February 2012.

8 Diamond, Sir Ian, and Universities UK (UUK) Efficiency and Modernisation Group, Efficiency and Effectiveness in Higher Education, London, September 2011

9 Department of Innovation Universities and Skills (DIUS), Innovation Nation, London, March 2008

10 Mandelson, Rt. Hon. P., Hugo Young Memorial Lecture, Chatham House, 3rd December 2008. Accessed at: http://www.chathamhouse.org/events/view/155345

11 HM Government, The Coalition: our programme for government, London, May 2010, p.9

12 Cameron, Rt. Hon. D., Transforming the British Economy: Coalition Strategy for Economic Growth, Speech delivered 28th May 2010, London. Accessed at: http://webarchive.nationalarchives.gov.uk/20130109092234/http://number10.gov.uk/news/transforming-the-british-economy-coalition-strategy-for-economic-growth/

13 Cable, Rt. Hon. V., Speech – Cass Business School, 3rd June 2010. Accessed at: https://www.gov.uk/government/news/vince-cable-speech-cass-business-school-june-3-2010

14 Ibid.

15 Osborne, Rt. Hon. G., Speech to the Royal Society, 9th November 2012. Accessed at: https://www.gov.uk/government/speeches/speech-by-the-chancellor-of-the-exchequer-rt-hon-george-osborne-mp-to-the-royal-society

16 HM Treasury and BIS, Plan for Growth, London, March 2011.

17 BIS, Economics Paper no 18 Industrial Strategy Sector Analysis, London, September 2012.

18 BIS, No Stone Unturned: In Pursuit of Growth (Lord Heseltine Review), London, October 2012. Accessed at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/34648/12-1213-no-stone-unturned-in-pursuit-of-growth.pdf

19 Willetts, Rt. Hon. D., 'Contribution of UK universities to national and local economic growth', 3rd April 2014. Accessed at: https://www.gov.uk/government/speeches/contribution-of-uk-universities-to-national-and-local-economic-growth.

20 See George Osborne's Spending Round 2013 Speech to Parliament, 26th June 2013. Accessed at https://www.gov.uk/government/speeches/spending-round-2013-speech.

21 Osborne, Rt. Hon. G., Speech to the Royal Society, 9th November 2012.

22 Lambert, R., Lambert Review of Business-University Collaboration, HM Treasury: London, December 2013

23 Wilson DL, Prof. Sir T., A Review of Business-University Collaboration, BIS: London, February 2012

24 Witty, Sir Andrew, Final Report and Recommendations - Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth, London, October 2013, p.4

25 Ibid., p.6

26 Ibid., p.8

27 PACEC, Strengthening the Contribution of English HEIs to the Innovation System: KE and HEIF Funding (Executive Summary), PACEC/HEFCE: London, April 2012, p.6

28 Witty, Sir Andrew, Final Report and Recommendations - Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth, London, October 2013, p.9-10

29 BIS, Economics Paper No 15 Innovation and Research Strategy for Growth, London, December 2011, pp. 81-82

30 http://artsmatrix.plymouthart.ac.uk/

31 http://www.wireuk.org/

32 www.cfsd.org.uk/eco-i-net

33 http://www.crest.ac.uk

34 Willetts, Rt. Hon. D., Bledisloe Memorial Lecture 2013 on Science, Technology and Agriculture, Royal Agricultural University, 31 October 2013

35 Witty, Sir A., Final Report and Recommendations - Encouraging a British Invention Revolution: Sir Andrew Witty's Review of Universities and Growth, London, October 2013, p.35

36 Ibid., p.8

37 The term 'disinterested producers of knowledge' is coined by the IPPR as one of five principles that should shape UK Higher Education in A Critical Path: Securing the Future of Higher Education in England, IPPR Commission on the Future of Higher Education, London, June

Enterprise and Innovation: Strategies for change in Higher Education institutions

Any expression of research and innovation first reflects the ethos of its host, whether this be a Frauenhoffer institute in Germany, an agricultural university in Shropshire or an arts college in Milwaukee, Wisconsin, USA. Yet a major challenge for HEIs is the refining of strategies for engagement that address the needs of their particular audiences. That is, not all HEIs choose to engage directly in the translational elements of innovation systems, and many more see their engagement and knowledge exchange solely through the lens of how it can benefit the institution.

In the UK, students have been identified as sitting at the heart of the innovation system, even as established collaborations with industry remain important to the financial and knowledge economies. The great virtue of involving diverse HEIs in innovation systems must be recognized as the substantial resources that can – when appropriately understood and rationalised – be concentrated on innovation and entrepreneurship. These include the physical 'kit' and / or collections and physical resources of the institutions, as well as the substantial intellectual capacity of the increasingly diverse body of staff and students comprising the local knowledge community. In the first instance, these resources can provide collaborators with the opportunity to solve an identified question or challenge, to generate new knowledge in the open market of ideas, and perhaps most importantly to open up new creative avenues, marrying knowledge and practice, that leave a mark on future entrepreneurs.

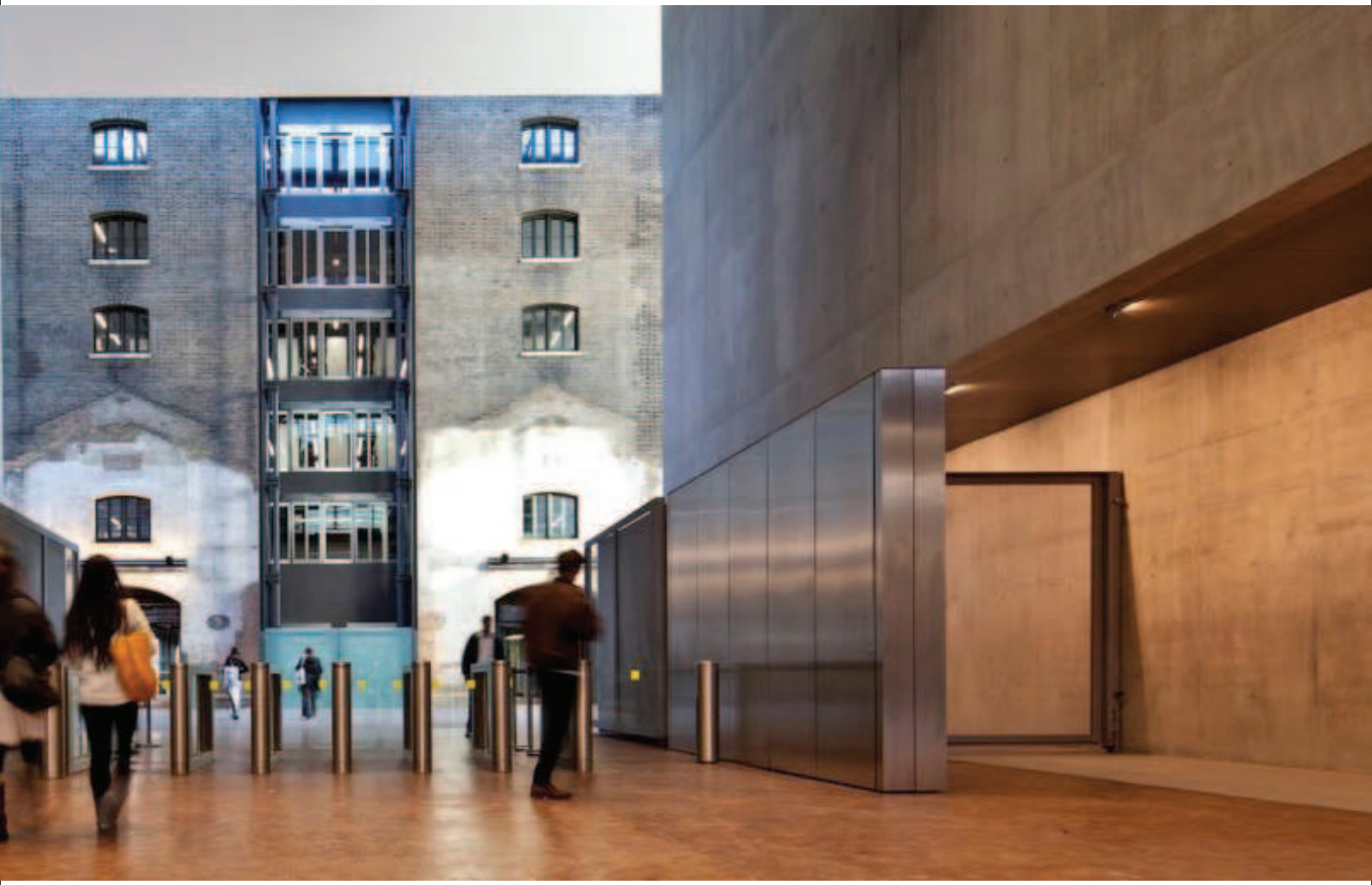
The impact of innovation is thus the product of the networks leveraged by the HEIs and (where relevant) partner organisations. The excitement of the non-linear model of innovation lies in the fact that spin-out expertise and / or products and models can emerge at a number of points in the various cycles, and be deployed by all of the various players in unknown and, in some cases, unanticipated contexts.

It is this support for the infrastructure of innovation, and the networks of practicing and potential entrepreneurs, that the most successful institutions are working to develop. Furthermore, as institutions find new ways of engaging with and making best use of their research, teaching, capital, estates, and human resources – students (undergraduate and graduate), staff and alumni – as lifelong learners, they play an ever more important role in ensuring that the knowledge capacity of their communities of innovators anticipates demand.

The alternative is a knowledge economy that is slow to comprehend, absorb, translate, and apply potential breakthroughs, be they in industries requiring highly-specialised interdisciplinary knowledge, skills, and capacities (textiles, or precision farming, for example) or consultative sectors (such as designing sustainable business models). When institutional structures and the networks they rely on are not maintained or appropriately exploited, or where the capacity or infrastructure to do so is not understood and rationalised from a strategic standpoint, the potential for innovation in the short, medium, and long-term inevitably decreases.

The proceeding narratives illustrate how three institutions negotiated strategic change in order to better align with their identified roles as responsive and engaged centres for innovation. They did so in ways that made the most of their long-standing disciplinary and geographical positions. Furthermore, they hinged their strategies on an identified need – and a unique opportunity – to serve the holistic needs of students as life-long collaborators and contributors to innovation systems.

Image of the Granary Building
King's Cross, Central Saint Martin's
College of Arts and Design,
2011 © John Sturrock



Case study 1: Central St Martins and University of the Arts London

Harriet Allen, University of the Arts London, UK

I. Introduction

The University of the Arts London

University of the Arts London is the largest specialist arts and design university in Europe, located in one of the world's most vibrant cultural capitals and made up of four colleges: Chelsea Camberwell and Wimbledon (CCW), London College of Fashion (LCF), London College of Communication (LCC) and Central Saint Martins (CSM). It is not a traditional university – it consists of a transformative, diverse, and ever evolving set of colleges, which are constantly redefining their relationships with each other and the University. The Colleges offer the University's 20,000 students a diverse range of courses at all levels from foundation and undergraduate to postgraduate and research. The University's 1,200+ teaching staff, as active professional artists, practitioners, designers, critics, and theorists, leads the way on creative and experimental practice. Each College has extensive engagement and relationships with industry partners that promote dense linkages between working and learning.

In response to HEIF round 5 (2011-2015), UAL created new organisational forms and management structures to deliver an enterprise strategy that would maximise the effectiveness of this internal diversity. This has been achieved by ensuring that enterprise and innovation activities are developed and driven directly by the four colleges, with a central enterprise support team providing specialist technical expertise.

This strategic approach was adopted following analysis of the Higher Education Business and Community Interaction Survey (HEBCIS) at the end of HEIF 4. This analysis revealed that most income was generated in the colleges and not at the centre. In the new strategy, the business development capacity was moved from a central service, managed by UAL, to local college delivery. Student and graduate enterprise is delivered by the newly created Student Enterprise and Employability (SEE), which works across all colleges.

This case study will firstly examine how UAL has shifted its strategic focus since the start of HEIF 5, before then considering how these new structures have made an impact at one specific college: Central Saint Martins College of Arts and Design (CSM). This will be followed by a close analysis of two areas of the CSM Innovation operation: sponsored student projects and short courses.

II. New organisational forms and management structures at UAL

UAL was awarded £2.52m for HEIF 5 and eighteen months (March 2013) into this round of funding the following strategic outcomes have been identified and addressed.

i. Establishment of a University Enterprise Working Group (EWG)

The EWG convenes monthly, and is chaired by the Deputy-Vice Chancellor for Strategic Development. The aim of this group is twofold:

- to encourage cross university networking and liaison between enterprise teams;
- to support staff to take advantage of cross-university opportunities from commercial or public sector collaborations.

Alongside the Director of Enterprise at each college, the group has representatives from a wide range of areas connected to enterprise, including London Artscom Limited (comprised of four business units generating significant additional funding for UAL through short course provision), the International Centre, Research Management, Development and Alumni Relations, and the UAL Awarding Body. So far the impact has been to make more people aware of what is returned on the HEBCIS so that UAL can focus on activities that will be driving HEIF income in the future – with £4m of additional income identified and reported on the HEBCIS in 2012.

ii. Restructuring of Enterprise Support
A restructuring of the central enterprise operation was implemented, shifting the focus of business development, day-to-day operational management of enterprise and innovation activities to the colleges. This is supported by a smaller and simplified service-focused specialist team of legal, financial and strategic intelligence professionals at the centre of the university.

iii. Greater legal support capacity
By 2014 the central enterprise legal team will consist of four lawyers. This growth in capacity has been necessitated by a new enterprise 'contracts protocol', which has established a set of processes and procedures designed to reduce UAL's exposure to risk by ensuring that all projects that bring in income and/or involve IP are professionally contracted. The impact of this has been enormous and a series of contract templates have been developed to support contract administration and management, which is undertaken in the colleges, and is supported with a small central budget made available for external legal advice where new legal precedents are needed by the University.

iv. Strengthened monitoring systems for HEIF expenditure
The Enterprise Finance Advisor has established a set of systems to provide an effective feedback loop from HEIF allocations to the income reported in the HEBCIS. Annually the results of the survey are divided by college and shared publicly with the college management teams and the UAL Executive Board, alongside commentary from the Head of University Enterprise Development, in order that all senior colleagues are aware of the activity and impact.

v. Establishment of a central Student Enterprise and Employability team (SEE)
Support for a broad range of student, graduate, and staff enterprise activity has been mainstreamed into core UAL provision under SEE, including: an annual SEED Fund for innovative idea start-ups; events, seminars and training; supporting the development and embedding of enterprise learning and teaching in the curriculum; supporting creative enterprises by showcasing their products and talent; and broader marketing and promotion of creative enterprise activity at UAL. SEE has proved to be extremely successful and in 2012-2013 they were awarded an increased HEIF allocation.[38]

vi. Renewal of the UAL intellectual property strategy and policy (January 2013-2014)
This process was kick-started with a series workshops designed to be open and consultative to enable a wide range of voices throughout the University to be heard. The existing IP policy, which was adopted in 2004, only considers IP in relation to exploitation as a result of knowledge transfer projects. There was therefore a need to review this in the context of our globally connected digital environment, and in light of the current Intellectual Property Office guidelines for HEIs which cover:

- Maintaining freedom to operate for teaching and learning, research and consultancy services, and contract research;
- Translating knowledge with immediate application for client problem solving, private consultancy, and CPD;
- Creating and managing new knowledge for free dissemination and sponsored research.

vii. Supporting growth of both new and mature enterprise units
Due to the different level of maturity of College enterprise units (CSM and LCF both have more mature enterprise operations, while LCC and CCW continue to build their teams), there has been a need for a flexible and supportive framework for development and growth. However, at all colleges there has been an increased focus on achieving self-sustaining income through those areas of enterprise and innovation activity which can be developed without public funding, such as consultancy, short courses, and IP development. This has occurred in parallel with a reduction of activity in those areas which are not able to contribute to either:

- the income measured in the HEBCI;
- or KPIs which measure a meaningful contribution to regional economic growth – for example, the number of start-up businesses supported.

viii. Hosting the Creative Industries Knowledge Transfer Network
Strategic engagement with the Technology Strategy Board via the Creative Industries Knowledge Transfer Network (CIKTN) has continued to develop in recent years. UAL is the managing partner for the CIKTN consortium and has been strongly involved in the consultation exercises for the Connected Digital Economies Catapult, the Future Cities Catapult, and the Satellite Applications Catapult. This will end in March 2014 with the reorganization of all the Knowledge Transfer Networks (KTNs) into a single organisation.

3. Central St Martins College of Art and Design
Dani Salvadori is both the Head of University Enterprise Development and the Director of Enterprise at Central Saint Martins. To coincide with the launch of HEIF 5 in May 2011, Salvadori took a 0.5 internal secondment for 2.5 years, putting her in the unique position of being able to take both a broad overview of enterprise and innovation activity from her central role, whilst at the same time working closely with the business development

managers and clients at college level. The new operational strategy outlined previously has been influenced by her experience as to what is required at college level, and her understanding of what is better handled at an institutional level – e.g. liaison with HEFCE (finance), the TSB, and the provision of technical and legal support.

The rich mixture of experiences that Salvadori has acquired over the last 19 years at CSM are worth noting in order to better understand the size, scale, and reach of the enterprise operation at the college in 2013. Starting her career at CSM in 1994 as the business manager for London Artscom Limited (previously Developments at the London Institute Ltd (DALI)) she took the turnover of short courses, consultancy and tailor-made training and study abroad programmes from £375K (1994) to £2m (2002). A key trigger for the acceleration of enterprise development at CSM came in 2006 when, during her tenure as Head of Marketing and Enterprise, Salvadori secured £1.86m of funding from the London Development Agency (LDA) to build an Innovation Centre on Southampton Row in Holborn. This increase in resource enabled the creation of the CSM Innovation team.

Shortly after the establishment of the Innovation Centre, London experienced a significant reduction in public sector funding sources, with a significant political shift with the election of Boris Johnson as Mayor of London and the effects of the global financial crisis, which led CSM Innovation to switch the focus of its activities from public sector fundraising to more commercial activities, including consultancy, joint ventures, and investor relations. The contract for the new building stated that if the CSM Innovation Centre were to move within ten years then the 487m² space would need to be replicated elsewhere. In 2011 CSM moved from central London to new premises in King's Cross as part of a dramatic redevelopment of the area, and, true to the LDA contract, the CSM Innovation Centre was given the same footprint of space.

Increased income resulting from enterprise activities is one of the main aims of the UAL medium-term strategy. The prominence of the new CSM campus, combined with the active encouragement of the CSM Pro Vice-Chancellor for Salvadori to take a leadership position at CSM, has served to catalyse enterprise as a prominent partner to the central academic mission of the college.

A. The CSM Innovation Centre

Located in the borderland between the London boroughs of Camden and Islington, the new 32,000m² RIBA award-winning campus for 5,000 students comprises a 19th century Grade II listed Granary building and transit sheds, with a 200 metre long new building designed by the architects Stanton Williams. The impact of CSM's position as a cultural anchor inm and one of the first occupiers of, the largest area of urban redevelopment in Europe, as fifty new buildings, twenty new streets, and ten new public squares are built, cannot be underestimated. In this emerging landscape increased HEIF funding has enabled the exploration of new possibilities, notably models for venue hire which relate to and enhance the College's expertise in the experience economy, providing a compelling opportunity for CSM's clients to engage with

Figure 1: Mix of activities at CSM Innovation Centre

students while giving the college a strong USP in a highly competitive marketplace.

Moreover, during the 2012 Olympics, the building played host to two prestigious events held by London & Partners in partnership with the Mayor of London and UKTI. CSM Innovation clients are predominantly from a few key sector groups: the creative and cultural industries; consumer facing businesses which use creative products (e.g. fmcg, luxury brands, property, leisure and entertainment, digital and media, fashion industry); businesses which benefit from design-led approaches (e.g. security industry); and local authorities and public sector bodies involved in culture-led regeneration. As might be expected, these events brought the college into contact with high-level networks of new international clients that brought about tangible business outcomes, further enhancing CSM's position as a major hub for the creative economy in London, nationally and internationally. Enterprise and innovation activities at CSM include: sponsored student projects; venue hire and events; professional design services; bespoke training; research and academic consultancy; corporate sponsorship; and graduate consultancy.

In 2011-2012 the CSM Innovation Centre reported an annual turnover of £8.5m, including income generated by short courses, the surplus of which accounts for 20% of the college budget. CSM Innovation does not get any subsidy from the college for activities, beyond a share of UAL's HEIF funding. The team is comprised of Business Development Managers for sponsored student projects, venue hire and events, graduate consultancy, research

and innovation, short courses and professional training - supported by an operations and administrative team. Driven by financial performance targets and attentive to corporate processes, the BDMs attend monthly finance meetings where they are answerable to financial targets and acknowledge first-hand the credit control issues of their clients.

CSM Innovation uses the interpretative innovation model, which can be likened to initiating and guiding a conversation. The BDMs are able to engage with the client to develop and tailor the service or product that they need by taking advantage of a range of resources that include academic and professional experts, experienced and knowledgeable trainers, and talented students and graduates with fresh ideas. It is this ability to broker across creative disciplines, while maintaining sales driven client empathy that defines CSM Innovation's approach to business development.

Figure 2: CSM Innovation product development

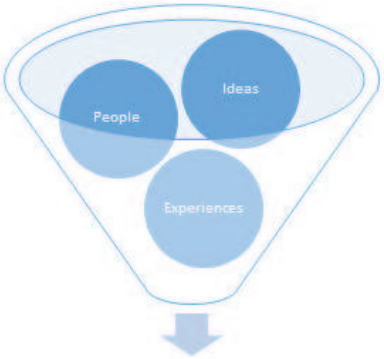


Figure 3: CSM Innovation's approach to business problems

B. Sponsored Student Projects

UAL operates on an income-led model where income goes to where it is earned, so budgets are locally managed and the income that CSM Innovation generates is spent at college and course level, and is not controlled by the university. One of the activities that provides essential income for the courses is sponsored student projects (SSPs).

Sponsored student projects commonly take the form of a live brief for a project, which is developed jointly by an external company and academic staff. Some courses weave the projects into the academic content as part of the curriculum and they are assessed as such, whilst others allow students to do projects outside the main curriculum. There has been a formalisation of the process of SSPs in recent years by CSM Innovation. The internationalisation of the college (54% of students are now from outside the UK) has made SSPs much less about local relationships and more about global circuits of ideas, so the formalisation of the processes was probably inevitable.

Central Saint Martins in particular has always had an active programme of industry engagement and SSPs involve companies as diverse as Samsung, Orange France, Heinz, Alfa Romeo and EDF. Since the formalisation of the process a report was commissioned by Professor Kate Oakley entitled 'The impact of business engagement on learning and working' (2010). [39] The major findings were:

- **Numbers:** Sponsored student projects are increasingly important at Central Saint Martins. Despite the recession, the number of projects is up - 41 projects in 2009/10, up from 34 in 2008/09.
- **Students:** Around a quarter of all undergraduates take part in projects every year. The students get experience responding two a commercially-driven live client brief enriching the students teaching and learning experienceand helping them to prepare for employment.

They described the benefits of SSPs largely in terms of soft skills, such as how to talk to clients, how to express ideas better, and how to deliver and progress an idea.

- **Firms**: Companies are still seeking to work with CSM despite the recession, but budgets are smaller. This means that income overall has dropped slightly, though Intellectual Property (IP) sales are up both in value and number. The increasingly aestheticisation of the economy and the importance of design and branding, even for non-cultural goods, helps account for the interest of a wide range of firms in wanting to work with CSM students. It is notable that the college brand – CSM – and in some cases particular courses (e.g. fashion) are what attracts clients.
- **Staff:** Most academic staff members take pride in the industry-facing nature of the college and its dense linkages between working and learning, and the college and industry that make it work. The view of staff on SSPs can be summed up by one staff comment: 'If our courses don't work with industry, they are short changing the students.'

Overall SSP projects respond to the need to produce highly skilled, entrepreneurial and employable graduates, as demonstrated in the examples given below:

Heinz
The brief: Heinz asked students from BA (Hons) Product Design to imagine how their iconic ketchup bottle could evolve in modern society.

The project: Students attended a briefing from the Heinz team into the history of the brand, accompanied by sausage sandwiches and Heinz ketchup in a variety of recent incarnations of packaging. They explored user behaviour around tomato ketchup, and considered questions such as 'how do you keep an iconic product as relevant today as when it was first introduced in 1876?'

The results: Students presented design concepts and 3D models to the Heinz team, which Heinz have used to inform their own research and development. Student insights into sustainability prompted Heinz to commission more research from academic staff to investigate this in relation to packaging.

> *'Heinz found the project with Central St Martins energising and inspiring, with a lot of great fresh ideas and new thinking.'* (Ian McCarthy, Brand Manager, Heinz Ketchup)

Givenchy
The brief: Givenchy sought a creative and contemporary visual concept for a limited edition lipstick package.

The project: Students from BA (Hons) Graphic Design were invited to design customised product packaging, point of sale ideas and exclusive gift accessories for a Rouge Interdit lipstick that had previously been product designed as a project with CSM BA (Hons) Product Design graduates.

The results: Givenchy purchased IPR for the winning designs by Florence Bamberger, launching the product in Tokyo in February 2009.

> *'We brief the students as if they're already commercial designers. The quality of the work is incredibly high.'* (Alain Lorenzo, President of Givenchy Paris)

C. Short courses at Central Saint Martins

Short courses at Central Saint Martins have historical significance institutionally and culturally. The Head of the Museum and Study Collection at CSM notes:

> *'Shorter courses of study have always been integral to the DNA of Central Saint Martins. Until the latter part of the 20th century few people attended art school as part of a formal course of study. In the early years of the Central School boy apprentices on day release populated the school during the day and adults attended evening classes for as long as they considered useful for their instruction – an evening, a few weeks, maybe a year. The Central School was particularly good at using that time to introduce students to key players in industry, so students might go on to be book illustrators, textile designers, or poster artists on the strength of those introductions. Dipping into art school for a short period of time to meet a group of like-minded peers, learn something new, and make contacts in industry is the way it's always been done. Short course attendees today are part of this long tradition.'*

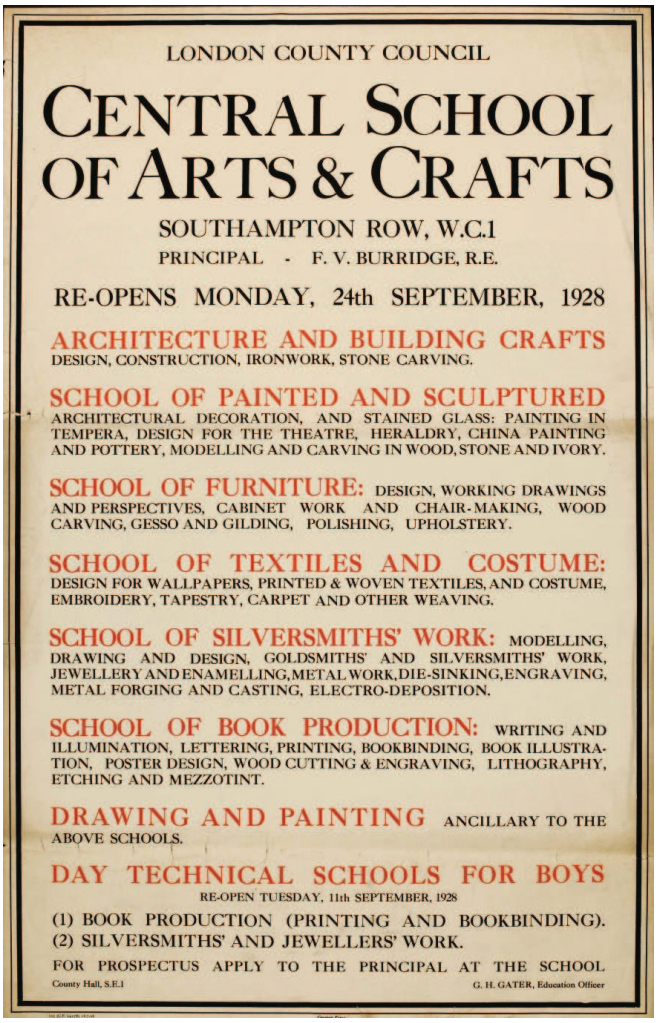
London Artscom Limited (previously DALI Limited) was established in 1989 as a separate trading company to UAL that provides short courses, consultancy, tailor-made training, and study abroad programmes. All profits are covenanted back to the University and as such Artscom has been generating important additional funding at all the colleges for nearly 25 years.

The profile of Short Courses at Central Saint Martins in 2013:

- CSM short courses are the most successful out of all the UAL colleges, accounting for 60% of the total Artscom revenue.
- CSM offer 1000+ short courses every year.
- The courses are scheduled in the evenings, on Saturdays, during the Easter, summer, and Christmas holidays, and delivered online. There are only three weeks of the year when short courses do not run.
- 60% of the courses are run from the King's Cross campus, while the other 40% are run from our campus in Back Hill Clerkenwell.
- In 2011-2012 approximately 12,500 students booked onto courses generating revenue of £6.2m.
- A survey in autumn 2012 showed that 91% of students who took a short course felt inspired by their experience.
- The survey also revealed that, equal to the content of the course, students were motivated to take a short course at CSM because of the college's reputation.
- International students account for around 40% of places on the evening courses and just over 60% of places during the Summer school.

Left: Givenchy judging session © Central Saint Martins College of Arts and Design.

Right: Poster, Central School of Arts and Crafts, 1928
© Museum and Study Collection, Central Saint Martins College of Arts and Design


LONDON COUNTY COUNCIL

CENTRAL SCHOOL OF ARTS & CRAFTS

SOUTHAMPTON ROW, W.C.1

PRINCIPAL - F. V. BURRIDGE, R.E.

RE-OPENS MONDAY, 24th SEPTEMBER, 1928

ARCHITECTURE AND BUILDING CRAFTS
DESIGN, CONSTRUCTION, IRONWORK, STONE CARVING.

SCHOOL OF PAINTED AND SCULPTURED
ARCHITECTURAL DECORATION, AND STAINED GLASS: PAINTING IN TEMPERA, DESIGN FOR THE THEATRE, HERALDRY, CHINA PAINTING AND POTTERY, MODELLING AND CARVING IN WOOD, STONE AND IVORY.

SCHOOL OF FURNITURE: DESIGN, WORKING DRAWINGS AND PERSPECTIVES, CABINET WORK AND CHAIR-MAKING, WOOD CARVING, GESSO AND GILDING, POLISHING, UPHOLSTERY.

SCHOOL OF TEXTILES AND COSTUME:
DESIGN FOR WALLPAPERS, PRINTED & WOVEN TEXTILES, AND COSTUME, EMBROIDERY, TAPESTRY, CARPET AND OTHER WEAVING.

SCHOOL OF SILVERSMITHS' WORK: MODELLING, DRAWING AND DESIGN, GOLDSMITHS' AND SILVERSMITHS' WORK, JEWELLERY AND ENAMELLING, METAL WORK, DIE-SINKING, ENGRAVING, METAL FORGING AND CASTING, ELECTRO-DEPOSITION.

SCHOOL OF BOOK PRODUCTION: WRITING AND ILLUMINATION, LETTERING, PRINTING, BOOKBINDING, BOOK ILLUSTRATION, POSTER DESIGN, WOOD CUTTING & ENGRAVING, LITHOGRAPHY, ETCHING AND MEZZOTINT.

DRAWING AND PAINTING ANCILLARY TO THE ABOVE SCHOOLS.

DAY TECHNICAL SCHOOLS FOR BOYS
RE-OPEN TUESDAY, 11th SEPTEMBER, 1928
(1) BOOK PRODUCTION (PRINTING AND BOOKBINDING).
(2) SILVERSMITHS' AND JEWELLERS' WORK.

FOR PROSPECTUS APPLY TO THE PRINCIPAL AT THE SCHOOL
County Hall, S.E.1 G. H. GATER, Education Officer

- The short courses offer students the opportunity to interact directly with people from industry who may deliver, design, or guest as part of one of these courses.

D. Underpinning research and conclusions

The major longitudinal survey Creative Graduates Creative Futures carried out between 2008 and 2010 looked at the career patterns of 3,500 graduates in art, design, crafts, and media subjects qualifying in 2002-2004 from UK HEI's. The survey shows that graduates were keen to develop their skills and knowledge, enhance their job prospects, and follow personal interests often related to their creative practice.

Almost three quarters of respondents (72 per cent) had undertaken some form of further study, education or training, or independent study/more informal learning since graduating. Four in ten (39 per cent) were undertaking formal further study of some kind at the time of the survey, often supported with paid work.[40]

From this research we know that creative people engage in developing a life-long learning portfolio and short courses at CSM are part of the training landscape for people in the region of London, the UK, and worldwide. The prioritisation of this strand of activity, as part of a wider, embedded innovation strategy at CSM, has been vital in raising the profile, the success and the dynamism of the institution, both with regard to internal perceptions and those of business and industry as external partners.

38 See 'UAL's enterprising ethos turns students into stars', Guardian, http://www.guardian.co.uk/university-arts-london-partner-zone/uals-enterprising-ethos> [accessed 14 March 2013]. Furthermore, the major longitudinal survey Creative Graduates Creative Futures (Brighton: Higher Education partnership and the Institute for Employment Studies, 2010) by Linda Ball, Emma Pollard and Nick Stanley carried out between 2008 and 2010, about the career patterns of 3,500 graduates in art, design, crafts and media subjects qualifying in 2002-2004 from UK HEI's was hugely influential in UAL rethinking the offer to our students and foregrounded the creation of SEE.

39 Professor Kate Oakley, 'The impact of business engagement on learning and working' (London: University of the Arts London, 2010)

40 Linda Ball, Emma Pollard and Nick Stanley, Creative Graduates Creative Futures, Brighton: Higher Education partnership and the Institute for Employment Studies, 2010, p. xxv

Case study 2: The Ontario College of Art and Design University

Dr Nicola Hepburn, University of Toronto, Canada[41]

1. Introduction

The Ontario College of Arts and Design University (OCAD U) is Canada's 'university of the imagination'[42]. The institution provides undergraduate and graduate level programmes and research opportunities in a learning environment that integrates studio-based education with historical, critical, technological, aesthetic and scientific inquiry. Situated in the heart of downtown Toronto's creative and digital industries district, OCAD U is proximate to numerous post-production facilities, media companies, design firms, galleries, artists' co-ops and other cultural industry players[43]. The University has developed robust partnerships with these local businesses, third-sector organisations, multi-national corporations and multiple levels of government (i.e. municipal, provincial, and national) to advance cutting-edge industry-relevant research in several areas including healthy and inclusive environments, sustainable futures, material innovation, aesthetics, and the creative economy[44].

OCAD U has a long history in Canada, evolving from a small arts school established in 1876 to a vibrant specialist university. With a population of 3,343 full-time students, 1,012 part-time students and 213 graduate students, OCAD U is the third largest of approximately 40 professional art and design universities in North America.[45] While the university maintains a low student faculty ratio of 17:16, enrolment numbers continue to grow; between 2006-07 and 2011-12 admissions increased by 30%[47].

Dr. Sara Diamond joined OCAD U as President in 2005. Dr. Diamond is an internationally respected artistic director, educator, researcher, critic, video artist, television and new media producer/director, and curator. Under her leadership, the institution has strengthened its reputation as 'a significant cultural institution' in Canada[48]. According to the university's Strategic Plan, *Advancing Excellence at OCAD University for the Age of Imagination, 2012 – 2017,* OCAD U's alumni and faculty have made a notable contribution to local and international prosperity, generating 'a significant portion of the more than $9 billion per year of cultural sector GDP in Toronto alone and some $20 billion in Ontario'.

OCAD U's Strategic Plan goes on to describe the university's mission as 'bringing the wisdom of art and design thinking and creation and the power of media to better society, improve human lives, build a sustainable economy, create jobs and help address the increasingly complex problems of today's accelerated age'[49]. The university has committed to working collaboratively with science, industry, and government, as well as other domestic and international institutions and communities, to address five interdisciplinary themes: sustainability, technological invention, diversity and global citizenship, health and wellness, and contemporary ethics. It is envisioned that OCAD U students, alumni, and faculty will provide Canada and the world with 'design methods and thinking combined with the experimentation and interpretive qualities of art, a mastery of technological invention and innovation, as well as cultural, social and economic entrepreneurship'.

Between 2012 and 2017, OCAD U will focus on four strategic priorities: advancing experience, advancing recognition, advancing influence, and advancing the

enterprise. To advance experience, the institution intends to grow and diversify student enrolment and faculty as well as enrich creative learning for students inside and outside OCAD U. Undergraduate and graduate programmes will be expanded in response to student and market demand, and the provincial government's target that 70% of Ontarians will attain a post-secondary education. Additionally, the university will facilitate time to completion, develop an honours stream, foster international opportunities, accelerate the launch of internships, and create new business and job opportunities for students. OCAD U aspires to be 'a hallmark of experiential learning' by providing students with a one-of-a-kind educational experience through various innovative mediums including online, blended, and mobile learning, service-based learning, internships, and partnered curriculum with not-for-profits and industry.[50]

To advance recognition, the university has committed to strengthening its capability for research, knowledge generation, and art creation and exploring new ways of showcasing faculty and student research excellence and talent. Expertise and research capacity will be added through new faculty hires and the growing student population. OCAD U will build its reputation for innovations through business spinoffs and intellectual property placements. In order to advance influence, the university will continue to nurture a community of local and global relationships that unite societal members with all of OCAD U's faculties. The university will focus on engaging multiple communities in strategic advocacy, public policy, and thought leadership at local, national, and international levels as well as engaging alumni as active participants, advocates, and contributors. Finally, in order to advance the enterprise, the university intends to launch a number of initiatives including offering enhanced professional development and training opportunities; developing capital, physical and virtual infrastructures and environmental sustainability; setting new funding goals; and, creating new forms of delivery to maximize capital resources.[51]

OCAD U has an annual budget of approximately $52 million[52]. The institution has seven sources of revenue: government grants, tuition fees, miscellaneous fees, investment income, rental income, donations/sponsorships, and other income. The university's expenditures include academic and non-academic compensation, non-compensation expenses, OCAD U's restructuring / retirement incentive plan, student assistance fund, debt service costs, and capital expenditures. See Table 1.1 for a summary of the university's funding sources and expenditures.

Table 1.1 OCAD University 2011-12 operating budget, revenues and expenses

Type of Revenue	Description
Government Grants	
Operating	The allocation of operating funds for all Ontario universities is based on a corridor funding system established by the Ontario government. Each institution has a targeted level of enrolment, and an institution must keep their five-year moving average enrolment levels within the ±3% corridor around the mid-point target set by the Ministry of Training Colleges and Universities to guarantee receiving funding according to that targeted level of enrolment (mid-point of the corridor).
Performance Fund	Funding is based on each higher education institution's ranking within three performance measure areas: employment six months after graduation, employment two years after graduation, and graduation/completion rate. Institutions that fall into system average ranges receive funding based on their share of overall system undergraduate basic income units (BIUs).
Enrolment Growth Fund	Funding is granted for year-over-year change in domestic enrolment.
Accessibility Fund for Students with Disabilities	Funding is intended to help HEIs provide supports and services to students with disabilities.
Quality Investment Fund	This grant is part of the annual multi-year accountability agreements institutions have entered into with the provincial government to improve quality, access and accountability.
Graduate Studies	Funding is derived from $12,680 per FTE of domestic regulated students.
Aboriginal Visual Culture-Growth Initiatives	This grant is an annual commitment towards the implementation of a new curriculum programme
Digital Futures Differentiation Grant	The Ontario government provided OCAD U with a permanent $2M differentiation grant to implement the Digital Futures Initiative.
Other Grants	Other revenue is received from successful grant applications to federal and provincial sources

Tuition Fees	Undergraduate and Graduate Studies: included in tuition fees are full-time, part-time and summer student fees
Miscellaneous Fees	Included: Ontario University Application Centre fee rebates, and other admission fees, class fees, user fees an Academic Equipment and New Technology fee, Production Materials fees and Student Support fees (e.g. literacy, laptop programme, Health & Wellness, Career Centre, Orientation fees, etc.).
Investment Income	Investments consists of fixed income securities, Provinces of Ontario, British Columbia and New Brunswick
Rental Income	Rental income received from the tenants at 205 Richmond St. W. and Aboveground Art Supplies
Donations/ Scholarships	Unrestricted external donations/ sponsorships towards university operating funds from the OCAD U Foundation[53] is included as well as externally restricted and unrestricted donations/sponsorships from upcoming philanthropy campaigns. Not included: donations associated with scholarships, bursaries and gifts-in-kind.
Other Income	This includes revenues from Continuing Studies, business development initiatives, the Grange Bistro, sale of supplies in the Academic Computer Centre, facility rentals, library membership fees, fines, book sales, ATM rebates revenues from the 317c computer and book store and Research overhead.

Type of Expenditure	**Description**
Academic Compensation	This expenditure includes salaries, benefits and professional development for faculty, technicians, teaching assistants, class assistants, markers, and staff in the Library, Visual Resources, Academic Computer Centre, Lap Top Programme, Graduate Studies and Fabrication Studios.
Academic Administration Compensation	This expenditure includes salaries, benefits and professional development for Deans, Assistant and Associate Deans, Programme Chairs, Faculty Support Staff, Studio Manager, Centre for Innovation in Art & Design Education, Professional Gallery, Centre for Advising and Campus Life, and Office of the Vice-President Academic

[Table 1.1] Sources: OCAD, 2012b; Ernst & Young, 2012; OUSA, 2010; COU, 2010

Non-Academic Compensation	Funding includes salaries, benefits and professional development for administrative staff in: Registrar's Office, Student Affairs, Finance, Human Resources, University Relations, Development and Alumni Relations, Marketing and Communications, Facilities Planning and Management, IT Services, Risk Management, Campus Services and Security, Admissions and Recruitment, Offices of the President and Vice-President, Finance and Administration.
Non-Compensation	This includes physical plant maintenance, class supplied, travel, memberships, visiting lecturers, office supplies, printing, programme development, publications, marketing, legal and audit fees, utilities, insurance, overtime, temporary help etc., plus compensation for models and student monitors.
Restructuring/ Retirement Incentive Plan	Applications are submitted for this faculty voluntary retirement incentive plan, and they must meet financial, curricular and faculty compliment planning
Student Assistance Fund	The Ontario Ministry of Training Colleges and Universities introduced a 'student access guarantee' policy which requires the university to finance any direct educational costs above what is provided through government assistance programmes (unmet need).
Long-term Debt-Service Costs	This cost is the interest on long-term debt.
Capital Expenditures Contingency	Funded from the operating budget

II. Educational services for students

OCAD U has a Faculty of Arts, Faculty of Design, Faculty of Liberal Arts and Sciences, as well as a School of Interdisciplinary Studies with undergraduate and graduate programmes. Students can earn a Bachelor of Design (BDes) majoring in Advertising, Graphic Design, Illustration, Environmental Design, Industrial Design, or Material Art and Design. To earn a Bachelor of Fine Arts (BFA), students can major in Criticism & Curatorial Practice, Cross-Disciplinary Art: Publication, Drawing and Painting, Drawing and Painting: Digital Painting and Expanded Animation, Integrated Media, Integrated Media: Digital Painting and Expanded Animation, Photography, Printmaking, or Sculpture/Installation. Graduate level programmes are provided in a number of areas including Contemporary Art, Design and New Media Art Histories (MA), Criticism and Curatorial Practice (MFA), Inclusive Design (MDes), and Strategic Foresight and Innovation (MDes). Through OCAD U's School of Interdisciplinary Studies, students may access the Aboriginal Visual Culture Programme, an initiative that combines degree programming with community outreach, research, and economic development. The programme focuses on historical context and creative explorations of contemporary First Nations, Métis and Inuit artists, designers, and cultural thinkers.[54] A minor in Aboriginal Visual Culture is available to students pursuing a degree in any studio programme. Students may also earn an Interdisciplinary Master's in Art, Media and Design.[55]

Programmes, courses, and research opportunities provided through OCAD U's Digital Futures Initiative (DFI) teach students the digital arts, and links knowledge in art and design to emerging digital forms and technologies [56]. Students can study Digital Futures as an undergraduate programme, graduate master's programme, and graduate part-time Diploma programme. Digital Futures students design or create processes, objects, products, experiences, and new forms of media expression. They develop an understanding of methodologies, research skills, and critical skills in theory and history, and they also learn management and business skills. DFI is highly collaborative, enabling students to engage industry and other research institutions (i.e. colleges, hospitals, universities, etc.) as they work on various research projects as well as their undergraduate and graduate theses. To further enrich this work-study experience, industry partners visit OCAD U classrooms and provide students with insight into local and global market demands, stimulating advanced thinking and research in emerging areas of development.

The Digital Media + Research Innovation Institute (DMRII) is the research and incubation component of OCAD U's Digital Futures Initiative. The DMRII consists of nineteen multidisciplinary research laboratories, virtual collaborative teams, accelerators and incubators that generate applied research in digital media and advance commercialization and knowledge transfer across a wide range of areas including ambient experience, digital painting, gaming, physical computing, and social media research.[57] Students and faculty affiliated with the DMRII work with industry and other research partners, sharing and exchanging human and physical capital. Matters

related to the DMRII are managed by OCAD U's DFI implementation office.

Imagination Catalyst – one of the nineteen DMRII labs – has been particularly successful at coordinating OCAD University's entrepreneurial and innovation activities as well as further integrating faculty, students, alumni, entrepreneurs, and industry to enhance students' business skills. Launched in August 2011, this talent development initiative is aimed at incubating design and creative knowledge transfer to help launch commercially viable ideas generated by faculty, undergraduates, graduate students, and alumni. Imagination Catalyst provides these individuals with the workspace, mentorship, workshop and networking opportunities as well as production, testing, and prototyping facilities they need to succeed as creative entrepreneurs.

Students, faculty, and OCAD U alumni work in close collaboration with a number of other locally-based research institutions and industry partners including MaRS Innovation, Ryerson University's Digital Media Zone (DMZ), the Canadian Film Centre, and a range of commercial accelerators (Ibid). In its short time of existence, the programme has been instrumental in: supporting start-up company formation; facilitating business planning and development plans; connecting participants with funding and investors; and coordinating design development and prototyping. As of April 2013, Imagination Catalyst has dedicated a total of $339,183 to fund eleven projects, and through its services this initiative has supported and/or enabled two graduate school acceptances, the commercialization of three products, three hires by industry partners, six patents, and the development of six new companies.[60]

OCAD U places a strong emphasis on providing their students with real-world work experience. In October 2012, OCAD University and Mitacs – a not-for-profit research and training organisation – signed an agreement to grant OCAD University's graduate students and alumni access to a federally funded internship programme [61] (Mitacs, 2012). The programme is a competitive six-month paid internship and business mentorship opportunity designed to connect students and graduates of science, technology, engineering, and mathematics (STEM) disciplines with small to medium-sized companies operating in a STEM sector throughout Southern Ontario. As part of the programme, the interns also receive three days of business and management training, a peer support network and progress monitoring 'to encourage skill and knowledge transfer to the [firm in which they are associated]'. This initiative is expected to benefit primarily students and graduates of OCAD U's Digital Futures, Inclusive Design, Industry Design, and Environmental Design programmes, however, other students from different disciplines that meet a given set of requirements may also apply. Through this programme, up to 15 graduates (undergraduate or graduate alumni within five years of graduating) and 11 current graduate students will be placed in the funded internships between now and 31 March 2014. Firms associated with the internship receive up to $15,000 in funding for each internship and are expected to match that amount.

The university also facilitates collaboration between

OCAD U students, local SMEs, and other higher education institutions in the Greater Toronto Area (GTA). For instance, OCAD U is working in partnership with George Brown College to create the Centre for Applied Design, Innovation, and Research (CADIR) [60]. The proposed centre will support collaborative learning, research, and commercialization in design, providing students the opportunity to earn certificates, diplomas, and degrees through new joint programmes and laddered articulation agreements (Ibid.)

III. Support services for the business sector

OCAD U offers an assortment of support services for the business sector to interact and collaborate with students and faculty across multiple areas of focus, including mobile and digital media. In light of its research and development strengths in design, the university plays a critical role in forging linkages with local industry partners to advance innovation in these two sectors. The following section focuses on the support services OCAD U offers to facilitate academic-industry research and commercialization partnerships in digital media and mobile [63]; these services are provided by two very different but effective initiatives: DMRII and the Mobile Experience Innovation Centre (MEIC).

The DMRII is instrumental in building collaborative ties between industry and OCAD U, providing services to both students and business sector partners. Private sector actors linked into DMRII have unfettered access to the bright ideas generated by students and faculty that are intended to solve an industry-related problem. Business sector partners may access the DMRII services through any one of its nineteen industry-led, student-led and / or faculty-led laboratories, accelerators, and incubators. A research team dedicated to working on a given industry-related issue is then assembled. This team may consist of OCAD students, faculty and industry representatives, and in some cases, members of other research institutions outside of OCAD U will also join. While each team is independent, its activities are overseen by the DFI office which provides project management support when necessary to help business partners and researchers overcome challenges related to industry-academic partnerships. For instance, the DFI office will help team members clearly define the terms of their collaborative arrangement so as to mitigate misunderstandings regarding the expectations of each set of partners and deliverables. If members of the team do not have documentation or certain skillsets required to advance a particular project, the DFI office will intervene to provide these resources. On a case-by-case basis, the DFI office also provides teams with contingency funding to address unforeseen challenges or results.

Business sector partners may also take advantage of a variety of services directly available through the lab with which they are associated. For example, the Inclusive Design Research Centre (IDRC) – one of DMRII's largest and most established labs – enables open source developers, designers, researchers, advocates, and volunteers, within and outside the university, to work together to ensure that emerging information technology and practices are designed inclusive of a full range of human diversity

including ability, language, culture, gender, age, and other forms of human difference. [64] To this end, the IDRC offers its affiliates with formal website accessibility evaluation and design consultation; corporate training for organisations who want their employees to understand accessibility, including local or regional accessibility legislation; and assistance in setting up an accessible standards compliant e-learning technology that IDRC designed for developing and offering online courses.

The MEIC (Mobile Experience Innovation Centre) was founded in 2007 by OCAD University as a mobile sector strategy and lobbying initiative [65]. With President Diamond as the inaugural Chair, over time MEIC evolved into a research and development collaboration between major industry, small- and medium-sized enterprise, and academic research partners, with a focus on analyzing and strengthening local capacity for research and commercialisation, facilitating the activities of start-ups and early-stage entrepreneurs, and promoting strategic foresight for Ontario's mobile content industry. In 2011 MEIC became a not-for-profit, industry-based organisation, and retained strong partnership ties with the university: MEIC is housed on the OCAD U campus; it has access to OCAD U's computer technology and network; President Diamond is the organisation's co-chair; and MEIC is funded 'as a coalition by OCAD U and [Ontario Media Development Corporation]'. [60] Further details of MEICs activities can be read in Chapter V: Smart, Creative and Sustainable Business where the centre is more fully explored as a separate case study of such HEI / business sector collaboration.

Both DMRII and MEIC have had notable success in collaborating with the business sector. Several partnerships between OCAD U and industry were made possible as a result of funding DMRII received in 2011 from the federal granting agency – the Federal Economic Development Agency for Southern Ontario (FedDev) [60]– through a programme called the Applied Research and Commercialization (ARC) Initiative. ARC was a $15 million fund designed to encourage greater collaboration between higher education institutions, R&D expertise, and smaller businesses with commercialization needs in order to address the gap between research and commercialization, [68] accelerate innovation, and improve productivity and competitiveness for businesses located in southern Ontario. [69] OCAD U used its $359,800 grant to launch thirty-two pre-commercialization projects led by various industry-academic teams associated with the DMRII. Table 1.2 presents a sample of these projects.

Table 1.2 A sampling of OCAD University's DMRII projects funded by the ARC initiative

Project Name	Industry Partner	OCAD U Collaborators	OCAD U Collaborators
Haptic Holography	Entact Robotics Inc.	Assistant Professor Michael Page, Faculty of Art	To develop haptic holography technology, allowing users to interface with 3D displays that provide sensory feedback.
Extend Lead	Mablemedia	Assistant Professor Emma Westecott (Team Lead)	To leverage OCAD U's expertise in design thinking and independent game development with the aim to develop original IP, market opportunities and business models.
With You	GestureTek Inc.	OCAD graduate, Haniyeh Khosravi Fard (Project Lead) and Associate Professor Suzanne Stein, Director of the Super Ordinary Lab (Principal Investigator)	To develop an interactive stool to enhance a socially interactive experience through design of a passive diagnostic tool for children with Autism Spectrum Disorder (ASD).
Tecla for MyVoice	My Voice	OCAD U Faculty of Design Professor Jutta Treviranus, IDRC Project Manager Jan Richards, Dr. Jorge Silva.	To adapt Tecla Access technology to the iOS mobile platform for use with the MyVoice Communication Aid. NB. These inclusively designed products, enabling its users to manipulate technology that might otherwise not be accessible to them due to disease or disability.

Project Name	Industry Partner	OCAD U Collaborators	OCAD U Collaborators
Mantiro	Farhad Shabani Designs	OCAD U graduate Farhad Shabani and Associate Professor Dianne Crouteau of OCAD U Faculty of Design	To further develop swimming device prototype Mantiro, which was intended to replace the typical flutter board used during learn-to-swim instruction. This multi-functional patent pending swim aid also enables physically challenged people and the elderly to have a safe water experience.
Visible Campus	DuROCK Alfacing International Ltd.	Professor Job Rutgers of OCAD U's Faculty of Design	To explore pavement elements, street furniture and wayfinding to express the connection aesthetically of the 12-building campus.
My Toshi	Albedo Informatics Inc.	OCAD U alumnus Trevor Haldenby, MDes and Assistant Professor Emma Westecott (Principal Investigator)	To assist Albedo in positioning its business ideas and to secure additional design and development financing. Haldenby led the foresight research project. This research, as well as extensive design consultation conducted during the software development process, supported the development and marketing of Albedo Informatics Inc.'s My Toshi product alongside other Albedo products.
InfoViz for social media	Echo Mobile	OCAD U alumnus Gabe Sawhney, MDes and OCAD U Associate Professor Judith Doyle (principal investigator/ Director of SMAC lab)	To map contributions and conversations on social networks, using information visualization.

[Table 1.2] Source: OCAD U website: http://www.ocadu.ca/research/arc-feddev-projects.htm

Project Name	Industry Partner	OCAD U Collaborators	OCAD U Collaborators
Surpise, Wonder and Delight	Media Lab Toronto	OCAD U alumnus Gabe Sawhney, MDes and OCAD U Associate Professor Judith Doyle (principal investigator/Director of SMAC lab)	To investigate the next generation of interactive technologies for playful engagement. The team studied challenges of language, client communication, and metrics for gauging success. The findings will inform a new generation of interactive technology products for experiential marketing, retail and fundraising.
Neutral Carbon Product	Zerofootprint	OCADU alumnus Peter Rose, MDes; and OCAD U Principal Investigators, Assistant Professor Suzanne Stein and Professor Dr. Barbara Rauch	To benchmark visualization aesthetics that could communicate the carbon footprint of a product, and to give consumers information leading to greener choices.
Alarm X	Guardly Corp	IDRC's Jan Richards and Dr. Jorge Silva	To further develop and commercialize a mobile personal/home alarm and monitoring security services and extend its supported devices including Google android smartphones to run its new app.
Sousveiller	Normative	The roots of the Sousveiller came from an OCAD-Normative project called 'Red Rover' which used design and technology explorations to understand how technology could be applied to senses to help individuals play simple games in different urban environments.	To explore the relationship between people and visual surveillance technologies. This web and mobile application is focused on creating a publicly accessible data set of urban locations that contain visual surveillance technology.

OCAD U's collaboration with the business sector has significantly contributed to local economic development. The close interaction between design students and industry representatives actualizes one of the university's principal institutional objectives: the training of the next generation of high quality personnel in industries such as entertainment, culture and new media, healthcare delivery, physics, and furniture design. [70] Co-op programmes and internships enable bright undergraduate and graduate students to work alongside local employers, become more knowledgeable about the challenges that exist within a given sector, and have the unique opportunity of working towards resolving some of those challenges. Upon their return to the classroom, OCAD U students bring back the knowledge and expertise they acquired while working with the business sector which enhances their colleagues' learning experience and informs the development and improvement of the university's curriculum over time.

As the university's curriculum improves and industry-academic relations intensify, OCAD U has become a stronger magnet for world-class researchers. An increased number of faculty and students seeking hands-on working experience with industry partners have been attracted to the GTA (Greater Toronto Area) as a result of ongoing efforts at advancing academic-industry knowledge and technology exchanges at the local level. These entrepreneurial academics and students add to the Toronto region's concentration of creative talent, help to reduce labour/talent shortages, and address retention challenges.

Ongoing collaborative research and commercialization activity between OCAD U and the local business sector has helped to strengthen ties between other Toronto-based research and industry actors across the city's mobile and digital media innovation ecosystems. OCAD U faculty and students work on many research teams that require the expertise of a range of other representatives from proximate intermediary innovation organisations, research institutions, and firms. These actors pool their resources and skills to address a complex industry-related issue, thereby facilitating the exchange of tacit and codified knowledge and promoting 'social learning' among these economic agents.[71] In today's competitive economy, knowledge is a valuable commodity, and the effective application of that knowledge has important implications for a city/city-region's capacity to innovate and contribute to local economic development. Through these collaborative knowledge exchange initiatives, local research and industry partners continue to strengthen the GTA's innovation receptor community and contribute to local firms' absorptive capacity, i.e. the ability of a firm to build an internal knowledge base as well as to evaluate and utilize knowledge from universities and other institutions.[72] These conditions have helped to build productive clusters in the digital media and mobility sectors in Toronto, and to increase the potential for creating economic value at a local level.

The concentration of talent associated with OCAD U and their industry partners has also helped to attract increased investments into the local economy. Local start-ups that have partnered with OCAD U's DMRII and MEIC are provided with the services and support they need to grow and intensify commercialization efforts, including leads to access risk capital from angel investors and venture

capitalists. The success that these young companies associated with OCAD U have had in developing their innovations contributes to enhancing the private investor community's confidence in the growing digital and mobile sectors of the Toronto region.

A number of OCAD U graduates who have benefitted from a learning experience enriched by industry engagement have acquired the marketable skills they need to enter the workplace. Equipped with the knowledge and expertise that are necessary for succeeding in a knowledge-based economy, about 86% of OCAD U graduates are employed six months after graduation, and 90% of graduates are employed within two years after graduation [73]. Many of these graduates join local high-growth firms and become valuable assets to their employers, contributing to the development of the firm as well as Toronto's productivity levels. Other OCAD U alumni use the knowledge and skills gained from experiential learning as a springboard for establishing start-ups that deliver new and/or improved innovations that provide an economic and/or social benefit to the local economy and/or the global community. Revenue from these ventures feeds back into the local economy and creates jobs in knowledge-intensive industries.

OCAD U is focused on building up its reputation as a global leader in excellent art, design and media education. To this end, the university has forged connections with a number of industry partners and research institutes from across the world. By bridging the divide between international agents and the local business sector, OCAD U has contributed to stimulating competitiveness and forward-thinking amongst Toronto-based firms, particularly those firms in the digital media sector where Canadian companies are considered relatively conservative, compared to their international counterparts.[74]

OCAD U's participation in the annual cultural event, Scotiabank Nuit Blanche, is yet another way the university collaborates with local business and contributes to economic development in Toronto. This twelve-hour 'high art' event transforms a large portion of downtown Toronto into temporary exhibitions showcasing the talent of hundreds of artists, curators, and other creative workers, inspiring public dialogue and reflection on the impact of art, design, and visual media.[75] OCAD U students and faculty members engaged in ongoing research and commercialization initiatives with various industry partners participate in this all-night celebration of art. In 2006, Nuit Blanche debuted in Toronto. With 425,000 people attending, this event's economic impact was estimated at $1 million. In 2012, about one million people attended with more than 170,000 visitors; the economic impact of Nuit Blanche for that year was about $38 million with an additional $4.2 million spillover impact for the Province of Ontario.[76]

IV. Strengths and weaknesses of the specialist HEI approach

The specialist HEI offers an in-depth focus on specific areas of knowledge. As new knowledge, innovative technologies, and problems are introduced into the world, academic disciplines must transform in order to keep up. Compared to comprehensive universities,

the specialist institution is often more nimbly able to adapt to these changes and evolve its curriculum to better meet the educational needs of its students and the market requirements of the local and global economy. In addition to the advantage of curriculum flexibility, the specialist institution is often more readily able to foster interdisciplinarity across the institutional research landscape. To this end, universities like OCAD U have become an important partner to other research institutions and actors from the business sector that require a specialised set of skills and knowledge to solve challenging socio-economic problems that cut across multiple disciplines.

The talent and expertise nurtured by specialist HEIs like OCAD University are useful for advancing unique, creative projects in emerging sectors of the economy. For instance, OCAD U's participation in an art-piece application called Tentacles evinces the impact that collaborative, specialist universities with cutting-edge knowledge and skills in art, design, and media can have on the gaming industry in Toronto. The Tentacles project allows a non-specialist audience to 'explore, improvise and play in a multi-user, location-based, game-like experience projected into public places.' [77] It is made up of two parts: a large-scale, responsive projected environment displaying avatars in a shared space and an application that turns a user's Apple iPad, iPhone, or iPod Touch into a remote control. [78] In 2009, Tentacles was launched and showcased at Scotiabank's Nuit Blanche, however the development of this project is ongoing. The initiative is being driven by students, faculty and researchers from York University's Mobile Media Lab and OCAD U's Mobile Experience Lab [79]. Several private sector partners have provided financial support and human capital to Tentacles, including the Mobile Experience Innovation Centre, Apple Canada, Ontario Media Development Corporation, and the Consortium on New Media, Creative and Entertainment R&D in the Toronto Region (CONCERT).[80]

While the specialist HEI approach has its strengths, it also has one noteworthy weakness that is particular to the Ontario context. Specialist universities in Ontario are somewhat disadvantaged relative to their comprehensive counterparts when it comes to securing higher levels of operating budget funding. OCAD U is one of the twenty publicly-assisted universities in the province, and public funding is apportioned to each institution according to its Basic Income Unit (BIU) weighting. (The BIU system provides enrolment-based funding through a weighting scheme in which different funding values are assigned by programme and year of study. The system assigns each student a weight ranging from 1.0 to 7.5 based on estimates of the relative costs of different programmes and different levels of study. Operating funding for a university is calculated by multiplying enrolment by programme weights.[81] A small, specialist university like OCAD U has a lesser BIU weighting compared to larger, comprehensive universities, and as such this institution receives less public assistance to finance its operational budget. A financial shortfall for these institutions can often compromise efforts at expanding and/or improving its teaching and research capacities. Furthermore, many comprehensive institutions have the capability of flowing money from

high BIU weighted programmes to subsidize smaller programmes – an advantage that smaller universities, including OCAD U, do not have.

A number of specialist universities in Europe, Australia, Latin America, China and India confer undergraduate, master's, doctoral degrees in a range of specialised programmes. However, regional and national governments across several other jurisdictions have not provided sufficient support to their specialised institutions that aspire to build out their curriculum to include a doctoral stream of study. Academic and administrative leaders from these institutions have had more difficulty in demonstrating to decision-makers the value of creating programmes at the doctoral level, the hybrid nature of their disciplines, and the complex knowledge that doctoral students from specialised institutions can bring to solving problems. Consequently, institutional growth for these specialist institutions remains compromised.

V. How policy has influenced the functioning of OCAD U

The federal and Ontario governments have developed a list of programmes to facilitate research excellence, encourage university-industry partnerships and fund the commercialisation of research generated from these collaborations. Grants from both levels of governments and their agencies are significant sources of revenue for OCAD U, and as such, are important for the functioning of the institution. As mentioned earlier, OCAD U has benefited immensely from the funding it received through FedDev's ARC programme. This federal agency has also provided the funding that flows through Mitacs to support the launch of OCAD U's new internship programme. A number of faculty members have received funding from two federal research granting agencies, the Social Sciences and Humanities Research Council (SSHRC) and the National Science and Engineering Council (NSERC) to advance various multi-disciplinary projects. OCAD U has also received grants from the Canada Foundation for Innovation (CFI), a not-for-profit corporation that supports the modernization of research infrastructure at Canadian research institutions. The federal government flows funding to the CFI, which is then distributed to eligible research institutions through ongoing rounds of research funding competitions. Financial support from CFI is matched by the Ontario government's Research Fund-Research Infrastructure (ORF-RI) programme as well as monies derived from other research institutions and industry partners. As of January 2013, CFI has committed $6.2 million to the university to fund DMRII's Inclusive Design Institute.[82]

Provincial research and innovation funding programmes have also offered the university a significant level of support. Funding for the establishment of the Mobile Experience Innovation Centre was provided by the Ontario Media Development Corporation as part of its Entertainment and Creative Cluster Partnership Fund.[83] The university receives ongoing support from the provincial government to advance its Digital Futures Initiative. OCAD U has also received a substantive amount of funding from the Ontario Ministry of Research and Innovation to support several projects associated with the DMRII labs[84], and a noteworthy amount of funding

has been provided through the Ministry's Ontario Research Fund-Research Excellence programme (ORF-RE). ORF-RE is a match funder that provides financial support for transformative, leading-edge research initiatives that demonstrate scientific excellence and strong commercialization potential; similar to the ORF-RI, the programme requires eligible institutions to seek the remaining amount of financial support from other research institutions and industry partners. Given that the adjudication of research proposals submitted to MRI is based on excellence, all disciplines are eligible for funding. However, the Ontario government has prioritized a handful of focus areas – including digital media and information and communications technologies – to target its investments. Overall, this level of support has been integral for advancing the applied research enterprise at OCAD U and nurturing the university's specialised strengths in those areas.

The development of a digital strategy and a mobile strategy at a provincial and/or federal level would further propel the research and innovation activities of OCAD U. Both levels of government acknowledge the significant impact that digital technologies have on almost every societal activity, and the pervasiveness of mobile innovation within and outside of Canada. However, neither a national or provincial strategy on either of these sectors has been established. OCAD University and other stakeholder groups have urged decision-makers to develop an action plan for systematically facilitating collaboration between the government, private sector and educational institutions to ensure the development of the skills Canadians need to excel in these areas, to drive service and product innovation across Canadian companies, and to raise the investment capital required to support these innovative initiatives.[85] The persistence of this kind of policy vacuum is a detriment to a specialist university like OCAD U with growing research and design capabilities in these areas.

OCAD U remains steadfast in its advocacy for a more systematic approach to support research and innovation activity in the mobile and digital media sectors. Most recently, the university successfully engaged the Ontario government in a dialogue on the capacity and benefits of harnessing the province's research and innovation strengths in the mobile sector. In January 2013, the university launched *Taking Ontario Mobile* which promotes the establishment of a five-year Mobile Action Plan based on lessons learned in other jurisdictions and successful local experiments. The final report highlights the need to facilitate affordable access to mobile broadband and devices for Ontario residents, brings to bear the importance of industry and government action on securing services and privacy protection, and underscores the value of creating a comprehensive regional mobile policy that would improve productivity, competitiveness, and public services.[86] (OCAD U, 2013b; OCAD U, 2012e). The campaign to 'take Ontario mobile' is being led by OCAD U's President Diamond and Dr. Vera Roberts, and is strongly supported by MEIC, a number of locally-based industry partners and other research institutions with expertise in the mobile sector. A companion report, *Mobile Innovation: Ontario's Growing Mobile Content, Services, and Applications*

Industry,[87] was produced by MEIC with the support of the Ontario Media Development Corporation, the Greater Toronto Marketing Alliance, the City of Toronto and OCAD University. Overall, Taking Ontario Mobile was well received by the provincial government, who was a major funding resource in the drafting of the final report.[88]

VI. Transferable lessons

OCAD U has been successful in forging productive working relationships with other academic, research, and industry stakeholders, and over the years, many of these partnerships have been leveraged to create synergies that intensify local economic growth. In its journey to become a world-class educational leader in arts, media, and design as well as an important agent of regional prosperity, the university continues to build on the following lessons learned along the way:

- **Encourage and enable a culture of entrepreneurship.** Many of OCAD U's faculty members have small businesses, some of which have been established in collaboration with other researchers and industry partners. Through their efforts at building on these relationships and accessing funding, over time OCAD Ufaculty members have become more engaged and integrated within the larger community and economy. A number of faculty members – particularly design and digital media faculty – also secure contracts, and they balance this work with research and teaching responsibilities associated with the university. These professors and lecturers become important resources for OCAD U when they bring their practical knowledge and expertise back into the classroom to share with their students. Moreover, these individuals often share their academic and non-academic contacts with other faculty members and student researchers seeking to expand their own applied research projects and entrepreneurial aspirations. As such it is important for specialist HEIs support and incentivize these individuals in their entrepreneurial ventures.

- **Maintain a curriculum that is relevant to students' needs, market demand and government priorities.** In a competitive, rapidly-changing, knowledge-based global economy, the pressure publicly-assisted HEIs face to demonstrate 'economic relevance' is palpable.[89] Students generally want courses that will equip them with the specialised knowledge and skills they need to become productive members of society. Specialist universities have the capacity to address these expectations by implementing a curriculum that will provide a rigorous and engaging disciplinary and interdisciplinary educational experience for its students and a competitive market advantage for its graduates.

- **Ensure that leadership is passionate about realizing the goals of the specialist institution.** OCAD U has benefitted from institutional leadership that is engaged with the local community; successful at building relationships with actors across different disciplines and sectors; committed to advancing research excellence; and focused on promoting OCAD Uas an ideal destination for students

seeking a unique educational experience in the arts, design and media. Specialist HEIs must ensure that senior administrative staff members and academic leaders embrace institutional goals and principles, and remain excited about actualizing the institution's mission.

- **Formalise structures for strengthening research-industry collaborations.** OCAD U has enabled industry to engage with its faculty and students by institutionalising ways in which business sector representatives can approach the institution, develop a partnership and move projects forward. Vehicles like DMRII and MEIC have been particularly influential in bringing together industry partners and academic researchers within and outside of OCAD U,and facilitating the flow of ideas, human capital and technology between these actors in order to take advantage of research and innovation collaborative opportunities in the mobile and digital sectors. It is worth noting that structures that are developed should be 'industry-friendly', providing business sector representatives with the support services required to collaborate and some substantive incentive for partnering with the institution. Access to the university's state-of-the-art technology and equipment and the option of hoteling are a few of the many servicesMEIC and DMRII offer to demonstrate a partner-friendly approach to working with industry. Specialist institutions seeking to establish or strengthen their working relationships with industry may also develop internships, co-op programmes and work placement programmes, all of which draw the institution's faculty and students closer to local industry actors who value their specialised knowledge and skills.

VII. Conclusion

To date, OCAD U is engaged in approximately two hundred active industry partnerships in research and classroom collaboration projects, and maintains over one hundred and fifty industry mentors and active participants in the academic and research culture of the university. This robust connection with industry partners has afforded the university's faculty and students the opportunity to apply specialised knowledge and skills in art, design, and media to solve challenging economic and social problems, and capitalise on untapped creative opportunities across a spectrum of disciplines and sectors. This case study on OCAD U has evidenced the significant impact a collaborative, specialist higher education institution can have in attracting talent, developing entrepreneurial skills, fostering experiential learning, contributing to business growth, and intensifying sectorial network development – all of which has contributed to local economic development. In particular, the Greater Toronto Area has benefitted immensely from the advances this specialised university and its research and innovation partners have achieved in digital media and mobile. As international competition intensifies across these sectors, the creative ideas and cutting-edge techniques OCAD U students and faculty offer will become even more valuable assets to the region's economy.

41 This paper has been prepared for the OECD LEED Programme. See http://www.oecd.org/cfe/leed/ for further details.

42 OCAD U, *OCAD University Honours Top Students with Medals* (May 1, 2013) Press Release, OCAD U, Toronto.

43 OCAD U, *Advancing Excellence at OCAD University for the Age of Imagination, 2012–2017, OCAD University's Strategic Plan*, Toronto, 2012, p.51.

44 Ibid. p.31.

45 OCAD U website, http://www.ocadu.ca/about_ocad/overview/background.htm

46 For this calculation, the student number is based on full-time equivalent, which is 3,613. See OCAD U website, http://www.ocadu.ca/about_ocad/overview/facts_indicators.htm

47 OCAD U website, http://www.ocadu.ca/about_ocad/overview/facts_indicators.htm

48 OCAD U, *Advancing Excellence at OCAD University for the Age of Imagination, 2012–2017, OCAD University's Strategic Plan,* Toronto, 2012, p.7.

49 Ibid, p.7.

50 Ibid, p.4.

51 Ibid., p.9.

52 OCAD U, 2012/13 Operating Budget - Proposed, OCAD U, Toronto, 2012.

53 The core objectives of the Foundation 'are to solicit, invest, receive and distribute monies and other property to support education and research at the University.' Ernst & Young (2012), Financial Statements – Ontario College of Art and Design University, Toronto, p. 1

54 OCAD U website: http://www.ocadu.ca/students/records_registration/course_calendar/1213/undergraduate/interdisciplinary_studies.htm

55 OCAD U website: http://www.ocadu.ca/graduate-studies/programmes/interdisciplinary-masters-in-art-media-and-design

56 OCAD U, 'Backgrounder on OCAD's Digital Futures Initiative', May 1, 2007, OCAD U, Toronto.

57 OCAD U website: http://www.ocadu.ca/research.htm. For a full list of DMRII labs, incubators, and accelerators refer to the Appendix.

58 OCAD U, 'Institutional Proposed Mandate Statement, Priority Objectives and Vision: A submission to begin the process of developing strategic mandate agreements', Submission to the Ministry of Training, Colleges and Universities, Ontario, October 12 2012, Toronto, p.3

59 OCAD U website, 'Imagination Catalyst,' http://www.ocadu.ca/research/imaginationcatalyst.htm

60 Interview, OCAD U, 2013

61 Mitacs, 'OCAD University partners with Mitacs to offer funded internships', News Release Mitacs, Vancouver, 15 October 2012

62 OCAD U, Institutional Proposed Mandate Statement, Priority Objectives and Vision: A submission to begin the process of developing strategic mandate agreements, Submission to the Ministry of Training, Colleges and Universities, Ontario, Toronto, 12 October 2012.

63 The majority of mobile content, services and applications companies in Ontario are located in the GTA. Source: MEIC, 2012a.

64 IDRC website: http://idrc.ocad.ca/index.php/about-the-idrc

65 MEIC website: http://research.ocadu.ca/meic/home

66 MEIC, 'MEIC Inaugural AGM' Slideshow presentation, MEIC, Toronto, 2011

67 FedDev was created in 2009 to deliver federal government economic development programmes 'tailored to the specific priorities of workers, businesses and communities in Southern Ontario.' Source: FedDev Ontario, 'Backgrounder: About the Federal Economic Development Agency for Southern Ontario (FedDev Ontario)' FedDev, Ottawa, http://www.feddevontario.gc.ca/eic/site/723.nsf/eng/00141.html

68 FedDev website: http://www.feddevontario.gc.ca/eic/site/723.nsf/eng/00445.html

69 OCAD U website: http://www.ocadu.ca/research/arc-feddev.htm

70 OCAD U, Institutional Proposed Mandate Statement, Priority Objectives and Vision: A submission to begin the process of developing strategic mandate agreements, Submission to the Ministry of Training, Colleges and Universities, Ontario, Toronto, 12 October 2012.

71 '[Social learning] is defined as the capacity to improve current performance as a result of experience by redefining the organisation's objectives, and modifying behavior and structures as a result of new circumstances. The idea of social learning assumes that innovation and economic development are interactive processes that rely on establishing supportive social relationships among a range of actors, and communicating insights and knowledge for successful outcomes. Regional economic development processes concern, at their most basic level, socially organized learning processes involving learning by individuals, by firms and by institutions.' In D. Wolfe, 21st Century Cities in Canada – The Geography of Innovation, The Conference Board of Canada, Ottawa., 2009, p. 122.

72 Wolfe, D., 'Innovation and Research Funding: The Role of Government Support', in F. Iacobucci and C. Tuohy (eds.) Taking Public Universities Seriously, University of Toronto Press, Toronto, 2005, pp. 316–40.

73 This data is based on the 2011 submission OCAD U made to the Ontario government reporting on the institution's graduation, employment and student loan default rates. These key performance indicators are forwarded to the provincial government annually. The data for OCAD U's 2011 submission on employment rates reflects the percentage of 2008 graduates of bachelor's or first professional degree programmes who are employed six months and two years after graduation. Source: OCAD U website, 'KPI 2010-11 OCAD University' http://www.ocadu.ca/about_ocad/accountability.htm

74 Interview, OCAD U, 2013.

75 Scotiabank Nuit Blanche Toronto website: http://www.scotiabanknuitblanche.ca/about/event-history.html

76 Ibid.

77 Tentacles website: http://www.tentacles.ca/index.html

78 Ibid.

79 Creative Leads include Rob King, the head of Addi.tv Art+Code; Michael Longford, the co-director of the Mobile Media Lab at York University; and Geoffrey Shea, the co-director of OCAD U's Mobile Experience Lab.

80 Tentacles website: http://www.tentacles.ca/sponsors.html

81 OUSA, System Growth, Policy Paper, Toronto, 2011.

82 CFI website: http://www.innovation.ca/en/OurInvestments/ProjectsFunded/SummaryProjectsFunded; https://www2.innovation.ca/pls/fci/FCIENREP.resultats?mecanismeSel=Tous&provSel=ON&typeEtabSel=1&etabSel=145&secteurSel=Tous&discSel=0&secteuraaSel=Tous&dom_appSel=0

83 This three-year $7.5 million Fund was launched in September 2006 'to help Ontario's entertainment and creative industries grow and move into new markets by promoting new content development, innovative marketing and distribution, and skills training. The industries include film and television production, interactive digital media, music recording, commercial theatre, and magazine and book publishing.' Source: OCAD U, 2008.

84 To help launch the DMRII, the Ministry contributed $9 million, which represents 50% of the total funds required to implement the project. Matching funds are provided by OCAD University through a contribution of $1.5 million and the remaining $7.5 million is provided in cash or in-kind contributions from industry partnerships. Source: OCAD U website: http://www.ocadu.ca/research.htm.

85 In 2009, the federal government convened open consultations to inform the development of a digital action plan for Canada. In its consultation paper, the important role governments can play in providing a legislative and investment framework for a digital economy was highlighted. Even though decision-makers committed to developing a national digital economy strategy in Budget 2010 and the Speech from the Throne, to date Canada still does not have a formal digital economy strategy. Similarly, the provincial government has highlighted the value of the digital media to the Ontario economy and in the Ontario Innovation Agenda (2008) – a central policy statement outlining the government's commitment to advancing innovation throughout the province – provincial decision-makers have prioritized funding for digital media and ICT. However, despite prompting from industry and higher education institutions across the province, Ontario political leaders have not developed a digital strategy.

86 OCAD U, Taking Ontario Mobile: Research-based recommendations for how mobile technologies are part of the financially responsible solution to providing better access to services for Ontarians. OCAD U, Toronto, 2012. Also see OCAD U, 'Taking Ontario Mobile: An Action Plan for Leadership in the Mobile Revolution: OCAD University's Landmark Research Shows How a Mobile Ontario Will Improve Productivity, Competitiveness and Public Services', Press Release, OCAD U, Toronto, 16 January 2013.

87 MEIC (Mobile Experience Innovation Centre), Mobile Innovation: Ontario's Growing Mobile Content, Services, and Applications Industry, MEIC, Toronto, 2012.

88 Ministry of Research and Innovation website: http://www.mri.gov.on.ca/blog/index.php/2013/01/diamond-3/

89 For a discussion on the pressure American universities face to demonstrate 'economic relevance', see Geiger, R and Sá, C., Tapping the Riches of Science: Universities and the Promise of Economic Growth, Harvard University Press, Cambridge, 2008.

Case study 3: Southampton Solent University

Richard Blackwell with Professor John Millican, Professor Suzanne Dixon, and Rosy Jones, Southampton Solent University, UK

I. Introduction

The essential starting point for HEI strategies is the mission and character of the institution. Southampton Solent University (SSU) is a vibrant 2005 university. Its institutional mission is 'the pursuit of inclusive and flexible forms of Higher Education that meet the needs of employers and prepare students to succeed in a fast-changing competitive world'. It aims to fuse academic rigour with real-world experience and to pursue 'imaginative external partnerships which develop the University and make a significant contribution to social justice and economic competitiveness'.

The University has been continuously active in curriculum renewal, pursuing a niche provision strategy with particular strengths in creative industries, maritime and marine industries, and sports science. It is currently investigating new niche opportunities for workforce development in health and well-being and retail.

A substantial majority of students are drawn from first entrant families (69% in 2011-2) and the University has a relatively high proportion of highly graded entrants (AAB+ or equivalent students), 10.3% of undergraduate entrants in 2011-12. The university performs well against its widening participation benchmarks regularly, enabling ordinary people to achieve extraordinary things. It has an increasingly national recruitment base, with only 25% of recruits from South Hampshire and the Isle of Wight (2011-12) and despite slightly under-shooting its Student Number Control (SNC), achieved its enrolment target in the first year of high fees (2012-13). Conscious of its strengths and keeping faith with its roots, the university has deliberately chosen to focus exclusively on education and has not applied for Research Degree Awarding Powers (RDAP).

II. Context and strategies for supporting innovation

The shift of funding for HEIs from state allocations to student fees and loans represents the most important policy change in higher education for decades. By setting its initial fee at £7,800, and raising that only by inflation to £8050, the University deliberately sought to strike a 'fair balance' between the need to continue to invest in the student experience and a desire to avoid driving its students into excessive debt. At the same time, SSU follows carefully emerging market and policy trends, including the apparent resilience of its brand attractiveness, lack of evidence of price sensitivity amongst prospective students, and declining likelihood of a significant 'core and margin' SNC allocation policy that might provide an incentive to price below the maximum fee permitted.

The transition from HEIF (Higher Education Innovation Fund) 4 to HEIF 5 afforded a welcome opportunity to move away from a focus on commercialisation of research, effectively encouraged under HEIF4. Our HEIF 5 strategy is tightly focused around evidence of our comparative strengths in providing short-courses for employers, supporting student start-up companies, and successful student engagement with enterprise, notably through volunteering. During HEIF 5 we have focussed mainly upon enlarging these strengths and assets and pursuit of an enhanced, joined-up 'no wrong door' approach to business and external partner contacts.

The income-only metric used by HEFCE to allocate the HEIF 5 funding actually produced increased income for SSU unlike other local post-1992 universities. Analysis of the HEIF 5 outcome demonstrates clearly that SSU's comparative advantage in income generation lies in close-to-market continuing professional development (CPD), especially in the maritime industry.[91] In this sector, the University educates the officer corps of the British merchant navy at its Warsash Maritime Academy [92], enjoying an international reputation and very close relationships with the major shipping companies. This provision, and the underpinning collaboration between SSU and business, was identified as an example of good practice by the Wilson Review of university-business collaboration.[93] In 2010, the university decided to merge this provision and faculty with the technology faculty to seek new synergies, including in knowledge exchange, creating the Maritime and Technology Faculty (MarTec). One outcome of this merger has been the Solent Super Yacht Academy, successfully launched at the Monaco boat show in September 2012, drawing on the assets of the two previously separate faculties. MarTec offers an example of how the successful short course model in maritime was initially adapted for transfer into the technology subject areas.

A. Enterprise[94] in the Maritime and Technology Faculty (MarTec)

MarTec at Southampton Solent University was formed by bringing together the engineering, computing, and built environment provision with a specialist centre, Warsash Maritime Academy (WMA), which serves the educational, training and consultancy needs of the commercial maritime industries (i.e. shipping, commercial yachts, offshore oil and gas, and renewables). WMA has its own dedicated campus situated some ten miles from the main university site, and is very different in its operations and culture. The formation of the new faculty therefore posed a number of integration challenges, but also offered opportunity for the different parts of the Faculty to learn from the experience of the others. This was especially the case in relation to the development of short courses, the subject of this case study.

i. Short courses in Technology

Despite several initiatives to generate 'third stream' income, the revenue from technology-based short courses and consultancy has been disappointing at the main campus. This may be because many of the technology-based employers in the local region are SME's with little in the way of training budgets and no tradition of CPD. However, it is also the case that ioweverHeach of these initiatives has been based on the same model – the creation of a small marketing / administration unit to promote and sell the expertise of the faculty staff, and to exploit the spare capacity of its specialist facilities.

This model has a number of problems. The salaries and operating costs of the unit create an additional overhead before any new income has been generated. To keep that overhead down, the staff employed by the new unit is invariably administrators acting as intermediaries, expected both to bring in new business and provide support for its delivery. When they do succeed in attracting

new business, they lack the seniority and authority required to command the resources needed to service it, and have to negotiate for them. Most academic staff members who were originally employed to teach on degree courses see a new business 'opportunity' as outside of their core purpose and an unwelcome addition to an already full timetable. 'Incentivising' staff with the offer of a share of the revenue is one way to get the work done, but it is self-defeating because it reinforces the view that this is not core business, and therefore that they need not do it.

At Warsash, whilst long, award-bearing courses are operated through one School, commercial short courses and consultancy work are managed and delivered through another, the School of Maritime Training. The management, academic, and administration staff of this School are all employed specifically for this work. The tension between commercial work and teaching on award-bearing programmes therefore does not arise, because different staff are employed for each. All of WMA's academic staff are paid a 10% salary enhancement to take account of the fact that, for commercial reasons, the Academy operates to an extended teaching year, but for those employed to deliver short courses and consultancy work this is their core mission, and they do not have to be specially 'incentivised' to do it. WMA aims to provide a commercial level of responsiveness and service to its customers, but the business is led by the academic staff, not the administrators. Although it has a marketing function to promote the brand, the principal way in which the portfolio is kept current is through the engagement of academic staff with the shipping industry. This operation is very well regarded by its customer base and has grown to a turnover of circa £6 million.

ii. Transfer to the main campus

The experience at Warsash suggests that success with 'third stream' work depends on combination of closeness to the market and a supportive organisational context for the staff who are expected to engage in it. If there is a sufficient critical mass to justify it, the School of Maritime Training model, with staff employed specifically to engage in third stream work, is probably the simplest because it neatly avoids the tensions which come from the 'not core business' problem. In the meantime, a modified approach has been adopted by the new faculty, MarTec.

The administrative / marketing unit has been disbanded and the focus shifted from administration-led business development to an academic-led approach. A small number of willing academic champions have been supported from HEIF funding to lead developments in their area, working closely with their industry. This approach will not lead to success every time in that so much depends on the drive of the individual champion, and the nature of the demand from that industrial sector. However, experience so far indicates that this approach, whilst not as effective as the separate academic department model, is an improvement on the administration-led model. As well as delivering better outcomes, it has saved the overheads of the old model and reduced the business risk and management time associated with it. Short course developments in acoustics have shown the way, led by a highly motivated Associate Professor who sees this work as part of building

his portfolio, and who has used the requirements and approvals of the relevant professional body to ensure that the courses he offers are aligned with the needs of industry. In brief, the model consists of high-level short courses with academic credibility, led by academics not administrators or business units, which are close to industry and provide added value, e.g. link to Chartered status, CPD points, and mandatory requirements of professional bodies.

In conclusion, it appears that the new model provides a better return on investment than the previous model, but is initially small scale because it is built on the interests of individual academics. It is therefore quite dependent on the ability and motivation of individuals (including ability at closing out contracts). It is probably best viewed as a work in progress.

III. Student entrepreneurship and start-ups

The second focal point under HEIF 5 is student start-ups. This builds on solid extra curriculum foundations laid during HEIF 4, supported by feedback on our HEBCI return 2010, indicating that we had disproportionate success in establishing sustainable student start-ups (2% of reported sector total of businesses still in existence after three years). We have put considerable effort and investment into substantially enhancing this programme by bringing it into the curriculum and focussing it on creative industries where student need and demand is highest. Over 50% of students at SSU are in the faculty of creative industries and society (FCIS) with large cohorts in fashion, journalism, media, and music where freelancing and self-employment are well established, normal career routes.

By setting aside substantial new seed-corn funding, adding pre-incubation and incubation space, enhancing existing mentor support and introducing new networking and training opportunities, we have created an analogue for the supported 'innovation pipeline' sometimes advocated for formal university (staff) spin-outs and science parks in more research intensive environments but focussed on students and graduates. However, as in other areas, we have ensured these innovations are integrated with organic change emerging 'bottom up' and 'middle out' from schools and faculties, in this case 'Solent Creatives'. This agency was developed out of FCIS to match student talent with the needs of micro businesses and SMEs for creative input, and thereby enhance student participants' employability and business sustainability.

A. Solent Creatives

Solent Creatives is a university-wide employability and enterprise initiative aimed at improving undergraduate job skills in creative disciplines. In the two years since its launch in March 2011, it has offered 1,000 opportunities to students. This agency offers the brightest talent from across 30 disciplines to external organisations needing flexible, freelance help. It provides a talent pool where we match journalists, photographers, web designers, copywriters, illustrators, and many more student skills with industry needs. This activity is embedded in the curriculum through the Freelancing at Solent Creatives option, offered across the Faculty of Creative Industries and Society. This unique unit allows students to work on a freelance project, some of them paid, and receive credits

Solent Creatives is a unique creative agency, established by Southampton Solent University in 2011. The agency offers unrivalled access to the University's acclaimed media faculty for businesses, students and private individuals alike
Photograph © Southampton Solent University

towards their university degree.

The units are offered at 10 and 20 credit versions, across the faculty to give students from different disciplines the opportunity to learn freelancing skills. Students have worked on filming assignments, branding and advertising opportunities, journalistic jobs, fashion and make-up styling for theatres and television production companies, magazines, web and app designs and other briefs. Staff support students but the intention is for them to be as independent as possible. All work is checked before final submission to the client. Before work begins, businesses contact agency manager Matt Weet with the assignment, which, after a meeting between the university and the business, is posted on Solent Creatives website.

Since its launch the agency has successfully achieved almost 900 student registrations, with student enrolments for early 2013 at 588. In the same period, the agency received between 7-9 new enquiries a week. Students can then pitch for the assignment, and the successful candidate is introduced to the business at a 'matching' session. Here, the fee for the work, the timescale and deadlines are discussed and agreed. Specialist staff are available to help if needed; one example is a recent filming assignment at IBM. Here the student team of first years needed help with filming permits and security clearance paperwork. These projects have exhibited excellence in the range and quality of work provided to industry. It has also provided the university with new opportunities to work with a range of new small and medium enterprises in the city. Here the qualities that students and their work bring to a team has been praised by businesses. Clients range from large companies and organisations including Sainsbury's, IBM, the NHS, Sodexo, Trimline, to charities and other not for profit groups such as the Quakers and St Michael's Church. Commenting on their engagement with students, Anna Hayles, Project Manager at Business Southampton said:

> *'We had a student design a logo for 'Dance Off Southampton', a new secondary schools dance competition and he fitted the bill perfectly. We can't wait to work with other students. [Solent Creatives] have been great in helping us out, and we couldn't have done it, or afforded it without [the agency].'*

B. Student start-ups

The agency has expanded to support business start-up for 'creatives' wanting to launch their own business. Final year students take a unit in creative entrepreneurship where they learn the skills needed to develop a successful business plan, followed by seed-corn capital investment for the best plans, mentorship support and an opportunity to win a place in the business start-up pre-incubation pods. The most promising of these businesses can also access subsidised incubation space and discounted membership of the local Chamber of Commerce.

The pods currently have seven students working from the centre, supporting them with mentoring and specialist advice. After nine months, some are now ready to move their business onto the next stage; others have been offered full time employment, because of the skills they have developed. The University has 2 incubation units, both within walking distance of the main campus and both in

buildings shared with local organisations. In total these offer up to 12 initially subsidised full incubation places and other cheap space has been identified locally should supply exceed demand.

Built on the solid foundation of five years' experience of stimulating sustainable student start-ups, current demand suggests a minimum of 40 students per annum will pursue the start-up route, a route now specially geared to the needs of industries in which self-employment and freelancing are established career options. In January 2012, 12 students chose the Creative Entrepreneurship option, 36 opted for the route in October 2012 and in January 2013, another 36 students elected to take this option. These students were recruited from the following courses:

- Hair and Makeup
- Fashion Styling
- Interior Design, Animation
- Popular music and record production
- TV and Video Production
- Fashion with Photography
- Interior Design
- Sports Journalism
- Screenwriting
- Fashion Graphics
- Media Culture and Production

The agency has also developed a new level five unit, Model Your Business, which will be offered as an option in the curriculum from September 2013. The unit allows students with an idea for a business to develop it using the Business Canvas model. This teaches students to build a business using creative and visual techniques. Students will then be able to take the Creative entrepreneurship unit at level six, to work on a more formal business plan and then pitch for a place in the Business Pods. In this unit, students study intellectual property, tax and other legal necessities required in starting up a business.

Finally, as part of a local initiative to stimulate a creative industries eco-system, Solent Creatives has also begun a joint project with the Hampshire Chamber of Commerce to measure the effect that creative talent can have on local businesses. This is very much work in progress, however, the agency is working with a number of businesses, both traditional and non-traditional SMEs, offering creative skills and input to enhance productivity and sustainability.

An intended consequence of the focus on comparative strengths under HEIF 5, has been to shift the centre of gravity of strategy away from staff research towards student employability. This repositioning aligns KE strategy more explicitly with our mission commitment to 'social justice', 'inclusive' HE and our strong performance in widening access and participation. In an increasingly competitive and difficult graduate labour market, the demographic profile of our graduates suggests limited social and cultural capital compared to more privileged peers from higher status HEIs. Our focus on student start-ups as a bridge between innovation policy and student employability, combined with other initiatives solely focussed on employability (notably a new, comprehensive Solent Graduate Scheme), enables us to address directly this issue.

Students from a wide variety of creative courses at Southampton Solent University are offered the opportunity to put their creative skills into practice through entrepreneurship and business initiatives. The final year unit in creative entrepreneurship culminates in the development of business plans, seed cordn capital investment for the best amongst them, mentorship, and the opportunity to to win a place in the the business start-up preincubation pods.

IV. Social Enterprise

One of the ways in which we deliver on our mission commitment to social justice is through our social enterprise programme. One aspect of this is support for specifically social enterprise, building on and enhancing past efforts. One of our two incubation centres is a legacy asset of the innovative South East Coastal Communities collaborative programme, part funded by HEFCE, based in a social enterprise hub in St Mary's, a poor but entrepreneurial part of Southampton adjacent to the University. This hub, developed in partnership with the West Itchen Community Trust (WICT), acts as a neighbourhood resource centre, as well as providing incubation space for student and staff social entrepreneurs, ensuring community benefit and integration. Recently, we introduced a new strand to our start-up programme specifically focussed on stimulating social enterprises and an associated award for excellence in this area, funded by a successful bid to UnLtd in 2012.

A second element of our commitment to social justice is a large student volunteering programme where SSU has a reputation for excellence. Student volunteering underpins 'Eco Ernie', the 2010 winner of the Times Higher 'Outstanding Community Initiative of the Year' award and, in 2011, the member of staff who co-ordinated the Eco Ernie initiative won the HEFCE/UnLtd award for excellence in social enterprise in the professional staff category. In the same year, our brand new SIFE team (now ENACTUS) also won a national award for the best National Citizenship Programme, based on their work in Southampton schools and their innovative deal with Hampshire Police, which enabled them to use the police training centre for free.

Volunteering efforts have emerged 'bottom up' at Solent, growing organically through the Students Union, the central Employability and Enterprise service and locally linked to employability development in courses, notably in sport, where a large programme provides direct experience of coaching to undergraduate students through the University's contract to provide out of hours sports training to Southampton schools. Volunteering outside course programmes is underpinned by a validated ('Curriculum plus') unit and, since 2012, co-ordinated through a new centre: the Centre for Student Involvement (CSI). CSI was created through co-investment by the university (utilising HEIF funding) and the Solent Students Union (SU), utilising its reserves, in the SU building. It is run by a joint steering committee chaired in rotation and is in the process of bringing greater focus and co-ordination to SSU's efforts, including working with Southampton Connect (a City Council initiative to leverage partnership working) and Southampton Voluntary Service. Together with the SU, SSU is developing new training programmes to enhance effectiveness and capitalise on employability opportunities. In 2010-11 at least 961 students volunteered in one or other of these ways.

V. Research and Knowledge Transfer Partnerships (KTP)

Notwithstanding the shift in the centre of gravity of enterprise at SSU, the University recognises the ongoing importance of the relationship with research, broadly defined. It has used its modest QR funding to support

clusters of excellence, including in emerging areas, partly to 'grow out' consultancy and contract research engagement from our CPD portfolio. Although the University plans a broader range of submissions for REF2014 compared with the submission for RAE 2008, the REF and its narrow definition of research has never been a main focus for research at SSU. Under HEIF 5, therefore, SSU continues to allocate funding to the research and enterprise project fund to support and underpin key linkages with our predominantly applied research. Second, we have made a modest investment in 'capacity building' to enhance the quality of proposals to potential external funders, including contract research proposals.

In late 2010 the University sought to underline its growing academic standing and reputation by establishing a new KTP office. Despite an unexciting record of previously acquiring only one ('classic') KTP in 1993, we have a good range of applied research (indicated by the 185 successful PhD completions validated by Nottingham Trent University), affording opportunities to acquire KTPs (especially shorter KTPs (sKTP)).

The University adopted a firmly demand-led approach. First, we identified the best internal candidate to support KTP activity and negotiated a mentoring relationship with an experienced and successful external KTP consultant. Together they identified and developed likely business projects before selectively approaching appropriate academic staff (and school heads/Deans) to act as the academic lead. KTP was at that time in turmoil (due to the uncertain attitude of the incoming Coalition Government) and this proved a helpful context for new entrants as existing university providers hesitated or (especially when HEIF 5 funding outcomes were known) withdrew. This approach has proved successful with five sKTPs either completed or approved for funding and a further three under development. In addition a number of other knowledge products have been 'sold on', notably paid graduate internships, by our KTP office [95].

The university will review its commitment to this area after Easter 2013 in line with HEIF 5 strategy, in which we made a time-bound provisional commitment with further investment dependent on performance and future prospects. The outcome of the review of KTP processes by the Technology Strategy Board may have a significant bearing on the latter of these conditions.

VI. Structures and Funding

One of the characteristics of an entrepreneurial university is the ability to combine a strategic 'steering core' with a developmental periphery.[96] Under HEIF 5 we have attempted to adjust our previous reliance on decentralised faculty-based 'Solent Centres' and introduced a partnership model, in which resources are shared roughly evenly between the university (centre) and the faculties. This partnership approach reflects the near-to-market needs of our short course strength and the desire for more strategically driven start-up and social enterprise programmes, linked to our wider mission and the employability needs of our student base.

In implementing the partnership model of funding, two faculties chose to revisit their structures, which involved employing specialist intermediaries from outside to lead

their faculty 'Solent Centres'. The newly created MarTec drew on its successful maritime experience to create a new approach in the technology area. This has enabled the development of the acoustics provision, which has gained professional accreditation for its short courses, a KTP, and consequently begun to develop a new income stream. In the creative industries faculty, emphasis has shifted from Solent Productions, which generates income and provides student experience through commissioned filming for video, TV and web-based media, to enabling Solent Creatives to develop its support for student start-ups. Only the faculty of sport, business and enterprise, containing the business school with a generic business-facing programme, has retained the previous intermediary-based model (and that is under new review).

The major changes, however, have occurred at the centre. Previously separate careers and enterprise teams have been merged around a new emphasis on employability embedded in the curriculum rather than the legacy approach based on one-to one advice and guidance, derived from an elite HE system. In addition, we have introduced a new centrally co-ordinated programme of awards (six of £5K each) focussed on priorities in employability and enterprise, designed partly to address national concern about the lack of incentives in knowledge exchange and partly to respond to disappointing levels of staff and student engagement during HEIF 4. We have also revised our conferred titles scheme to be more inclusive and in the first round of the new scheme (2012), a professorship was conferred explicitly for an outstanding contribution to 'creative enterprise'.

VII. Employability and Enterprise (E&E) Service

In 2011, SSU had a traditional Careers and Employability Service organised around careers advice sessions and backed up with a self-developed 'Jobsboard'. Enterprise was neither integrated nor focused on employability lines. For HEIF 5, Enterprise was brought into the new E&E Service and our enterprise activity changed from commercialisation – never a key area for Solent – to employability through enterprise. Shortly afterwards E&E was reorganised into four functional teams, and strategically.

Our strategy involved:

- pursuing effective employability and student engagement by focusing on curriculum change;
- achieving better self-employment through a focus on graduate start-ups;
- recognising and addressing the challenges of Social, Cultural and Psychological Capital.

We created four teams:

- The Faculty Engagement team uses our careers advisers' skills and knowledge to move from advising students to supporting academics to embed career methodologiesand transferable skills directly into the curriculum – from 'Sage on the Stage' to 'Guide on the Side', key to our strategic refocus.
- The Student Employability team is responsible for non-curriculum activity. Here our focus on supporting and building social capital really takes hold, through peer learning, mentoring, and student-selected seminar programmes as well career development triage –

supporting the first stage through drop-in for students.

- The Business, Community and Graduate team recognises the importance of building excellent relationships with key employers. A 'top 300' list targets and develops relationships with businesses that would, and could, recruit our graduates, based on development of a legacy jobs board from the south east graduate retention initiative.
- The Enterprise team works with potential freelancers, business owners and the self-employed – whether they've set up their business or are just thinking aboutit – to help them into their enterprises and support them through the first stage of growth.

VIII. Business and Skills Interfaces

This case study has focussed on the intersection of SSU's key industry and subject strengths, notably the maritime, creative and sport industries. There are, however, a few important relationships in the SME and public sectors and one initiative that require further discussion. A Deputy Vice-Chancellor is a board member of the Hampshire Chamber of Commerce. Recently, in 2013, the Chamber has acquired funding to stimulate start-up activity amongst local residents, including the unemployed, and training and support will be delivered by staff from the University's Employability and Enterprise (E&E) Service.

Since its inception, SSU, through its Vice-Chancellor, has led the Southampton Skills Development Zone (SSDZ), the major collaborative driver for up-skilling the local workforce, especially in the public sector. SSDZ core members are Southampton City Council, Job Centre Plus and Southampton Universities Hospital Trust (SUHT). The apprenticeship strand of SSDZ successfully acquired 'Future Jobs Fund' monies of £428K in 2009-10, which created nearly 64 apprenticeships and an ongoing programme of activity. One consequence is that the relationship with SUHT is developing into a major strategic alliance for (non-clinical) workforce development, involving foundation degrees, short courses, internships, and so on.

Finally, there is growing enthusiasm locally for an initiative led by the University to create a growth-oriented creative industries eco-system in Southampton. This activity so far comprises; a joint project that has been established with the Chamber of Commerce, a bid has been submitted to the HEFCE catalyst fund with Creative Skillset (the industry's sector skills body) and seven HEI partners; the University is participating in £1.4 m regeneration of the adjacent Old Northam Road area (historically a centre of antiques restoration and trading at the top of St Mary's); and on-going discussions with the City Council about converting empty shops in the Southampton high street to dual use home and workshop premises. It is, however too early to predict the impact of these efforts.

IX. Conclusion

SSU aimed to create a comprehensive strategy that aligns strongly with our mission, our students' needs, and our comparative strengths in enterprise. This provides an exciting, appropriate model for our type of university: student-focussed, socially responsible, and business responsive.

91 HEFCE, *Higher education innovation funding 2011-12 to 2014-15; policy final allocations and requests for institutional strategies*, HEFCE, Bristol, 16 May 2011.

92 http://www.warsashacademy.co.uk

93 Wilson DL, Prof. Tim, *A Review of Business-University Collaboration*, London, February 2012, paragraph 4.6.6.

94 At SSU 'enterprise' is used to refer to the full range of knowledge exchange activities unless the context indicates reference to a specific activity or type of activity.

95 See Table: *Southampton Solent University Knowledge Transfer partnerships acquired since 2011* in the Appendix.

96 Clark, B., *Creating Entrepreneurial Universities: Organisational Pathways of Transformation*, Oxford: Pergamon-Elsevier Science, 1998.

Timsbury Lake is the location for the world's finest Ship Handling Centre and offers the international maritime industry an invaluable new state-of-the-art training facility, using accurately scaled model ships to simulate the handling characteristics of actual vessels. As the only centre of its kind in the UK, and with only four others in the world, it provides invaluable specialised training and assessment for Captains and senior officers in ship handling, enabling mariners to practice and progress their ship handling skills through trial manoeuvres in a safe environment.

Regional Agendas

One of the major areas of concentrated activity for many small, specialist, and regional Higher Education Institutions is to enable students at all points of study – and from increasingly diverse academic and professional backgrounds – to join in the conversation about how to become active citizens and entrepreneurs, capable of working in a variety of contexts, and of marketing themselves to various sector audiences.

The orientations of students, staff, and local and regional organisations and partners engaged in developing and sustaining new microbusinesses that draw on local, regional, national, and international knowledge and innovation systems are necessarily complex. Some look specifically to a traditionally-defined local context, relying on an understanding of highly specific micro-economic and / or cultural forces and build businesses imbibed with a core belief in the potential for boutique innovations to solve highly specific problems. This awareness, and the potential to respond to the need for responsive micro-business and SMEs with the potential to morph quickly and to fill gaps in this grassroots context, should not be undervalued, particularly in terms of achieving a balanced UK economy.

This local focus is not, however, limited to the parochial. Particularly in an age when the need to organise and exchange knowledge in a manner that makes it not only nationally but globally accessible is increasingly emphasised, and is becoming a policy priority for governments; 'local to local' innovation working with ever-shifting regional contexts of the sort discussed in the proceeding case studies is more and more in demand. This remains an important factor as HEIs work with various partners - public and private - to attract and retain skilled entrepreneurs, to stimulate growth in sectors that may have lost their way in terms of market relevance, and in generating entirely new business models responsive to the changing needs of potential consumers and collaborators.

Case study 1: Mondragon University and business and technology in the Basque region

Professor Charles Davis, University of Strathclyde, UK [97]

I. Introduction

Mondragon University is a small private university in the Basque Country, established as a cooperative and connected with the famous Mondragon system of cooperatives in the region. Established as a university in 1997 from existing colleges of engineering and business, the university has a very practical orientation and close links with local industry, both with the cooperative system with a focus on engineering as well as with a range of other small businesses. The university currently has around 3600 students.

The close relations between the university and local SMEs in the Mondragon cooperative system has enabled the development of highly innovative processes for collaborative research with companies, and in 2010, had 278 collaborative projects with companies. The university has developed technology committees involving the university, companies, and other technology partners to develop a technology roadmap – a 3 to 4 year agenda on future technology needs within a particular industry. The roadmap is then used to identify a series of potential projects with attached budgets which can be offered to the industry partners. Specific projects are in turn implemented according to the needs of the industry partners, each with their own characteristics and dynamics through teams involving academic staff, PhDs, and students.

Additionally, the University has in recent years launched a new faculty of gastronomic sciences in the form of a centre for culinary education in partnership with some of the leading chefs of the San Sebastiàn area. This novel initiative, the first of its kind in Spain, promotes research and training in gastronomy in partnership with some of the most inventive chefs in the world. Alongside the local chefs with multiple Michelin stars, the centre has an international scientific board comprising 12 of the world's greatest chefs. As well as offering education to domestic and international students, the centre works with local food companies exploring a range of different technologies for preservation and presentation.

Although much of the university's activities have been initiated privately, it has also benefited from support from the Basque Government through a contract that has incentivised interaction with industry and the development of research activity.

II. Institutional context

Mondragon University is a unique institution, having developed in a very specific context of the Mondragon system of cooperatives, evolving in partnership with the cooperative system, and consequently embedded in the local community. The emergence and institutional form of the university cannot be understood without a little history of the Mondragon System.

Mondragon is a small manufacturing town tucked in the hills of the Basque Country, in the province of Gipuzkoa, with a current population of around 22,000 people. In 1943, in the aftermath of the Spanish Civil War, a parish priest, Father José María Arizmendiarrieta, moved to the town and established the Escuela Politécnica Superior (EPS) to provide technical training. Through this technical college Arizmendiarrieta promoted a

particular form of humanism based on local solidarity and collaboration alongside the need to develop technical knowledge. With five graduates from the EPS he established an initial cooperative company in 1955, which today is known as Fagor Electrodomésticos, a core unit within the Mondragon Corporation.

The university has developed symbiotically with the Mondragon Group since then, and is also part of the group. A business administration school followed the engineering school to support the management education needs of the companies in 1960. A teacher training college was then established in 1976, initially under the guidance of the Pontifical University of Salamanca. All three were united in 1997 to form the Mondragon University. A new faculty of gastronomic sciences has been added in 2011 due to the establishment of the Basque Culinary Institute. This involves a partnership with the Basque Government which provided some of the investment along with the national government and so has a slightly different foundation status. The university is therefore a specialised institution with just five main areas of knowledge: engineering, business management, education, communication sciences, and gastronomic sciences.

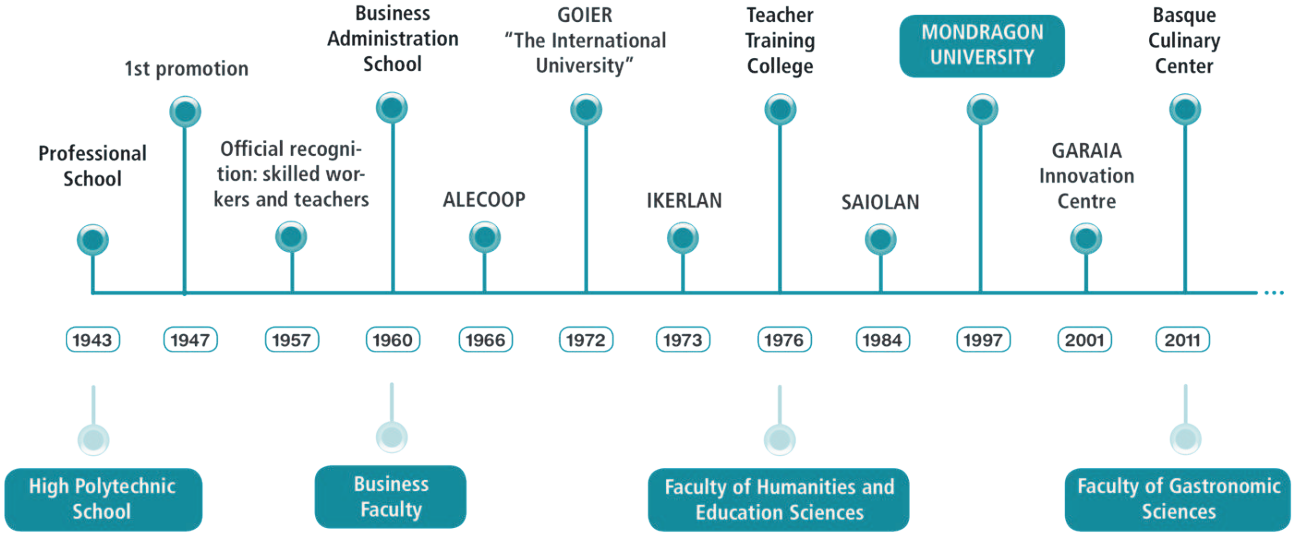
The Mondragon group also has grown and diversified since those beginnings, now encompassing 256 companies and 83,869 staff (2011), with a turnover of 14,832 million € (2011). Although the Basque Country remains the headquarters and largest base, the group is now highly internationalised, and is the largest company based in the Basque Country and seventh largest in Spain. Manufacturing remains the main focus with foreign subsidiaries in 17 countries, mainly in Europe, but also the US, India, Thailand, and China: other businesses include banking, retail, and knowledge or research.

The research businesses developed in parallel with the university: Ikerlan, for example, is a cooperative research facility for the group, and works in close partnership with the university as well as with other research and technology centres in the Basque Country. The University is thus embedded in an industrial system which is both strongly localised in the Basque Country but also internationally networked, and this context is important for the definition of the university's mission.

Although a private non-profit institution with a social vocation, the university is part of the Basque higher education system and is partly funded by the Basque Government. It is not subject to the same kind of governance and control as the public universities in Spain, and does not receive core funding for teaching, but it does receive funding from a 'contract plan' with the Basque Government which incentivises new activities and quality enhancement. It is also eligible to receive public research grants.

The cooperative governance model of the university requires some explanation. The university is legally a group of cooperative societies. This has important implications for the governance of the university which is different from other universities, and for some of the managerial structures and processes which follow a cooperative logic and differ from those of other public and private universities in Spain. The nature of being a cooperative also sets the particular values and philosophy of the

Figure 1: Timeline of Mondragon University
Source: Mondragon University presentation



university, which shapes its interactions with society, and with other cooperative firms in the Mondragon system.

The university's values which are central to an understanding of how it delivers its teaching mission are rooted in the Basque cooperative movement:

- participation by all workers in management;
- cooperative solidarity, expressed through fair and proportionate remuneration for work;
- cooperation between firms, both as an expression of solidarity and also for corporate efficiency;
- valuing people;
- the work ethic as personal and social fulfilment;
- embeddedness in the Basque Country, in its socio-economic problems, its culture and language.

The cooperative structure of the university thus reflects the centrality of participation in the ownership of the organisation, solidarity and democracy. The governance therefore acknowledges three sets of members and the need to balance their interests and participation:

- Working Partners (consisting of the staff of the university both academic/teaching and support /non-teaching);
- User Partners (students) and;

- Collaborative Partners (businesses, government, local authorities, and other institutions).

The university currently has 328 working partners and another 158 contract workers who may over time become members of the cooperative. Thus each of these groups has a role in the management of the faculties of the university, and this tripartite structure provides for the autonomy and accountability of the university, as distinct from the state control and regulation in public universities. These groups participate in the governance of four main cooperatives, each one a separate legal identity and 'owning' a faculty, plus a fifth, Mondragon Unibertsitatea S.Coop., the central university administration, constituted by the other three, plus some additional companies and institutions. Each of the cooperatives has the same management structure of other industrial cooperatives in the Mondragon system, a General Assembly, an Advisory Board, and a Board of Directors.

The General Assembly is the supreme authority for each of the cooperative entities and is made up of all the members of the cooperative. At the annual general assembly all of the members have an equal vote on the annual business plan which includes investment decisions, remuneration to the worker owners, and other core business decisions. The Advisory Board is a representative, government, and management body for each of the five University cooperatives. Members of the Advisory Boards are appointed by the General Assemblies through the democratic election of nominated candidates. The Boards of Directors are the governing boards of each cooperative and to whom the Advisory Boards delegate the management. In the case of Mondragon Unibertsitatea S.Coop. (the umbrella cooperative), the University's Board of Directors is made up by the Rector, Vice-Rector, the Deans of the four faculties (which are at the same time general managers of their cooperatives), the General Secretary and the Financial Manager.

So whilst the overarching governance structure of the university is quite different from that of a UK university, the senior management team takes a similar form. This management team is responsible for operational management, but subject to a monthly supervision by its Governing Council and, on an annual basis, oversight by the General Assembly. Operational management is undertaken within the framework of a five-year strategic plan and an annual management plan, and is underpinned by an organisational culture which values effective management using business criteria for the best use of human and financial resources, planning and control, and quality assurance. The five senior executives (Rector and four Deans) function as chief executives, under the supervision of the Advisory Boards, and are held responsible for the achievement of the qualitative and quantitative goals set in the annual business plan.

Overall, the university has a decentralised structure with a high level of self-management and autonomy, but with a central structure that ensures integration and consistency. The central cooperative also balances out the financial performance across the group, negotiating assistance for any faculty that experiences financial difficulties, and addressing investment opportunities such

Figure 2: Staffing in the faculties by type.
Source: Mondragon University presentation

	High Polytechnic School	Faculty of Business Studies	Faculty of Humanity and Education Sciences	Faculty of Gastronomic Sciences	MU KOOP.	Aggregates
PARTNERS	199	68	57	0	4	328
CONTRACTS	63	21	50	23	1	158
OTHERS – Ikerbasque	2	0	0	4	0	6
Work placement students	80	14,5	2,5	7	3	107
TOTAL	344	103,5	109,5	34	8	599

as the new Culinary Institute. Those staff who are working partners have a vote on the management of the institution, its business plan, and the senior management team, but their contribution is managed conventionally by their line managers, with the additional dimension of strong peer pressure to deliver against the business plan.

Looking at staffing levels, the biggest faculty is the engineering school with more than half the staff, whilst Business and Humanities are approximately equal to each other. The Faculty of Gastronomic Sciences has a much smaller staff base, and all are on contract rather than being cooperative partners. The Ikerbasque category refers to staff placed by external organisations – Ikerbasque is a sort of regional research council that recruits talent into the region and places them in universities and research institutions. It should be noted that the central administration only employs 8 staff.

A. Objectives and Mission

Mondragon University has a clear mission (set out in the box below) which derives from its vocation as a cooperative university with a strong commitment to its local community.

Mission

Mondragon Unibertsitatea is a non-profit cooperative University of common public interest, integrated within MCC, with a socially-orientated initiative and vocation. As a University, it was set up as a creator of culture with the aim of enhancing knowledge development. Its main activities are education, research and the provision of services to companies, educational centres and other public or private organisations.

Its fundamental mission is the development of

Box 1: Mondragon University
Mission Sttement
Source: Mondragon
University Strategic Plan

quality all-round education, which also incorporates technical-scientific knowledge, the necessary skills professional life as well as the values derived from the cooperative experience, which enable the students to meet the following:

To undertake their incorporation into professional life with guarantees for success and to respond to the challenges set out by the evolution of knowledge and the permanent transformation of the business world and the social environment in general.

To become an active agent in the transformation of society, contributing to its humanistic, technological and economic progress, essentially through business development.

For this purpose, **Mondragon Unibertsitatea** will establish the necessary conditions to ensure it has an innovative group of workers at all times, who are committed to satisfying the students, companies, collaborating bodies and institutions.

Likewise, **Mondragon Unibertsitatea** considers itself to be part of a global university system, in which inter-university connection and collaboration enable us to contribute to scientific development and the better development of society, and to enrich MU's University Project.

The objectives of the university go beyond the usual statements of creating new knowledge through research and providing high quality education to encompass a transformation of society within its own community and on a more global level. These objectives also have an explicit excellence agenda, with the University having a vision of being best in the Basque Country in its chosen fields, but through a model of higher education which is applied to the needs of society, rather than being purely focused on research excellence.

B. Delivery and funding models

As a private university, Mondragon differs from public universities in that a relatively high proportion of revenues come from student fees. Whilst the main public university in the Basque Country receives around 70% of its budget from the public sector, the figure for Mondragon is only 26.5%, and part of that is only due to relatively recent improvements in grant capture. The Basque regional university plan allocated €363 million to the University of the Basque Country in 2013, compared with just €9 million for Mondragon.

Consequently, Mondragon has needed to secure funding from a much more diversified set of sources, and student fees accounted for 48% of the budget in 2010. Direct contracts with firms are relatively high at 15.5%, much higher than other Basque and Spanish universities, and reflecting the close relationship with the wider Mondragon Group. The firm contract income has increased over recent years. Current income is around €44 million.

The university is free to set student fee rates at whatever the market will bear and fees are set much higher than those within the public sector which only cover part of the costs of tuition. Currently the University of the Basque Country sets bachelor's degree fees at between €13 and €19 per ECT credit, whilst the rate for Mondragon is €72 to

[Table 1] Source: Mondragon University data

€137 per ECT credit. This works out at an annual fee for a BA from €4330 pa (2011-12) in teacher training, to €8240 pa in gastronomy. Engineering is €5316 (2012-13). At master's level the annual fees are a little higher at between €5200 in teaching to €7800 in Business. [Table 1]

Part of the capital base of the University comes from the worker members who are required to make an investment in the business when they become a member of the cooperative, usually after two years in post. This is a standard model across the wider group and amounts to around one year's salary at a minimum salary level. New members in the University have to invest around €14-15,000, but there are mechanisms to assist this, such as revoking a social contract from the state and using their social security payments from their first two years. Staff can also borrow money from the cooperative bank at advantageous rates. This investment accrues dividends in years in which the financial results are positive and gradually accumulates until it is paid back at retirement. What is important is that this gives the University a considerable base of working capital on which to invest.

Table 1: Structure of revenues for Mondragon University

	2006	2007	2008	2009	2010
Fees formal education	42.6%	40.9%	39.8%	40.3%	42.2%
Fees life-long learning	7.0%	6.5%	6.8%	5.7%	5.8%
Public Sector competitive	12.9%	15.7%	17.5%	16.3%	17.0%
Public Sector non-competitive	7.6%	6.9%	7.5%	7.5%	9.5%
Firms	13.5%	13.9%	14.8%	17.9%	15.5%
Other	16.4%	15.8%	12.8%	9.6%	10.0%
Total Budget	n/a	32M€	n/a	n/a	n/a

Another source of capital is a Fund for Education and Social Projects, established by the Mondragon Group. This recycles part of the profits from the wider group into projects of community benefit and has provided funding for some of the capital infrastructure and equipment for the University.

The cooperative nature also helps the University to cope with years in which results are poor as staff can and do vote for a salary cut in deficit years. In 2011-12 the Business School had a deficit and members opted to take an 8% pay cut, and similarly the Engineering faculty opted to take no salary increase for two years as a form of solidarity with other Mondragon firms that were struggling in the global financial crisis.[98]

The majority of delivery is conventional on campus delivery via eight locations across the province of Gipuzkoa, mainly concentrated around the Mondragon area in the South West and San Sebastiàn in the North East. Engineering is focused in Mondragon and Ordizia, business in Onati and Irun, education and humanities at Aretxabaleta and Eskoriatza and gastronomy at San Sebastiàn.

C. Students

Mondragon is a relatively small university with just 3018 undergraduate students and 592 postgraduate students,

Figure 3: Location of campuses. Source: Mondragon University presentation

although there are a further 4-5000 students involved in some form of CPD or lifelong learning. The university has a limited range of programmes with just 12 undergraduate courses, 13 master's courses and 4 diploma courses, plus PhDs and CPD.

The focused nature of the university is revealed in the list of undergraduate programmes. Engineering has the greatest number but even then these are quite limited in scope:

- Mechanical Engineering;
- Industrial Design and Product Development;
- Production Engineering;
- Industrial Electronics;
- Computer Science;
- Telecommunication Systems.

In 2008, the 4000 individuals participating in lifelong learning courses contributed fees amounting to 4.8% of the university's budget. This activity is strongly linked with the historical roots of the University in the old engineering school in supporting the continuous development of the working population and supporting the needs of firms in the Mondragon system.

The management of teaching programmes involve a degree commission, involving staff and students, which meets at the beginning of each semester to review the previous operation of the programme, identify what changes have been made and the feedback from the students. Course evaluations from the students are discussed directly with the board and the staff concerned. This mechanism is used to ensure a process of continuous improvement.

Since 2002, the University has been developing a distinct teaching model, known as the Mendeberri (New Century) Project, developed in-house, and compliant with the Bologna Process. This was developed to ensure that graduates developed not just technical knowledge but a set of other complementary skills, usually developed outside the educational process in the workplace. Mendeberri was in response to the expressed needs of firms recruiting from the engineering faculty, who were concerned about the quality of transferable skills and the demands of increasingly operating in a globalised market. The skills identified by forms included team work, communication, problem solving, leadership, decision making, global vision, and learning to learn.[99] There were also concerns about language skills and awareness of living and working internationally.

The programme which has been adopted seeks to develop a form of problem-based learning encompassing

reflective practice, situated learning, and constant reflection and feedback. Use of ICTs and a shift to multilingual education have also been part of the process, with English being added to Spanish and Basque as required languages of instruction. The importance of English was largely driven by the increasingly wide range of countries that the Mondragon companies were operating in such as the USA and China where English was essential.

The model also seeks to promote a set of values which are strongly connected to the cooperative heritage of the University and the wider Mondragon system. These include:

- participation, involvement, and cooperation;
- innovation and entrepreneurship;
- sense of responsibility and focus on social transformation.

A core element of the new approach has been a shift away from the traditional lecture format to an emphasis on learning by doing, group work and discussion, and a project approach, with a refashioning of the teaching environment as lecture theatres have been reconfigured for group work. In order to ensure students get experience of real world problems there is a greater connection between the companies, university research, and student projects.

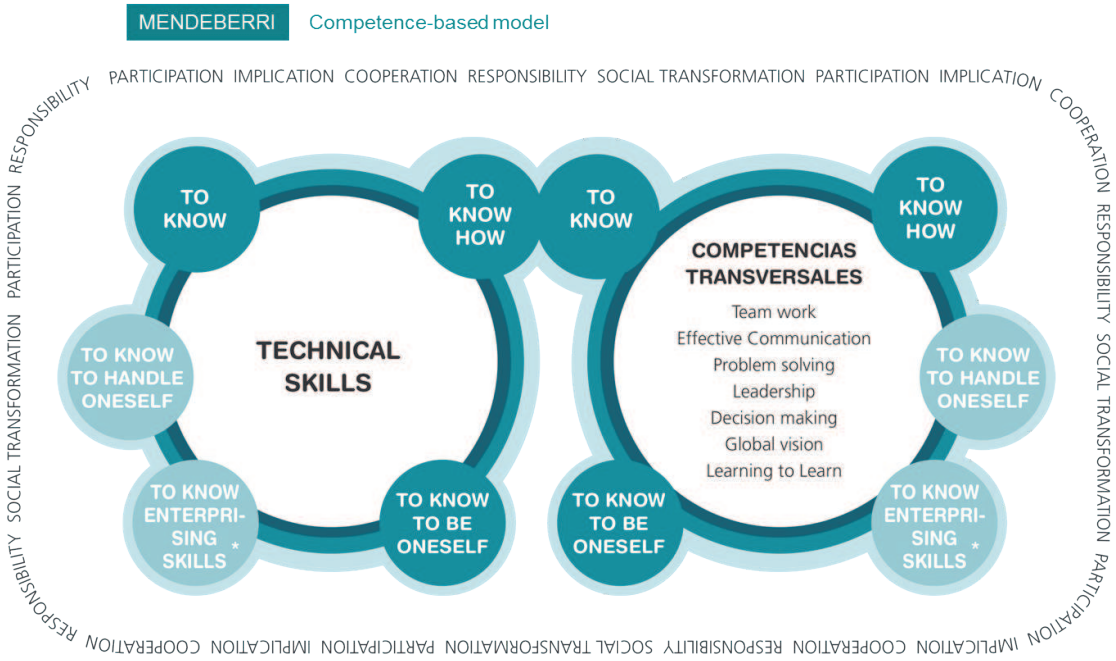
The final year project is a key element of study at Mondragon.

- These are of one year duration, and are carried out on a full-time basis.
- The student has a genuine engagement in the company, working on real projects within it.
- The project must have a technical content in line with the demands of the degree programme.
- The student is guided by tutors from both the company and the university.
- Each year, around 500 students carry out a final year project within companies.
- There is current investigation of the possibility of these projects being carried out not just at local companies but also at company branches abroad.
- 27% of students get a job in the company where they do their final year project.

Entrepreneurship is also being encouraged among students with the EKITEN programme and the ELI degree. EKITEN is a programme focused on generating entrepreneurial ideas in which multidisciplinary teams of students from the three faculties develop potential ideas and business opportunities. EKITEN organises official learning activities in the final year of degree programmes, as well as raising awareness, lectures on entrepreneurship and an annual competition, where the prize is a grant to help develop the entrepreneurial project at SAIOLAN.

This is complemented with a new university degree ELI - Entrepreneurial Leadership and Innovation. This was the first degree of this nature to be established in Spain in the 2009-2010 academic year. The idea was drawn from the TEAM ACADEMY [100] project at the University of Jyväskylä in Finland, and the ELI degree is based on a learning model focused on acquiring knowledge through experience, comprehensive process-based learning, teamwork, and a central role for the students. The

Figure 4: Mendeberri model. Source: Mondragon University presentation



programme trains the students to lead companies and self-managed teams, with an emphasis on them being agents of change, developing new firms, and working in a globalised multilingual world.

The students also often work whilst studying throughout their degrees and there is a special programme to manage this. A separate company, Alecoop, established in 1966, manages the process and establishes contracts with local manufacturing companies within the Mondragon system for them to take students on a part-time basis at regular salary levels. The students work for half a day in the company, and their classes are timed to fall in the other half of the day. This means the timetable must be set to accommodate this option, but there are considerable advantages to the student and the university. The students receive help to finance their studies by this means, but also gain valuable work experience. The university builds a closer engagement with the companies. The university

[Table 2] Source: Mondragon University data

also makes use of this model itself to employ students as technical and admin staff within its own faculties. Overall, about 600 students currently have employment through this model.

The results of this emphasis on employability have been highly positive. Recent data were not available, but for graduates in 2003 the results were:

- Labour market integration was over 90%.
- Average time of access to a job was under 3 months.
- 27% of the students found work at the companies in which they carried out their projects.

The international focus is underpinned by a considerable number of Erasmus partnerships, and there is a requirement that students will spend some time abroad.

III. Successful examples of collaboration with the business sector

For a small university Mondragon has a very strong performance in terms of R&D links with industry. Of the €8.5 million in 2010 research income, 82.7% comes from the private sector (See Table 2), an unusually high level which is attributable to the close relationships within the Mondragon Group. Although the public university has a research budget around ten times the size its contribution from the private sector is only 17%.

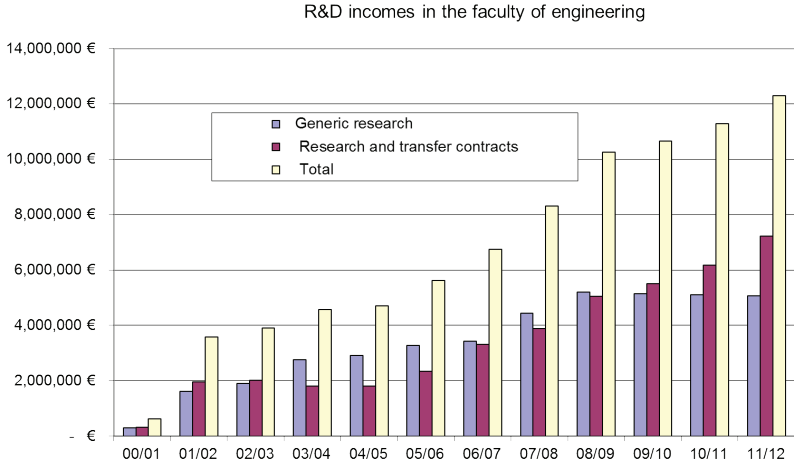
Mondragon has developed a collaborative research model in which a technology committee is formed involving the university, companies, and other technology partners to develop a technology roadmap – a 3 to 4 year agenda on future technology needs within a particular industry. The roadmap is then used to identify a series of potential projects with budgets which can be offered to the industry partners. Specific projects are then implemented according to the needs of the industry partners, each with their own characteristics and dynamics through teams involving academic staff, PhD researchers, and students. The outputs from the projects are monitored and fed back into the technology committee. Whilst the core members of these technology committees are from the Mondragon group, there are other local firms involved from outside of the cooperative movement as well. The benefits that arise from this scheme, in addition to the technical outputs, include the development of mutual trust among the participants, a commitment to expand R&D activities

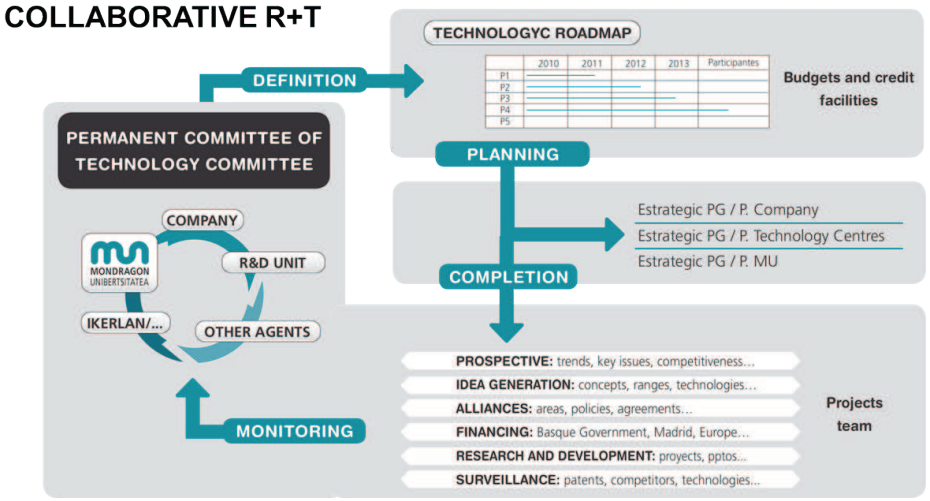
Table 2: R&D earnings of Mondragon University (❑)

	2006	2007	2008	2009	2010
R&D earnings	4,298,573	4,871,450	6,031,903	7,444,842	8,476,913
%Private sources	77.80%	80.30%	84.40%	79.80%	82.70%
As % of total budge	n/a	15.20%	n/a	n/a	n/a

(Top) Figure 5: Growth in R&D in engineering. Source: Mondragon University data

(Bottom) Figure 6:Model of the collaborative research process. Source: Mondragon University presentation





[Table 3] Source: Mondragon University data

within the companies, a closer alignment between the university's research and the company needs, genuine collaboration to replace a customer-supplier model, and a culture of external surveillance and idea generation to promote innovation.

The other model used for managing research links with companies is the research commission. An academic enters into discussion with a company about their needs and the capabilities of the university. The outcome of that discussion then becomes the focus for a research commission involving several members of staff on a cross-disciplinary basis, which proposes a collaborative project involving the company. The format of the project may involve a company subsidised PhD, or a larger long term project involving the company R&D unit, Mondragon University, and perhaps a technology centre such as Ikerlan, including the broader model described above. In 2010, Mondragon University had 278 contracts with firms, of which 35% were with SMEs, and with a total value of €7 million.

The university does not, however, prioritise patents: indeed, only 4 patents are currently actively managed by the university. Their main focus is to transfer knowledge to the firms.

There are some spin-off companies that have resulted, and the numbers are quite creditable given the small size of the university, although it seems employment as yet remains small.

If staff wish to set up their own company or to leave to work for another business they have a right to take up to two years on sabbatical during which their post is kept open for them to return to. After two years, if they do not return, they can cash in their investment and receive 80% of its value, or they can leave it in as an external non-voting investor, but the numbers choosing to do this are quite small. Only about 4 staff per year choose to go on sabbatical. Turnover rates of staff are extremely low.

In addition to the spin-offs directly created by the university, Mondragon University set up SAIOLAN in 1984, a Business Innovation Centre (Centro de Empresas e Innovación), with the objective of promoting and supporting the generation of new business ideas from the university or local firms. SAIOLAN is managed by academic staff of Mondragon University and has created 194 new firms since its creation. SAIOLAN is a partnership involving the Provincial Council of Gipuzkoa, Basque Government Department of Labour, Fagor, Ikerlan, JM Altuna, and SPRI, the Regional Development Agency. Figure 3 shows the SAIOLAN process, which supports companies through five stages from training, strategy, development, implementation and consolidation. SAIOLAN offers workspaces for entrepreneurs starting from single desks, as well as training facilities and workshops for prototype development.

Mondragon University has recently launched a new faculty of Gastronomic Sciences in the form of a centre for

Table 3: Number of spin-offs from Mondragon University

	2006	2007	2008	2009	2010
Number of spin-offs	2	5	4	5	5
Average size	2	2	2	3	3

Figure 7: SAIOLAN company development process. Source: Mondragon University presentation

culinary education in partnership with some of the leading chefs of the San Sebastiàn area. This novel initiative, the first of its kind in Spain, promotes research and training in gastronomy in partnership with some of the most inventive chefs in the world. Alongside the local chefs with multiple Michelin stars, the centre has an international scientific council comprising 12 of the world's greatest chefs, chaired by Ferran Adrià from El Bulli and with members including Heston Blumenthal and Michel Bras. Housed in a highly innovative new building, the centre is recruiting 100 students each year (half of which are international) onto 4-year degree courses to meet the need for more highly trained chefs, and is also working with a wide range of food companies to innovate in techniques, cooking, and in the dining experience. The centre also houses a restaurant in which the students can learn to cook and serve food to local customers, and which is booked out for several months in advance. This example illustrates a creative approach to building partnerships and identifying new opportunities for locally embedded research and teaching. Indeed, the centre has run ahead of educational policy in that teaching staff are required to have university training, which means the centre had to recruit staff who had trained in other disciplines but were passionate and knowledgeable about cooking, as there is no other place which awards degrees in gastronomy.

The focus on gastronomy opens up a number of additional opportunities for commercial activities, so the centre has been developing a range of short courses aimed at professional chefs and mature enthusiasts, and this can be combined with holidays in San Sebastiàn. For example one-off courses are offered using well-known chefs from San Sebastiàn. Currently the centre is also running a competition for professional chefs, sponsored by the EROSKI supermarket chain (which is part of the Mondragon Group), to identify recipes based on local ingredients from Navarra. The competition is part of an ongoing partnership with the Government of Navarra (the neighbouring region) to promote local foods.

The centre also engages in research in partnership with various food manufacturing and retail businesses relating to packaged prepared foods, sensorial analysis and stimulation, and the application of new technologies in food preparation.

A. Impact on local economic development

To some extent, the extremely tight embedding of the University in its community makes it difficult to identify an impact on local economic development, in the usual sense that a University does something exogenous to the local economy that has additional impacts. Rather, in the

case of Mondragon University is an essential part of the local economy and underpins the operation of the local cooperative system. The University is the main high-level training organisation for the Mondragon Corporation and a central part of the research and innovation system for the group. It has not taken on that role, but evolved to fulfil that need – if the need had not existed then the University would not have been created.

B. Strengths and weaknesses of the specialist HEI approach

Mondragon University has a number of strengths, especially seen from the point of view of a small specialist university, and a number of points which other universities and colleges might learn from.

The university has a close and embedded relationship with the wider Mondragon Group, which underpins both the teaching and business engagement strategies. The original idea of linking the development of the teaching colleges with the needs of the local community and the emergence of the cooperative movement in Mondragon was inspired, and the cooperative status of the university has ensured that the focus on the Mondragon Group has continued.

Extremely close mechanisms for collaborative research and innovation support exist in the group. The depth of the relationship between the university and the group can be seen in the support for innovation which is an exemplary process, even if other universities may offer more leading-edge technology. There is a strong sense of local community in which the University is embedded. Due to a combination of historic culture and the cooperative movement, the local area has a strong sense of social solidarity, underpinned by a strong family culture. Students are keen to stay in the area both to study and to work subsequently, with a high proportion moving into the local cooperatives. The university is committed to this local culture and is a responsible corporate citizen.

The university has pursued entrepreneurial opportunities, even where this meant changing the notion of what a university does, as exemplified by the Culinary Institute. To identify the opportunity of working with world-class chefs and building on a particular local reputational strength in San Sebastiàn showed a degree of entrepreneurialism, however, to develop a successful model, even though there was no existing template within Spain for university level gastronomy, showed genuine creativity. Across the whole university though there was innovative and entrepreneurial thinking in the curriculum and in business engagement.

Related to the entrepreneurship has been flexibility in adapting new activities within the regulations governing Spanish universities. The cooperative organisational form and internal process of consensus-building is highly unusual but has been made to work very effectively at Mondragon. A strong spirit of solidarity has been built within the university and a willingness of staff to work together cooperatively, whilst also permitting considerable diversity of role, all within a framework of objectives and targets. There is relatively low turnover of staff, and there has been no need to dismiss an academic since the establishment of the colleges.

The university has made excellent progress in building internationalisation into the curriculum and the wider university strategy. This was in response to the demand of the local industry which was concerned about the relatively low levels of mobility of students and low immigration into the region at a time when industry was becoming highly internationalised.

In spite of the undoubted success of the university there were a few weaknesses which can be observed. Both the university and the local region have a degree of introspectiveness due to the strong focus on the local culture. This is exacerbated by the need to recruit largely local academic staff due to the need to teach at least in part in the Basque language, something which is difficult to obtain from non-locals. Although there has been the development of some teaching in the English language, alongside Spanish and Basque, the desire to retain a relatively high proportion of Basque instruction presents a barrier to attracting international staff. This is also exacerbated by the main Mondragon area being a series of small manufacturing towns some distance from the more cosmopolitan cities of Bilbao and San Sebastiàn.

Within the Spanish higher education system, the University experiences some difficulty in building genuine research excellence as public resources have been concentrated in the main public university in the region. Whilst the university has developed methodologies for identifying and developing research that meets the long term needs of firms, it is undoubtedly closer to the market than the research undertaken by some other universities, and this restricts the opportunities for publication and building an international research reputation.

IV. The Policy Context

The University has largely evolved as a private institution and much of the basic model and forms of education and engagement have been the direct consequence of its context in the region and the relationship with the Mondragon Group. As such the University has a distinctive governance and a set of practices which differentiate it from the usual outcomes of Spanish national higher education policy.

There are still some specific areas where the University has to abide by national university regulations. So in the case of the Culinary Institute, the University had to hire teaching staff who had degrees, rather than using chefs who had learned their art in the kitchen. This was an example where national rules restricted creativity and had to be negotiated around. Thus a policy to ensure quality of teaching was irrelevant to the specific circumstances, meant that some ideal teachers could not be appointed, and meant the University had to be creative to find good quality staff who were qualified to be university teachers, but whose qualification was not necessarily relevant to what they were teaching.

However, there have been some recent efforts by the Basque Government to support and encourage the further development of the University and its focus on academic quality and local engagement. The Basque Government uses additional funding to encourage greater research activity. The programme contracts, which cover all three universities, provide additional funds for new activities that meet with the needs of the region. Around half of the funds associated with the programme contracts are research related and support the development of new

[Table 4] Source: Mondragon University data

research activities, PhD studies, as well as new research infrastructure such as libraries. Targets focus on tangible, measurable outcomes such as numbers of publications, citations, and PhDs awarded.

Part of what makes Mondragon University distinctive is its relationship with the wider Mondragon cooperative system, and this would be difficult to replicate in other places, especially in the context of existing HEIs, but there are specific lessons that can be drawn by other HEIs.

A. Building an innovation ecosystem in a locality

Mondragon University developed in parallel with the evolution of the Mondragon system, and particularly with the development of other research organisations and local practices promoting collaboration and innovation. In recent years these have been supported by the Basque Government with both the university and technology centres such as Ikerlan receiving funding to support their work with industrial companies. The university has developed a series of activities that represent a systemic approach to business engagement, making links through teaching, research, and knowledge exchange programmes. Another specialist HEI could start to develop such an innovation ecosystem by building a close relationship with a local industry cluster or even just a locality, through a proactive approach and collaboration with local agencies. The key lesson from this is that such an effort has to be maintained over a very long period, probably at least ten years in the first instance before relationships become institutionalised and some form of self-sustaining development takes place. The Mondragon case does, however, show that this can be done in a relatively small non-metropolitan community, comparable with places such as Lincoln or Falmouth in the UK.

B. Developing a curriculum with local employers

This lesson is fairly conventional and most HEIs these days

Table 4: Funding for Mondragon University from the Basque Government Programme Contract 2011–14

Programme contract	2011		2012		2013		2014		2011-2014	
	□	%	□	%	□	%	□	%	□	%
Formal training	1,585,602	40	2,203,986	40	2,821,103	40	3,596,906	40	10,207,597	40
Informal training	396,400	10	550,997	10	705,276	10	899,226	10	2,551,899	10
Research	1,585,602	40	2,203,986	40	2,821,103	40	3,596,906	40	10,207,597	40
Transfer	317,120	8	440,797	8	564,221	8	719,381	8	2,041,519	8
Equity, effectiveness and social protection	79,280	2	110,199	2	141,055	2	179,845	2	510,379	2
Total	3,964,004	100	5,509,966	100	7,052,757	100	8,992,265	100	25,518,991	100

try to work with employers in ensuring the curriculum is appropriate to the needs of employers, especially in areas of professional practice, such as architecture and the broad spectrum of creative industries. The practicalities of working with employers also tends to mean that some of these relationships are localised. Mondragon probably goes further than any UK HEIs as their very existence is predicated on meeting local employment needs, and the nature of Basque society means that students tend to stay at home during study and afterwards. Mondragon through the Mendeberri project offers some interesting lessons though on how relationships with employers can be managed, and a recognition that such a close relationship can over time lead to curriculum innovation and an international perspective.

Of particular relevance is the process surrounding the final year projects in partnership with local companies, as part of a wider process of engagement and collaboration. In addition, the Alecoop mechanism to support students in work whilst studying offers huge advantages at a time when students are facing large debts and concerns about finding work after graduation. A variant on the Alecoop process would be very attractive to students from disadvantaged backgrounds with concerns about debt and lacking the social capital of the middle classes that helps in finding work.

C. Seeking partnerships outside of the conventional industries

Whilst the core of Mondragon's company partnerships are in the traditional engineering industries which form the core of the Mondragon system, the diversity of the cooperatives means that partnerships are being developed with a wide range of firms. In particular, the partnership between restaurants and the Basque Culinary Institute demonstrates a means by which local partnership and quality can be combined in an innovative programme.

D. Developing an international perspective

The needs of the local firms for assistance with the challenges of globalisation has led to the University pursuing a highly international agenda, promoting student exchanges, English language teaching and global partnerships. The example of the Culinary Institute with a highly international student body and a network of globally known star chefs illustrates the extent to which the university has moved on from being a purely local institution.

V. Conclusion

Mondragon University is a unique case but lessons can be drawn for a wide variety of types of HEIs. The main differentiating factor for the institution is its particular nature both as a cooperative organisation and also its embeddedness within the wider Mondragon group of cooperatives. As such the university evolved to serve the needs of the wider Mondragon Group, but has a particular social character with a strong commitment to civic society and to the local workforce. This coupled with its unique governance and constitution has meant a willingness to consider radical approaches to mainstream university activities, so developing distinctive approaches to the curriculum and to collaboration with business.

View of Basque Culinary Institute, Mondragon University, 2013
© David Charles

These approaches have had considerable success in the quality of engagement and in employability outcomes for its graduates.

What is particularly notable is the quality of vision. The community of Mondragon is essentially a small working class town hidden in the valleys inland, away from the more cosmopolitan cities of San Sebastiàn and Bilbao, and the University is a relatively small institution closely linked with local employers. In other circumstances, not only would a private university be unlikely to emerge in the first place, but it might be expected that its perspective might be somewhat parochial. In the case of Mondragon this is not the case. The University has an innovative and global perspective, and a confidence to follow its own path rather than trying to copy the public universities, or even other Spanish private universities. The confidence in its approach is not only clear in the attitude of the Rector and his senior management team, but also in that of other staff, students, and partners. This confidence shines through in the Culinary Institute and its emphasis on truly world class quality, including a building that is exquisitely designed.

It is clear that the Mondragon companies value quality and a global outlook in their partnerships with the University and have encouraged the University to strive for that quality. Some of the details of the forms of partnership which have developed may be difficult to replicate elsewhere, but the recognition that a local orientation for a small specialist institution can co-exist with excellence and a commitment to global solidarity is inspiring for all HEIs.

97 This paper has been prepared for the OECD LEED Programme. See http://www.oecd.org/cfe/leed/ for further details. It is also based on interviews and materials gathered as part of the forthcoming OECD Review of Higher Education in Regional and City Development in the Basque Country, conducted in September 2012: Martínez-Granado,M., Greño, P. and Oleaga, M. 'The Basque Country, Spain: Self-Evaluation Report', *OECD Reviews of Higher Education in Regional and City Development,* 2012, http://www.oecd.org/edu/imhe/regionaldevelopment

98 Wright, S., Greenwood, D. and Boden, R., 'Report on a field visit to Mondragon University: a cooperative experience/experiment', *Learning and Teaching*, 4, 2011, pp.38-56.

99 Ibid.

100 See the project website: http://www.tiimiakatemia.fi/en/


auditorium

Case study 2: University of Worcester, Worcestershire and The Hive

Professor Geoffrey Elliott and Debbie Lambert, University of Worcester, UK

I. Introduction

Through innovative partnership and at a time when many public libraries are being closed, the University of Worcester worked closely with Worcestershire County Council (WCC) to plan, build, and open The Hive, Europe's first joint university and public library, at a total cost of £60m. This project has placed Worcester at the heart of the Central Technology Belt, delivering innovation and regeneration in the city, and working as an information and cultural hub for the county and surrounding area. The partners have a shared strategic vision that makes this development work for both: the County commitment to social inclusion is mirrored in the University's intensive work to widening participation in higher education. Both partners are committed to extending learning opportunities for people in Herefordshire, Worcestershire, and the surrounding area, and contributing to the aspiration of making Worcester a well-connected, world-class city.

Before the turn of the century, the University began to develop a vision for an artistic, cultural, and learning quarter for Worcester, based on the site of the former Infirmary. In 2004, the University of Worcester acquired the Royal Infirmary site to build a new city centre campus to accommodate expansion. Worcestershire County Council agreed funding for a much needed new public library for Worcester. Adjacent to the new campus was the Worcester City Council's waste depot, and as enthusiastic supporters of regeneration of this part of the city, they agreed to sell the site and relocate. The project involved the integration of the university and public libraries, the county record office, the county archaeological service, and the Worcestershire Hub customer service centre. These services were to be incorporated into one building, working together to ensure that existing services are maintained while taking advantage of the opportunities available for new developments. The building is unique in Britain and forms a physical, symbolic, and innovative link between the new university campus and the city.

II. The Hive

The Hive was opened by The Queen in July 2012, and sits adjacent to the University's new City campus, and together these developments will attract inward investment and skills to the region. The University currently injects over £200 million a year into the regional economy and these developments will increase this further. In this case study we have separated The Hive and City Campus, however, in reality they are a linked development, alongside the Worcester Arena and Riverside campus on the north side of the River Severn, that will transform the city of Worcester physically, socially, and economically. The scale of the University's expansion is impressive, especially when set against the background of increased student fee contributions and economic recession:

Table 1: Comparative income and student admissions

University of Worcester	2005/6	2011/12
Income	£32 million	£70 million
Student admissions	1,500	2, 900

'A library turns the key to the whole world.' Ted Hughes

'We have talked together about the aspirational nature of a young child going to their local library to change their picture books alongside a University student looking for their course books.' The Hive project team member

In the 2012, a record number of people applied to study at the University of Worcester – up 4.24% compared to 2011. This is significant as it is the first year when potential students were able to look around The Hive independently or at an Open Day before accepting their place. The University's new city campus is situated within the grounds of the former Worcester Royal Infirmary. The university has renovated and adapted the main hospital building and has landscaped the remaining site, creating an inspiring facility for residents and business, as well as attracting growing numbers of home and international students. The campus incorporates the Worcester Business School, home to 1450 students studying a range of academic programmes from HND to PhD, and community, business, and conference facilities. The former Infirmary was the birthplace of the British Medical Association, and to honour its special local and historic significance, the University has established on site the McClelland Health and Wellbeing Centre, alongside the Infirmary Medical Museum, which itself attracted £537,000 from the Heritage Lottery Fund.

Set out over 5 floors, The Hive is an outstanding and eye-catching addition to the Worcester cityscape, bringing together books, documents, archives, digital technology, and services from both organisations. It also houses one of the country's largest children's libraries, council customer services, meeting rooms, study areas, and a café. The Hive is a regional hub for education, research, business, and cultural experiences, attracting people who have not traditionally enrolled in a library: to raise aspirations, and forge links between the university, people, and organisations.

The resources of the University are available to all: use of the space and collections is defined by what you want to do, not by who you are. Public library non-fiction is shelved alongside university texts; study spaces and computers are shared; teenagers and children do homework alongside university students writing assignments.

A. Facilities

The facilities at The Hive comprise:

- A reception area which acts as a link between public spaces and commercial areas and provides orientation for users of the centre. The reception area is capable of being used as a performance space and uses a range of media to showcase the range of services available in the building;
- A general lending and research library open to all, including university collections. The library includes modern learning technology and areas with comfortable seating where people can quietly read books and newspapers. The library space includes a Youth Zone, an area where young people can meet, relax, and access library resources;
- A self-service lending and information service, with full access to the library catalogue and online resources;
- A flagship children and young peoples' library, offering books, music, drama, art, and storytelling sessions to inspire creativity in young people. This is supported by a range of events, exhibitions, and activities that engage with families and children outside of school hours;
- A history centre including the collections of the historic environment and archaeological service and the county

record office, providing a resource for academic and independent research with the ability to engage with schools, families, and individuals;
- The Worcestershire Hub customer service centre providing improved access to council services;
- A new business centre which works with the Chamber of Commerce, the Institute of Directors, Economic Development at Worcestershire County Council, and the University Business School. Workshops and business intelligence services are offered, particularly to support SMEs and start-ups;
- A suite of meeting spaces which can be used for seminars and conferences, and are used as dedicated student study areas during peak exam times.

B. Objectives

The objectives established for The Hive are as follows:

- Create a ground breaking development that will be a model of good practice to other projects around the world;
- Build successful partnerships that are of benefit to the wider community;
- Regenerate the St Clement's Gate area of the City of Worcester and be part of the creation of a dynamic learning and cultural quarter;
- Raise aspirations and reach new people;
- Ensure that the design achieves a landmark building which is fit for purpose;
- Create a facility and services that are positively welcoming for everyone;
- To improve the quality of life for individuals and communities;
- Innovation in service delivery and development;
- To enhance regional identity by developing pride in the area's history and current achievements;
- To be driven by the needs and aspirations of the communities it serves.

The services and experiences offered are engaging that part of the wider community who currently use few local authority services, as well as continuing to attract existing users. With members of the public working alongside university students, and a year round programme of school visits and usage, the potential of The Hive, right next door to the City Campus, for extending access and widening participation are immense. The pedestrian links with the city centre and the University are a critical design factor, with its location making an explicit link between the wider community of citizens and their University.

C. Participants and processes

The Hive was born of a partnership between a number of agencies and partners with differing but complementary expectations and objectives for the project. These included:

- University of Worcester
- Worcestershire County Council
- Worcestershire Records Office
- Worcestershire Archaeology Service
- Worcester City Council

The Hive, Worcester, 2013
© University of Worcester

- Regional Development Agency (Advantage West Midlands)
- Higher Education Funding Council for England and Wales

In 2006, the Higher Education Funding Council for England and Wales allocated £10m from the Strategic Development Fund; the Department for Culture, Media and Sport committed £46m of PFI credits; and the regional development agency, Advantage West Midlands contributed £7m. Early investment from HEFCE in particular provided a base from which the University could leverage and attract further investment from a variety of partners.

The University and the County Council both believed that to achieve an egalitarian, open, and inspirational service, integration was vital. Each partner would be separately accountable financially, and achieve its different sector quality benchmarks, but to library users - students, children, academic staff, and families – the whole community – it would appear to be a single service.

Registrations, reader, and borrower numbers are dramatically ahead of those for the former library. The Hive opened in July 2012, and at 2:46 on the afternoon of Tuesday 11th June 2013, the one millionth issue was recorded at The Hive. The title of the item issued was Why Love Matters: How Affection Shapes a Baby's Brain. The most-issued title, however, has been Reflective Practice in the Early Years (547 issues) [Table 2].

Furthermore, evidence suggests that the opening of The Hive has not only impacted library users central to Worcester, but has had a far-reaching effect on library use across the county. For example, in the three months prior to opening The Hive visitor numbers to Worcestershire's libraries remained consistent with the year before changing by only 1% more or less. However, in the ten months after opening, visits to Worcestershire libraries increased on average by 13%.

III. Impacts[101]

Consultants were commissioned by University of Worcester and Worcestershire County Council to review the information available from each of the existing services forming part of The Hive. The review of information follows initial research which recommended the most appropriate methodologies to be used to assess the economic impact of The Hive. The University's subsequent approach builds on this work, and the logic model developed by the UK Department of Culture, Media and Sport (DCMS 2009) that links the activities and outputs of a sector, to the range of most likely impacts that a sector could evidence. This is appropriate as it takes into account that impact may be evidenced in terms of a range of outputs that the literature shows are intrinsic and extrinsic; 'hard' and 'soft'; short-term and long-term; direct and indirect; social and economic.

Analysis has identified seven key areas of impact that can be evidenced by measurement of a range of outputs that flow from social innovations such as the joint university public library, utilising an impact model as a framework to present existing and potential data that will evidence the effectiveness of The Hive in increasing economic and social capital.

Table 2: Comparative user data for Worcester City Library and The Hive

	Worcester City Library 2011/12	The Hive 2012/13
Number of visitors[102]		
Total number of visits from 2–16.June	299,441	915,624 (up by 305.8%)
Daily average number of visits to The Hive from 2.July–16.June	820	2,708 (up by 330.2%)
Number of issues		
Total number of issues from 2.July–16.June	328,865	1,011,568 (up by 307.6%)
Daily average number of issues from 2.July–16. June.	901	2,882 (up by 319.9%)
Ratios of issues during 1–16.June 2013		35.1% to University memberships; 64.9% to public memberships
Number of members		
Total number of new members from 2.July–16.June	2731	17,863 (up by 654%)
Daily average number of new members from 2.July–16.June	10	53 (up by 530%)

	Worcester City Library 2011/12	The Hive 2012/13
PC usage		
Total number of unique PC users		22,287
Daily average of unique PC users		645
Daily average of unique PC users in old Worcester library 2011/12		151
Rations of PC use 2.July–16.June		24% to University; 75% to public members
Use of Archives and Archaeology		
Number of people counted in Archives and Archaeology 2.July to end May		51,404
Other classes / activities		
Baby Bounce and Rhyme Time	30 per weekly session	Average 70 per weekly session (up by 233%)
Preschool Bounce and Rhyme Time	30 per weekly session	Average 40 per weekly session (up by 133%)

The University also recognizes that there may well be impacts that are unanticipated; we are certainly expecting that, in terms of capacity-building, The Hive and other associated developments will leverage funding and support for further projects that will extend the University's footprint and influence on civic renewal and regeneration. [Table 3]

A. The University Context: Education and Skills

Work with children and young people is one of the areas where the synergy between public and academic is very strong. The University has a distinctive major strategic focus on working with children across a range of disciplines, while working with children has always been a fundamental and critical element of public library focus. The Hive has created a unique opportunity to work together in history, creative writing, in drama, digital media, and in encouraging young readers with a love of literature which will endure into adulthood.

The Hive hosts the university library, to which members of the public now have access. It plays a key role in the development of information literacy skills, for example by organising revision and Extended Project workshops for sixth-form students, and providing IT and job seeking support for all ages and abilities every Wednesday at 2.30 - 3.30pm. Children's literature festivals, reading groups, and homework clubs have been successfully launched in The Hive's first year of opening. Baby Bounce and Rhyme classes are held every Friday from 11.00 - 11.30am for 0 - 1 year olds and their parents/carers. Other provision for children and young people includes:

- Baby Latte Worcester, every Friday , 11:30 - 12:30pm;
- Saturday Storytime, every Saturday, 3.00pm;
- Chatterbooks (age 8 – 12), monthly, every second Tuesday, 4.00 - 5.15pm;
- Youth mentor team, organise events and activities on Saturdays, Wednesday and Friday afternoons and during school holidays;
- Write On! Writing Squads. Creative writing groups for ages 8-12;
- Big Build (aged 4 - 12 years with parent) LEGO building activities as well as an interactive story sharing session. Two workshops running at 10am - 12pm and 1:30 - 3:30pm;
- MA Drama students run drama workshops for young people at weekends and in the summer holidays.

Provision for adults includes (in addition to usual concessions):

- Adult Readers Group (16+) Monthly, every third Monday, 5:30 – 6:30pm;
- All about Partners becoming parents: how relationships change when babies arrive (Professor Mary Nolan);
- Art for All – Pencil / Watercolours / Acrylics;
- British Sign Language (Level 1);
- Cake Decorating for Complete Beginners;
- Computing for Beginners;
- DIY Wedding;
- English for Speakers of Other Languages (ESOL);
- Everything you wanted to know about babies (Professor Mary Nolan);

Table 3: Seven pillars of impact of civic innovation (adapted from Elliott, 2013)[103]

Area of impact	Outputs	Source of information	Timescale	Measures
Education and Skills	Widening access Increasing participation Graduates	University Registry Partner colleges	Long	WP PIs Growth in student nos., Employability, Graduate retention in area
Regeneration	Development Growth Capacity building Business performance Inward investment Public / private / voluntary partnerships	Economic Development Unit Chamber of Commerce	Medium	New businesses Business links created City refurbishment Direct and indirect jobs created, Investment Diverse workforce
Social	Community Inclusion Social capital formation	County Inclusion Team	Medium	Youth zone use Community groups Childrens floor Hub crossover
Tourism	Visitors Leisure destination	Discover Worcester Destination Worcestershire	Short	Visitor numbers Resident and visitor spend City profile
Media and Culture	Exhibitions and events Users and diversity Creative clusters Esteem indicators eg awards, positive publicity	Hive Worcester News website Awards events	Short	User numbers - profile and projection based on 3 quarters, Range of arts events, exhibitions Corporate involvement DCMS Taking Part Survey Media mentions Prizes
Health and Well-being	Health information provision Classes and activities	Hive monitoring reports	Medium	Book loans Information services Activities and workshops
Unforseen				

- Family History;
- Floristry for Beginners;
- Further Ancestry: Beyond the Census;
- Kays at The Hive - Sat, 20 July 2013. Event celebrating one of Worcester's most famous industries, Kays and Co Ltd;
- My DIY Wedding – Bridesmaids;
- Sewing Surgery;
- Starting a Craft Business;
- Starting Ancestry: The Census;
- Traveller History Month. Every Saturday in June;
- What's New on Ancestry (single session).

B. Regeneration

The Hive is now central to the University's future capacity building. The University has acquired several pieces of land along Henwick Road to create a University and cultural quarter in the south-west corner of the city. The facilities that have been created enjoy mixed university and community use, and form a key strand of the City Council's regeneration and development plans towards 2020. The cumulative effect of this development has been to increase the profile of the university and the city, and to attract inward investment with attendant economic and social benefit. As an indicator of this, The Hive has been integral to a range of bids and projects with a capital value to date of over £60M.

The Hive hosts Worcestershire's Business Development Service that provides:

- business support for embryonic / new businesses;
- employer training opportunities to develop skills, and move into an accredited framework of leadership and management training in partnership with others;
- market intelligence for established businesses to support their development;
- a place for 'touchdown', meetings and networking for local business people.

The University and County Council made a successful 'Skills for the Future' bid for two years funding for graduate trainee posts in museum and heritage, working with WCC and small independent museums in the county.

C. The Social Context

Connecting with citizens - The Customer Service Centre (Council Hub) is an essential part of the mix, as it is not only a key information provider to the community of Worcester, but it attracts a wide range of users, some of whom would not readily feel that a library or history centre was a natural place for them to visit.

In recognizing the value to both organisations of detailed and longitudinal economic impact research, the University and the Local Authority have commissioned a Social Return on Investment study that will report in 2014. This report will supplement the present study and provide both organisations with valuable evidence and evaluation that will be shared with stakeholders and inform future innovation projects.

A preliminary scoping study is currently in progress and early indications evidence that those questioned perceive

The Hive as having a vast social impact on the city. For example, 88% of those questioned claim that The Hive has changed the city for the better. Furthermore, 65% of those questioned affirm that The Hive has changed their life for the better. Although this study is in the early stages, results have been encouragingly positive and demonstrate the importance of The Hive to the local community.

D. Tourism

In time, this category will be able to capture user and employee expenditure, and thus gauge the impact that The Hive is having on the tourism economy of Worcester and the surrounding area. There is evidence that The Hive is attracting users and borrowers from beyond the city itself, and that The Hive is regarded as a draw to the city for public and professional groups.

There are a number of visits and events, both public, professional and academic hosted at The Hive that have attracted a wide cross section of people into the library. These include Big Build Lego Event, World Book Night, Peter Rabbit eggtastic treasure hunt (Easter Event), *Partners becoming Parents: how relationships change when a baby arrives*, and Gypsey Roma Traveller History Month (June 2013).

Furthermore, visits and tours of The Hive are arranged daily. To date organisations that have pre-booked have included: local schools and colleges, university and public libraries (including visitors from The Netherlands and Berlin), WEA, U3A, Girl Guides, Women's Institute (WI) groups, Worcester Twinning Association, Institute of Directors, Chamber of Commerce, and Citizens Advice Bureau.

E. Media and Culture

Public usage of all services has increased since The Hive opened. User numbers are an important means of establishing economic impact, as they allow methodologies such as multiplier analysis to be carried out. In terms of The Hive as a vehicle for widening participation these data will be key. Dramatic increases in library usage and borrowings have been recorded. New library members attributable to The Hive are up over 500% on the previous year. Particularly significant is the increase in activity of younger people. For example, loans of junior picture books have increased by over 400% since The Hive opened, and junior hardback loans are up over 200%. Interestingly, book loans and library usage have increased across all of Worcestershire libraries since The Hive opened last year, which is evidence that The Hive is having a wider regional impact beyond the city itself.

The national 'percent for art' scheme was applied to The Hive, which meant that the university and WCC spent £100k on a series of hugely successful county/university community arts events, including a one day literature festival, one day music fest, VAMOS mask drama, new play on history connected with the site, and a Cultural Olympiad dance fest.

Another £200,000 was expended on the commissioning of two major pieces of public art by rising young artists with a national reputation. These not only add to the experience and visual satisfaction of all who use The Hive, but as the reputation of the artists increases in stature, they will add to the attraction of The Hive as a visitor destination.

The History Centre is a distinct service area within

The Hive, but heritage celebrated in many places within the building using archives and artefacts within a contemporary context.

Positive media mentions and prizes are an important indicator of esteem. During the last year, over 500 positive pieces have appeared in press, TV and radio, increasing public awareness of The Hive and City Campus and capitalising on The Hive's unique status. The Hive has been nominated for, or entered into, 43 separate prestigious awards. Of these it has been shortlisted or won over three-quarters, including:

- Guardian University Awards, Contribution to the Local Community Winner;
- Chartered Institute of Building Services Engineers, Best New Build Project of the Year, Winner;
- Royal Institute of Chartered Surveyors, Community Benefit, Winner;
- Royal Institute of Chartered Surveyors, Design and Innovation, Winner;
- Civic Trust, Civic Trust Award, Winner;
- Royal Institute of British Architects, Winner of National Award;
- BREEAM Outstanding Sustainability.

Further impact is being achieved through academic and professional publication and conference presentations that feature the economic, social, and cultural benefits of The Hive on its community and the university itself. The Vice-Chancellor, Professor David Green, spoke at the 2012 conference for *Future Strategies for Universities and College Libraries,* discussing The Hive as an example of an innovative university library with strategies that could be employed by some other university and college libraries to improve inclusion and widen participation. In his article 'Character and impact of social innovation in higher education'[104] Elliott uses The Hive as a case study to argue the importance of reconnecting the social dimension of education within the economic in order to fully enhance the benefits of lifelong learning through social inclusion and community building. The Hive has been presented as a model of community building, access, and inclusion at two Westminster Briefings during 2013. The rationale and community strategy of The Hive are discussed by Hannaford and Fairman[105], who highlight how it can be a model for other local authorities and universities.

F. Health and Well-being

Public libraries are a major contributor to health literacy, with one survey by the Laser Foundation in 2005[106] finding that 48% of respondents surveyed had accessed health information from libraries.

The Hive organises Health Walks for all ages and abilities every Wednesday at 10:30am. Participants can explore the past of the city with a fact sheet supplied by The Hive Archive and Archaeology Team. The walks are run by qualified leaders and include access to an NHS Health Trainer. The Hive also hosted the British Heart Foundation Heart Walk in May 2013 adding to awareness locally.

IV. Forward impact and sustainability

The University's contribution to the region and its economy is now firmly embedded in its strategic vision (University of Worcester 2013). University Park, a 47 acre centre for business, health and care, and technology is just over one mile from the St John's campus and set to be an integral part of the Central Technology Belt. The University intends to develop the site to provide for its future expansion and to integrate this with a science and enterprise park that will enhance links between the University and the local business and scientific communities.

The Arena occupies the site of the former fruit and vegetable market, and aside from an excellent international standard sports facility for the University and the community, is a purpose-designed base for a number of elite national disability sports teams.

As a group of connected projects, The Hive, Arena, City Campus, and University Park are an integrated part of the infrastructure of the University. The University has established its role in leading social innovation, regeneration and economic development. The Hive and City Campus, together with other ongoing University developments, are an integral part of this enterprise and are core to the University's future strategy and development. Staffing and services are provided from core budgets and there is no cross subsidy.

The Hive has been built with a number of environmental sustainable features:

- Natural Ventilation & summertime cooling strategy;
- Daylight strategy;
- Renewable Energy strategy, Biomass heating and river water cooling;
- Water management strategy.

V. Conclusion

Although only open for just under a year at the time of writing, The Hive is beginning to deliver on the vision created by the University and Local Authority of an innovative and unique combined facility that would become a source of inspiration and pride for children, families, current and future students, and the business community. It is widely recognised that universities play a major role in promoting and sustaining economic prosperity, through their research, knowledge transfer, and creation of a skilled graduate workforce.[107] What is less clear in the policy or theoretical literature is how a regionally embedded university can maximise its impact in its community and the wider society — a problem identified by Andre, Carmo, Abreu, Estevens, and Malheiros [108] who call for 'a research agenda focusing more centrally and explicitly on the relationships between education/learning and socio-spatial cohesion, and which can frame more progressive public policies'.[109] The need for this seems implicitly recognised in a recent government review of business – university collaboration, in which it is asserted that 'a university provides economic, environmental and cultural benefits to its community and, critically, should play a central role in rebalancing the economy of a community under stress and promoting growth in one that is prosperous'.[110]

In the absence of well-documented, convincing examples of such re-balancing, this case study demonstrates how, as

the only university in Herefordshire and Worcestershire, the University of Worcester has developed a strategic role as an engine of regeneration and growth, and is locally and regionally embedded, whilst maintaining international excellence for its research specialisms and one of the strongest national student applications profiles in the UK.

These themes are explicitly brought out in the institution's strategic plan 2013–18 which outlines the university's key role in generating investment in human and physical capital, but goes much further than this:

> *However, the role of universities in the 21st century extends far beyond the contribution made to the economy. In some areas of society the purpose and value of higher education is being questioned. It is therefore important that universities are able to demonstrate the wider role they play in society and their contribution to public benefit: the transformational role they play in the lives of people through widening access and inspirational learning and teaching; their contribution to the social and cultural lives of the communities they serve; the improvements they make in the health and wellbeing of people, through the application of research and knowledge exchange to public and other community services.*[111]

It is important to recognise how explicitly the strategic purpose is expressed in framing the University's role in innovation, educational development, and regeneration. In other words, purposeful innovation doesn't simply happen, it must be planned and managed in a way that can only be achieved if transformational change and strategic partnership are at the heart of the University's mission and values.

101 This section draws extensively upon the report, Worcester Library and History Centre: Economic Additionality Impact Study, 2008, carried out by JURA Consultants for the University of Worcester. This report is available in electronic format from the Strategic Partnership Office, University of Worcester

102 Care is needed in interpreting this data as The Hive data include University members.

103 Elliott G., 'Character and impact of social innovation in higher education', International Journal of Continuing Education and Lifelong Learning, 5 (2), 2013: https://w5.hkuspace.hku.hk/journal/index.php/ijcell/article/view/170

104 Ibid.

105 Hannaford, A. and Fairman, R., 'The Hive: a New University / Public Library and History Centre, Worcester UK', Connection and Convergence: Second International Conference on Joint Use Libraries, 3rd - 4th November, 2011, Adelaide, South Australia, 2011; https://eprints.worc.ac.uk/id/eprint/1532. See also: Fairman, R. and Hannaford, A., 'Synergy, Efficiency and Vision – the Worcester Library and History Centre', SCONUL Focus (50), 2010, pp. 86-89: https://eprints.worc.ac.uk/id/eprint/1286

106 Referenced in BOP Consulting, Capturing the Impact of Libraries, Department of Culture Media and Sport, 2009: http://webarchive.nationalarchives.gov.uk/+/http:/www.culture.gov.uk/images/publications/Capturing_the_impact_of_libraries.pdf

107 Dearing, R., The National Committee of Inquiry into higher education (The Dearing Report), 1997.

108 Andre, I., Carmo, A., Abreu, A., Estevens, A., & Malheiros, J. Learning for and from the city: the role of education in urban cohesion, 2009. Retrieved from: http://www.socialpolis.eu/uploads/tx_sp/EF07_Paper.pdf

109 Ibid., p.6.

110 Wilson DL, Prof. Tim, A Review of Business-University Collaboration, London, February 2012, p.80.

111 University of Worcester, Strategic Plan 2013–18, 2012, p.3: http://www.worcester.ac.uk/documents/university-worcester-strat-plan-2013-18.pdf

The Hive is beginning to deliver of the vision created by the University and Local Authority of an innovative and unique combined facility that would become a source of inspiration and pride for children, families, current and future students, and the business community. View of the interior of The Hive, 2013 © University of Worcester

Case study 3: Milwaukee Institute of Art and Design and redesigning the manufacturing economy in the Midwest

Dr Stuart Rosenfeld, Regional Technology Strategies, USA[112]

I. Introduction

Twenty years ago, Milwaukee was striving to 're-engineer its once dominant manufacturing economy. Its leaders were looking mainly to technology to re-establish the region's position in the world industrial economy. Today, industry competes in a very different environment and increasingly Milwaukee is focusing on 're-designing' its manufacturing economy, relying as much or more on creativity as on technology. The difference signifies not any diminished importance of engineering and technology, which remain important sources of innovation, but a greater reliance on art and design as innovation, which can give local businesses advantages that are sustainable even with lower-cost competitors.

Economic growth plans that depend on creativity imply different skill-sets and talents and thus have important implications for education. This new, emerging strategy shifts the Milwaukee Institute of Art and Design (MIAD) from its position near the centre of cultural planning, but periphery of economic planning, into the of heart the City's economic strategy.

MIAD is a baccalaureate granting college (HEI) that prepares students for careers in the arts, or applications of the arts to various forms of design. It is the only non-profit, independent college of art and design offering a Bachelor of Fine Arts degree in the state of Wisconsin, and one of just 37 similar institutes across the United States that are members of the Association of Independent Colleges of Art and Design (AICAD). MIAD is also one of only two higher education institutions in Wisconsin that offers a baccalaureate degree in industrial design, important in a region looking to design and innovation to reinvigorate its declining (in employment), but still substantial, industrial base.

MIAD's value is inextricably linked to Milwaukee's past and present economy and, more importantly, to its hopes and plans for the future. Its programmes and impacts can only be fully appreciated in the city's educational, cultural, and economic contexts, and also in respect to its industrial base.

A. The Economic Setting

Situated on the southern shore of Lake Michigan, Milwaukee is Wisconsin's largest city. Originally populated by Germans and then Poles and Jews from Eastern Europe, the city became a mecca for manufacturing. By the 1930s Milwaukee was known as 'the machine shop of the world'. It became best known for the production of small engines, fabricated metals, printed materials, and, of course, beer. In the second half of the 20th century, Milwaukee was the national headquarters of Allis Chalmers, A.O. Smith, Bradley, Harley Davidson, Master Lock, Johnson Controls, and Rockwell Automation. The city, once home to four of the nation's largest brewers, Schlitz, Pabst, Miller, and Blatz, was sometimes known as 'Beertown'. At one point it was the largest beer-producing city in the world.

By the 1920s, the population of the city had grown to almost a half million. It then spurted to almost three quarters of a million people in 1960 before settling back down to around 600,000. For decades, Milwaukee had been a family-oriented, neighborhood-based,

ethnically polarized, maker-oriented city with different neighborhoods serving the city's very large German community and Polish community (the fourth highest among all USA cities) as well as smaller, but distinctive, Jewish, African-American, and other populations. In the 1970s and 80s, there was an increased shift of population to the suburbs.

Population loss was also driven by loss of manufacturing competitiveness during the industrial recession in the 1980s. Milwaukee rests in the heart of what became known as the nation's 'Rustbelt'. Before the region's manufacturing base was able to fully recover from the technological competition of the 1980s, it was hit by competition from emerging Asian economies that now have the technologies and skills at much lower labour costs. From 1980 to 2005, as the city's total employment grew by 24% Milwaukee still lost 32% of its manufacturing jobs. Manufacturing has been responsible for about 90% of the city's job loss since 2000. The percentage employed in manufacturing in the city had dropped to 18% in 2000 and is down to about 15% today.

This was the situation that Milwaukee's leadership found itself in when the city began to reinvent itself in a very different image. Without giving up its industrial traditions and ethnic cultures, Milwaukee began to redefine itself in ways that catered more to the interests and needs of the younger, more educated populations and the talent-dependent businesses. It needed a makeover that would support the culture of creativity and innovation that could reboot its economy. At first, it focused on the design of the environment, on becoming an arts and culture district.[113] The city did a masterful job. The tipping point was the Quadracci Pavilion of the Milwaukee Art Museum on the shore of Lake Michigan, a strikingly original and beautiful structure designed by Spanish architect Santiago Calatrava, which opened in 2001. Its movable wing-like roof became the symbol of the new Milwaukee, much as the Guggenheim has for Bilbao. To cement the changes, the city redeveloped the downtown with art and walkways and turned its historic Third Ward into an Art and Design District. The Milwaukee Institute of Art and Design is located in that Third Ward, a neighbourhood that was highlighted in 2012 as one of America's Top Twelve Art Places by a prestigious alliance of USA foundations called ArtPlace.[114]

Next, however, the city turned more to a deeper view of creativity, one that would drive innovation and business development. Manufacturers most likely to remain competitive would be those making things that relied on innovation, creativity, and/or connections to place for competitive advantages. This included both Milwaukee's largest and most successful legacy corporations but also a large number of new small, entrepreneurial firms, that relied on creative employees with different talents and skill-sets than those employed in the past. The city's future, in essence, depended on building a culture of creativity and innovation.

This brought MIAD, which more than any other college represented the traditions of famous Milwaukee designer Brooks Stevens and its design-oriented businesses like Harley Davidson and Kohler, even more into the centre of the city's plans. Milwaukee, still a city of makers, was

redefining itself as a city of creative makers.

In 2010, as part of the plans to take the region's vision to the next level, Mt Auburn Associates and Regional Technology Strategies carried out an in-depth assessment of the seven-county region's creative industries. Their report, *Creative Industries: A New Economic Growth Opportunity of the Greater Milwaukee Region* [115] included the contributions the education institutions make to the area's creative occupations, work, and environment. It reinforced the direction the region was taking and recommended additional actions based on art and design. MIAD, along with the rest of the city's higher education sector, were expected to play major roles.

B. The Institutional Context

MIAD is one of many public and private non-profit higher education institutions located in Milwaukee (see Appendix): two major universities, Marquette and the University of Wisconsin-Milwaukee, Concordia University, Cardinal Stritch University, Mount Mary College, Alverno College, Wisconsin Lutheran College, Milwaukee School of Engineering, and a two-year college, Milwaukee Area Technical College. Two for-profit institutes, the relatively new Art Institute of Wisconsin and the ITT Technical Institute also serve the area.

Each of these institutions offers one or more programmes in fine arts, applied arts, and/or some aspect of design. But the only two schools that are focussed exclusively on art and design are MIAD and the for-profit Art Institute of Wisconsin. The latter is part of a national chain of for-profit art institutes and a growing for-profit USA education sector that has become quite controversial in education policy, especially with respect to federal aid to students. MIAD is a non-profit, far more embedded in the city's history, has a different, and somewhat unique, educational philosophy as compared to other institutions in the area and mostly offers different programmes.

MIAD began in 1920 as the Layton School of Art, established as part of the Layton Gallery of Art. By the 1950s, that college was considered one of America's five best and most progressive accredited art institutions of higher education. By 1974, however, the school had declined and lapsed into insolvency, and, with the help of dedicated faculty, was re-configured and revived as the Milwaukee Institute of Art and Deign.

Today MIAD is housed in a five-story, 150 plus meter-long Jane Pettit Bradley Building overlooking the Milwaukee River, very near Lake Michigan and the now well-recognized 'winged' Quadracci Pavilion of the Milwaukee Art Museum. The college's space is large enough to offer all students individual studio space and shared space. The interior of the college enhances its goals of fostering creativity. In addition to the displays in the college's three galleries - the Brooks Stevens Gallery of Industrial Design, Frederick Layton Gallery, and MIAD Student Gallery - the work of students is visible throughout the building, in almost every public spaces and classroom, including in the cafeteria and lounges.

Freshmen and sophomore students reside in a new luxury-style residence hall - TWO52TWO - across the street from the college. Designed especially for the needs of art and design students, the sustainable building offers five

floors of fully furnished two-bedroom suites for students and their resident advisors, including a living room, kitchen and two bathrooms lounges.

C. Mission, Goals, and Objectives

When MIAD's new, visionary President, Neil Hoffman, assumed the leadership of the college in 2007, it was evident that changes were needed to raise the visibility of the college and strengthen its position in the city's education, cultural, and economic systems. He quickly initiated an inclusive planning process that was intended both to move the college forward and to build community and trust. The process involved everyone with a stake in the college, from custodians to trustees. Together, they assessed the college's strengths, weaknesses, opportunities, and threats, and came up with a new vision statement, goals, and a plan that 'unlocked the curriculum' and introduced a 'flexible and integrated approach to learning' that would not only raise the visibility of MIAD in the city, but also move it to the centre stage of professional arts education in the United States.

The goals that emerged from the planning process set out to achieve that vision were to:(1) increase application and enrolment to a stable base of 850 highly qualified students; (2) create a preeminent four-year college education that integrates all learning in studio practice and liberal arts featuring mastery of chosen art, communication skills, and entrepreneurial problem solving acumen; (3) create a comprehensive space plan for 850 students that reflects and enhances the college's educational mission; (4) raise capital gifts for the new student union and residence apartments and increase scholarship support.

MIAD's mission, officially summarized in the Institute's promotional materials includes:

- Critical thinking and creative problem solving;
- Diversity;
- Education and lifelong learning;
- Innovation;
- Passion, commitment, and dedication;
- Quality;
- Visual, verbal, written and media literacy.

All of these qualities represent the mission and vision, but it is the college's philosophy of education, design and delivery of education programmes, experiences, and environments to achieve the mission and vision that together set MIAD apart from other institutions of higher education.

II. Educational Programmes

The programmes at MIAD are designed to enable students to acquire a taste of the various programmes, to get to know the faculty, and then to decide which path they want to pursue. At the same time, the curricula allow enough flexibility for students to make adjustments as they learn more and gain more experience and to pursue compatible interests through cross enrolments and minors. It is the process of first multi-discipline exploration, then specialisation, and continual cross-disciplinary exchanges and collaborations that defines MIAD's

learning environment. While the college is specialised, the institution encourages diversity across fields of interest to spur creativity.

A. Enrolments and Applications

Enrolments are intentionally low compared to most four-year institutions in the area in order to maintain the desired personal and community atmosphere. Yet, although enrolments have risen 20 percent since Neil Hoffman became President, he would like it potentially higher, with around 850.

Acceptance in the programme is based in part on past academic performance and part on talent, as demonstrated by the applicants' portfolios. The college relies on high school grade point average rather than the standardized tests, which undervalue artistic talents. Each applicant's portfolio is rated on a scale of one to ten. In the past, the bar for acceptance was set at about six, but in recent years the levels of talent among applicants has risen to where more than six in ten applicants now score ten.

MIAD accepts up to 48 studio hours and 36 liberal arts studies credits for transfer students, including those coming from two-year community or technical colleges. Courses transferred must be compatible with the MIAD curriculum and completed with a grade of 'C' or better.

B. Establishing the Foundation in Year One

The first year of study is aimed at drawing students into the community, exposing them to various forms of art and design, acclimatising them to the unusual environment of the college, and getting them to relate art and design to their own experiences. Every student takes a core foundation, integrated learning curriculum in year one. 'The core of the First Year Experience is about creating self-awareness': it often changes students' notions of how art and design are used and challenges them to consider a broader range of career paths. One graduate related that he arrived at MIAD intending to study sculpture. But by the end of the first year, he came to appreciate the connections between sculpture, shapes, communication of ideas, and design. He switched to industrial design and became a highly successful furniture and interior designer.

In year one, all students take a liberal arts curriculum that spans each of the 11 areas of specialisation. This first year helps them define their artistic identities, select the areas in which they want to specialize, begin to assume responsibility for their education, and become accustomed to a collaborative approach to learning. Students take field trips, visit places to observe and interact with the environment, and hear artists and designers talk about a range of innovative subjects.

'The goal of liberal studies is to transform students into lifelong learners and further the ability to communicate.'

The education is predicated on the assumption that artists and designers must master verbal language skills and critical thinking as much as visual talents.

Foundations Professor James Barany asserts that:

> *'The Foundation curriculum is, with no doubt in my mind — one of the most diverse experiences that I have had with students … [since being hired in 1997] … through connection in the realm of blogs, experiences, and discourse with each other.'*

An education at MIAD is delivered in an environment aimed at developing its students' talents based on their values, needs and experiences.

> *'MIAD's pedagogy is based on the understanding that art, design, and academia do not exist in isolation, but rather inform one another to offer our students a complete education.'*

The educational experience from year one is contextual, collaborative, and flexible. Every first-year student takes part in an annual Research, Practices, and Methods exhibition at the end of the first semester that includes the use of visual communications to make a five-minute presentation. The ten best are then repeated for a larger audience.

C. Making Choices

After year one, students enter one of 11 different fields of study, four in design, six in fine arts and one in the newest field, time-based media. While curricula vary, there are common elements. Each programme, for example, includes:

- Introduction to Biology;
- History of Modernism (either design- or arts-oriented);
- Critical and Creative Forms;
- Topic in Cultural Studies / Humanities;
- Art History elective.

Industrial Design prepares graduates to 'see products that don't exist' and 'see how to improve those that do'. The programme operates at the intersection of creativity, psychology, marketing, engineering, and ergonomics. In addition to industrial design courses, the curriculum includes materials and methods, technical illustration, visualization techniques, and display and exhibition design. Industrial design, among the college's newest and most popular programmes, is nationally acclaimed. In 2010, MIAD was ranked tenth nationally among baccalaureate industrial design programmes according to a survey conducted by DesignIntelligence Journal. This programme also happens to be one of only two baccalaureate programmes in the state of Wisconsin[116] and vitally most important to the city's industrial base. Milwaukee was home to one of America's most renowned, if not the most renowned, industrial designers, Brook Stevens. Stevens taught at MIAD and endowed the nation's first industrial design gallery at the college. Students in this programme are highly sought for internships during their school years and as employees after graduation.

Interior Architecture + Design is about design of space, covering architecture, interiors, lighting and furniture. Students are expected to solve spatial problems with solutions that embody both aesthetic and practical concerns. The curriculum includes introductory architecture, drawing, and systems. This programme has a Green Studio that addresses sustainability and green products and emphasizes Leadership in Energy and Environmental Design (LEED) guidelines.

Illustration is representative art, using images to convey a story, message, or mood. Students use two- and three-dimensional art to develop their own unique vocabularies and styles. Some work for publishers or media firms but many become freelance illustrators.

Communications and design is about the use or various forms of art and design to convey information, send messages, and create brands. Students intern and are later employed in advertising, marketing, communications, design, and media companies. Students study digital design, photography, typography, and advertising and complete their programmes with a portfolio of their work.

Time-based media is art and design at the intersection of time, movement, and space. This programme forms the basis for time-based communications and visual story telling using conventional, digital, or video means. It is offered under three options: time-based media - animation; time-based media - video; or just time-based media. Students learn character development, storyboarding, script writing, sound recording and editing, and research.

Integrated studio arts allows students to customize their education, choosing from among any of the fine arts and studio electives. Integrated studio arts is a more ambitious and somewhat experimental programme that emphasizes the junction of the arts and enables students to think about new genres. The required curriculum highlights integration and intersection.

Drawing is taught as a visual language and students are challenged to be experimental and find new forms of expression. Graduates may become studio artists, teachers or illustrators or work in galleries or museums.

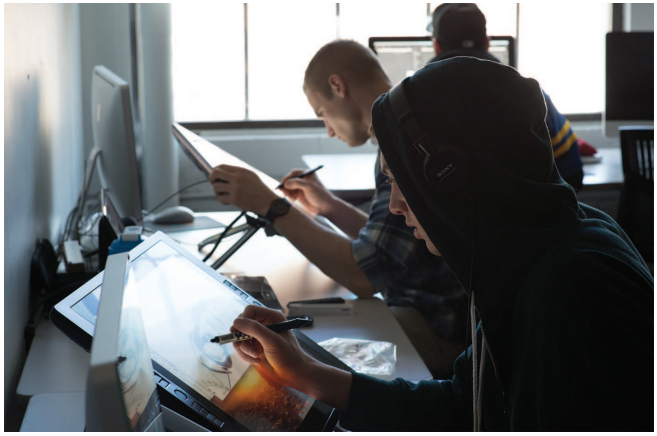
Sculpture represents the three-dimensional interface between art, space and light using a variety of materials to create art forms. Students learn from group critiques, field trips, and on-going faculty consultation. Graduates may work on commission for public spaces, businesses, and individuals or sell at galleries.

Painting, one of the most traditional art forms, is continually innovating in its forms of expression, media, and techniques. Students are encouraged to make their medium a form of self-expression. Graduates are likely to pursue careers as painters or educators or apply their art to commerce.

Photography emphasizes both the aesthetic and technical aspects of the medium, using both the darkroom and digital methods. Graduates are prepared for work in fine arts, commercial photography, advertising, photojournalism, or industrial photography.

The first year of study at MIAD is aimed at drawing students into the community, exposing them to various forms of art and design, and acclimatising them to the unusual environment of the college.

Students in the MIAD studios
© MIAD



Printmaking is a surface intensive two-dimensional art that has a long history in a region that for years has had one of America's largest printing clusters, a cluster that has changed dramatically but is still quite dominant in Milwaukee. Printmaking is an interdisciplinary talent that draws on a variety of techniques

D. Adding a Minor

The college offers minors to students either internally or, in areas not available at MIAD, through a relationship with Marquette University. Minors available at MIAD are:

- Studio minor for 15 credit hours in any if the disciplines offered;
- Art History or Writing minor for 15 credit hours in the Liberal Arts programme;
- Science minor for 15 credit hours in the natural sciences.

Minors available at Marquette University are:

- Advertising minor for 15 credit hours, mainly for students in Communications Design;
- Business minor for 15 credit hours in business for students with entrepreneurial ambitions who want to learn business theory and practice

E. Summer Institutes and Continuing Education

During the summer months and weekends, MIAD offers a Pre-College Programme that is devoted to developing high school students' artistic skills and preparing them for an art and design college. The programme, aimed at preparing students for college, giving them an edge in scholarship competitions, and introducing them to careers in creative industries. The programme is nationally recognized and funded by the National Endowment for the Arts, Surdna Foundation, Wisconsin Department of Public Instruction, and Milwaukee Partnership for the Arts.

The college has a limited continuing education programme, between graduation in early May and the end of June. In 2013, the college offered a dozen courses in areas such as Advanced Printmaking Studio, Night Photography, and Introduction to Studio Lighting.

F. Experienced and Talented Faculty

When MIAD's president Neil Hoffman assumed the college's leadership, he initiated a comprehensive two-day planning process that involved not only all of the faculty but all employees as well as trustees. His goals for reshaping MIAD's future included challenging and empowering the faculty and developing a collaborative and collegial environment that would extend across the faculty, student body, and educational experience. Another result of the process was a more inclusive and less hierarchical faculty leadership structure.

A large part of MIAD's success can be attributed to its ability to attract distinguished faculty who have extensive experience in their field. Nearly all MIAD faculty members have extensive portfolios, many have entrepreneurial experience and are recognized nationally and internationally by their peers. In creative fields, a doctorate degree is often given less weight than talent, experience, and reputation. These are a few examples from among the 130 plus faculty members:

- Industrial Design Professor Pascal Malassigné was past regional Vice President of The Industrial Design Educators.
- Professor John Caruso was given the 2012 Midwestern Honors Award for educational excellence by the Industrial Design Society of America.
- Eric Vogel, chair of 3D Design, is a Harvard graduate who studied sculpture at Columbia, won national awards, designed a number of high profile sustainably built projects in Milwaukee, and started the Vogel Design Group.
- Zoë Darling, after graduate school, co-founded PushPullPress Cooperative, founded the Healthcare Show, and co-founded DIAA Milwaukee (Discussing Intersections: Artists & Addiction).
- Jason Yi, who has sculptures in major museums in the USA, Japan, and Korea, was selected Milwaukee Artist of the Year in 2006.
- Anne Ghory-Goodman has degrees from Yale and studied at the Basel School of Design,
- Christiane Grauert, is a free-lance illustrator whose work has appeared in the *New York Times, Washington Post*, and *Los Angeles Times* as well as many magazines and books.

In addition, MIAD has distinguished lecturers, drawn from among the city's creative industries, who provide more real life experiences as well as internship and employment possibilities. Bob Schwartz, General Manager of Global Design and User Experience for GE Healthcare, and Jim Weimer, Vice President for Creative+Marketing Strategies at DCi Marketing, teach at MIAD, and famed designer Brooks Stevens is a former teacher.

G. An Engaged Board of Trustees

Specialised institutions are better positioned to select Trustees for their Board who have deeper understanding of, and possibly closer ties to, the college's goals. The vast majority of members of MIAD's Board (see Table 1) are from creative industries or organisations that depend on a creative community. This enables the Board to better understand and be more involved in college policy and programmes.

III. The Foundations of Learning and Impacts on the Economy

Under the leadership of its President and Board of Trustees and dedication of the administration and faculty, MIAD has been able to build a very effective approach to learning. It's based on a collaborative, interdisciplinary learning style that emphasizes social and collective responsibilities. This has turned the college into one of the region's most highly esteemed sources of higher education.

Mark Rios, founder of Rios Clementi Hale Studios in Los Angeles, chair of UCLA's Landscape Architecture Programme, and fellow of the American Institute of Architects told faculty and students during a recent visit for the college's 'Creative Series' that

> *'I've visited many art and design schools around the world and found an atmosphere and confidence at MIAD that are unique.... Students have a clear and well-deserved sense of*

themselves and their work, and that is a rare thing. It is a beautiful confidence that comes from being nurtured.'

Elements of the college's learning environment include: (1) contextual learning, (2) connections to community, (3) learning across disciplines, (4) preparation entrepreneurship, and (5) creativity as an underlying theme.

A. Contextual learning

Instruction includes theory - but theory taught, wherever possible, within the context of real business problems, social issues, and sustainable eco-systems. It involves the close bonds to business and industry that have long characterized Europe's technical colleges and universities and that are becoming more carefully studied in the USA

All students at MIAD are given opportunities for internships, and many have a chance to work on team projects for/with employers, often alongside students from other colleges or universities representing other fields, like engineering or business. Having a President with one foot in the regional economy, and so many faculty with past and current work experience and connections to their professions, enables the college to find corporate partners willing to provide the experiences. For example, the Harley Davidson Company, which is one of, if not the city's leading design-oriented companies, has been a sponsor of the industrial design course at MIAD for almost a decade and a source of inspiration to industrial design students.

The college incorporates contextual learning in four ways:

- Experienced faculty that are well connected to industry and bring real life problems into the classroom;
- Internships, which are part of the curriculum;
- Corporate partnerships that involve class projects.

More than 90% of the students typically have three credit-bearing internships with businesses during their four years at MIAD. Examples of the dozens of companies that have provided internships for MIAD students are: American Public Television, Digital Kitchen, Fuskars Brand, Kohl's Corporation, Mercury Marine Visa Lighting, High Sierra Sport Company, and Rapid Displays.

Corporate sponsorships are organized as either half-class projects for $20,000 or full-class projects for $40,000. MIAD teams of third or fourth year students take on projects identified by the company and involve their engineering, design, and marketing departments. Half of the funds raised go to scholarship support and half to academic programme support.

Fiskars, a Finnish design-oriented tool company that manufactures in Milwaukee, is one of those sponsoring companies. The firm works with teams of students who develop ideas and present them to management. For example, students designed garden scissors with five different functions, and made polished and smooth presentations that Fiskars' CEO cited as outstanding. Their design is in production, with $10 million in sales to date.

B. Community and Responsibility

The administration has endeavoured - successfully - to create a sense of community among students. The campus is compact enough to foster a tightly shared learning

Table 1: MIAD Board 2013

Chair	Vice Chair	Treasurer	Secretary
Madeleine Kelly Lubar Community Volunteer	Robert L. Mikulay Retired Executive VP for Marketing Miller Brewing Company	Jason W. Allen Partner Foley & Lardner LLP	Paul Tonnesen President Fiskars Americas

Trustees

Lila Aryan '90, Alumni Representative, Principal/Owner, Lila Aryan Photography
Jerry Benjamin, Principal, A.B. Data, Ltd.
Sean Cummings, President, Milsco Manufacturing Company
Stefanie Davis, Time-Based Media Major, 2013 Student Representative, Student Government President
Judy Guten, Organisation Development Consultant, Chair, TEC
Jennifer Hansen, President/Owner, The Anderson Group, Inc.
Allison Heaney Sr., VP Wealth Management, BMO Private Bank
Robert Joseph, President, Joseph Property Development, LLC
Matt Levatich, President & Chief Operating Officer, Harley-Davidson Motor Company
Linda Marcus, Owner, Linda Marcus Design
Michelle Mason, Managing Director, American Society for Quality
Lawrence P. (Larry) Moon, Chairman & Chief Executive Officer, Sandstone Group
Jill Morin, Author, Consultant, Community Activist
Justin Mortara, Chief Executive Officer, Mortara Instrument
Matthew D. Rinka, AIA, NCARB Principal, Rinka Chung Architecture, Inc.
Andrea Schloemer, Artist/Community Volunteer
Robert T. Schwartz, General Manager, Global Design & User Experience, GE Healthcare
Scott Schwebel, Director of Marketing, Alterra Coffee Roasters
Jill Sebastian, Faculty Representative, Professor of Sculpture, Fine Arts
Jeremy Shamrowicz '98, President, Flux Design, Ltd.
Randy Strauss, President/Chief Executive Officer, Strauss Brands, Inc.
Deanna L. Tillisch, President and Chief Executive Officer, United Performing Arts Fund
James Wiemer, '85 VP, Creative & Marketing Strategies, DCI Marketing
Allen W. (Sandy) Williams, Jr., Retired Partner, Foley & Lardner LLP
Thomas B. Wilson III, Retired President, Private Banking, US Bank Milwaukee


MILWAUKEE
INSTITUTE OF
ART&DESIGN

Previous: MIAD is housed in a five-story, 150 plus mete-long Jane Pettit Bradley Building overlooking the Milwaukee River. Photograph © MIAD

experience where it's easy for students to meet, interact, share ideas, and offer constructive critiques of one another's work.

Perhaps the most dramatic demonstration of the community and social responsibility of the college is represented by a project students took on in which they are engaged in art and design projects that involve solving health and social problems. The catalyst for what ultimately became the institution-wide Compassion Project was an arrangement between the college and General Electric Health Care's Milwaukee area-based Global Health Care's Global Design and User Experience unit. That unit, under General Manager Robert Schwartz (also a lecturer at MIAD and member of MIAD's Board of Trustees) operates six studios around the world and is responsible for user-interface, human factors, and contextual issues related to GE's medical products. Challenged to attract world-class talent, GE Healthcare recognized MIAD as a source of talent and creativity in its own backyard.

The company proposed a joint project to MIAD that would be carried out in collaboration with the biomedical programme at Marquette University. GE Healthcare asked MIAD to apply its talents to the world-wide problem of barriers that were keeping women from getting screening, therapy, and access to resources. These problems, the General Manager was convinced, crossed art and design disciplines and the best solutions would require 'removing silos' and involving the talents of the entire MIAD student body. Students were asked to explore the end-to-end journey of breast cancer awareness, prevention, detection, diagnosis, cure and therapy and find new and meaningful experiences for all women.

This project gave the college a common theme and problem around which all students could rally. Drawing on the experiences of four women who had had double mastectomies for breast cancer, they sought a way to reduce future needs for such operations. Student teams analysed their stories and devised approaches likely to lead to earlier discovery of breast cancer.

General Electric (GE) also invited students to its own studios to join with its own staff for design thinking workshops, feedback, and critiques. According to GE management *'The breadth, integrity, and quality of their work was amazing'*. Through the joint effort, GE acquired *'a remarkable portfolio of intellectual property'* and the college students acquired invaluable experience and connections.

What neither GE nor MIAD anticipated, however, was the degree to which this project would be taken over by the students. It gave the college a common theme around which all students could rally. According to Bob Schwartz, 'the project went viral', taking on an even greater breadth than anticipated. About 240 students participated in the project, ultimately renaming it, 'The Compassion Project'.

The Compassion Project profoundly changed the way learning occurs in an art and design college and how artists, with designers, can provide insights to a leading global company. It affected the very nature of the educational experience at MIAD from 'what I can get from my education' to 'what I can do for the good of the world'. This impact was evident in the senior projects of the class of 2013, which were dominated by *The Compassion Project*.

C. Collaborative and Interdisciplinary Learning

Faculty-student interaction is integral to the day-to-day learning environment at MIAD. The student body is small enough for faculty and administrators to know each other on a name basis and be more responsive to and supportive of individual interests and needs. The team-oriented project students take on as part of their internships also teach collaboration and facilitate cross-discipline creativity, including collaboration across institutions.

MIAD has collaborative arrangements with both Marquette University and University of Wisconsin-Milwaukee (UWM). Marquette's engineering students and MIAD's design students, for example, work together on projects under the leadership of faculty from both schools. According to Marquette's Dean, the MIAD students bring very creative approaches to engineering problems and the engineers develop the practical applications. One recent joint project designed a mechanism that fits in a backpack and enables a young woman with a rare congenital disorder that prevents her joints from working properly to eat meals without using her hands.

Four teams of students representing MIAD's Green Studio in its Interior Architecture + Design programme and UWM School of Architecture and Urban Planning competed to renovate a tavern in Wisconsin's Menominee Valley and make it a sustainable, green facility for an Urban Ecology Center that would educated and inspire people to understand and sustain their environment. Student teams worked with consultants on the exterior, interior, renewable energy sources, and aesthetics. The design involved bike paths, gardens, lighting, an animal room, tree houses, wind turbines, safety codes, and LEED certification, all in an urban setting.

Another example is Indiana-based Delta Faucet, which contracted with the college for a cross-disciplinary team of students to work on its most frustrating design problems. Although the company typically works with universities that feature cooperative education, it recognized MIAD's unique interdisciplinary learning style. Delta's Director of Industrial Design explained that

> *'the students often make us rethink what may be possible — whether from a materials, a manufacturing or even a technology standpoint'.*

Delta Faucet sends managers to MIAD to hear presentations by students on their concepts. It awards prizes to the best and helps students file patents for those that show commercial promise. MIAD, unlike other institutions, allows its students to take ownership of their work and does not try to claim the economic value.

D. Entrepreneurial Passions

Given that creative industries have disproportionately large numbers of microenterprises, freelancers / self-employed and sole traders compared to most other sectors of the economy, entrepreneurial skills are important. Nearly two in five (37 percent) 2012 graduates reported some form of entrepreneurial activity, from selling at shows, to freelancing, to embarking on a business start-up.

Whereas some colleges have courses in business skills, MIAD does not and thus such skills must come from the

faculty, generally embedded into their curricula as part of class problems or examples. Reflecting on his educational experience, 1993 industrial design graduate Bill Roozee said *'The most important thing MIAD taught me was the business side of creativity'*. Those students that are interested in delving more deeply into the entrepreneurship can take a minor that is offered through an exchange relationship with Marquette University.

MIAD has spun-out a number of highly successful companies and individual artists, including Flux Design, Blend Studios, and Red Fusion. Flux Design, for example, started by two MIAD graduates in 2000, Jeremy Shamrowicz and Jesse Meyer, has become one of Milwaukee's most frequently featured success stories. It now employs nine MIAD graduates. Starting in Gallery 326 in the historic Third Ward, Flux now operates out of a 20,000 square foot facility in Riverworks Business Park. The company has designed and built 40 bar spaces. It begins by recycling found lumber and scrap metal and converting it to 'organic' furniture. Shamrowic explained that although he took no business classes, he learned business economics by having to apply them to classroom problems. In 'Introduction to Becoming a Public Artists', for example, he developed budgets for building sculptures at different sites under varying conditions, learning costing techniques that he later applied to his new business.

Blend Studios, another success story, was started by a 2004 MIAD graduate, Nick Waraksa, who earned a degree in Communications Design and, simultaneously, a degree in music and mixed media from UWM. After a six-month internship with Digital Kitchen, a successful content-based ad and branding agency in Chicago, and freelancing for two to three years, he returned to Milwaukee and in 2009 with two partners founded Blend Studios. Blend combines their musical and motion design competencies to produce high quality products for Kohler, GE, MillerCoors, Expo, Summerfest, and Citgo among others. Currently the company has a competitive video installation of a robot touring the University School, a private K-12 school in Milwaukee.

E. Innovation and Creativity

Educational institutions over the past few years have been experimenting with a variety of practices to encourage creativity in their students. MIAD has not had to experiment; creativity does, and has for some time, rank high among its core values. One of the ways the college encourages and fosters innovation and creativity is by offering various lecture series, exhibitions, and competitions.

One of the most prestigious programmes MIAD offers is the 'Creativity Series', which was founded by Board of Trustees Chair Madeline Kelly Lubar and her husband David Lubar. They awarded the college a grant to bring internationally preeminent artists, designers, and scholars to MIAD for a period of time to speak to and meet with students and faculty. Through the series, experts don't only come to share their views but to fully engage with students and faculty informally, including reviewing students' work and giving faculty the benefit of their experience.

In April 2013, for example, James Ludwig, notable architect, industrial designer, Vice President of Global

Design for Steelcase and Fulbright Scholar, spoke to the college and the community at Discovery World Center on *Curiosity and Empathy as Essential to Design*. He also spent time talking with faculty and critiquing students' work. On returning he commented:

> *'The[re is an] atmosphere of openness and curiosity that the MIAD culture so clearly embodies… everyone I met reflected the same enthusiastic approach to the world and what they are doing'.*

Another avenue for inspiring creativity is the practice of showing, describing, and explaining work produced to one another and getting feedback. In the spring of each year, for example, MIAD hosts an annual MIAD Define day, which is dedicated to student presentations, student-faculty discussions, panel discussions, dialogues, and lectures. The day is dedicated to thinking about and discussing how MIAD, as an art and design college, identifies itself, learns what others are doing and how all members of the community might grow as creative professionals.

A poster at the graduate project presentation in April 2013 spoke to the creative spirit that prevails:

> *'My work is an investigation of the everyday. I find comfort in the ordinary. I am inspired by daily repetitions. Every day interactions with objects and places all speak to the lives that we live and our own personal habits…. Out of habit and practice, these unremarkable activities that I choose to interpret are made into playful and inviting sculpture installations. My purpose for making is to challenge the role of the material through my viewer's pre-conceived understanding of its place in the world'.*

The emphasis on creativity and breaking down boundaries in thinking about programmes also plays out in the solutions to real problems students are asked to develop. For example, in 2011, industrial design students were assigned a difficult problem that had perplexed AO Smith engineers: how to create a heat blower for the extraction of heat from the top of a water heater. The company paid MIAD $40,000 to engage the class, despite the lead engineer's initial scepticism of 'artsy' students trying to tackle an engineering problem. Splitting into teams of four, they restated the problem and process and then proceeded to analyse and test possible solutions. They suggested designs and piloted them from production through delivery. The class took on engineering the problem, 'as if they were trying to cure cancer'. They challenged basic design assumptions that had not been questioned previously and eventually came up with a solution - which was adopted.

IV. Educational Services and Outcomes

One of the first aims of the new president was to raise college enrolments, which had slipped in past years. Enrolments did increase by a third his first year in the position, as did first and second year retention rates - from 67 percent in 2006 to 84 percent in 2011. He also implemented a student satisfaction survey that compared students' perceptions to their expectations, using that information to improve the quality of the programmes. Employment rates in fields of study and starting salaries

The college fosters and encourages innovation and creativity by offering lecture series, exhibitions and competitions. Students frequently show, describe, present and explain their work to one another, to faculty and the public, and get feedback. Photograph © MIAD

[Table 2] Note: This does not include first year students who have not yet chosen fields of study. Source: MIAD data, 2013.

for graduates are quite high, especially for a college that specializes in occupational fields that are not widely recognized in the USA as 'high demand' and in an increasingly technology and vocationally oriented education policy environment and when half of the college-educated work force is employed in occupations that do not require a baccalaureate.[117]

A. Enrolments

Students entering the college ultimately choose among one of 11 different programmes of study. First-year students are encouraged to take a general programme that exposes them to different disciplines to see where their interests and their talents lie and are under no pressure to make a choice of major immediately.

After a year of exploration and learning from other students and faculty, they select one of the 11 fields of study organized roughly as design, fine arts, or the relatively new but increasingly popular time-based media. The largest enrolments (54%) are in the design fields, next in fine arts (40%), and the remainder (40%) in time-based media (see Table 2). The graduation rate is about 60 percent, rising from 35 percent in past years.

B. Employment Patterns of Graduates

More than four in five of MIAD graduates find employment within one year, three-fourths of those finding full-time employment (Table 3). About four in five of those employed report satisfaction with their job.

Graduates of MIAD are employed across a diverse, far reaching, and impressive set of companies. A sample of those employers to illustrate the range includes Apple Inc., Estee Lauder, Whirlpool, GE Healthcare, General Motors Design Center, Harley-Davidson, Master Lock, Hallmark Cards, Trek Bicycle, Milwaukee Art Museum, Johnson Wax, Alter-Ego, Nike, Ziba Design, DCi Marketing, Flux Design, and Brooks Stevens Design Associates. Other alumni teach at every level of education, own studios and design firms, and exhibit their work internationally.

Table 2:
Student Enrolments and Completions, by Programme

Programme	Enrolments 2013	Graduates 2012
Design		
Industrial design	69	17
Interior architecture and Design	35	10
Illustration	74	18
Communications and design	74	31
Time-based		
Time-based media	26	5
Fine Arts		
Integrated studio arts	67	9
Drawing	30	16
Sculpture	16	5
Painting	29	10
Photography	35	17
Printmaking	16	6
Total	431	144

Companies that employ MIAD graduates, often continue to seek graduates: DCi Marketing, for example, has about 17 MIAD graduates, many in Communications Design.

C. Entrepreneurs and Freelancers
Entrepreneurship, often in the form of self-employment, has proven to be much more common among MIAD graduates than typical university graduates. After one year, 37 percent of 2011 MIAD graduates were engaged in some form of self-employment or entrepreneurial activity. Of these:

- 52% were freelancing with various clients;
- 29% were selling their work directly to customers.

Of those self-employed or operating a business:

- 24% report spending less than 10 hours a week on that business;
- 33% do it part time (10-37 hours per week);
- 24% are full time entrepreneurs (more than 37 hours per week).

Only about seven percent of MIAD graduates went on to graduate school in 2011, not surprising in fields in which portfolios and connections carry as much weight in terms of economic success as post-graduate credentials—except for teaching, which is a career goal for some students, particularly in the fine arts.

D. Diversity and Demography
The college serves a traditional age population. About 75 percent of students enter MIAD directly from high (secondary) school, which is generally age 18. A smaller number of students transfer from the region's two-year technical colleges, with which MIAD has articulation agreements concerning transfer of credits. In the 2012 - 2013 school term 64 percent of the students were female and 36 percent were male. About one in five students was of an ethnic minority, with the following distribution by race:

- 9% Hispanic;
- 5% African American;
- 3% Asian;
- Less than 1% Native American;
- 3% multiple races.

Approximately 60 percent of students were residents of the state of Wisconsin. Of the other 40 percent, about half were from the adjacent state of Illinois and half from other states, mostly in the Midwestern USA region.

V. Student and Social Services
MIAD offers both the conventional services that characterize almost all of higher education but also the more innovative services that require engagement of students into the community or into the economy.

A. Institutional Services
MIAD offers a wide range of services to its students, which cover their academic and social lives and career opportunities. Although most of these services are common to almost all USA institutions of higher

[Table 3] Note: Based on 51% response rate.
Source: MIAD data, 2013.

Table 3: Employment Statistics after One year: Percentages, by Fields of Specialisation, Class of 2011

Programme of Study	Percent Employed	Full Time	Part Time	Related to Major	Satisfied with Job
Industrial Design	78	57	43	72	100
Communications Design	93	100	0	100	92
Interior and Architecture	75	100	0	73	75
Illustration	89	67	17	58	67
Fine arts (all)	73	50	58	50	56
Total	82	75	24	71	78

education, the specialised nature of MIAD allows them to have a tighter focus and be more customized to the needs of their client base.

- Learning Resource Center at MIAD with special assistance in writing, reading, and research.
- Disability Services to accommodate students with documented disabilities.
- Counseling Center at Marquette University that provide access to psychologists, social workers, and psychiatrists.
- Library with 24,000 books, periodicals, and researchable databases with access to other college and university libraries.
- Academic Advising establishes an advisor for each students and is based on a close student-advisor relationship.
- Student Government enables students to take responsibility for building community, maintaining channels of communication, and improving college life.
- Student organisations include Ecology, Community Awareness, and Multi-Cultural Students.

B. Community Relationships and Service Learning

In 2012, MIAD made President Obama's Higher Education Community Service Honor Roll for its commitment to service learning and productive relationship in the community. 'Service Learning', born in the USA Community Service Act of 1990, is a rapidly growing teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities.

Service learning was integrated into MIAD's curricula more than ten years ago, shortly after the legislation was enacted, making it was one of the first institutions of higher education to make service learning part of the educational process and with among the highest number

of required hours of community service. It remains only one of two institutes of art and design in the USA to require service learning, the other (in Maryland) having started very recently.

MIAD embraced service learning early because it recognized that, according to its long-time coordinator, *'artists have the wisdom to contribute to all kinds of situations'*. It allows students to *'get out into the community and remove the isolation'* often associated with university life. Students bring what their experiences back into the classroom where they contribute to shaping their art and design. MIAD positions its Service Learning in the third year of the four-year baccalaureate and requires a minimum of 35 hours of community service. Each student's work is evaluated by a supervisor who understands and accepts the requirements and knows the expectations.

MIAD's programme has 200 community partners, and in 2012 students' work was with 78 of those partners. The deep connections built in the community are cited as a major reason that about 80 percent of alumni remain in Wisconsin.

In 2012, 148 MIAD students did 5,100 hours of community service in south-eastern Wisconsin valued by an independent study at $112,700 in volunteer labour in a variety of kinds of organisations with many types of needs:

- 36 percent were related to animals or the outdoors;
- 26 percent were with children;
- 10 percent worked with homeless populations;
- 17 percent addressed health care or social justice issues;
- Only 14 percent worked in art organisations or museums.

C. Milwaukee's Emerging Creative and Innovation Infrastructure

South-eastern Wisconsin's manufacturers are increasingly looking to design for their competitive edge, and MIAD is a partner in that effort. The reorientation began to take shape in the 1990s as a neighbourhood development effort when the Riverwalk was built to connect to downtown. But the real art and design focus came about with the completion of a study of the creative economy for Cultural Alliance of Greater Milwaukee in December 2010 that recommended that the city 'Grow the Design Segment'. Recommended actions included:

- to create a Milwaukee Regional Design Showcase;
- to develop a Design Incubator in partnership with higher education;
- and establish the Milwaukee Region Design 'Skunkworks'.[118]

Two consequences of the study were that the following year the Cultural Alliance formed the Creative Milwaukee Alliance, and the Greater Milwaukee Committee received a $500,000 grant to further its plans for a design cluster and establish an organisation to accelerate design-based innovation and networking. That entity is called MiKE (Innovation in Milwaukee)[119]. MIAD's President is both a member of the Board of Directors of Creative Alliance Milwaukee[120] and MiKE's Leadership Council. In addition, MIAD faculty and students participate in events.

VI. Funding context and financial issues

MIAD, although less expensive than many other private colleges or universities, is still an expensive education, beyond the reach of most high school graduates without financial aid. In 2012-2013, MIAD's tuition was $30,700 and housing and food estimated at almost another $8,000. All first-year students coming from more than 45 miles away are required to live in the college's housing. Virtually all students received some student aid or loans.

A. Federal Aid

MIAD does offer a variety of government and private financial aid programmes. The USA government programmes, which are need-based, include:

- Federal Direct Subsidized Stafford Loan;
- Federal Direct Unsubsidized Stafford Loan;
- Federal Direct Parent Loan;
- Alternative Non-Federal Loan programmes.

MIAD's federal loan default rate is two percent, which is only a fraction of the national default rate of nine percent for students in all colleges in 2012. The college also has a federally supported, also needs-based, work / study form of financial aid, with students paid from both federal and MIAD funds. Students are paid through the regular MIAD payroll process.

B. State Aid

The state of Wisconsin has a needs-based tuition grant programme for private non-profit colleges only that is based partly on the portion of tuition that exceeds tuition at University of Wisconsin-Madison.

Scholarships and Private Aid: MIAD awards more than a million dollars annually in scholarships. The college draws on its endowment to provide merit-based aid for the first year to all new entering students who qualify for enrolment, beginning at $6,000. Students compete for a wide range of merit- and need-based scholarships awarded by local businesses and organisations to continuing MIAD students, and the college helps students identify and compete for other regional and national scholarship opportunities.

Finally, MIAD raises corporate support, some of which goes for scholarships. For example, with a grant from Harley Davidson in 2005, MIAD was able to begin a motorsport design programme. One successful strategy devised by President Neil Hoffman involves identifying ten *'highly qualified companies based on design as a core value in business.'* The ten companies selected pay $100,000 to MIAD for the honor, much of which goes to $10,000 scholarships. MIAD has not ever been turned down by a business.

VII. Strengths and Weaknesses of Specialist Higher Education Institutions

Strengths and weaknesses of specialised institutions are based on what can be inferred from a single case study in one specialised field of study. American higher education is a combination of very large 'flagship' research-oriented universities, smaller but still large second-tier research universities, smaller liberal arts colleges, and two-year community and technical colleges, some of which now also offer selective baccalaureate degrees. Specialisation in

higher education in the United States nearly always occurs within large institutional settings, not as free-standing schools, and with varying degrees of independence.

Specialist colleges in America are, for the most part, military academies, colleges for special populations such the hearing or vision impaired, and a smaller number of colleges that focus on certain categories of clustered occupations or interests, for example agriculture, religion, ecology, or, as in this case, art and design. Art and design, in fact, is one of the most common areas of specialisation in higher education. The National Association of Schools of Art and Design, founded in 1944, has 322 members, of which 37 USA members are free-standing colleges of art and design. The other members are diversified institutions, most of which include degrees in the fine arts within their liberal arts programmes or in communications and graphic arts, and a smaller number granting degrees in some aspect of design.

Most of the strengths and weaknesses of this college can be traced to its (1) more specialised academic focus, (2) smaller scale of operation, or (3) particular types of skills that are learned.

A. Strengths

i. Leadership

The success of a small, specialised college hinges to a large degree on the vision and leadership qualities of the college's President and the support of the Board of Trustees. In this case, the choice made for a new President led to greater inclusivity in planning and responsibilities, which is what led to a new vision for the college and its learning environment.

ii. Tighter focus, in this instance on creativity

Specialised colleges are better positioned to more finely hone the skills they want students to develop with required and optional courses that complement one another. The city's arts and design cluster becomes the context for learning across more varied subjects, from biology to writing.

iii. Stronger sense of community and esprit de corps

Students who have a greater number of interests in common are more likely to find friends with whom they can relate, and their student body can develop more cohesiveness. This was best illustrated at MIAD by the *Compassionate Project*, cited earlier, which engaged about a third of the entire student body.

iv. Deeper faculty expertise

By offering a narrower set of programmes, the college can employ more faculty members with experiences and skills that are more directly relevant to the interest and career plans of students. Such faculty are better able to integrate their practical knowledge into the curricula.

v. Stronger connections with industry

Institutions are more likely to establish closer ties over time to those employers that need and depend on the talents they develop. MIAD's ability to develop long-term relationships, including financial support, internships, and adjunct faculty, is in part because of its focus. The connections are enhanced by having a Board of Trustees that has a deeper appreciation of the college's curricula and that benefits from its successes.

B. Weaknesses

i. Lack of understanding of career track in feeder schools (secondary education)

The more specialised a college is, the less feeder school counsellors understand the intricacies of its particular career paths and economic opportunities. Artistic talents, for example, are rarely encouraged in secondary schools, often because the federal data are unable to project employment.

ii. Smaller population from which to recruit

Recruitment must be more targeted to those students that have the needed talent or potential talent and interest. Focussing on creative occupations is particularly challenging because the career tracks are not as well defined or understood by high school teachers and counsellors. Current emphasis on STEM-based education (science, technology, engineering, and math) leads high schools toward careers around those skills.

iii. More limited opportunities for career changes without changing schools

If a student wishes to change career paths to a field outside of the college's area of specialisation, it would require changing schools. This could be more disruptive and may cause more difficulty transferring credits than in a larger scale, comprehensive university setting.

iv. Less diversity within student body

The other side of greater cohesiveness is more limited exposure to very different interests and perspectives such as students will find after they leave. Higher education itself is a constrained environment, but as in specialised institutions can be further limited. MIAD's student population does not come close to representing the population of the city, which is heavily minority. But MIAD offers career paths that secondary schools and parents do not encourage young people to follow because there is too much perceived uncertainty. Talented minority students are urged to enter high status fields in science, business, medicine, or law.

v. Diseconomies of scale

This is an issue for all educational institutions that choose to remain small but want to offer a wide range of services. Their fixed costs per student are higher. Staying small without raising tuition fees requires more creative revenue generation and allocation of resources.

C. Effects of Public Policies

Public education in America, not mentioned in the US Constitution, is governed at the state level and the costs of higher education are mainly the responsibility of the individual. The federal governments' interests are largely related to equity, to enable people with fewer resources to have access to higher education. The annual cost of an education at a private institution is now over $50,000 per year.

States provide support to public institutions but that support has been declining in recent years. For example, from 2008 to 2013, state aid to higher education in Wisconsin declined by 17.5%, its largest annual decline in 50 years. Higher education institutions are increasingly forced to raise student tuitions.

Federal support comes from grants and subsidised loans. But the current sequester of federal funds from the government has resulted in an 8.2 percent reduction in money for higher education and, without Congressional action, the interest rate on the loans are scheduled to increase dramatically in the summer of 2013.

Conservative state governments, which currently includes Wisconsin, recently have been attempting to use their financial support and influence to shift educational resources towards vocationally oriented programmes, those that were once called 'the useful arts', and away from cultural fields and liberal arts. Higher education measures success largely in economic terms - research and development dollars obtained by faculty, size of endowments, income generated by athletic teams, and, more recently, numbers of patents and new businesses produced, and the returns on investments in graduates.

This poses a challenge for programmes in the arts and applied arts to demonstrate their economic value, which MIAD does. Government in the USA provides little support for art or design. Industrial design, although vital to government efforts to promote advanced manufacturing, receives very little financial support. The USA does not license or provide recognition for designers and there are no state or national boards that certify an industrial engineer. Up until 1995, the USA Census did not even establish industrial design as a job category.[121]

Local policies and interests, increasingly favour MIAD. South-eastern Wisconsin's manufacturers are increasingly looking to design for their competitive edge, and MIAD is a partner in that effort. One result is that local businesses are more apt to invest in partnerships with MIAD. In a city working to develop a design cluster and establishing an organisation to accelerate design-based innovation and networking, businesses are more likely to want to invest in the programmes MIAD offers and look to its faculty and students as resources.

VIII. Best practice and transferable lessons

MIAD, as an example of a specialised college, has attributes that have the potential for adaptation to other institutions, in other places.

i. Contextual learning: MIAD's applications of contextual and collaborative learning, while quite common in many European systems, is still too rare in most of USA higher education. A small number of universities do offer cooperative education, and most colleges encourage limited internships. But contextual learning is rarely fully embedded into the curriculum or carried out in a collaborative mode with teams addressing problems.

ii. Multidisciplinary education: The idea of multidisciplinary education is also not commonly found in higher education, which is much more strongly oriented towards specialisation. Even though recent research has shown the value of double majors over a single major, most programmes do not want their focus diluted. 'Cultural workers are typically interdisciplinary and spark one another's energies across genres'.[122]

iii. Business relationships: Building close ties to the business community enables MIAD to identify real needs in the local economy that match the niche strengths of the institution and develop a network of industry partners that lead to internships, industry projects, and employment. Many colleges and universities hire adjunct faculty from industry, conduct joint research, and take on interns. But at MIAD, the scale and depth of the business relationships take it beyond what will benefit the business to the good of the students, institution, and community.

iv. Smaller scale: Smaller size offers advantages that much larger institutions cannot match. Some of the factors that have contributed to the demonstrated quality of public school education in smaller settings apply to higher education as well[123] – qualities like more personal relationships with and attention from faculty, and increased sense of place and community. Smaller size allows for more one on one interaction with faculty. In the case of MIAD, it means that the Provost and President know most of the students by name.

IX. Conclusion

MIAD's success is closely linked to three things: the vision and leadership of a new President and successful efforts to raise MIAD's visibility; the re-orientation of the city's economy towards design and innovation; and the social consciousness that the President and his staff have forged and fostered throughout the institution.

A. Deploying Design for Competitive Advantage and Economic Growth

Although design has always played a role in the success of many Milwaukee companies, it has always taken a back seat to scientific research and technology as the drivers of innovation and source of growth. That bias still drives most of the USA programmes intended to revive manufacturing. Milwaukee has been ahead of many USA regions with design advanced as an innovation and growth strategy in Milwaukee's Creative Economy Strategy. MIAD has been a vital factor in developing the city's design capabilities. *'A place's design education centers can influence local production, at least when the rest of the ensemble is present.'*[124]

In Milwaukee, that ensemble is present in force, with design-dependent local corporations, support from the Creative Alliance Milwaukee and MiKE, and an emergent 'design cluster'. In a survey of Milwaukee area manufacturers conducted in 2011[125], three in four responded that *'design can provide lasting advantages that cannot be easily duplicated'*. MIAD, as the premier source of industrial design talent in the state and one of the best in the nation, is best positioned to support design-led growth. As a result of the expertise of its faculty, and quality of its graduates, many of the city's leading manufacturers now look to MIAD for their creative workforce.

B. Nurturing Entrepreneurship

Entrepreneurship is becoming one of Milwaukee's highest priorities. Since discovering recently that the city ranked near last among cities in various measures of entrepreneurial activity, the city has supported programmes

to develop new businesses. MIAD is a source of new businesses. But those produced by MIAD are not the kind of businesses that are likely to qualify for or get federal grants, or receive the recognition given firms that spin-out of research labs or 'commercialise technologies'. They fly under the radar because their intellectual property is less likely to be patented and many plan to remain small- or mid-sized, which reflects the dominant structure of creative industries as defined informally in the USA and formally by the European Union's Directorate for Culture and Education. In 2010 the Milwaukee metropolitan area was home to more than 1,000 self-employed in specialised design services and 3,780 self-employed as artists, writers, and performers.

Almost four in ten 2012 MIAD graduates become entrepreneurs in some fashion, almost certainly a higher rate than most institutions of higher education, although those data are not collected nationally. MIAD supports entrepreneurial career paths by embedding entrepreneurial skills informally within the curricula and, for the most serious entrepreneurs, by offering a minor at Marquette University. Entrepreneurial preparation, however, may be a skill-set that deserves even more emphasis.

C. Increasing visibility

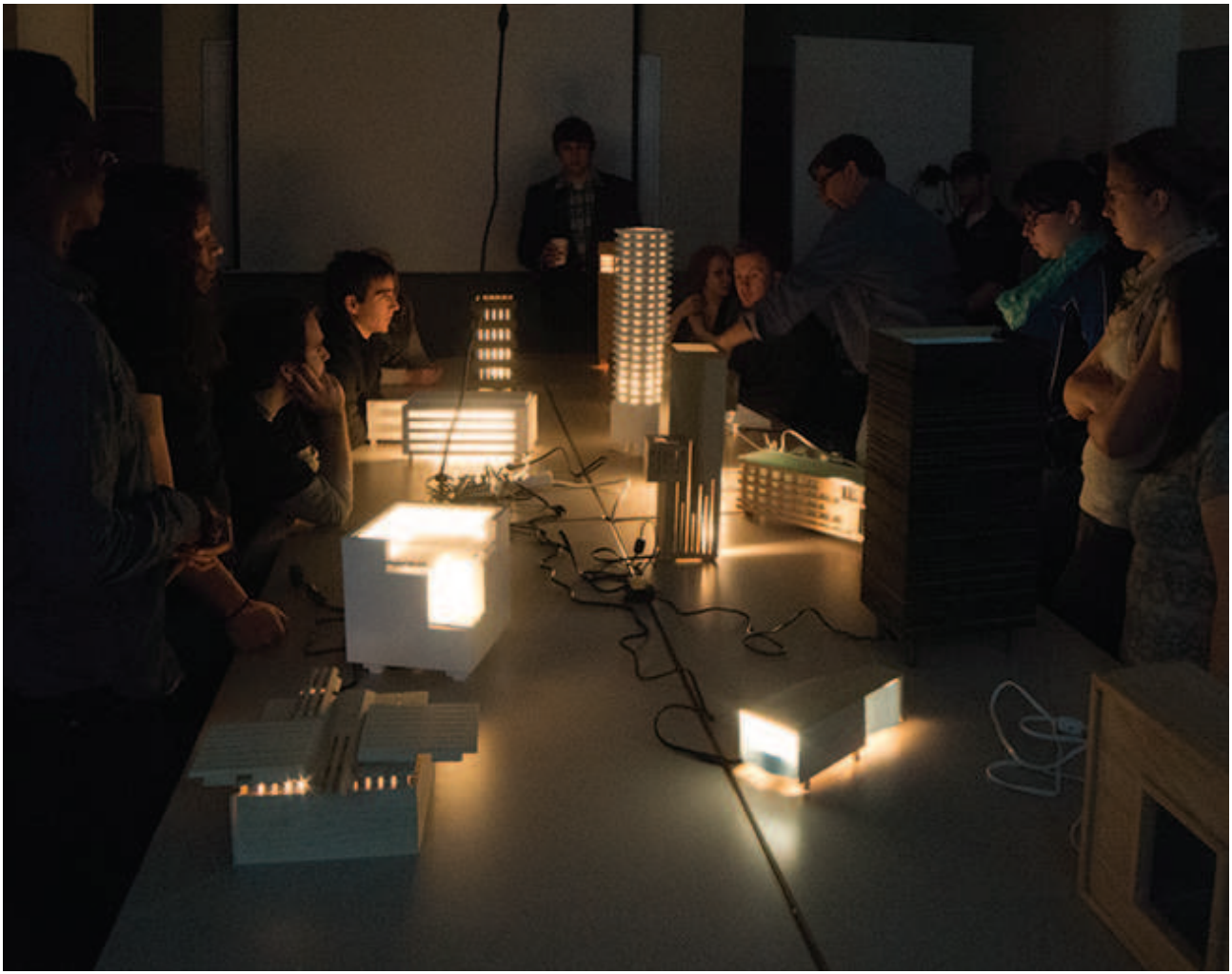
Although MIAD has been a part of the city's education system for many years, it's easy to be overshadowed by the larger institutions (see Appendix): Marquette University, University of Wisconsin-Milwaukee, Milwaukee School of Engineering, and even Milwaukee Area Technical College, a two-year college serving some 50,000 full-time, part-time, and non-credit students. As Board chair and advocate Madeleine Lubar noted, *'A lot of us were not familiar with MIAD, it was smaller but had lots of strengths'*. President Neil Hoffman, with help of his new Board of Trustees, set out to make the community more aware of its value and become more fully engaged in the community and economy.

One of the first events was called 'Creative Fusion', an annual event to reach out to the community and raise the profile of MIAD as well as sell art to raise money for the college. Another was the 'Creative Series', with MIAD bringing to Milwaukee internationally renowned art and design luminaries, to spend time on the campus with students but also in the community, through organisations such as Creative Alliance Milwaukee. The third is through high visibility projects with local industry.

D. Contributing to a 'Culture of Creativity and Innovation'

City officials, in the current competition to increase employment, believe that they have to be bastions of creativity to attract and keep the talented young people that growing businesses need.[126] The city develops it creative ambiance in multiple ways, from expanding cultural amenities to developing a social infrastructure for the creative class. In every case, the educational infrastructure plays a major role. Although each of the city's many educational institutions offers some number of competing programmes in the arts and design, none is totally dedicated to building a culture of creativity and innovation and few, if any, have such a high proportion of its creative graduates remaining in the area. Every MIAD graduate will epitomise the 'creative class' and most will stay and contribute to the – if not easily defined – 'culture of creativity and innovation.

Although design has always played a role in the success of many Milwaukee companies, it has always taken a back seat to scientific research and technology as the drivers of innovation. MIAD has been a vital factor in developing the city's design capabilities. Photograph © MIAD



112 This paper has been prepared for the OECD LEED Programme. See http://www.oecd.org/cfe/leed/ for further details.

113 Argosy Foundation (2005). *Milwaukee Arts and Culture District Research Report*, Milwaukee: Greater Milwaukee Committee, Updated 2008.

114 http://www.artplaceamerica.org/articles/americas-top-artplaces-2013/

115 Cultural Alliance of Greater Milwaukee and the Greater Milwaukee Committee, *Creative Industries: A New Economic Growth Opportunity of the Greater Milwaukee Region*, 2011. The study (http://rtsinc.org/publications/documents/CreativityWorksMilwaukeeFull_Report.pdf) included an in-depth assessment of the contributions of the education institutions and the education they offered intended for creative occupations and work. The President of MIA, Neil Hoffman, was a member of the study's steering committee.

116 The other is at University of Wisconsin-Stout.

117 Vetter, R., 'The Great College-Degree Scam', *Chronicle of Higher Education*, December 9, 2010.

118 'Skunkworks' is a term used in business, engineering, and technical fields to describe a group within an organisation given a high degree of autonomy and unhampered by bureaucracy, tasked with working on advanced projects.

119 See http://innovationinmilwaukee.com/

120 See http://creativealliancemke.org/

121 Molotch, H., *Where Stuff Comes From: How Toasters, Toilets, Cars, Computers, and Many Other Things Come to Be As They Are*, New York: Routledge, 2005

122 Ibid., p.179.

123 Stuart Rosenfeld (1987), 'Small is Often Better Than Big', Commentary, *Education Week*, January 14.

124 Ibid., p.178.

125 The survey, conducted by Stuart Rosenfeld for the Cultural Alliance of Greater Milwaukee in 2011 drew 120 responses.

126 Florida, R., *Who's Your City: How the Creative Economy is Making Where to Live the Most Important Decision of Your Life*. New York: Basic Books, 2008.

Case Study 4: Bishop Grosseteste University, Lincolnshire and BG Futures

Allison Lawrence, Bishop Grosseteste University, UK

'One of the most appealing features of universities from a local perspective is, of course, that – unlike so many other participants in the local economy – they are immobile. A university is necessarily committed to its community for the long term. '
(H Thorp & B Goldstein, *The Entrepreneurial University in the Twenty-First Century*, 2010)

'The university today finds itself in a quite novel position in society. It faces a new role with few precedents to fall back on . . . We are just now perceiving that the university's invisible product, knowledge, may be the most powerful single element in our culture, affecting the rise and fall of professions and even of social classes, of regions, and even of nations.'
(Clark Kerr, *The Uses of the University*, 1963)

I. Introduction

BG Futures is the Careers, Employability and Enterprise Department of Bishop Grosseteste University. It was launched in April 2012. The Careers and Employability Team and Enterprise Team were merged as it was considered the two strands were intrinsically linked and there would be mutual benefit. The Department consists of a student facing Careers, Employability and Enterprise Service, a Business and Enterprise Centre and a range of other 'Enterprise' related activity and emerging services for business. This case study will focus primarily on the development, work, community, and economic benefits of the Business and Enterprise Centre but will, however, make reference to other inter-related work of the Department as appropriate.

Benefits from the merge of Careers and Employability with Enterprise include the following:

- Improved knowledge of Careers professionals in relation to what business requires through increased exposure to business. This in turn ensures that business can benefit from more effective graduates;
- Increased opportunities for University graduates in relation to full- / part-time opportunities, internships, and placements and improved access for business to a pool of graduate talent. Longer term the Department has identified Micro- businesses and SMEs as a particular niche area for the University. These opportunities can be particularly useful for students in allowing them to learn about a company 'holistically' with a wide range of potential activities being available;
- Knowledge Exchange. Employers support the careers and employability agenda through offering input to teaching and learning. The University supports employers by providing expertise, for example, in working with young trainees and selection and recruitment practice, and a developing research and continual professional development offer.

The 'Enterprise' strand has three key aims:

- To develop a culture of 'Enterprise' across the University. The aim is to ensure that the University produces students who recognise and demonstrate 'enterprising' activities who will benefit the local economy both as employees and business owners;

- Provides opportunities and support for 'Entrepreneurship and Business start-ups' – for BG students, graduates and the local community;
- Offers support to business to encourage business success and growth.

The BG Futures Business and Enterprise Centre offers 15 incubation start-up units, virtual tenancies, 3 conference rooms, business 'start-up' support and exhibition space.

II. Project design and initiation

In December 2007 a new facility, the 'Sky Centre', was opened at BGU. Although the curriculum at that time offered no courses associated with business, enterprise, or associated subjects, there had been a growing demand amongst the student body to find out more about the 'Enterprise Agenda' and business creation as a potential career choice. Staffed by a single person, the Centre had minimal facilities but soon became recognised as the hub for all enterprising activity and information on business creation.

The appointment in May 2008 of a new Business Development Manager, together with an Officer in support, provided fresh impetus to the whole area of business and enterprise, and he was briefed to investigate ways by which closer links to private businesses, the public, and third sectors could be developed to mutual benefit.

At the time there was only one dedicated business incubator facility within the Greater Lincoln area which focussed exclusively on high-end media businesses. Through personal and institutional network connections and extensive hands-on experience of providing business start-up support, together with a clear policy direction provided by the then Regional Economic Strategy, the Lincolnshire Enterprise Sub-Regional Investment Plan, the Lincolnshire Investment Plan (ERDF), and Lincoln's Sustainable Community Strategy 2008 – 2023, BGU were able to identify a market failure (and opportunity) - within a 50-mile catchment area there was no facility providing in-house, dedicated support to pre- and start-up businesses that was affordable, inclusive, and of high quality, and that was targeted at areas of the local economy that were known to be lagging.

The project consisted of the construction of a multi-function business incubator and enterprise hub – BG Futures - on the campus of BGU, to facilitate the development of micro-businesses. This includes 'Hot-Desk / Virtual Office' facilities and provides on-site, logistical, and specialist knowledge support services. The 'hub' would not only provide physical and virtual space for new businesses, particularly for those in the target groups, but also become recognised internally and externally as the Centre for all aspects of new / micro business support – a key developmental goal.

A. Project Partners

The project was made possible through the cooperation of numerous partners, each bringing a different perspective to and expectations of BG Futures. Funding partners include Department for Communities and Local Government for ERDF funding, Lincolnshire County Council (with Bishop Grosseteste contributing the remainder) for capital spend.

A local business offers a bursary for up to two tenants to have six months' rent free. Businesses go through the usual recruitment process. All are made aware of the availability of the bursary. Where a business can prove they would genuinely struggle to pay the costs of a unit, BG Futures would put a recommendation if a strong business case has been submitted to the business offering the bursaries who would then conduct a separate interview. ERDF currently fund, for 3 years, the salary of the Enterprise Development Manager.

The process through which tenants are recruited and supported has been developed through consultation with local business. The assessment of business plans and tenant interviews are undertaken by BGU staff and a representative from business and/or the Institute of Directors. Support is offered from the business community in relation to regular tenant support- particularly in relation to legal, financial, and marketing support.

B. Specialist Expertise

Childcare and Early Years Development, a specialist teaching area in which BGU is acknowledged as being a regional leader, was seen by BGU, the County Council, the Sub-Regional Strategic Partnership (SSP), and the Regional Development Agency (RDA) as being a vital key with which to unlock the restricted potential of parents wishing to return to the workforce. Recognising that one of the most important areas for attention was the up-skilling of management and staff working in the sector, they readily supported the project proposals put forward.

BG Futures was, from the outset, designed to be different to other incubators through the differentiation of its target market. By focusing on the sectorial theme of Childcare and Early Years Development, a growth area that could be serviced by graduates of BGU and users suffering from a broad range of disadvantage, we aimed to address need and demand that was not currently being met, yet identified in key policy documents as priority areas. This in itself demanded a different approach.

C. Sustainability and time-scales

The project is a long-term on-going concern, expected to continue to bed in to the local and regional economic landscape and to continue to act as a growth stimulator, and an attractor and retainer of skilled talent for micro-businesses. The money awarded for the project was capital. In addition, ERDF funding has been awarded to support the services of the Enterprise Development Manager. BG have underwritten this post following the ERDF funding period. Therefore in the long-term BG Futures will be self-sustaining (although non-profit making) through revenue gained from unit rentals, services to business, and the hire of conference facilities.

III. The Ethos of Knowledge Exchange partnerships

The University learned from talking to, and working with, target beneficiaries that a lot of people wanting to explore and develop a business idea, even some of those already trading, are simply not ready to move into managed workspace without there being intimate, dedicated, support, including that from non-business disciplines, at the earliest possible opportunity and throughout the

early stages of development. There is a need to break down identified barriers, many due to false perceptions and myth, if we are to 'tap-into' a pool of talent formed from individuals and groups who otherwise would not progress their ideas because of being marginalised, frequently by circumstances beyond their control.

The combination of on-site support, selection criteria, and bringing businesses together under one roof, develops a creative environment in which start-up enterprises can flourish and grow, through networking opportunities, collaboration, inter-trading and opportunities to learn from their peers, along with the more formal support mechanisms provided through government funded projects. Essentially, we intended to create a community of like-minded people, united in a common goal – business sustainability; people prepared to work with and support each other, benefiting from each other's skills, knowledge, and experience and utilising networks and contacts as a 'force-multiplier' with BGU, it's staff, and facilities, providing professional, quality support across many areas and access to markets that otherwise might prove challenging to 'crack'.

For BGU, BG Futures provides the perfect focus for enterprise-related Knowledge Exchange activities and a means by which, together with partner organisations, we can begin to address key areas of need across the City of Lincoln and beyond. BG has a long and successful history of addressing the under-representation in Higher Education of people from disadvantaged socio-economic groups and low participation neighbourhoods, maintaining recruitment from these groups at a level well above the Higher Education Statistics Agency (HESA) benchmark. Figures at that time (2007/08) showed BGU were 3rd in the UK for the percentage of students from NS-SEC classes 4-7 (which placed BGU 1st in the East Midlands). The HESA Performance Indicators for 2007/08 also showed that BG had the second highest proportion of students in receipt of Disability Study Allowance in the East Midlands with 7.1% against a benchmark of 4.2%.

These statistics simply serve to highlight the ethos of support and valuing the individual that underpins all activities at BGU, and it is that ethos that we see as being fundamental to the success of this project. This project is not only about creating new enterprises: it is equally about developing the individuals who own and work in them. By creating an atmosphere of support and understanding we want to encourage people to try, to take a risk, knowing that they are not alone in their venture. We want to work with people to improve their self-confidence and belief, to enhance their communications skills, and feelings of self-worth, equally as much as providing them with the tools and skills for business. In doing so we help to address key policy drivers at a local, sub-regional and regional level.

Following the Manager's appointment, August 2008 – December 2008 was used as a project definition phase. During this phase the shape of the project, cost and potential delivery and support partners were defined. Key amongst these were the City Council, County Council and the Chamber of Commerce who all lobbied strongly for the project to go forward In August 2008 a presentation was made to the Board of Lincolnshire Enterprise (SSP) who were strongly supportive of the concept. In January 2009 an

application for Single Programme funding and ERDF was approved by the Local Management Committee (Lincoln) and EMDA to be taken forward to full application.

During the summer of 2009, Key Information Sets were collated. These included the 'Impact of Travel Plan', consultation with local residents, environmental and acoustic impact. The full application was submitted in late 2009 for a total of £1.15 million with the balance, some £600,000 to come from BGU reserves. In early May 2012 the Board of the East Midlands Development Agency approved both Single Programme Funding and ERDF.

Following the change of Government in 2010, Single Programme funding was withdrawn at virtually no-notice. However, successful negotiation was undertaken with Lincolnshire County Council for £240,000, as elected members were incredibly supportive of the concept of the Business and Enterprise Centre despite the pressures on Local Government at this time. BGU being a small HEI at the heart of the community with strong local partnerships meant it was able to communicate the vision and economic benefits that the project would bring. The facility was opened on the 12th December 2011 by the Chief Executive of Lincolnshire Co-operative Ltd who also serves as Chair of the Greater Lincolnshire LEP and Chair of the Chamber of Commerce, amongst other influential positions related to the economy and well-being of Lincolnshire – a deliberate statement about the importance of the project, particularly in such difficult times.

BG Futures provides 15 business incubator units of various sizes ranging from 8 m2 to 25m2, in-house enterprise development staff, support facilities such as reprographics and IT and a range of meeting / conference / exhibition rooms. Affordability, due to the relatively small size of the units, has been a key consideration as this can be a major factor in the success or failure of a start-up SME. Units are currently charged for at the rate of £150 per m2 inclusive of all utilities including broadband and telephone but excluding VAT and Small Business Rates.

Potential tenants may be at the pre-start or start-up stage or within 2 years of commencement of trading to qualify. There are also two financial bursaries, one currently secured, provided by a local businessman to encourage and support those with the right attitude but who couldn't otherwise afford the rental charge. Tenants enjoy 'easy-in/ easy-out' terms of one month's notice from both parties and the tenancy period would normally not exceed two years to allow others to benefit from the support provided.

'Hot-Desk' and the provision of 'Virtual Office' facilities are another example of supporting SMEs and micro-businesses. For as little as £25 per month a service is offered where a virtual tenant can use BG Futures facilities and support, without renting a physical office space.

BG Futures was intended from the outset to target specific beneficiary groups such as migrant workers and their families, women, those from communities suffering the greatest deprivation, and the disabled, all of whom tend to be more marginalised economically. By doing so, Futures provides a complementary offer to that available elsewhere in Greater Lincoln, builds on the extensive experience of the institution in these fields and will be a key deliverer of Knowledge Exchange and wider considerations, such as those found within the 'Big Society' agenda. There is

For Bishop Grosseteste University, BG Futures prvides the perfect focus for enterpise-related Knowledge exchange activities and a means by which the University can begin to address key areas of need across the City of Lincoln and beyond. Her Royal Highness The Princess Royal visited Bishop Grosseteste University on Friday 15th February 2013 and stopped by to meet tenants at BG Futures. 2013 © Bishop Grossteste University

potential with the move of some public services, to offer support to public sector staff wishing to start their own businesses, including via social enterprise models.

Outreach and support to other businesses beyond BG is also undertaken in support of the local economy. Pro-bono (free) services are provided one day each month by local professionals covering accounting, legal, and marketing for businesses and their staff. These areas have been identified in collaboration with tenants who identified them as priorities for support. Initially targeted at Futures tenants, the offer has now been extended to new-start businesses across the City and beyond.

A. BG Futures objectives

The following have been identified as key strategic aims, designed to maximise institutional resources and to stimulate local and regional economic growth.

i. To facilitate the development of new micro-businesses

BG Futures Business and Enterprise Centre was designed with 'micro-businesses' in mind. Units were created from just 8.4sq metres which had a rental value of just £ 105 per month plus VAT plus business rates (if applicable). In addition, the relationship that the University had with local business meant that a local benefactor offered two bursaries for potential tenants who could show how they would benefit from this support.

Support is available to potential business from pre-start. The Enterprise Development Manager on site is able to support with business planning, potential sources of start-up and signposting to other support agencies. ERDF funding has been awarded to support the costs of this role. In relation to recruiting businesses the University took the view that they would like to create a diverse community of sectors rather than, the model of a 'creative' hub, for example that other Universities had developed.

It was felt that there were several benefits to this approach. Having a diverse group meant that there were greater opportunities for the community to work together rather than in competition. There have been several examples of collaborative working as the services of many of the business complement each other and make a stronger business offer. For example, two of the businesses have worked with Bishop Grosseteste on a scoping offer focusing on services for schools. There have been examples of design, web, and print delivered by one business to other tenants. The Health Screening Service based in BG Futures has recently been awarded a contract to offer a screening service for BG staff; two of the tenants are involved in Summer School activities, and a film production company based in BG Futures has been commissioned by Bishop Grosseteste and other tenants to produce short films.

The Centre was able to target potential tenants who were socially and economically disadvantaged. Two offices were equipped for potential tenants with physical disabilities. Links have been made through to the local Disability Employment Adviser to raise awareness of the facility for potential applicants.

Highlighting business advisory services, a smaller/specialist university can also provide consulting services and networking opportunities to local businesses, particularly SME's, that are in such short supply following

the changes made to the Business Link offer. SME's, unlike larger enterprises, usually don't understand how a HEI can support them and often feel intimidated by the size and reputation of larger institutions. BG Futures has increased its PR activity, personalising this through, for example, profiles of staff in the local business press.

ii. To achieve 80% occupancy for BG futures by December 2014

By 1st August 2012 the Business and Enterprise Centre was 100% full. In fact at the end of 2012, the centre surpassed this by 2 companies sharing one office space and the successful relocation of one of our original businesses. The centre has not needed to engage in large marketing campaigns to achieve full occupancy. This we believe was again in part to accommodating the facility at a small HEI. Potential tenants have come to BG Futures Business and Enterprise Centre principally via referral. Of the 18 business tenants (16 current tenants), 4 have been via referrals from other tenants, 7 from partners / networking groups where information has been passed on. (The BG Enterprise Development Manager is a part of a Lincolnshire Incubation Centre Managers network which cross refers potential tenants). A further 2 were 'anchor tenants' who had premises space at BG prior to the new facility, 1 saw the external advertising on campus about the facility and 4 had an existing relationship with Bishop Grosseteste.

iii. To provide graduates of BG with 'start-up' practical support and facilities

BG Futures Business and Enterprise Centre has principally recruited non-BG Graduates. We are confident, however, that in the future there will be a number of our own graduates taking tenancies. The strategy adopted for recruiting tenants was that the most important thing in the early stages was to get a vibrant community up and running. Due to the nature of the two year tenancies, this means that spaces will become available intermittently. The team have recently undertaken sessions with all level 4 and 5 BG Undergraduates to make them aware of the offer. The Enterprise Development Manager has been a part of these sessions. The offer has been made that even if a student is considering self-employment as one of several options, or extremely early on in their thinking, they have the opportunity to talk this through. An Enterprise and Entrepreneurship Degree has also been under consideration. Whilst the focus of the degree is not just offered to those wishing to start a business, it would inevitably attract a number who will be interested. BG Futures provides an excellent facility for recent graduates to start a business in an affordable, supportive environment. The experience of planning this has led the team to explore further whether Entrepreneurship will be offered as an element of other degree programmes.

iv. To provide enrichment to the BG Community through the housing of 15 businesses.

This provides opportunities for students all stages of their educational experience to participate in knowledge exchange, and is a key area that is starting to demonstrate significant develop. Businesses have offered placements to students. For example, New Youth Theatre (where the

Director is a BGU Alumnus) have offered placements to our Education Studies and Drama in the Community undergraduates. Other students wanted experience of working in a setting with parents and babies and so a contact was made with 'Tots on Tour.' One of the businesses offering Management services have been involved in the development of the Enterprise and Entrepreneurship Degree. Tenants have led on sessions such as social media, and chiropractic services which have also been available to academic staff. This is an area that we see developing further. Students are being introduced to tenants through induction sessions, group visits on Open Days. Several tenants are very keen to support including recruiting interns through the proposed BG Internship programme.

V. To provide on-going support when businesses are established

On-going support for businesses is approached and provided in several ways:

- **One to one mentoring** and support from the Enterprise Development Manager. Examples of this have included problem solving sessions when business have encountered difficulties and wanted support with the way forward. Support is also offered to help tenants make a smooth transition into suitable premises;
- **BG Futures events.** These have taken place either as workshops. One very popular one was run by a local business man who is exceptionally successful with regard to owning numerous businesses and having a good story to tell in relation to growth. He was able to inspire and bring the community together. These events have also provided tenants with the opportunity to provide an update about their products or services. One business per event has the opportunity to make a longer presentation. These events have also helped to facilitate peer support between the businesses and help them identify potential areas for collaboration. Staff from across the University are invited to attend. Again, facilitating these links and networks;
- **Business clinics.** These have taken place monthly, supported by two major local employers offering legal and financial support. A marketing clinic is about to be tested. These again have been set up using the contacts from BGU and are of no cost to BGU or tenants. Again these clinics have been developed based on business need - local businesses identifying the support they require and BG Futures responding to this.
- Information is regularly distributed via a monthly **Newsletter** and on an ad-hoc basis as information is received which will benefit tenants - for instance if the team receives information on sources of new funding for local business;
- **Workforce Developer**. This focuses on the role of universities in designing and implementing workforce training programmes with, and for, local businesses. If combined with the 'employer' role described above, it can provide a more comprehensive package for both employers and universities in understanding the activities required to effectively recruit and train local residents rather than 'importing' talent from outside the economic catchment area which has direct benefits for

the local economy. Simply put, local staff tend to spend locally whereas 'visiting' staff tend to spend where they are domiciled. However, this is not the complete picture. By developing the local workforce, in conjunction with employers, the following are also key outcomes:

- Employers gain confidence that investment in growth, new plant or processes will be serviced by an appropriately qualified local workforce without an undue time-lag;
- Inward investment will be encouraged by the presence of a skilled pool of manpower;
- Ambitions are realized resulting in positive social impact across generations; adults become successful models for their children.

Recognising that learning doesn't have to take place in a formal way, BGU is a leading light in the Government sponsored Workplace Learning Advocates Programme. Its business incubator, BG Futures, took part in the pilot funded through BIS and was recognised as being the first nationally to facilitate informal learning to SME's within an incubator setting. The reach of BGU was subsequently extended. Firstly, by the incubator Manager becoming a trained WLA and then Lead WLA within Lincolnshire, providing advice and support to other newly qualified WLA's across the county. Secondly, he was then asked to 'train the trainers' as the programme expanded and now has joint responsibility for delivering training across an area bounded by the Humber in the North, the Black Country in the West, London in the South and East Anglia to the East. Being small doesn't necessarily reduce impact.

IV. Impacts

Given that BG Futures is still in its early days, measuring its impact on the local and regional economy remains an on-going priority for the University. To date the break-down of 18 businesses who have had full tenancies are as follows:

- 13 were complete new start businesses;
- 3 were in the first 2 years of start-up;
- 2 were anchor tenants who had previously had tenancies at BGU;
- 7 became virtual tenants;
- 3 of these were past BGU students, 5 virtual tenants were new start-ups.

As of June 2013, BG Futures tenants and business owners account for 38 posts. A conservative estimate for the future would be for 20 jobs created per year. However, it would be reasonable to expect, that as support services for business grows along with virtual as well as physical tenants this could be greater. There is clear evidence of the impact of the businesses from a local, regional, national, and international perspective. Two of the businesses have primarily customers from the Middle East. Bishop Grosseteste University is engaging with one of the businesses to develop Summer Schools.
Furthermore, the experience of BG Futures to date demonstrates how local purchasing programmes

create 'win-win' partnerships between universities and communities: the programmes provide investment for local businesses while creating improved service and delivery of goods to universities, given the close proximity of local vendors. Smaller and specialist universities tend to have a greater impact due to their location in less populous locations compared to larger universities.

Short and medium term impacts are also specific to individual businesses and sectors, and two of the BG Future tenants (see Table 1 for information about each) provide examples of the type of micro-businesses supported and grown over the course of the project.

A. IBEX

In March 2012, Dr Ahmed Elseragy, an Egyptian citizen living and working in Lincoln and London, applied to BG Futures to become a tenant of the Business and Enterprise Incubation Centre. Although his professional area is architecture and sustainable development, he wished to create a new business to address an identified need and niche in the marketplace. He had no previous business experience. Dr Elseragy and company (IBEX) are involved in promoting international recognition in the context of innovative learning, bespoke short courses, knowledge / cultural exchange programmes and education partnerships between international and multicultural nations (the UK, Asia, Africa, Gulf States and the MENA region). They support establishing international links between local and regional educational and professional institutions with their international peers as know-how and expertise providers. IBEX aims to help UK institutions raise their international profiles overseas through different international short-courses, academic activities, and partnerships.

IBEX mission is to put young people in touch with, and ahead of, future opportunities by helping them gain understanding, acquire knowledge and develop application and problem solving skills thus enabling them to work competitively in a global, interdependent, and culturally diverse world. IBEX vision includes the Knowledge and Cultural Dimensions of Globalisation. As an institution Bishop Grosseteste University is looking forward to developing win-win relationships with Dr Elseragy and IBEX with a view to bringing overseas students to BG and increasing ties with a range of countries, which will benefit not only the university but also the local economy

B. Multi-Sport Pro

Multi-Sport Pro (MSP) had been trading for less than a year when they applied to BG Futures for a unit in the business incubation centre. Run by two recent graduates in their early 20's, the business was struggling to break into the school's market where they wished to provide curriculum delivery of sport together with after-school and holiday provision.

Following their successful application they began working with BGU, facilitated by BG Futures staff, to better their understanding of the market, develop their offer and improve delivery. The result is that they now employ six BG Education Studies & Sports student's, have more than doubled their workforce of self-employed trainers, increased their geographical coverage from the City of Lincoln to embrace the whole county and beyond,

and are now offering placements to BG students. Their next step is to employ one, possibly two, managers / administrators to free them up to work more strategically at growing the business further whilst considering becoming a franchised operation. The owners readily admit that without being in BG Futures and having access to the support from BGU, the pace and scale of their growth could not have been achieved.

C. Creative Hope Studio

Thom is the owner and Creative Director of Creative Hope Studio. As a studio they cover 4 areas: Graphic Design; Web Design; App Development and Sound Design. Thom started the studio in May 2012 as a sole-trader with just two clients; he is now managing a staff of three that work with over 100 clients around the UK.

BG Futures asked Thom to give a bit of background as to how he started his micro-business, and why he was keen to work with the University on the project:

> *'From our experience of working with another studio, we learnt that we wanted to provide an honest, creative and approachable design studio. With that in mind it was our aim to secure 2 years of work before the first day of commencement of official trading. Soon after, we secured two retainers with a total projected income of £62,000.*
>
> *The first phone call made on the opening day was to BG Futures for an enquiry about offices; that day we secured the ability to use hot-desking and haven't looked back since. In the first month we picked up more clients and work to the total of £3,207 [...]*
>
> *[...] As we said we love design, and we think we are pretty good at it, but one thing that does worry us is getting the business side right. We want to be honest in all areas and not cut any corners, so being in a place that can help us with our business concerns, is a life saver.*
>
> *We are also passionate about networking and passing on our thoughts and skills. We have already been able to bring over £4000 of work to other businesses within BG Futures and we look forward to being able to do more of the same, but also being able to learn from other peoples abilities is an opportunity we don't want to miss.'*

Creative Hope Studios has identified the following as short-term goals:

- To have a place we can call home;
- To help other businesses understand and develop the importance of good design;
- To continue to be creative thinkers and visual problem solvers;
- To win more awards for the fine work we produce;
- To have 2 more retainer deals secured within the next 2 years;
- To have 5 staff members within 2 years.

Thom and his business are among the most successful of the BG Futures tenants, but their story and their achievements are by no means unique. Table 1 (overleaf) demonstrates the variety of businesses benefitting from the services at BG Futures.

IV. Conclusion

The importance of a university to the success of business in a particular locality or region has proven to be particularly the case in the Lincoln and Lincolnshire context. As local communities focus on the importance of innovation and an educated local workforce to their long-term prosperity, a project like BG Futures offers a model for how a small and specialist institution can leverage its relative resources to make the most both of its scale and the importance of place. In order to do so the University is relying first and foremost on the most valuable assets in the knowledge economy: highly educated people, expertise, and new ideas. Working with various partners – in this case regional organisations that have now been replaced by Local Enterprise Partnerships, has further cemented the central role the University plays as a provider of infrastructure and expertise. The Greater Lincolnshire Local Enterprise Partnership acknowledged the importance of BG Futures and Bishop Grosseteste University more broadly to regional growth:

> *'Bishop Grosseteste University contributes to the economy of Lincoln in particular, and the area defined by the Greater Lincolnshire Local Enterprise Partnership (GLLEP) more generally, in a number of key ways. Directly, they bring enhanced spending power and economic stimulus through their students, visitors and as an employer, which has a particular relevance given that they are surrounded by some of the most disadvantaged communities in Lincolnshire. They also provide essential support to SME businesses, using their network and community connections to break down unseen barriers to participation; the success of the BG Futures Project bears ample testimony to this. They also have a vital role in influencing and communicating. Connected as they are to so many elements of the local community they occupy the middle-ground between the strategic positioning of the GLLEP and those involved in small business, students and the workforce and provide an ideal two-way conduit for all.'*

In the future, the presence of organisations like BG Futures may also attract other key economic resources to the region, including additional microbusinesses and – potentially – larger firms and educated individuals who may see the benefit of clustering close by, as well as financiers, entrepreneurs, and others seeking to exploit new ideas and the business opportunities that are beginning to radiate out from the this enterprise hub.

127 Please note that this list of tenants and collaborators was completed early in 2013; an updated list of tenants as of March 2014 is included in the Appendix to this report.

Table 1: BG Future Tenants[127]

Tentant	Status & Description
Tots on Tour	Tots On Tour works with parents, carers and their children and early years' professionals both locally and nationally, helping all children to become confident communicators.
Skills Reach	Provides consultancy advice on HR/Training and Skills funding together with business/training needs analysis. Skills Reach also provides project management.
Amethyst Health Screening	Their aim is to create a greater sense of 'well-being' and health in Lincoln and the surrounding areas. The company provides a health screening service designed for private and corporate customers.
Ruscello Management Services Limited	Dr Andy Brookes was made redundant from LCC at the start of the year and subsequently established Ruscello (Italian for Brookes). He provides management services aimed at improving performance through effective people management; change management and business systems.
New Youth Theatre	Rachel Jerem, joint owner of NYT with her husband Jason, graduated from BG in 2000, with a BA in Drama. NYT work with children from pre-school age up to 19 years putting on musical productions across the county and have now franchised their business.
Multi Sport Pro	MSP is a sports coaching company offering sports coaching to primary school children. They use the sports facilities at BG and are offering student placements. They are relocating from Enterprise at Lincoln. Stuart King and Simon Mowbray.
Blink Creative	Blink Creative is a video and event design company that considers clients 'message' and how that is communicated by thinking differently and producing something that impacts an audience in the most relevant and effective way possible. They are relocating from The Terrace. Richard Holland and Nikki Toyne.
ibex	International Cooperation and Development in Education, Learning, and Training, Internationalisation in Learning Skills, Higher Education and Research Links, Innovative Learning, Professional Training and Culture Exchange: Dr Ahmed Elseragy
Aspire Consultancy & Training	Aspire Consultancy and Training is a new social enterprise based in Lincoln, established in

Tenant	Status & Description
	response to the needs of communities to the government's vision of a Big Society and the impact of recent local and central government cutbacks to local service provision and facilities. First applicant to be awarded a bursary provided by Jon Thornes.
Creative Hope Studio	Graphic design, Web design, web apps
Abrahams Smart	Executive recruitment consultancy placing middle/senior managers in the built environment posts. Specialising in the Middle East but world-wide.
Lincs Psychotherapy and Counselling	Psychotherapy and Counselling services
EPIX Media Ltd	Digital media, web and app design. One area of work the company specialises in is time – lapse photography.
Marc Jones	A range of business ideas including bringing vacant private housing stock back into occupancy through Local Authority intervention and a sales/letting coaching service for buyers and vendors.
The Acorn Group	Stephen Allen runs a glazing and general maintenance company and has taken a 'Bronze' tenancy.
Legal 4 Landlords	Dennis Sanford-Casey runs a letting agency and landlord service franchise. 'Bronze' tenancy.
Paul Fox Home Interiors	Paul Fox runs a retail furniture business, 'Bronze' tenancy.
Cultural Learning	Rebecca Fawcett delivers and evaluates learning and engagement programmes in the cultural sector. 'Bronze' tenancy.
GO Fitness	Julie Whaley (ex-BG Graduate) is setting-up a business around personal fitness training, getting into running and delivering training qualifications. 'Bronze' tenancy.
EPICTS	To provide ICT Training and Consultancy services to schools (particularly staff), business users and the wider community particularly those in rural communities. Yvonne Walker is an ex-chemist and primary school teacher.
Squirl.Com	Sophie Coles runs a Peer – Business lending company.

Specialist Approaches to Innovation in a Global Context

In terms of innovation systems, modern theorists consistently emphasise the global contexts in which new ideas, products and companies must engage and, ultimately, compete. The global infrastructure that supports first and foremost the transfer of knowledge dictates the pace at which new ideas must be consolidated and exploited. Yet the nature of innovation, and the fact that the competition for new collaborators and markets takes place in a global context requires of the champions of new models, ideas and products a depth of specialist understanding combined with the skills to develop and appropriate capitalise on market gaps. These gaps can, in some instances, be tested and refined through engagement with local and regional players; for example, a new piece of agri-tech kit might first be developed to respond to a particular condition (for instance, national legislation about carbon-reduction targets, or a contained threat to food security), but when disseminated appropriately and with an eye towards replicable international markets, can eventually emerge as a global innovator. However, the local roots, and an understanding of the particular context that originated the innovation, remain pivotal.

The UK infrastructure encompassing research and development, of which Universities and Colleges are a substantial pillar, has worked hard in recent years to increase access to the innovations resulting from investment in Higher Education, the research and science base and skills. As global innovation systems demand higher skills of all developers, managers and graduate employees, working in tandem with specialised technologies, both must possess the flexibility to respond to changing contexts determined by changing conditions and the opportunities and challenges posed by collaborations. As each new idea or product develops, it must be fitted in to the system; there is a chain reaction that resonates across the workforce and the existing technological systems. Direct collaborations, spin-ins and co-investment with specialist industries – be they the 'undercapitalised' [128] creative sectors, maritime or agri-tech – appear to be paying dividends as the UK moves to develop more inclusive and holistic strategies for how to lever investment, thereby 'rebuilding the connection between basic research and applied science' [129].

Each of the following three case studies illustrates the value of in-depth specialist understanding and the potential for HEIs to bridge the gap between basic research and reactive, applied sciences, all of which rely on the ability of highly skilled graduates to absorb and apply innovations that emerge in real time, often from local, regional and / or national sources, within a global competitive marketplace.

128 Technology Strategy Board, *Creative Industries Strategy*, 2013-2016, p. 5.

129 Willetts, Rt. Hon. D., *Bledisloe Memorial Lecture 2013 on Science, Technology and Agriculture*, Royal Agricultural University, 31 October 2013, p. 8.

Case Study 1: Arts University Bournemouth and the Visual Effects (VFX) Sector

Professor Stuart Bartholomew, Arts University Bournemouth, UK

I. Introduction

The Arts University Bournemouth is a specialist university focussed on the development of creative professionals and their subsequent employment. Operating with national and international reach, the University develops the creative talents of its students in professional studio-based settings blending theoretical and practical knowledge and skills to support knowledge-intense occupations. The co-development of relevant industry-related education is one reason why graduates of the University achieve high levels of employability; the latest survey of graduate employment showed 97.7% of graduates in employment or further education and training six months after leaving the University.[130]

Visual Effects (VFX) is an innovation-led growth sector, with Gross Value Added (GVA) per head sitting at 20% above the average for the UK economy. As a key growth sector of knowledge-intense traded services, the Government has recognised the importance of maintaining a strategic partnership with the VFX industry; [131] in his March 2013 budget the Chancellor specifically registered the growth-potential of 'our world-class visual effects sector'. The existing strength and anticipated growth of VFX also informed local and regional discussions, wherein the benefits of building an alliance between HEIs, graduates, and employers was viewed as key to the success of the Dorset region: 'This sector [Digital Media] has enormous potential for job and wealth creation, especially if the LEP can help to retain graduates from local education institutions.' [132]

II. The Visual Effects (VFX) Sector

The VFX industry's cutting edge and international success is based on the fusion of scientific knowledge and artistic talent, which in turn leads to the creation of new, innovative, and bespoke products that compete in an international marketplace. As a result of this requirement for a specialist skill-set, the sector is particularly reliant on a highly-skilled and creative workforce with the potential to operate across and between traditional disciplines. In terms of scale, the sector is heavily reliant on small- to medium-sized enterprises. Soho (London) is the UK hub of the VFX industry, housing the largest companies: Double Negative, Framestore[133], MPC, and Cinesite. When compared to other sectors the size of even the largest companies is modest: a 'large' company typically has between 500 and 1,000 employees.

Working with Framestore and its collaborators in the VFX industries, Arts University Bournemouth recognised that the continued success and expansion of the VFX industry was challenged by the lack of a talent pipeline, and weaknesses in the continuing personal and professional development of existing employees. Addressing these challenges is key to the industry's future success and to ensuring UK companies meet growing demand and remain ahead of their international competitors. In the words of Alex Hope, CEO of Double Negative: 'UK VFX companies are turning away millions of pounds worth of work every year for one reason: they can't find the skilled people they need.'

Whilst attracting new talent was viewed as critical to growing the employment base of companies like

Framestore, equally important was the need to maintain the currency of existing employees; the industry's pace of change demands that they constantly upgrade and extend their skills (both technical and artistic). Barriers to such skills development - particularly for relatively small companies in an expanding sector - are the high cost, limited provision, and absence of time to release employees from the workplace.[134] Yet it is recognised that, in the VFX context as well as more widely with respect to innovation-driven micro-businesses and SMEs, that if the barriers to growth and competitive threats could be successfully addressed, the UK had the potential to carve out a commanding global position in a high value knowledge-based industry.

III. Building the Bridge

Building the Bridge (BTB) emerged from this context as a HEFCE Catalyst funded project developed by the Arts University Bournemouth (AUB) in partnership with Framestore, one of the UK's leading VFX companies with whom the University had an existing relationship. The project addresses key barriers faced by an export-orientated industry, formed of significant numbers of small- and medium-sized enterprises that puts at risk business and, ultimately, sector growth and graduate employment. Addressing the barriers to the VFX industry's growth and development, BTB was designed to extend and deepen the existing and successful collaboration between the AUB, Framestore, and the VFX industry that has led to the establishment of a company 'OutPost' in the AUB's Enterprise Pavilion.[135] The OutPost is linked by broadband to Framestore's headquarters in London, and globally to its offices in New York, Los Angeles, and Montreal, and works on A-list VFX products, such as 'Sherlock Holmes II' and 'A Game of Shadows'.[136]

Working with Framestore as a lead partner, BTB planned to test and pilot multiple bridges between the VFX industry and HE. Specifically, BTB has five inter-related strands of activity, namely:

- Creating a talent pipeline for the VFX industry;
- Supporting the successful transition of graduates from HE into employment with the VFX industry;
- Enabling the continuing personal and professional development (CPD) of VFX employees;
- Facilitating the exchange of knowledge and staff between the VFX industry and the AUB through staff exchanges;
- Establishing an innovation hub and graduate academy for the VFX industry within the Dorset LEP area.

The key outputs for the project focused both on the strategic compatibility of the collaborators and the potential to specifically enhance the talent pool for a growing creative industry. They included: an increased flow of undergraduate / postgraduate students seeking employment in the industry as a result of the VFX buddy scheme and associated mentoring; the effective transition of new talent into the industry through the use of internships; the provision for industry-specific and personalised CPD activities and programmes; the exchange of staff and knowledge between Framestore and the AUB; and the establishment of a VFX innovation

hub and academy in the Dorset region in 2013-14 to support industry innovation and employability in an internationally competitive sector.

Likewise the projected BTB outcomes included 14 undergraduate and 7 postgraduate courses, with circa. 2175 students supported by Framestore. The minimum number of students receiving industry mentoring in 2013-14 was set at 81, with a projected 240 in total expected to benefit from the scheme by the end of 3 years. BTB also projects a minimum of 36 new internships and graduates employed per annum by 2015-16, with over 1000 employees expected to have engaged in at least one CPD activity by the end of the same year. A minimum of 2 'tutor' internships/ exchanges per annum were also created through the project, allowing for direct exchange of HE and industry expertise in terms of pedagogies and skills development.

A. Specialist industry staffing and collaborative training needs

Many of the UK's VFX competitors now off-shore or out-source VFX prep tasks to low-cost centres in Asia. As partners in the BTB project, Framestore noted that, were the issue of the talent pipeline not addressed quickly, in the future they might also be forced to follow suit. However, these roles remain an important entry point for many UK graduates into the VFX industry and Framestore has a good track record in promoting individuals through these departments; indeed they noted that some of their most talented artists started there, at the start of their talent pipeline, and that they aimed to retain (albeit small) Tracking and Paint & Roto teams in the UK. In addition to prep-teams in the London office, as of 2012 Framework employed 16 artists at their Bournemouth OutPost. This team is supported by a full-time production co-ordinator, a part time Studio Manager - part-funded (circa 13%) by AUB; one of Framework's senior artists devotes 2 days a week to the operation, overseeing quality control.

As a result of this collaborative investment in staffing and facilities, the OutPost has emerged as a cornerstone of Framestore's UK graduate recruitment strategy and provides a template for graduate engagement for their overseas facilities in North America. Outpost employees gain genuine work experience on A-list VFX projects for major studios, and are the beneficiaries of mentoring and training that shapes their future careers at Framestore or other VFX facilities.

Locating Outpost on-campus at AUB has also proved to be an attractive prospect for graduate employees, in that it provides a 'half way house' between student life and what can be a daunting industry. Graduates learn the ropes in a supportive atmosphere whilst still enjoying the many benefits of student life. By design, the collegiate ethos relies on the previous year's graduates teaching the current cohort, creating an environment where questions are welcomed, and where mistakes are expected and accepted and, in turn, integrated in to learning and training pedagogies. However, the demands of a career in VFX are made clear from the outset, and the quality threshold is high. When Framestore's crew move from Bournemouth to the London-based facilities they arrive fully equipped for the challenges ahead.

Both Framestore and AUB viewed the Outpost as

central to the success of the BTB project. This previous collaboration was viewed as the half-way point in the middle of the bridge. Through the BTB project, with its focus on mentoring, 'buddying', training and internships, the public and private sector partners aimed to transform the Outpost into a nascent Graduate Academy. Under the aegis of BTB graduates from a variety of courses could access training in cutting-edge VFX software and techniques, gain an understanding of workflows with the aim of efficiently undertaking the 'day job' of VFX professionals, and meaningfully contribute towards genuine projects in production, all the while benefiting from mentoring and training that enables their next step on the VFX career ladder.

B. Collaborative Course Design

BTB was structured with the aim of receiving a graduate intake each summer, with a further post-graduate intake each autumn. In keeping with the responsive nature of the collaborative partnership, the size of intake was determined by project need. Each graduate starter was assigned a buddy or mentor from the existing Outpost team on a 1:1 basis. New entrants would be regularly and rigorously assessed, and only those who reached a given standard would move to the next stage in the training programme. Overall BTB and Outpost planned to end each year having retained and fully trained the 'cream' of the previous graduation class. Some of these artists will be ready for promotion whilst others will remain in the prep teams as senior artists to mentor the next intake of graduates. Each summer (prior to the graduate intake) the management team would run an intern programme for second year students. These would be selected from students who have attended classes in Tracking and Paint & Roto techniques taught during term time by existing OutPost staff; again, the size of intake will be dependent upon production need.

The course structures were envisioned thus, with flexibility built in – through management and continuous review by the BTB Steering Group.

i. Strand 1: Strengthening the Pipeline of Artistic Talent

This could be divided into a multi stage process throughout the student lifecycle:

- Keynote lectures and workshops, with themes including:
  - Introduction to VFX;
  - Show-n-Tells on VFX Projects tailored for particular courses: e.g. animation, model-making, etc.;
  - Insight into VFX workflow and roles within it;
  - Life briefs and Master classes.
- Mentoring:
  - Specifically for students in model-making, animation, and film production.
  - Mentors are based in Framework's London facility, and primarily engage with mentees and critique work through online software.
  - Tracking and P&R training (2nd year students):
  - Students are assigned 'Buddies' from within the OutPost.
  - Those who participate in this course can also apply for OutPost internship.

- Online Forums:
  - AUB students are encouraged to join online forums where they can engage with other students, buddies, mentors and OutPost staff.
- Paid internships (for 2nd year students):
  - Hosted by the OutPost.
  - Paid internships are only open to those who have participated in the Tracking and P&R training, with the number of interns dependent upon production need.
  - Extending 6-8 weeks over the summer vacation.
  - Student exchanges with Centre NAD in Montreal also form part of this strand.
- Prep for employment, including:
  - Mock interviews;
  - Reel workshops;
  - Partnering with AUB's careers advisory service to prepare materials and services for jobseekers;
  - Talks by recent graduates and interns;
  - Use of the Framestore's London cinema for the Graduation show.

ii. Strand 2: Framestore Staff Development

VFX is the art of recreating the real world in the digital or virtual space. Framestore noted that their junior staff members in particular possessed the technical abilities associated with the Computer Sciences and related disciplines but needed to develop their creative skills to match. Hence BTB included provision for Framestore to work with AUB to develop a suite of classes that would train their junior artists to observe and replicate the world around them, as well as courses that would enhance their our senior team's ability to analyse and appreciate what they are seeing.

It was determined that this strand of training would have to be delivered at Framestore's London facility using a short course model, as such are the demands of VFX that it would not be possible to commit crew to more than a few hours at a time. This can be divided into two thematic programmes:

- Practical/Work related courses:
  - Life drawing;
  - Sculpture;
  - Anatomical drawing;
  - Acting for animators;
  - Tailoring/Dressmaking basics;
  - Observation' classes;
  - 'Appreciation'.
- Non-work related courses:
  - Art appreciation;
  - Script writing;
  - Performance.

iii. Strand 3: Staff exchanges

- Outpost staff teach Tracking and Paint & Roto modules to existing graduates.
- Faculty internships provide an opportunity for AUB staff to take on a summer summer placement at Framestore's London facility.
- Technical staff buddying and / or internships provide an opportunity for support staff at AUB to understand how equipment is utilised at a live facility.

C. Dissemination, impacts and sustainability

BTB is central to both AUB and Framestore's compatible strategies for achieving a step-change in employability, collaborative course design, and knowledge exchange. It offers an innovative HE-business solution, fusing the different knowledge and expertise of the HE and business partners, bringing forward new private investment. Based on the AUB and Framestore working in complementary ways to combine academic and industry training and skills development, BTB leverages each partner's specialist knowledge and expertise to enable outcomes and impacts that would otherwise be very difficult, if not impossible, to secure.

The level of public investment in BTB reflects the potential of the VFX industry to be a source of future job and wealth creation. The resulting private and public benefits could not adequately or reasonably be achieved without HEFCE's support of the project through the Catalyst Fund; public investment in the project leverages three times as much private investment for each £1 invested, with HEFCE Catalyst funding attracting forward private investment, and helping to fund the initial expansion of infrastructure required for BTB to become established. Equally, at a time when private investment in the UK economy is at a low point, BTB has encourages real collaboration with and co-investment in a joint venture that benefits both the private and public sectors.

BTB has been planned using tried and tested project management methods that reflect AUB's commitment to the project, including rigorous and detailed assessment processes, involving a comprehensive time line of activities and risk analysis. The governance and management structure involves both steering and management groups with representation from senior management both at AUB and Framestore, with clear links between the two. Outputs and outcomes are regularly monitored in detail, with both quantitative and qualitative baselines for each strand of activity captured and documented at the commencement of the project. Progress towards achieving the planned outputs and the outcomes is reviewed monthly by the Project Management Group and every other month by the Steering Group.

For the University, working in close partnership with, and co-investment by, the industry and professionals it seeks to serve continues to be of vital importance in terms of its international academic and sector reputation, its offer to existing and future students, and its role as an economic anchor vis-à-vis the Dorset LEP and the wider region. BTB duly enhances AUB's role as an economic anchor for the Bournemouth, Dorset and Poole sub-region, which has acknowledged weaknesses to its industrial structure, resulting in the net outward migration of graduates (reflecting the persistent problem of insufficient graduate-level jobs). The BTB project has, as a result, been fully discussed with the Dorset LEP and structured so that it aligns with the local economic growth plan; BTB will also be included in emerging prospectus for European Structural Investment Funds and has the potential, through Horizon 2020, to attract additional investment in the region.

The principle of co-investment is central to BTB with all parties making financial contributions and investing substantial amounts of senior staff time. In

terms of financial sustainability and co-investment, value-for-money is an underlying principle of the AUB's procurement policy, whilst for Framestore the need to closely manage margins requires strict cost control. In relation to the procurement of IT equipment, the largest area of infrastructure spend, the AUB has developed close relationships with leading companies, including Citrix[137] who are advising and assisting the University to develop an appropriate model of the hosted environment at a significantly reduced cost.

Dissemination of the learning and best-practice associated with BTB and the wider AUB collaboration with VFX is expected to take place through the following channels:

- presentations to national and international conferences and workshops;
- engagement with sector bodies, including relevant sector skills councils;
- sharing knowledge with specialist university networks and groups, e.g. GuildHE, Universities UK, Universities South West, UK Art and Design Institutions Association (ukadia) and Council for Higher Education in Art and Design (CHEAD);
- the Dorset LEP and other LEPs (on request);
- publication of open-source materials on the AUB's website;
- and articles published in various trade press and newspapers.

Finally, the essence of BTB is to build and deliver a portfolio of high-quality products and services working in conjunction with Framestone and the VFX industry who demand, and accept, nothing less than the highest possible quality standards. Engagement with commercial partners places a demanding, and unforgiving, scrutiny on outputs. Additionally, all CPD materials and courses will be subject to AUB's academic quality assurance policies, placing an additional check on the quality of the content and assessment of the learning. In choosing to work with the AUB, Framestore offers strong evidence that the University is able to meet these exacting quality thresholds.

V. Conclusion

Driven by the fusion of technical and artistic talent, VFX is one of the UK's newest and most successful innovation-driven industries. Working together to share knowledge and expertise has been identified as the only way of achieving the development of the multi-disciplinary skills required by the VFX industry to sustain growth. This approach is novel for the VFX industry and places HE knowledge at the core of the industry's innovation ecosystem, a role for HE highlighted in the *Government's Innovation and Research Strategy for Growth*.[138] The intention to fuse different fields of knowledge and systems of thinking underlies the BTB project, and AUB, Framestore, and the VFX industry's longer-term collaborations, with the aim of further strengthening an industry in which the UK has a comparative advantage.

130 Higher Education Statistics Agency, *Destination of Leavers from Higher Education, 2010/11* (2012).

131 Department for Business, Innovation and Skills, *Industry Strategy: UK Sector Analysis* (2012), p. 32.

132 www.dorsetlep.co.uk/projects

133 www.framestore.com

134 See A. Hope and L. Livingston, *Next Gen Transforming the UK into the world's leading talent hub for the video games and visual effects industries* (London: NESTA, 2011).

135 http://aucb.ac.uk/about-us/campus/enterprise-pavilion/

136 www.framestore.com/work/sherlock-holmes-games-shadows

137 www.citrix.co.uk

138 Department for Business *Innovation & Skills (BIS), Innovation and Research Strategy for Growth*, London, December 2011.

Case Study 2: Aalesund University College and the maritime industries

Professor Björn Asheim, Lund University, Sweden[139]

I. Introduction

Aalesund University College is a result of a policy of providing decentralized, tertiary higher education in Norway, in addition to the ordinary universities located in the main cities. This policy was initiated already in 1969 where three regional university colleges in Stavanger, Kristiansand, and Molde were given permission to start on a non-permanent basis. Today, two of these regional university colleges have become ordinary public universities (Stavanger in 2005, and Agder (Kristiansand) in 2007), while Molde obtained the status as a specialised university in logistics in 2010. In 1975 regional universities colleges were given a permanent status, and the number grew considerable to more than 20. The guiding principle was that each county in Norway, of which there are 20, should have a regional university college. The teaching given should primarily aim at providing relevant education for regional business, industry, and public sector jobs. Almost all colleges provided teaching in business management, and, in addition, other subjects relevant for local economic activities. The courses were originally 2 year undergraduate programmes, which were gradually extended to become 3 year BA courses when Norway, in 2002, adopted the Bologna principles of organisation of higher education.

Originally, these regional university colleges were primarily teaching institutions. Applied research was organised in collocated but formally independent regional research institutes, funded by a combination of state grants and local and regional contributions from business and the public sector, in addition to research grants from research councils and other sources achieved through competition.

In 1994 the regional university colleges were merged with other, tertiary educational institutions providing education in nursing, teaching, engineering, and information technology into state university colleges. Becoming state university colleges, a more comprehensive public funding model was established to also fund some research by the tenured staff. The conditions were far from as good as for the ordinary universities, where teaching and research activities roughly take up half of the working time. The university colleges on average are able to let their tenured staff with research qualifications (normally a PhD or similar level) allocate 30% of their time for research. This is, however, far better than comparable educational institutions, such as applied universities in Germany and the Netherlands, are able to do, where the staff in principle only teach. This gives the university colleges a research capacity which could be exploited to the benefit of local business and public administration.

Aalesund University College (AaUC) was founded in 1994 as a result of this reorganisation of professional higher education in Norway. Three former colleges in Aalesund, the College of Marine Studies, the College of Engineering, and Aalesund College of Nursing, were merged into one institution. The College has 2,000 students and a staff of 200, and is divided into five faculties: Faculty of Maritime Technology and Operations, Faculty of Business / International Marketing, Faculty of Health Care and Faculty of Natural

Science and Engineering. In this case study the main focus will be on education and research provided by the Faculty of Maritime Technology and Operations.

AaUC has a profile and identity which reflects the close collaboration with business and industry in the region. The close contact makes AaUC unique in a national perspective. The College aims to be close to the field of practice and to focus on innovation in interplay with business and industry. AaUC is situated in a region in Western Norway characterized by a strong industrial base with international competitive maritime and marine clusters which are vital to the national economy. The maritime cluster around Aalesund plays a pivotal role in maritime technology and operations, and is characterised by having a complete production chain in offshore shipping activities which operates in a global market and which has become a global knowledge hub. Over many years, business and industry in the region has been able to recruit highly qualified engineers from AaUC, and, more recently, the College has become one of the leading educational environments in maritime education in Norway. Within this area the College provides bachelor's and master's degree programmes specialising in maritime technology and operations, involving education and research in ship design and marine equipment, as well as in the operations of vessels.

This reflects that AaUC gives priority to those research fields that are closely linked to the core content of various study programmes, and to the needs of business and industry in the region. The vision of the College is to conduct industrial research and development, and to educate candidates whose qualifications are customised for this industry.

II. Theoretical perspectives: organisational and institutional aspects

To put this discussion in the right perspective, some introductory information has to be provided about the industrial structure and the location of research and R&D activities in Norway. The Norwegian industrial structure is highly specialised within 4 dominant sectors or clusters: oil and gas exploitation; maritime industry, mainly providing specialised equipment for the oil and gas industry (drilling platforms and other engineering based equipment as well as specialised supply ships); smelting of raw material, especially aluminium; and marine / fish farming. While the industry demonstrates a geographically decentralised locational pattern, the knowledge generation and R&D activity are highly geographically centralised.

A. Norwegian Centres of Expertise

Of the 12 Norwegian Centres of Expertise (NCEs), the leading national cluster programme in Norway organising the most internationally competitive industries within the dominating sectors mentioned above, only 1 is in Oslo and 1 in each of the other main cities: Bergen, Stavanger, and Trondheim. The remaining 8 of the NCEs are located outside the main cities in more peripheral areas, especially in the southern and western parts of Norway.

While these decentralized districts of SMEs rapidly developed international competitiveness and successfully exported a large share of their production, the comparable educational and research facilities were not present in

the majority of these regions. Traditionally, these SMEs neither employed university trained workers nor requested R&D based knowledge, as their mode of innovation was the experienced based, DUI (Doing, Using and Interacting) type.[140] Not even the majority of the regional university colleges provided, in most cases, relevant education and moreover seldom undertake research, as they were primarily teaching institutions, which were dominated by general business management courses and education for public sector jobs (e.g. teaching and nursing). Only those places which had non-university engineering colleges, providing what now is a 3 year BSc, could in some cases offer relevant education for these industries.

Thus, when increased international competition made it necessary to go beyond a total dependence on the DUI mode of innovation and to also acquire research based innovation input in a STI (science, technology and innovation) mode of innovation, these industries had to approach the Norwegian University of Science and Technology (NTNU) for assistance. This main technical university, which together with its applied research division, SINTEF, constitutes the largest technical research organisation in Northern Europe, has traditionally totally dominated technical education and research in Norway.

The Maritime cluster is part of the national Norwegian Center of Expertise programme (NCE) which is run by Innovation Norway and the Norwegian Research Council. To evaluate parts of the strengths of the specialist HEI approach, in this region in general and for the innovativeness and competitiveness of the regional industry specifically, it is worthwhile to notice that, in contrast to the Centre of Expertise programmes in Sweden and Finland, which (especially in Sweden) was based on a regional innovation system approach, in Norway it was basically a cluster programme which depended on the national stronghold for technical research, NTNU, together with its research organisation and other specialised industry research institute, for input of external R&D based knowledge.

The Norwegian model of Centres of Expertise (NCE), with a strong concentration and specialisation both with respect to knowledge exploration and knowledge exploitation (the dominance of the offshore oil and gas and maritime industries), and which has enjoyed positive lock-in for a long period of time, can contain a structural problem ending up in negative lock-in situations in a medium and longer term perspective. The lack of diversity in the Norwegian system may result in new and emerging industries (for example knowledge-based SMEs), which have little in common with the economically dominant existing sectors, discovering that the national and sectorial innovation systems are poorly adapted to their needs.[141] Thus, the NCE strategy is faced with the challenge of how to support the necessary diversity in the knowledge exploration subsystems of the national and sectorial innovation systems. One way to do this would be to open up, for the support of long-term and systemic relations, to internationally strong R&I milieus in areas which represent windows of opportunity for emerging industries in Norway, but where the necessary expertise cannot be found in the specialised research milieu in Trondheim. Another way is to upgrade research capacity in the NCEs

which is collocated with regional university colleges, as is the case for the Maritime cluster and AaUC. With a relevant exploration capacity at hand for the regional industrial cluster a regional innovation system can be formed. This would partly continue strengthening the existing industrial specialisation (path extension or positive lock-in) and partly also be better positioned to promote regional renewal, based on developing and adapting the competency and skills of the existing industry specialisation into related industrial production (path renewal).

B. Regional innovation systems and Triple-Helix

A regional innovation system can be thought of as the institutional and organisational infrastructure interacting and supporting innovation within the production system of a region. Thus, in case the following two subsystems of actors are systematically engaged in interactive learning it can be argued that a regional innovation system is in place: (1) The regional production system or knowledge exploitation subsystem which consists mainly of firms, often displaying clustering tendencies; (2) The regional supportive infrastructure of the knowledge exploration subsystem which consists of public and private research laboratories, universities and colleges, technology transfer agencies, and vocational training organisations.[143]

Over the last decade the international dimension of globally distributed knowledge networks has increased dramatically in importance. This means that it is more vital than ever for national and regional policy makers to understand how the international context interacts with region- and sector-specific conditions in affecting innovativeness, competitiveness, and economic growth.

Building regional innovation systems today often takes place in a 'triple-helix' policy framework. This is also the case for regional innovation policy programmes in Norway and is the model being developed in the formation of such a system in the Aalesund region. The triple-helix approach represents one strategy of improving the connectivity in a Regional Innovation System (RIS). It underscores the increased interaction and interdependence between universities, industry, and government in modern, knowledge-based economies by acclaiming the transformation to the entrepreneurial university. The difference between a RIS and a triple-helix can be summed up in the following two points: 1) triple-helix has an explicit positioning of the public sector / government / governance in its framework; and 2) it is a normative, policy oriented approach arguing that the three spheres should co-operate closely.

The triple-helix approach maintains that in a rapidly emerging knowledge economy those places with entrepreneurial universities would increasingly see growing demand for knowledge transfer to industry and, through government, to society.

C. From Mode 1 to Mode 2: Modes of organising university research

The move from the discipline-based 'Mode 1' model of university research to the interdisciplinary 'Mode 2' model is precisely a consequence of universities adapting to the needs of industry for R&D input, generated in collaboration between universities and industry.[145] Thus,

both approaches 'claim that universities and firms are working closer together than before due to the changing nature of the knowledge economy'.[146]

The Mode 2 literature argues that university research in general has become more contextualized and applied, and, consequently, more oriented towards adapting to the needs of industry and other potential users in society. Thus, knowledge production in Mode 2 is moving towards a new mode which is more problem-oriented, application and context-driven, and heterogeneous and inter-disciplinary, than the traditional Mode 1 paradigm, which is described as being dominated by disciplinary hegemony and often associated with the linear model of innovation.[147]

Furthermore, the Mode 2 literature does not only discuss how university research adapts to the need derived from innovation processes within firms, it also focuses on how universities should organise the research in order to make it more relevant to innovation processes in firms.[148] As part of the specific triple-helix context policies universities in Finland and Sweden (and later in Norway) for some years have been given a so called 'third task', i.e. to co-operate externally with the surrounding society in addition to doing research and teaching. The increased interest for and importance of the 'third task' of universities could be described as a change from mainly taking on 'generative' roles to engaging more and more in 'developmental' roles.[149] Generative roles refer primarily to the provision of limited, discrete knowledge outputs, such as scientific and technological information, equipment and instrumentation, skills or human capital, networks of scientific and technological capabilities, and prototypes for new products and processes in response to business or public sector demands.[150]

In taking on developmental roles universities, in contrast, constructively interact with broader regional governance structures and, thus, more directly promote regional economic development. Universities typically become involved in strengthening as well as creating new systemic connections within RISs, resulting in positive, long-lasting impacts on regional economic growth.[151]

III. Range of educational services for students

In the process of transforming the cluster from a regional industrial cluster to a global knowledge cluster, the Norwegian Centre of Expertise Maritime cluster started focusing more explicitly on the importance of innovation, research, and education by establishing a 'forum' promoting these activities. In this process the upgrading of the State University College played a strategic role. In an evaluation report of the cluster from 2012, the importance of the expansion of research activities by an increased number of academic staff as well as number of students at AaUC is emphasised several times, and that it has resulted in increased use of and trust in the capacity of AaUC. This expansion has been strongly promoted by the NCE Maritime cluster as well as large companies in the oil and gas sector of Norway, such as the state oil company, Statoil, by among other things providing 4 professorships paid by industry.

This has resulted in an expansion of education offered in English especially at master's level. In co-operation with industry two new master's programmes in Product

and System Design and in Ship Design have been started, adding to an existing master's programme in International Business and Marketing. The master's degree in Ship Design is offered as a part-time course. In 2013, a new master's programme in Management of marine operation will be started. A master's programme given in Norwegian on Machine Technic is requested directly by the industry.

The Faculty of Maritime Technology and Operations has in the study year 2013/2014 the following studies and the maximum number of student uptake (see Table 1).

There are also several courses at other faculties which are relevant for the maritime cluster:

- Electrical and electronic engineering (BSc)
- Computer science (BSc)
- Civil engineering (BSc)
- Geographical information systems (BSc)
- Managing marine operations (MSc)

The Master of Science degrees are taught in both English and Norwegian. Of the nearly 40 students on the two master's degree, about 20 come from industry.

In addition AaUC has been very active in offering life-long learning courses often directly ordered by the industry. The running of these courses is organized in a unit called 'Maritime Operations', which is fully owned by AaUC. In 2012 the college issued 1015 maritime course certificates. In 2013 the aim is to increase this number to 1050. Some examples of life-long and part-time courses offered by AaUC include: Anchor handling, platform supply, fast craft, costal navigation for apprentice pilot exemption, position references, ECDIS/AIS, SCTH – safe cargo transport and handling on offshore vessels, train the trainer, subsea/seismic in work, dynamic positioning, applied risk management, stability on offshore vessels, and language and culture.

Table 1:
AaUC Faculty of Maritime Technology Courses

Course	Max. Student No.
Product and system design (BSc)	30
Ship design (BSc)	20
Nautical (BSc)	40
Shipping and logistic (BSc)	45
Shipping management (one year programme)	10
Product and system design (MSc)	20
Ship design (MSc)	15
Automation	40

Moreover, in some of the master's degrees (Ship Design and Product and System Design) 12 best practice weekly modules are also offered as further education. The latest master's degree in 'managing marine operations', which is an experienced-based master's, is organized in sessions and is designed for professionals working in the maritime industry. Such persons can take single courses or the whole degree. There are also plans for a new bachelor's degree for ship engineers which is based on a vocational educational background and two years of practice from industry. In this way flexible studies are developed, of which parts

either can be taken as single courses or as a whole program. Both these studies are a result of requests from industry. All students obtain employment before finishing their degree. At the moment a lack of qualified workers are the main limiting factor for further growth in the region. All candidates on bachelor's and master's studies co-operate with the industry when writing their thesis. To facilitate this there is an extensive use of highly qualified persons from the industry (e.g. chief designer, R&D director, CEO of a shipyard etc.) as teachers on the bachelor's and master's courses. In addition some professor IIs (i.e. 20% professorships) are recruited from other universities.

IV. Range of support services for the business sector

The companies in the marine industry are internationally oriented and highly dependent on exports. Western Norway is a world leader in the maritime industry and has between 50 and 70 percent of the world market for offshore ships. The development of offshore oil and gas fields has meant that the industry has doubled its turnover in the period of just a few years. Today there are 213 firms in this industry of which 15 are involved in ship design, 14 are ship yards, 165 produce ship equipment, and 19 are ship owners. Thus, we find almost a complete value chain in this cluster.

AaUC is located in the Knowledge Park in Campus Aalesund together with the administration of the NCE Maritime cluster and the global training centre of Rolls-Royce as well as the most advanced offshore simulator centre for marine operations in the world (The Offshore Simulator Centre). This concentration of organisations represents a core resource in the new Norwegian Maritime Competence Centre, which houses education, research and 17 firms from the maritime cluster belonging to the Norwegian Centre of Excellence cluster programme in one new building. The attractiveness of this new Maritime Competence Centre can be illustrated by the decision of Rolls-Royce, which is one of the most well-known international firms of the cluster, to locate its global technology and training centre to Aalesund. To strengthen the relation between AaUC and the cluster the chairman of the board of the NCE Maritime cluster comes from the institution.

This collocation of the different activities of AaUC, the administration of the NCE cluster, the Offshore Simulator Centre as well as the global training centre of Rolls-Royce in the Knowledge Park in Campus Aalesund is very important. It creates proximity and maximizes knowledge spillover effects which promote innovation.

AaUC has been reorganised in this process of expansion and upgrading and a new department of offshore marine operations was established. This implies that research and teaching in technology and nautical subjects have been united within a common department. This change reflects the increased focus and strength within maritime education and research, which give AaUC a clear identity. As a result of this the institution is perceived by the industry of having become more business oriented, which is exploited by industry through common research projects as well as new education and training programmes.

The research is organised in a unit called 'Marine Operations in Virtual Environment (MOVE)'. In close co-operation with industry the following 6 research

laboratories have been defined. The concrete research projects now running are listed by title under each lab:

1. The Human Factor Lab: Main research areas: a) Testing of new equipment simulating human-machine interaction; b) Methods for risk assessment in socio-technical maritime systems.
   - Development of human-machine interface aimed at increased output from simulation training.
   - Ulstein Bridge Vision, 2010 – (development of a new design for ship bridge).
   - Utilisation of integrated simulator facilities for safety risk and performance assessment of demanding marine operations.
2. Machinery System Lab: Main focus on modelling, simulation and optimisation of machinery systems (including hybrid systems and milieu optimisation).
   - Integrated machinery systems.
   - Chief engineer.
3. Mechatronics Lab: Integrated interaction between mechanics, electronics, and software. The main focus of this lab is the development of smart functions on ship equipment such as cranes.
   - A flexible and common control architecture for marine cranes and robotic arms.
   - A novel integrated anti-sway system for Rolls-Royce marine shipboard cranes.
   - A novel climbing robotic system for ship anti-fouling, cleaning and inspection.
4. Ship Operation Lab: Ships' performance in various types of operations.
   - Integrated marine operations.
   - Virtual prototyping of marine operations.
5. Simulation Training Lab: Development of laboratories used in teaching and training in demanding maritime operations.
   - The virtual continental shelf.
   - Eco Wind (European Offshore Wind Service Project).
6. Design Lab: Innovation methodology and use of prototypes in development processes.
   - Re-modelling of lab.

Lab 5 is mainly used for courses and teaching in nautical subjects, while lab 6 to a large extent is exploited to assist students' work on building prototypes.

To illustrate the research focus of some of these labs: The Mechatronics Lab focuses on two general technical challenges: The first and most important problem is the navigation and control of vessels in complex dynamic environments, and the second is the enormous challenges faced regarding the deck operation. Here, maritime innovation is the key research focus. Efforts will be put to improve the design and operation safely and usability. The development of new maritime machinery systems will offer a novel alternative solution to the above-mentioned problems, thus, furthermore improve the technological level and productivity of the maritime industry. In parallel, bio-inspired robotic research is the other research focus of this lab. The lab owns several state-of-the-art mechatronic systems and robots, including climbing robots, modular robot, and swimming robot, which allow testing of a large number of new research ideas and also to providing

interesting systems for different levels of teaching activities at AaUC.

The research of the Human Factors Lab mainly revolves around understanding human factor issues that exist on the ship bridge assuming it is a focal point of control during a marine operation. The lab is most specifically concerned with resolving human factor issues in the context of advanced maritime operations such as anchor handling, platform supply vessel operation, and remotely operated subsea activities. From the standpoint of the cognitive and physical-human factor it means addressing issues of interface design and workspace layout in the ship bridge design. From the standpoint of the social-human factor it is about facilitating communication and addressing ways of measuring and developing competency and skills of maritime personnel. The aims of the research are to create knowledge that will ultimately lead to the design of next generation ship bridges that are modern, safe, and efficient

The expansion of the research capacity of AaUC strongly supported by the industry in the cluster has also resulted in a range of other collaborative research projects in design of machinery system, the promotion of safer handling of anchors, low speed operation at sea, extreme machine operations, innovation in global production, methods for design of propellers and steering systems of offshore ships, composite structures of offshore ships, new collaborative methods in a globalised world (open innovation), and advantages related to integration in modern supplier chains. The turnover of the research activity is 20 million NOK, and all projects are carried out in co-operation with industry. Thus, it is a question of Mode 2 and applied research and not basic research. In 2013 seven PhD students are affiliated with the research groups.

This expansion and upgrading of research would not have been possible without the recruitment of the four new professors paid by industry. These new professors are carrying out research into the importance of the human factor in the interplay with machinery, on machinery systems, and mechatronics. In addition, some of the most qualified professionals from the industry – at the moment four individuals - have part-time positions at the AaUC as professor IIs (20% professorships).

V. Strengths and weaknesses of the specialist HEI approach

The strengths of the specialist HEI approach lies in the increased proximity and accessibility provided by a collocation of both exploration and exploitation capacity which provides the opportunity of building a regional innovation system, which in this case did not exist before the expansion and upgrading of AaUC's research capacity. This is especially important in a typical engineering-based sector such as the one found in this maritime cluster, where interactive learning through face-to-face relationships is the main driver of innovation. This strengthening of regional research and education capacity moreover increases the attractiveness of the region, which in this case can be illustrated by the strong presence of the global company Rolls-Royce as well as other large, international companies. It also makes it easier to retain both local and foreign firms in the region in spite of high and increasing cost levels, as is the case in Norway. The only way to compensate for this

is to embark on the high road strategy of innovation-based competition, which must also be based on a constantly increasing educational and competency level in individual firms, as well as at the regional level in general.

The proximity obtained by the collocation of all strategic stakeholders of a triple-helix constellation has previously showed to be very instrumental for making such a framework work efficiently. Here we are not only referring to spatial proximity but also to the other proximity dimensions – social, organisational, institutional, and cognitive – which have a tendency of 'bundling' together with spatial proximity. This is not only of importance in the interactive learning based innovation activities between AaUC and the regional industry, but also with respect to a broader set of co-operation concerning voicing requirements with respect to new education from the industry side to AaUC, as well as more practical concerns of facilitating collocation of common activities, which has happened in this case, and improving transportation and infrastructure. One such example of the impact of an orchestrated voice from the region is the opening of a new direct route from Aalesund to Amsterdam by KLM, which dramatically improves the accessibility of Aalesund to the rest of the world. Before this new route Aalesund only had connections to Oslo and Copenhagen of the bigger cities, which often meant up to three transfers of intercontinental routes. This clearly increases the attractiveness of the region for foreign firms as well as giving the region an improved relative location in the global economic geography with respect to open innovation and participation in global innovation and value chains. Such voicing is clearly facilitated by the presence of social proximity / capital (namely, trust) and other relevant proximities.

The expansion of research capacity at AaUC is therefore of key importance in the transformation of the cluster from an industry cluster to a knowledge cluster of global reach. This also implies that the nearly total dependence on NTNU in Trondheim is somewhat reduced by the introduction of similar and complementary competence and research at AaUC. Based on this, one could say the we are witnessing a development from a regional industrial cluster to a regional innovation system with the knowledge exploitation subsystem (the industrial cluster) as well as the knowledge exploration subsystem (the university college) collocated and present in the region.

An important aspect of the upgrading of Aalesund is a change from a traditional, discipline organised HEI (i.e. Mode 1) to a HEI using the whole range of marine operations as a focusing device aiming at becoming an active partner for innovation and development activity in the firms of the cluster. This implies that AaUC has adopted a Mode 2 way of organising its education and research activities, i.e. becoming more interdisciplinary as well as problem-oriented, application and context-driven. This reorganisation of AaUC has gone hand-in-hand with the strategy of an increased need of, and focus on, innovation, research, and education in the maritime cluster. This has been implemented by organising a Forum for Innovation, Research, and Education as well as a Forum for Incubation and New Initiatives.

Another strength of a regional specialised HEI approach is the importance of an increased educational

capacity – especially if provided in English – partly to increase the local educational level and partly to attract foreign students, in addition to students from the rest of Norway. Norway lacks engineers even moreso than is the case in Western nations in general, and the only way to solve this problem is by either recruiting trained engineers from abroad or attracting foreign students to take an engineering education in the region to secure their relevance for the local and regional industry.

If this is a large problem for Norway in general it is on an even greater scale for a region such as the one studied here, as it is dominated by an international competitive engineering based industry on the one hand and had no offer of university level engineering education on the other. The only relevant technical education was a three year, non-academic engineering education. Thus, a strong upgrading of the educational offer with several relevant master's studies of which many is given in English, represents a very serious effort in educating more engineers in the region. These new students will have to be recruited both regionally and nationally in addition to attracting foreign students to the region. The upgrading of the educational capacity of AaUC has already given positive results by an increased number of students, both Norwegian and foreign, to the new master's studies in engineering disciplines.

The value of strengthening the regional industrial cluster by upgrading the knowledge generation capacity in the region can clearly have very positive effects on the international competitive regional industry, and given Norway's industrial structure and the location of the country's internationally oriented industry, this should not be undervalued. Furthermore, experience has shown that the presence of good local / regional HEIs attracts local students to university education that would not have otherwise entered into HEIs. The drawback with such a situation is reducing the geographical mobility of students nationally and internationally, which is strikingly demonstrated in Spain, where students prefer to study and stay in their home region in spite of the HEI not being of high quality and with low prospects of obtaining employment after graduating.

In this specific case the conclusion so far is clearly positive based on the increased research capacity, the wider educational offer, and the improved collaboration with local industry that the upgrading of AaUC has led to, which has had a very positive impact on the attractiveness of the region as well as the competitiveness of the regional industry.

One potential weakness of specialised HEIs is that their academic level may remain too low, because they do not have the capacity or economy to reach a critical mass necessary to secure and develop state-of-the-art research as well as research-based teaching. A highly international competitive industry cannot base their activity on suboptimal knowledge. This seems to be solved in this case by the heavy investments in increased research capacity paid by the industry and the recruitment of foreign experts as professors at AaUC. In addition, engineering-based industries such as the one in this maritime cluster generally claim that having research capacity close by which allows for face-to-face interaction in itself represents a competitive strength, even if it is possible to find even

more advanced research at other international universities. The spatial proximity between AaUC and the industry allows for, among other things, the employment of senior professionals from the industry at the institution as professor IIs and also having industrial PhD candidates (i.e. PhD candidates paid by the industry with an obligation to work 20-30 % in the company which pays) on a frequent and regular basis doing the relevant parts of the research in the R&D facilities of the firm. This type of personal interaction would of course be more difficult with a more long-distance relationship between industry and university.

Another potential weakness is that in order to reach critical mass in contemporary important fields of research for the local industry, the HEIs become too specialised and, thus, will not have enough capacity to initiate industrial renewal if/when the industrial cluster approaches negative lock-in situations. Here the advantages of proximity, especially the cognitive proximity, turn to a disadvantage if too many regional players are thinking in the same way. If so, the need for industrial renewal is not identified in time implying a danger for ending up in a negative lock-in situation. However, if the research at the specialised HEIs is more complementary to existing national research, they may bring about some renewal in the form of regional branching by providing related knowledge which the local industry can use to transfer into new but related production. There are signs that the latter is happening through the establishment of an emergence cluster in marine industries, supported by another Innovation Norway cluster programme called Arena.

These potential weaknesses or challenges can moreover be compensated by an organised collaboration with strong HEIs in Norway and abroad. Aalesund University College continues its close collaboration with NTNU in Trondheim as well as actively strengthening cooperation with leading technical universities internationally. The same picture is seen in other regions in Norway with NCE supported clusters where similar tendencies of changing from a situation from 'only' being a regional industrial cluster with no relevant knowledge generation capacity to becoming a regional innovation system. Of other examples worth mentioning is the light metal cluster at Raufoss, north of Oslo, where SINTIF has established an applied research institute in collaboration with the industrial cluster; Vestfold south of Oslo where the regional University College is collaborating with leading international universities; and in Gjövik, north of Oslo, where the regional University College established one of the best PhD educations in data security in the Nordic countries, in co-operation with Chalmers Technical University in Gothenburg, Sweden, which is one of the leading technical universities in the Nordic countries.

From a national perspective, one weakness of a strategy of specialised HEI institutions, in addition to the above mentioned, is the risk of spreading the resources available to the sector too thinly out to too many HEIs. This is especially a substantial risk in a country such as Norway which has a combination of a small population and a decentralized policy and is at risk of creating a number of HEIs that cannot offer education and research at a sufficient quality level. The risks associated include not achieving a critical mass of students, problems recruiting qualified staff, and

a general level of underfunding. Due to Norway's very strong oil and gas based economy the latter has not been the case so far, however, with falling oil and gas prices this could rapidly become a problem. On the other hand the decentralised location structure of the most competitive Norwegian industry provides good arguments for the current policy of also decentralising the research capacity.

VI. How policy has influenced the functioning of the specialist HEI

Policy has been highly influential in promoting the outcome presented in this case study. Three policy areas have especially contributed to the emergence and development of Aalesund University College:

- University reform
- Norwegian Centres of Expertise
- Regional policy

This is, thus, an example of other policy areas not particularly focusing on regional policy have had significant impact on the regional outcome of educational and industrial policies. The geographical expansion of the HEI system in Norway has provided the potential of locating knowledge exploration capacity in a geographically dispersed manner, and the public supported cluster program, the Norwegian Centres of Expertise, which the Maritime cluster is a part of, has had a strong influence on the increased collaboration between the firms in the cluster, as well as the realisation of the need for strengthening the competitiveness through increased focus and investment in higher education and research.

The Norwegian Centres of Excellence programme (NCE) was established in 2006. The NCE programme focuses on the most international competitive Norwegian clusters, and the programme is only supporting a limited number of regional clusters (12 in total). The underlying idea of the programme is to strengthen innovation and internationalisation processes in clusters that already are internationally competitive. Joint efforts by local actors are seen as important for maintaining and strengthening the competitiveness of the cluster firms. The strengthening should in particular take place by promoting collaboration between firms, R&D institutes and HEIs, and the public sector. There is thus an explicit support for the exploitation of distributed knowledge networks at regional, national, and international levels in this program.

The combination of a Scandinavian welfare state policy on investments in higher education and a Norwegian priority of regional policy have resulted in a strong expansion of HEIs outside the established, traditional university cities. The creation of the university colleges in the 1990 through a merger of several forms of post-secondary school education was a result of a restructuring policy implemented by an active minister of education, a Professor in Sociology at the University of Bergen with an American PhD. This merger, which has been criticised and has its problematic aspects due to the merger of very heterogeneous educational institutions, created, however, a larger critical mass regionally, which made it possible to upgrade these HEIs to university colleges with improved public funding.

In addition to the Norwegian Centre of Expertise programme there are also other regional innovation programmes such as the programme for Regional R&D and Innovation and the Regional Research Fund, organized by Research Council of Norway, which together has channelled a substantial amount of funding towards the regional industry and HEIs, and especially promoted collaboration between HEIs and regional industry, preferably in the framework of regional innovation systems based on a triple-helix constellation of regional stakeholders. Norway is perhaps the western country that has implemented the most radical regionalisation policy of not only regional (innovation) research but also of the funding system for such research through the initiatives mentioned above.

Thus, what we observe in this region is a typical outcome of a Nordic welfare state with a coordinated marked economy where the role of the state is significant. This is not least the case in Norway as a result of its strong economy and long tradition of social democratic, interventionist policies especially within education and public health. In addition, regional policy has always had a strong position in Norwegian policy, which has meant that an above average share of investment in public sector facilities and infrastructure have been allocated to the less central parts of the country. This strong emphasis on and support of regional policy is clearly stronger in Norway than in most comparable countries.

In a region such as the one studied in this paper, which has a long tradition of strong, outward oriented industry and entrepreneurs, having the absorptive capacity of making use of the proactive public policy, the importance of public policy cannot be underestimated. Thus, policy has had a significant impact on the outcome described, which would hardly have happened without the support of public educational and regional policy. Norwegian regions are too small to manage developing strong HEIs without massive national policy support.

VII. Key lessons for other places

This case shows that a combination of well-funded and relevant public policy initiatives both with respect to support of higher education and research, and industrial upgrading, and an international oriented and entrepreneurial regional industry, can produce successful results. This cluster has always been very international competitive and outward looking, which in combination with a high level of local entrepreneurship has made this cluster one of the most successful in Norway. The international orientation of the local industry, which has been strengthened by incoming foreign investments by global corporations such as Rolls-Royce, has educated the local industry and entrepreneurs what is needed to succeed in the increasing competitive, globalising knowledge economy.

Together with being one of the prestigious Norwegian Centre of Expertise clusters this has demonstrated to the local stakeholders that to accomplish the establishment of a regional exploration capacity of a world-class standard substantial investments had to be committed. The mobilisation of local industry money to co-finance the new professorships has been very instrumental to enable

a sufficient upgrading of the research and development capacity of AaUC. In addition to this local mobilisation, national money from the maritime and shipping industry, being one of the four most important export industries in Norway, was also accessed.

In this process of upgrading, individual academic entrepreneurs also have been of strategic importance in addition to the business entrepreneurs. This is in line with the original ideas behind the triple-helix approach that also universities needed to turn entrepreneurial to be able to respond to increased demand from international competitive industry. Individuals such as professor Hans Petter Hildre, Dean of the new Faculty of Maritime Technology and Operations and Per Erik Dalen, who is the director of the NCE Maritime as well as of Aalesund Knowledge Park, have played a very decisive role in achieving what is accomplished in the region. In addition, a national actor, Professor Torgeir Reve, at the BI Norwegian Business School in Oslo, was very instrumental in mobilising national industry resources in support of funding the 4 new professorships. Reve, who was previously the Director of BI is the 'Porter man' in Norway, meaning that he has carried out three comprehensive cluster studies over more than 20 years in Norway, the output of which has been the academic foundation for the NCE program. Reve is very well networked with Norwegian industry in general and especially with the maritime industry. Thus, as in most successful cases, individual entrepreneurs both in business and in academia often represent the sufficient condition for making things happen.

VIII. Conclusions

To draw general conclusions from specific cases, such as the one presented in this chapter, always offers theoretical, methodological, and practical challenges. This is not least the case for a study of a Norwegian region, as Norway has so many contingencies and particularities that make it rather unique. Not only the enormous oil and gas richness, the homogenous society and politics, the small population, but also the peripheral location of much of the country's most competitive industry, the long driven regional policy which not only represents one 'niche' in the national policy landscape but has a general impact on almost all policy areas, not the least on education and infrastructure policies, makes it a very difficult task to generalise from this specific case.

However, as said in the previous section, generally speaking a combination of well-funded and relevant public policy initiatives both with respect to support of higher education and research and industrial upgrading represent important necessary conditions for producing a positive outcome of engaging specialised HEI in regions to contribute more to develop local business and industry.

More specifically, the policy direction of Innovation Norway's main cluster program, the Norwegian Centre of Expertise, of mainly focusing on supporting path extension, i.e. creating positive lock-in in the traditional international competitive industry, has clearly demonstrated to be a success. Often policy analysts argue that public policy primarily should be directed towards supporting new path development as the firms themselves will be able to secure their positive lock-in. However, I am

quite convinced that the traditional industry sectors of Norway would have been in a much weaker state today if it had not got the quite substantial support through the NCI cluster program. Without this continued success of the regional located export industry, there would have been no 'market' for the upgrading and strengthening of the research capacity of regional university colleges, and, consequently, the impact of specialised HEIs in Norway would have been limited to education and the improvement of human capital in the regions.

On the other side it must also be said that concentrating all industrial and innovation funding on securing path extension leaves no capacity and economic resources to handle the very important question of promoting new path development. Especially in the case of Norway, with its strong dependence on oil and gas, a decreasing productivity, a very high-cost level, and an innovation and R&D capacity that is clearly below comparable countries, this is a rather scary picture and should constitute one of the major policy challenges.

Finally, with respect to regional specialised HEIs, the case supports a policy of giving such HEIs an increased capacity of doing R&D, especially applied research in the context of a Mode 2 organisational model. This guarantees the relevance of the research for the users in the region, and, thus will have the effect of a larger impact of the contributions of the HEI for promoting competitiveness, innovation, economic growth, and job generation in the region. Seen in this way, non-university HEIs, for example in Germany, the Netherlands, Austria and Switzerland, where the polytechnics are mainly teaching institutions, would be able to make a valuable contribution to upgrading the local industry, making it more competitive and innovative, and, thus, promoting regional economic growth, if the funding system was changed to allow for more research and R&D activity in these HEIs.[152]

139 This paper has been prepared for the OECD LEED Programme. See http://www.oecd.org/cfe/leed/ for further details.

140 Asheim, B. T. (2012): 'The changing role of learning regions in the globalising knowledge economy: A theoretical re-examination', *Regional Studies*, 46, 8: 993-1004.

141 Narula, R. (2002), 'Innovation systems and 'inertia' in R&D location: Norwegian firms and the role of systemic lock-in', *Research Policy*, 795-816.

142 Asheim, B. T. (2007), 'Differentiated Knowledge Bases and Varieties of Regional Innovation Systems', *Innovation – The European Journal of Social Science Research*, 20, 3, 223-241.

143 Etzkowitz, H. and Leydesdorff, L. (2000) 'The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple-Helix of University-Industry-Government Relations', *Research Policy*, 29, 109-123.

144 Lundequist, P. and Waxell, A. (2010) 'Regionalizing 'Mode 2': The Adoption of Centres of Excellence in Swedish Research Policy', *Geografiska Annaler: Series B*, 92 (3), 263-279.

145 Gibbons, M. et al. (1994) *The new production of knowledge: The dynamics of science and research in contemporary societies.* Sage, London.

146 Lundequist, P. and Waxell, A. (2010) 'Regionalizing 'Mode 2': The Adoption of Centres of Excellence in Swedish Research Policy', *Geografiska Annaler: Series B*, 92 (3), 263-279, p.266.

147 See: Gibbons, M. et al. (1994) *The new production of knowledge: The dynamics of science and research in contemporary societies.* Sage, London; Lundequist, P. and Waxell, A. (2010) 'Regionalizing 'Mode 2': The Adoption of Centres of Excellence in Swedish Research Policy', *Geografiska Annaler: Series B*, 92 (3), 263-279, p.266; Nowotny, H. et al. (2000), *Rethinking science: Knowledge and the public in an age of uncertainty. Polity*, Cambridge.

148 Lundequist, P. and Waxell, A. (2010) 'Regionalizing 'Mode 2': The Adoption of Centres of Excellence in Swedish Research Policy', *Geografiska Annaler: Series B*, 92 (3), 263-279.

149 Gunasekara, C. (2006), 'Reframing the role of universities in the development of regional innovation systems', *Journal of Technology Transfer*, 31 (1), 101-111.

150 Benneworth, P., Coenen, L., Asheim, B. T., Moodysson, J. (2009): 'Exploring the Multiple Roles of Lund University in Strengthening the Scania Regional Innovation System: Towards Institutional Learning?', *European Planning Studies*, 17, 11, 1645-1664.

151 Ibid.

152 Asheim, B. T. (2010): 'Contribution of research organisations'. In Potter, J., Proto, A., and Marchese, M. (eds.), *SMEs, Entrepreneurship and Local Development in the Marche Region, Italy.* OECD, Paris, pp.70-80.

Case Study 3: Harper Adams University, precision farming and rural enterprise

Dr David Llewellyn and Professor Peter Kettlewell, Harper Adams University, UK

I. Introduction

In September 2012 Harper Adams University (HAU) applied for HEFCE Catalyst Funding to invest in infrastructure supporting research and training in agricultural engineering, creating a new building for the National Centre for Precision Farming (NCPF). The initiative received widespread support from industry, and considerable interest from the UK Research Councils and the Technology Strategy Board (TSB). The potential to collaborate in the future with other universities conducting basic research in adjacent disciplines (for example, new forms of biosensors and in robotics) but which lack access to field scale trials or connections with the farming and agricultural engineering sectors that can be provided by the University, increased the project's potential unique value to the HE sector more broadly, as did its ability to facilitate the education of a new cohort of agricultural engineering graduates with the skills necessary to drive growth in the sector. Through the project the University, in turn, gained substantial engineering facilities to complement its large scale machinery base, and created a physical home for the Centre and the education and the subsequent applied research opportunities that this initiative is now generating.

In addition to providing a major boost to the UK's contribution to global food security research and practice, the NCPF has also helped to catalyse collaborative discussions about the need to build a series of such centres across Europe vis-à-vis Horizon 2020, with an emphasis on addressing Grand Challenges concerned with food security and sustainability. This collaborative initiative thus has the potential to engender a broader network working to significantly improve the uptake of advanced engineering techniques in European agriculture, and to provide access to European research funding and knowledge exchange and transfer opportunities for industrial partners (from SMEs to large conglomerates) and HE partners.

II. Global food security

In February 2012 a report commissioned by the Government's Chief Scientific Advisor as part of the Foresight programme, and later approved by the Government's Food Research Partnership, recommended that, 'we need to encourage the farming industry and the agricultural engineering business community to work with the innovators and educators to establish an appropriate focus for innovation that brings together the needs of agriculture, novel engineering and business opportunity'.[153] Global food security is an established Government priority[154] in which there have been numerous calls for an increased focus on applied research and education, and agricultural engineering has been identified as a key discipline in tackling global food security. The BBSRC's Advanced Training Partnership (ATP) scheme was implemented to address an identified need for postgraduate training in agri-food subjects (HAU is a participant in this programme); recent research by the Institution for Mechanical Engineering concluded that the demand for engineers over the next five years will far outstrip graduate supply.[155] In discussions about the Department

for Business, Innovation and Science (BIS) Industrial Strategy statement it was noted that, 'the Government is keen to boost the R&D performance of the farming and food industries, which lags behind that of other sectors'.[156] It has also increasingly been acknowledged that the emphasis of research in agri-food subjects has been in the biosciences, and that the role of engineering has been largely overlooked.

Within the sector the growing importance of precision farming was singled out as a research priority by the TSB, among others. Precision farming is a rapidly evolving concept which uses new technologies and advanced engineering to improve the efficiency and effectiveness of arable and livestock agricultural operations. Using advanced engineering in such operations can have positive impacts upon agricultural productivity, management of the environment (by minimising agricultural inputs such as pesticides and herbicides), and protection of natural resources such as soils and water.

Owing to its specialist expertise with respect to research, innovation, and teaching in agricultural engineering and precision farming the University devised a project designed to help redress this balance by providing a base for industry and higher education collaboration. Given the annual domestic market for farm and related outdoor machinery (c £2.5bn), the value of exports (c £1.8bn), and the fact that agricultural engineering supports a UK agricultural sector which annually yields more than £20bn of production to the UK economy, the need for continued innovation in this area, in support of economic development and job growth, was clear.

III. The NCPF and Harper Adams University

The University is committed to maintaining a presence in agricultural engineering because it provides a fundamental element of teaching across a broad range of related subjects, including agriculture. The NCPF directly supports HEFCE's activities in STEM subject development, and contributes to engineering as SIVS discipline. Furthermore, the project addresses the fundamental policy issue of food security from a radically different angle by enabling the UK higher education sector to develop and contribute engineering solutions to this major global challenge.

The Centre represents a key resource supporting HAU's efforts to place agricultural engineering at the heart of the UK's efforts to tackle the challenge of global food security.

The University published a new Strategic Plan in January 2012, identifying two key areas of potential growth; precision farming and the closely related field of soil and water management. The Plan noted that the NCPF will 'operate not only as a centre of innovation, but also as a facilitator and bridge between the wider agri-food sector and farm businesses',[157] adding that it will be important, 'to ensure that the University's unique provision in production agriculture and agricultural engineering [...] stand out' in the new student market.[158] This is particularly important in the case of agricultural engineering; a 2009 food security review by DEFRA concluded that expertise in agricultural sciences, and in specific technical areas (for example, soil science, weed science, 'whole organism' biology, and agricultural engineering) was not being replaced and that many universities were no longer teaching relevant courses in these fields. Furthermore, the Strategic Plan noted that

the Foresight Panel Land Use Futures report from 2010 concluded that, 'Advanced information, engineering, and biological sciences, including technologies such as precision farming and anaerobic digestion' will need to become more widespread. The document added that the University's 'plans in precision farming have the broad support of the agricultural engineering industry'. This is evidenced by the provision of equipment and expressed demand for graduates with agricultural engineering expertise in the elements of engineering and agricultural practice to which precision farming techniques contribute.[159]

The NCPF also helps to support regional development initiatives, and to cement the University's role as a regional enterprise leader. The Marches Local Economic Partnership (LEP) is aiming to generate development in the immediate sub-region, but recognises that, although the agricultural engineering sector is spread across the UK rural economy, around 80% of the land in the LEP is rural and that the food and drink sector is a key driver of the Marches economy. Whilst the primary beneficiaries of NCPF project are the agricultural engineering and farming sectors, the potential for the collocation of innovation-led SMEs in advanced engineering, the crossover value of the project to the Herefordshire Enterprise Zone, with its emphasis on the defence sector, and the new Jaguar Land Rover plant currently under construction near the University, were of considerable interest to the LEP. For example, the University projects a creation of 150 additional jobs in the agricultural engineering sector by July 2015, followed by an additional 200 by July 2016, and a further 300 by July 2020.

IV. Funding and leverage

The University actively sought to reduce the funding required from HEFCE by securing a large proportion of the cost of the NCPF project from other sources. It was determined that without the initial Catalyst Fund the initiative for this ground-breaking Centre, taken with industry and with other collaborative partners, could easily have been lost, with subsequent negative impacts on research and innovation in agricultural engineering in the UK, potential national and international collaborations between HE and industry partners, and student recruitment and employability in this key sector.

The budget for the building (and fixed equipment) element of the project was set at £2.93m. The NCPF project received a grant of £1.465m from the Catalyst Fund; the HEFCE contribution accounted for 50% of the cost of the project. Two small trust fund donations (the first of £150k and the second for £75k) – dependent on the completion of the HEFCE funding package for the project – were secured; a donation from the Douglas Bomford Trust was retained for the new building owing to the success of the NCPF Catalyst bid. The University also made a capital contribution £490k. The contribution from the Marches LEP (£0.75m) for a revolving fund loan came from its Partnership Development Fund, and has been negotiated on the basis of a short term (seven years) loan at an interest rate of 2.43%. The interest and principal repayments were incorporated in to HAU's institutional financial planning, and were deemed to be sustainable over the initial building phase owing to the Catalyst investment; the contribution was vital to enabling the Marches LEP leveraged funding

The National Centre for Precision Farming (pictured) represents a key resource supporting Harper Adams University's efforts to place agricultural engineering at the heart of the Uk's efforts to tackle the challenge of global food security, 2013 © Harper Adams University

to be released towards the scheme.

Although HAU sought capital funding from industry this was not forthcoming because of structural issues within the sector. It was also determined that, in the longer term, this would not be the best means of securing sustainable collaboration because HAU was keen to ensure that the project was seen as a resource for the entire agricultural engineering industry, and not one or two particular companies. This was also important in ensuring that cross-industry equipment and data standards, for example, were developed in a neutral environment. The University did, however, seek and secured pledges from a range of agricultural machinery manufacturers for donations of equipment, test and teaching rigs in support of the NCPF; the pledges amounted to over £0.5m in September 2012 (at the time of the Catalyst bid) and have risen as the NCPF has been realised. It is unlikely that this scale of donation would have been achieved without the completion of the new building.

V. Financial and environmental sustainability

The completed NCPF building has relatively high service demands because of the nature of the work to undertaken within it, together with suitable structural capacity to accommodate large-scale agricultural machinery. In commissioning and constructing the NCPF the University deployed an experienced estates team, and supervision of the construction phase included on-site monitoring to ensure that appropriate cost controls, standards of work, and timeliness of delivery were maintained by the building contractor. A value-engineering exercise was conducted to ensure that the tendered costs are appropriate and that value for money will be obtained. Furthermore, an independent assessment of the value for money of the construction costs of the building has been undertaken as part of the due diligence process followed by the Marches LEP; the project achieved a positive outcome in this review.

HAU's approach to procurement involved a rigorous assessment of accommodation requirements across the University to look at other options for the provision of the 'clean' engineering facilities required for the Centre, in a location that will maximise the benefits arising from the development. The selected site is immediately adjacent to existing engineering facilities, thereby reducing repeat building costs, and is next to farmland that has been dedicated to long-term controlled traffic farming trials that form part of the Centre's work. The site is also close to HAU's biomass technologies building to make economic use of a biomass district heating system. An assessment of costs compared with industry norms using the Building Cost Information Service (BCIS) and recent projects using the same BCIS methodology was conducted prior to tender, and the tender process was carried out in accordance with established University procedures.

Earlier work on the project also removed many of the risks associated with the pre-construction stages of the building programme. The scheme had already secured full planning permission at the time of the Catalyst application, and had been designed and tendered, so the building phase was able to commence very shortly after funding approval was granted in order that the facility could be made available for the 2013/14 academic year.

Operating costs for the NCPF project are also supported by income from two new taught postgraduate programmes. The first is an industry partnership programme in applied engineering with the defence sector and the second is a joint programme with China Agricultural University, the leading agricultural university in China. Staffing support has already been obtained from the Claas Foundation and the Douglas Bomford Trust (the latter in addition to their capital contribution), whilst equipment costs will be largely covered by donations from the agricultural engineering industry. The risks associated with operating were therefore addressed early on in the project, though fluctuating elements (such as student recruitment) require continuous assessment.

Finally, the University is highly regarded for its work on sustainable development and the use of its estate to support its objectives in promoting sustainable rural practices, and has recently won a number of national awards for its work. Sustainability lies at the very heart of the NCPF project, because it aims to develop and encourage the adoption of 'climate smart' agricultural practices that will be more effective in terms of food production and environmental management, but which will also improve business efficiency in the farming sector. The building will incorporate a number of sustainable features. It will use electricity generated from food and farm waste by our anaerobic digestion system. It will be heated by the development of a community biomass heating system feeding the next leg of our campus heating ring main. Energy saving fittings have been incorporated in the design and we intend, based on experience from other recent building projects, to pursue an appropriate BREEAM [160] rating for the building during the construction phase.

VI. Specialist expertise and skills development

The University has a unique understanding of the agricultural engineering sector, including precision farming techniques, and is the only provider of undergraduate agricultural engineering programmes in the UK. HAU developed the NCPF based on its specialist expertise in agricultural engineering, building on the strength of its crop and livestock research base, as well as its links to experts at other universities and research institutes (including Manchester, Rothamsted, and Aarhus in Denmark). The project was thus designed to act as a catalyst for research and education, innovation in the application of precision farming, and job growth in order to support the adoption of these technologies for the benefit of the agricultural and food production sectors. It was noted that there was also considerable potential for 'crossover' applications in other related 'all terrain engineering' fields such as construction, defence, and relevant sections of the automotive industries.

The project also directly encouraged essential developments in the provision of agricultural engineering at the University, which offers the only undergraduate courses in this discipline in the UK. The agricultural engineering industry advised HAU that it was in short supply of graduates skilled in the fields of mechatronics, hydraulics, and other aspects of advanced engineering and the agricultural sciences. The NCPF therefore directly contributes to addressing this shortfall in this important engineering specialism – a key growth industry – and, in

turn, provides access to UK and international students who are trained in new areas of agricultural engineering practice, providing a resource for applied research and undergraduate and postgraduate teaching that will address the needs of industry partners, while simultaneously speaking to student employability in an important sub-sector of the knowledge economy. As a marker of success, the University looks to increase recruitment of national and international students, with 40 additional engineering undergraduate and postgraduate students recruited from 2013, and to maintain graduate employability in engineering at over 90% each year in the period up to July 2020.[161] Thus the NCPF looks both to create new practices, markets and positions, both for graduates and for its industry partners.

From the start of the project HAU intended that the NCPF would act as a catalyst for cross-disciplinary and cross-sector activities that will contribute engineering solutions to agricultural problems through advanced precision farming techniques. It was determined that there is little doubt that demand for this type of innovation, and education, will grow as the need to address global food security becomes more apparent, and potentially more urgent. The resulting building is fully utilised by HAU's students (in engineering and in agriculture and food), by those wishing to retrain in new farming techniques, and also by industry, working with academic institutions, as it seeks new ways to generate efficiencies in agricultural systems and reduce the impact of agriculture on the environment. The NCPF also provides a much needed resource to foster interest in engineering at school level through initiatives such as HAU's work with the JCB Academy.[162]

Drawing on the University's considerable agricultural production expertise, through the NCPF HAU's engineering staff play and will continue to play, alongside private sector industry partners, a critical role in developing new strands of applied research to implement and 'join-up' precision farming technological developments; educate future generations of engineers and farmers on the application of precision farming; provide updating courses to develop the precision farming skills base of the current farming community; and act as an independent source of advice on precision farming techniques.

VII. Specialist intrastructure and HE collaboration

The NCPF building, which began operating in October 2013, supplements exisiting HAU facilities. The Centre was constructed in response to the growing need to provide 'clean' laboratory and workshop facilities for, in the first instance, HAU's engineering department in which research, teaching, industrial liaison activities and training could be conducted in the field of mechatronics, hydraulics, and robotics. Prior to the construction of the NCPF the University's facilities were not suitable for this inter- and cross-disciplinary world because they were focussed on other field-based elements of agricultural engineering education and research, including increased fuel efficiency and methods to reduce greenhouse gas emissions from large scale farm machinery.

The NCPF includes an engineering laboratory and teaching facilities along with a number of unique features – such as a novel full-scale 'all terrain' vehicle simulator room – that supports product development and training, and

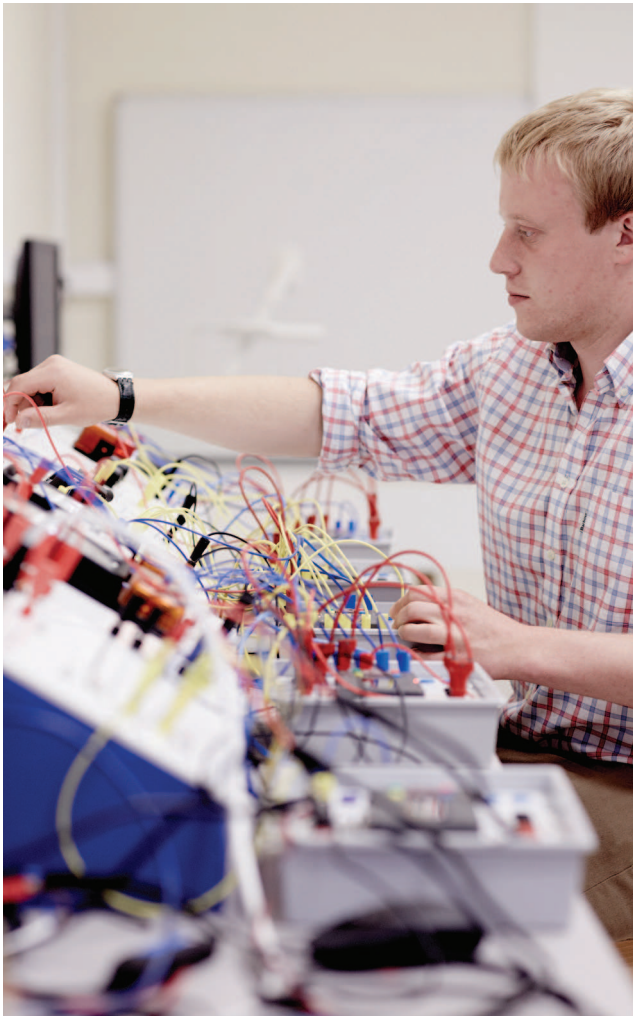
The NCPF is fully utilised by Harper Adams' students, in engineering and in agriculture and food, by those wishing to retrain in new arming techniques, and by industry, working with academic institutions to generate new efficiencies in agricultural systems. Photographs © Harper Adams University

has the added value of providing a means to verify health and safety measures in the design and development of new agricultural machinery and precision farming techniques.

The NCPF is now in the position to generate wider benefits for the HE sector by providing a base for co-ordinating basic research activity with the agricultural and agricultural engineering applied science community, and with the agri-food sector. HAU and Cranfield University (with Nottingham University and Rothamsted Research) are members of an Advanced Training Partnership funded by the BBSRC. Cranfield has expertise in soil science that is of direct benefit to the NCPF and its industry collaborators; several of its staff have already discussed collaborative work in this area. Discussions have also taken place with expert teams in the University of Manchester (biosensors), and the Universities of Sheffield and Bristol (robotics). Further engagement is planned with other universities with expertise in agricultural production. The Government's Chief Scientific Advisor, the Chief Executive of the BBSRC and the FRP Global Food Security Champion, Professor Tim Benton, have also visited the University to discuss the contribution that technological advances in precision farming can make to food security.

VIII. Dissemination and feedback

The NCPF is the only centre of this nature in the UK higher education sector. Launched in February 2012 at a London-based reception attended by 150 representatives of the agricultural engineering and farming sectors, it immediately generated significant interest and investment, including an early donation of GPS equipment valued



at over £30K, the transfer to HAU of responsibility for the AEA's Precision Farming Industry Group, and visits by senior representatives of the BBSRC, GOS and other agencies who were briefed on its short to medium term plans. The project was also mentioned in the Institution of Agricultural Engineers' report, published in June 2012. This helped to confirm HAU's arguments with respect to the uniqueness of the NCPF and the particular need for facility that has proved to be of significant interest to a wide range of disciplines supporting the UK's response to the challenge of global food security and the transition to 'climate smart' agriculture.

It was determined that there a number of risks in securing 'buy-in' from the agricultural engineering and farming sectors for the NCPF concept, but these were mitigated by the transfer to Harper Adams of the Agricultural Engineers Association precision farming group (the AEA is the industry representative body), and the interest shown in the NCPF by both sectors. In developing the NCPF the University worked – and continues to work – closely with the AEA and the Institution of Agricultural Engineers, and seeks annual external feedback on progress with the initiative from these and other sources in the farming sector.

In developing dissemination and engagement plans HAU drew on experience of this type of project monitoring and reporting via its RDA-funded Regional Food Academy – which works with SME and larger food businesses in the region to increase the higher level food technology and business management skills needed to facilitate new product development – and was delivered

on time and on budget, meeting nearly all of its outcome targets a year ahead of schedule. This project, funded in part by Advantage West Midlands and the University, commenced in 2008 and blends training, consultancy, research and provision led to substantial jobs' growth in the area, collaborations with a variety of companies, trusts and educational bodies, as well as a number of Foundation and Post Graduate Certificates and short-course modules, and the launching of more than twenty new products onto the market place.[163] Relationships developed throughout this project have the potential to contribute to the work of the NCPF, as do formal networks facilitated by HAU, including the Women in Rural Enterprise (WiRE) network[164] established in 1998 as part of the Land, Farm and Agribusiness Management Department; WiRE membership currently stands at more than 6000 individuals and businesses. The University also runs an open access online library – OpenFields[165] – through which the free, unbiased information for practitioners and policy makers generated by NCPF and partner HEIs and organisation can be accessed.[166]

VIV. Conclusion

The NCPF brings together a variety of academic disciplines (including engineering, crop sciences, and livestock sciences) from a number of universities, together with the agricultural engineering industry and the farming sector, to explore new innovations and encourage their application in farming practice. The Centre provides a physical resource around which Higher Education and industry collaboration can be stimulated in a new field supporting innovation in high-technology food production. Although the initial investment in the infrastructure was relatively small-scale, building upon existing facilities and expertise already present at the University, the NCPF continues to yield a significant return for the HE sector and this important STEM subject, enabling collaborations across the sector and internationally in a discipline that is beginning to get broader recognition, but which lacked a focal point for innovation and university / industry interaction.

153 Agricultural Engineering: A key discipline enabling agriculture to deliver global food security, Institution of Agricultural Engineers, June 2012, p. 57.

154 See the UK Cross Government Food Research and Innovation Strategy (2010) and The Future of Food and Farming: Challenges and choices for global sustainability (2011), Government Office for Science, London.

154 Meeting the Challenge: Demand and Supply of Engineers in the UK, Institution of Mechanical Engineers, London (2011): p. 24.

155 Research Fortnight Today, 11 September 2012: www.researchresearch.com/index.php?option=com_news&template=rr_2col&view=article&articleId=1246814

156 Harper Adams University, Strategic Plan, 2012, p. 13.

157 Ibid, p. 7.

158 Ibid, p. 13.

159 BREEAM sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance. See www.breeam.org/ for further information.

160 As reported annually via DLHE and KIS.

161 Visit www.jcbacademy.com/ for further information about the Academy; see www.itv.com/news/central/2012-09-07/fourteen-year-old-engineers-swap-school-for-university/ for an example of how the JCB Academy was portrayed in the regional news.

162 See Appendices, 'Harper Adams University: Regional Food Academy' for a further breakdown of partners, activities, job growth data and information on new course creation.

163 WiRE organises local meetings for some 1800 business women each month, representing every stage of the business development process (30% new start-up businesses; 40% growing businesses; and 30% mature businesses). WiRE offers accredited and non-accredited training; for example during 2010 WiRE trained 117 start-ups within the West Midlands with a cumulative project turnover of £1million (within two years). See Appendices, Harper Adams University: Women in Rural Enterprise (WiRE) and I. Warren-Smith and C. Jackson, 'Women Creating Wealth through Rural Enterprise', International Journal of Entrepreneurial Behaviour and Research 10 (2004): 369-383.

164 www.openfields.org.uk/

165 The OpenFields project was developed from work on the National Rural Knowledge exchange, a HEFCE-funded collaboration between 14 universities that is currently hosted and supported by HAU. Over 60 organisations have contributed material, including: HAU, Royal Agricultural University, the Arthur Rank Centre, the Grazing Advice Partnership, the Royal Agricultural Society of England and the Rothamsted Research Association.

Smart, Creative, and Sustainable Business: Delivering innovative approaches to business models and practices

All industrial sectors in the UK are currently experiencing rapid change to the way business happens and the products and services which are in demand. The pressure on businesses, both small and large, to remain competitive is immense, particularly in a protracted period of economic stagnancy. Creativity and innovation is considered central to succeeding in this competitive environment, regardless of the industry area, as our economies tend towards being 'knowledge based'. Providing sectors with talented, able and employable graduates with relevant skills is central, not only in lending creativity to their processes now, but for sustaining those businesses into the future.

Specialist HEIs are able to meet the demands of businesses for fresh thinking and new approaches to business, not only through the graduates they produce. Through close-to-market research which is responsive to the changing environment in which businesses operate they provide a vital link between blue-skies academic research and action on the ground. That environment is increasingly more than simply economic, and goes beyond more immediate issues such as financial resource. Global concerns exist around environmental and material sustainability, and efficiency in the use of technology, tools, and resources. To meet the inevitable changes in available resources in the decades ahead, businesses are aware that they will need to approach not only what they provide but how the provide it in a different way. Emerging technologies and especially, as argued compellingly by Mazzucato, 'being green' have never been so crucial for the economic competitiveness of the UK in the global market.[167]

Looking to Europe, there is an emphasis on 'Smart Specialisation' - identifying local specialisms and local needs and building on these, through investment and research, to collectively meet demands at a local, national, and global scale. Being locally-centred, yet with the advantage of keeping a weather eye open on the wider environment through research centres and research activities, small and specialist HEIs are in a unique position to offer distinctive, specialist advice, services, and skills beyond academia. A specialist focus (in this part we are considering that of the expanded creative industries) enables institutions to cultivate deep knowledge in a focused area and develop skills amongst students, graduates, and staff to make lasting, sustainable changes to the status quo within that field.

The BIS report *Innovation and Research Strategy for Growth* highlights that, in the current economic climate, industries which have not traditionally been supported by the public sector through national funding programmes for research and innovation have seen significant decline in growth and 'it is vital that we use public funding to leverage investment from other sources'.[168] This is particularly true for the creative sector, a sector often looked to for the impetus to lift local and national economies out of decline, and yet which is made up of many smaller-sized, fairly disparate businesses for which funding opportunities are either too complex or too narrowly defined to be relevant. Universities can play a crucial role in connecting public investment with private sector organisations by providing a point of connection through which businesses can more easily engage. By formalising

these points of connection we see such endeavours can develop regional economies in dynamic and future-focused directions.

Over many years of local engagement specialist institutions have emerged from and developed close, reciprocally beneficial relationships with local communities, local organisations, and local businesses, earning trust and understanding what matters in their localities. Where these relationships are new they are sought in a spirit of mutual benefit and local advantage - for student learning and opportunity, for staff development and engagement, for institutional reputation, and for business growth. In summary, specialist institutions offer a unique viewpoint on central problems to creative, sustainable, and smart economic growth, and are pivotal in creating and nurturing the local ecologies and networks that will sustain it.

167 Mazzucato, M. *The Entrepreneurial State*, DEMOS, London, 2011, p.113.

168 Department for Business Innovation & Skills (BIS), *Innovation and Research Strategy for Growth,* London, December 2011, p.36

Case Study 1: Norwich University of the Arts and Archant

Ed Walker, Business Director, Norwich University of the Arts, UK

I. Introduction

Business models in the creative industries are constantly under pressure to meet the demands of a rapidly shifting environment, ever more so with an increasing shift towards digital outputs and consumption. The media sector, in traditionally paper-based / analogue means of communication, newspapers especially, has seen dramatic drops in circulation numbers, with associated revenues from hard-copy advertising, both corporate and classified individual adverts, falling significantly as more immediate and cost-free options become available. Identifying that these advertising opportunities needed to be pitched at a younger generation, local media company Archant joined up with ideasfactory@NUA, a creative consultancy enterprise created by Norwich University of the Arts (NUA), to solve the problem of the decreasing relevancy and use of this traditionally fruitful revenue stream.

To anchor this opportunity in the curriculum NUA used a pedagogical model common to art and design education, the Live Project, extending it to provide open competitions for external clients. Live Projects have been a long-established method in art and design disciplines for encouraging a 'business' mind-set amongst students early on in their training. These projects are couched in pedagogical terms as enabling learning through and within 'communities of practice', encouraging the students to engage in their own development as a creative practitioner by defining and reinforcing their position within that community. Live Projects bring a sense of reality into the largely sheltered, theoretical world of the degree programme. They involve the students in actual client relationships which hinge on delivering products or designs on time, to specification, and within budget, having a tangible outcome and accountability which may otherwise not have been experienced thus far. Using the learning environment as a base for developing teams of students and meeting assessment criteria through collaborative design tasks, NUA has shown that adding a competitive element to this for actual contracts with local companies on graduation has greatly enhanced their ability to leverage graduate talent into the local economy.

II. The Ideas Factory and Archant

The ideasfactory@NUA works with Archant, one of the UK's leading regional media businesses, owning websites, and publishing magazines and Norfolk's biggest selling daily newspaper, the Eastern Daily Press (EDP), and the Norwich Evening News.

Archant has a significant in-house production department, which is responsible for large volumes of daily and weekly design output. With teams working to such deadlines, there is rarely time to look at new projects. Archant has an ageing readership, and with sales of daily printed newspapers in decline nationally Archant are keen to embrace the ideas and opinions of a younger generation. During the period from July to December 2010 to the period from July to December 2012, ABC figures for the EDP show that circulation fell by over 10,000 from c.59,000 to c.49,000.

The ideasfactory@NUA had been commissioned by Archant to work on a number of projects since 2010, covering publishing design, games design, photography,

and brand identity. Perhaps the most significant has been the work to re-imagine the classifieds advertising section. Archant have the opportunity to outsource research and development to the university and receive innovation, conceptual ideas, and implementable design ideas back on a regular basis.

Members of NUA's Strategic Management Group (SMG) have a good relationship with Archant. During regular dialogue in 2010 about skills and ideas to develop the creative reputation of the region, a possible collaborative project idea was discussed. NUA had recently undertaken a curriculum review, which attempted to support employability in the curriculum. The recently announced ideasfactory@NUA proposition struck a chord with Archant as it could allow them to access the experience of academic and technical staff and the ideas of enthusiastic and talented design students.

Hence the ideasfactory@NUA work with Archant sought to:

- provide implementable innovation for Archant;
- allow Archant the opportunity to meet future graduates;
- give students exciting Live Project briefs;
- allow students to present to real clients improving business and professional skills;
- give academic staff interesting projects to work on in partnership with students thus improving their own industry knowledge and experience;
- provide revenue for the University.

All participants in the project persistently asked the question: 'what makes this collaboration between NUA and Archant distinctive?' They developed the following rational:

- Rather than the project briefs being simply provided to NUA as a form of good will, the briefs were developed out of specific business problems and the resultant work has been launched by Archant and improved business performance;
- Archant have paid for this work, thus further demonstrating their belief in the quality of the insights and deliverables produced;
- The work with Archant has proven to the University that the ideasfactory@NUA is a model of university and industry collaboration in which to invest;
- Students working on the project have not only been given experience in real projects, they have gained employment, the process acting as a 'job interview' and a bridge between university and employment.

A. Tangible outcomes

The largest piece of design work was completed during the summer in 2010. The project saw a complete re-imagination of the EDP's classified advertising section. The company intended to test a new design in the free Advertiser title, before launching in their flagship daily paper, the EDP.

The Classifieds section was chosen by Archant and NUA as the first engagement project. As a section that featured in a number of papers it was possible that a new design could be implemented in one paper as a 'test-bed' before being rolled out across further newspapers once the re-

design had been proven to be successful. Small, classified adverts were still a strong revenue stream for the company, but were described as 'unloved'.

The ideasfactory@NUA was briefed to:

- re-imagine the classifieds section;
- create a cleaner contemporary style that would unify the look of all the classifieds sections across the company;
- develop iconography to categorise and highlight sections;
- develop information graphics to highlight pricing and readership figures.

The entire 3rd year student cohort studying BA Graphic Design and academics worked together to answer the brief. A consultancy, problem solving, and idea generation session provided the following insights:

- terminology used was old fashioned and out of touch with modern on-line auction sites;
- use of colour was chaotic and confusing rather than assisting navigation for readers;
- pricing of the various sizes of adverts offered was not explained.

As part of the work a new name 'SMALL ADS' was proposed.

Students worked in teams with academic support and a number of different concepts were presented to Archant for review. The process was tightly controlled so as to mimic a real life agency pitch scenario.

The winning group of students were then taken on as interns after graduation to develop the project further for Archant. This intensive internship opportunity gave them both paid employment and time to refine their ideas with regular academic contact.

The winning student team designed layouts of the relevant categories - Births, Marriages and Deaths, Retail, and Public Announcements - and created iconography to highlight the categories, before producing a comprehensive style guide to enable implementation by Archant's in-house production team.

They also designed a new header to announce the start of the SMALL ADS section, introduce the different categories, and introduce the new pricing structure. [Figure 1]

B. Tangible results

NUA's work with Archant has delivered tangible results. Following a trial launch in the Norwich Advertiser, the SMALL ADS format has now been launched in the EDP and the Norwich Evening News. The Norwich Advertiser has seen revenue increase 26% since the redesign, and inbound calls regarding SMALL ADS in the EDP and Evening News have increased by 8% in the 6 months following launch.

SMALL ADS revenue was up 13% in 2012 on the previous year. There were a number of factors that played a part in this success including the re-design of the classified platform and additional promotion using the advertising campaign created by the ideasfactory@NUA.

> *'It is clear through talking to our customers that the adverts have strengthened the brand.'* (Andrew Denney, General Classified manager, Archant Norfolk)

'Archant is one of the UK's largest independently-owned regional media business. We were delighted to be involved at an early stage in discussions about the University's ideasfactory@NUA initiative, and to provide a number of pilot projects. These were successfully delivered by NUA staff and students and Archant has continued to commission designs and other creative projects from ideasfactory@NUA. The quality of work produced by NUA is exemplary. In particular, we at Archant have been impressed and delighted by students' creative thinking and problem-solving and their highly original design solutions. Our relationship with ideasfactory@NUA has brought unexpected benefits – for example, invigorating debate about the Archant brand and creating employment opportunities for students on graduation. We believe that the University's approach to employer engagement, as exemplified by ideasfactory@NUA, demonstrates an institution which is thinking creatively and acting positively to build external relationships and to support the local and regional economy.' (Adrian Jeakings, Chief Executive, Archant)

On the strength of this original project, NUA was asked to create a press advertising campaign to promote the new SMALL ADS section within the paper. Originally eight adverts were created. The typographical idea presents copy in the same bright colours used to signify the different headings under which the SMALL ADS are categorised. The copy highlights the eclectic offer of goods, services, and announcements in a witty and engaging way.

Using a hand-drawn typographic style, these offers are spread across the page vertically and around interesting illustrations. The final creative is flexible enough to allow a number of adverts, each reflecting the redesigned SMALL ADS section and announcing its confident re-launch to a younger demographic. [Figure 2]

i. Job creation

The timing of the first project (July 2010) allowed NUA to employ four paid student interns. These students worked with academic staff to develop ideas and refine the work. At the end of the project, all four interns were offered full-time jobs at Archant in their production department. Three went on to take up a post and the remaining graduate went on to take up a post in a rival publishing company in the city.

The success of both of the projects has led to a further work from Archant, which continues to be produced, by both students and staff working together.

In 2011, a further set of four interns were employed and worked on a range of other projects including web design, information graphics, and corporate illustration for clients and marketing materials for NUA. All four students went on to further study immediately after the internship and two have subsequently graduated and gone into employment, one at internationally renowned design consultancy Turner Duckworth.

ii. Developments for staff

The engagement with Archant through the ideasfactory@NUA mechanism has created new opportunities for academic staff for professional practice in their disciplines, a significant positive outcome of the project. This is very

[Figure 1:] SMALL ADS redesign for Archant – header graphic to explain pricing to readers, Eastern Daily Press

[Figure 2:] SMALL ADS print advertising for Archant

different to the more traditional forms of 'research' in which they have always engaged. It is a highly legitimate application of their advanced knowledge and skills and feeds directly into teaching and learning. This work provides them with:

- consultancy opportunities in their area of expertise;
- an opportunity to keep up to date with modern design, print and digital technology;
- rapidly evolving briefs which allow for academic exploration and quick and dirty research to support design rationales by providing insights.

[Figure 3:] Game Design concepts for Archant showing quests

A recent example of this has been another project completed for Archant by academic staff and students from BA Games Art and Design which explored the ways in which Archant can reach a younger audience by becoming a producer of computer games, or to put it another way, by 'gamification' of parts of their website.

The younger generation are keen on playing games online, and through social media they share these experiences and collaborate or compete with friends online, either at home, or while out of home utilising smartphones and tablets. For Archant this is a very interesting and potentially highly profitable way for them to engage with a younger audience online, while proving their advertising clients with an interesting new channel.

At the start of the project, 150 students were briefed alongside staff and they formed teams that worked to answer the brief over a number of weeks. Over 30 concepts were presented to Archant, with ten picked for further development during the next stage. This continued to involve up to 30 students who further refined the initial concept and presented a mini design document and refined five-minute pitch presentation.

The course leader was able to use this project as an assessed piece of work for all students at the initial concept stage, with the students who went through to the development stage being able to submit a more extensive piece of work for assessment. Some of the shortlisted teams were made up of first and second years who were asked to submit to a level of detail not normally expected until year three. [Figure 3]

C. Audiences

The work for Archant had been primarily for a regional audience reflecting the market of the newspapers produced. The games provide a potentially greater geographic opportunity, as the concepts developed could work across

the UK. Implementation of the first Live Projects began in March 2010 and the employment of four student interns to work on projects commenced from July 2010. The SMALL ADS re-designs were launched in the Norwich Advertiser in February 2011 and in the EDP in November 2011. Projects continue to be worked on for Archant at the time of writing.

A number of students presented SMALL ADS concepts as part of assessed work during the summer term in 2010. On the strength of this work, four students were offered paid internships at the ideasfactory@NUA. These interns worked on the designs of the new SMALL ADS layouts during July and August 2010 and then were responsible for creating the full-page press adverts. The interns were offered full-time positions at Archant in September 2010, three went on to take up posts. The collaboration also drew on contributions from:

- Two full-time staff in Business Development, the Business Director and a Business and Enterprise Administrator;
- Over 100 students involved in the SMALL ADS project;
- Over 150 students involved in the Games Design project;
- Up to eight academic staff involved in each project.

III. Conclusion

By engaging with NUA, Archant have been able to realise the growth potential of an area of their core business which may have otherwise become obsolete. NUA graduates have offered fresh thinking on this key revenue stream which has proposed a range of spin-off business models and approaches to engaging with the local community. Through reaching a younger, more digitally literate audience, this local business has reached a more stable position in relation to their sustainability in a rapidly changing communications industry. It has resulted in direct appointments of NUA graduates and a level of investment in these areas of their business which would not have been realised otherwise.

In this case study of addressing business problems at a local economic level, it is suggestive that certain results were not originally anticipated by the business engaged. At the start of engagement, as seen in the objectives set, the company involved are seeking access to talent, and the university access to real world 'live' experience, but they do not necessarily equate this with direct business growth or employment of the graduates after the projects' completion. This may be a characteristic of engaging with a relatively small, local business, but for many small and specialist institutions this is the predominant business environment in which they operate. It is interesting to note that, through establishing a consistent mechanism of engagement, ideasfactory@nua, Norwich University of the Arts have made their pool of graduate talent accessible for, relevant to, and ultimately employable by local communities, and are helping those businesses reinvigorate their energies in a difficult and economically constrained climate.

Case Study 2: The Centre for Sustainable Design® at University for the Creative Arts: A focus on innovation and sustainability

Uwe Derksen and Martin Charter, University for the Creative Arts, UK

I. Introduction

The Centre for Sustainable Design® (CfSD) was established in 1995 at Farnham, Surrey, UK at the University for the Creative Arts (UCA). The Centre has participated in a range of international research projects as well as organising several hundred conferences, workshops, and training courses focused on innovation and sustainability. The Centre researches, develops, and disseminates understanding of present and future sustainability issues and solutions related to innovation through projects, training, events, networks, and information. To achieve this, CfSD works with partners in Europe, North America, and Asia to deliver high quality results and, as a result, has become an internationally recognised centre of excellence that attracts funding from major bodies. As well as using their knowledge and skills to help external stakeholders the Centre also draws upon its partners to help deliver expert lectures and workshops to the student population at UCA.

II. Leveraging specialisation through research centres

Research centres in smaller and specialist institutions tend towards applied, close-to-market research. As indicated above, the translational nature of this research fills a much needed gap between blue-skies academic research and action on the ground. In the South East, University for the Creative Arts has made use of its unique nature as a multi-campus specialist creative arts institution to reach a wide variety of creative businesses in a key region for high growth businesses. Through the services of the Centre for Sustainable Design (CfSD) UCA has targeted the sustainability agenda, and Eco-design specifically, assisting and training businesses both in the local area and internationally to change their practices and address sustainability issues throughout their business models.

The Centre researches, develops, and disseminates understanding of present and future sustainability issues and solutions related to innovation through projects, training, events, and networks. The work of the centre is focused on sustainable innovation - or eco-innovation, whereby innovations at all levels of business and production are considered with sustainability (environmental, financial, social) at the core, and product sustainability, considering the organisational, management, development, and design implications of a sustainable approach to products. A simplified summary of the breadth of situations to which these two concerns may apply is given in the opening of *Eco-Innovate! a guide to Eco-innovation for SMEs and business coaches*, published by the eco-innovation observatory (EIO) and CfSD in 2013:

> *'Eco-innovation can be an idea for a new start-up or product as well as for making improvements to existing operations. One focus of eco-innovation is new technologies, but creating new services and introducing organisational changes are just as important. At its core, eco-innovation is about creating business models that are both competitive and respect the environment by reducing resource intensity of products and services.'* [169]

Through dynamic leadership and drawing on specialist expertise at the forefront of the global issue of

environmental sustainability, CfSD has been pivotal to the development of international standards for Eco-design, and has grown a reputation as an international centre of excellence. By being located in a smaller, specialist HEI, research at the centre has also benefited from interdisciplinary engagement, broadening the reach of its narratives beyond design and business management. For example, raising public awareness has been facilitated by the Professor of Cultural History at UCA, whose research into perceptions of climate change has used the insights of the Centre and engaged directly with the long running programme of conferences and public events.

A. Focus areas

Essentially the Centre has two areas of focus. The first, *sustainable innovation*, relates to understanding the policy and business implications of sustainable innovation and working with companies to develop sustainable solutions. The second area is centred on understanding the organisational, management, development, and design implications of *product sustainability* while working with companies to develop and deliver strategic programmes. Within this context CfSD provides the following services:

i. Research and projects

CfSD has undertaken a wide range research projects for both private and public sector clients developing considerable expertise in eco-design within the electronics sector. The Centre has also completed research in areas related to sustainable consumption and production, producer responsibility, product policy, eco-innovation, eco-design, design for remanufacturing, eco-packaging design, marketing, procurement, supply chain management, product-service systems, and new business models. It has also led overseas missions to Japan, China, Hong Kong, and Taiwan to explore best practice in innovation and product sustainability. Current and past projects include:

- *Towards Zero Waste in Industrial Networks (ZEROWIN*). CfSD is a partner in this project funded by the European Commission's (EC) Framework 7 Programme (FP7). It is running from 2009-2014;
- *Sustainable Supply Chains through Innovation (SUSCIN).* CfSD was the lead partner for this project funded by European Regional Development Fund (ERDF)/South East England Development Agency (SEEDA) that ran from 2009-2011;
- *Environmental Market and Innovation Development (ECOMIND).* CfSD was a partner in this project funded by the European Commission's (EC) Interreg IV A 2 Seas programme that ran from 2008-2011;
- *Sustainable Research Consumption Exchanges (SCORE).* CfSD was a partner in this project funded by the European Commission's (EC) Framework 6 Programme (FP6) that ran from 2005-2008;
- *Asia Eco-Design Electronics (AEDE).* CfSD was the lead partner for this project funded by the EC Asia Pro-Eco (Aid) programme and ran from 2005-2007.

ii. Training
Over the last two decades the CfSD has designed numerous training programmes for private and public sector organisations based on their significant research and practical experience. The Centre's training programmes have been delivered in Europe, North America, and Asia, and cover: Sustainable innovation, product development and design, as well as sustainability within marketing. CfSD has also set up and facilitated a range of expert workshops related to s*ustainable innovation* and *product sustainability* with a particular focus on green electronics, packaging, marketing, corporate social responsibility, electronic reporting, producer responsibility, legislation, and product policy.

iii. Events
A key output of the Centre is the organisation of the internationally recognised 'Sustainable Innovation' series of conferences which have run for the last 18 years attracting over 2000 delegates representing businesses, governments, and academic institutions from more than 50 countries. In addition, CfSD has also organised conferences in Europe, North America, and Asia covering sustainable innovation, product sustainability, consumption and production, eco-design, and product-service-systems.

iv. Networks
Over its lifetime the Centre has launched a wide range of Knowledge Transfer Networks covering ecodesign, green electronics, environmental management, and eco-innovation (eco-i-net). eco-i net's events and online community (eco-innovation_network@yahoo.co.uk) has been particularly valuable in bringing together stakeholders interested in developing low carbon and sustainable building technologies. In doing so it provides a space for best practice that does not require a great deal of up-front costs for micro-business and SMEs in the early stages of development.

v. Resources
Finally the CfSD website is recognised as a key global resource for information and insight into sustainable innovation, product sustainability, eco-innovation, eco-design, and sustainability within marketing. A range of high quality content can be freely downloaded including: Research and projects reports, conference abstracts and proceedings, videos and presentations, tools and checklists as well as back issues of the *Journal of Sustainable Product Design*. CfSD have also produced a number of books and booklets including the recent *Guide to Eco-Innovation for SMEs and Business Coaches (Miedzinski, Charter, Doranova, Castel and Roman, March 2013)* that covers key business models and product / service development or production processes that optimise eco-focused innovation.

B. Overview of Projects: Supporting SMEs in Eco-Innovation
As a business-focused research centre at the University for the Creative Arts, The Centre for Sustainable Design® (CfSD) has partnered in several business-support projects providing new opportunities for small businesses in the South East of England through eco-innovation (resource

efficient-low carbon innovation). The 'Green economy' is underpinned by SME's that create eco-innovative products, technologies and services, broadly composed of manufacturers, consultants, distributors, agents and other services across a range of product / market sectors. These two cases illustrate the impact of two European Commission (EC) funded projects, EcoMind and *SUSCIN* that CfSD ran between 2009 and 2012, when it provided eco-innovation business support to over 590 SMEs in the South-East of England.

i. Environmental Market and Innovation Development (EcoMind)

EcoMind was a three year EC funded programme designed to support sustainable business growth, facilitate the development and market penetration of the new sustainable products and services, and is aligned to the European Union's pledge to tackle climate change through innovation and sustainability whilst promoting business growth. It ran in parallel with the SUSCIN project with the Centre providing in depth support for another 30 SMEs through the INTERREG IVA 2 Seas' Environmental Market and Innovation Development (EcoMind) project. This involved working with EcoMind partners in the South East of England, France, and the Netherlands providing business support to relevant SMEs. The project also included creating partnerships between UK, French, and Dutch SMEs who together held 121 events and provided one-to-one assistance for 271 businesses.

Within this context CfSD ran a number of OpenGreen© innovation and eco-design workshops and led a series of product development meetings while also making introductions and forming connections with businesses that led to both business development and partnerships being built. In addition, CfSD also prepared reports and presentations in response to the needs of specific SMEs and provided further business support that addressed funding, IPR, and procurement. The business support provided through EcoMind enabled SMEs to accelerate the development of eco-innovative products, technologies and services helping the businesses to better apply sustainability thinking to their business and products. Typically this related to building on existing eco-innovative solutions such as enhancing market links, improving market research and marketing material as well as leveraging new concepts, examples of which are outlined in the following section.

Project impact, value and benefits

Over three years, EcoMind partners together held 121 events attended by 7,489 visitors, sponsored 128 individuals to attend trade fairs and workshops abroad, and provided one-to-one assistance for 271 businesses, ranging from marketing guidance and design support to assessing sources of suitable finance. From 2009 to 2011, CfSD provided one-to-one support for 30 SMEs responding to their needs. Commonly support was in the form of:

- Consultation on new greener business areas for development (17 SMEs);
- Eco-product / service marketing advice and research on market aspects (14 SMEs);

- Product/service specific research e.g. eco-materials availability/supply, new or competing applications (14 SMEs);
- Signposting suitable eco-product / service development funding sources (12 SMEs);
- Networking introductions and referrals to specialist services (8 SMEs);
- Training on eco-design (4 SMEs).

In addition, CfSD led 10 workshops based on eco-innovation themes such as re-manufacturing and eco-building, 4 company-focused workshops identifying sustainable innovation opportunities and 2 product development meetings. CfSD also made introductions for 8 SMEs leading to 16 meetings. Each meeting led to further business development and in the case of 3 firms the formation of strategic alliances. CfSD also prepared 20 reports and presentations and arranged promotional materials for 3 company cases. Overall CfSD facilitated a number of successful improvements in eco-innovative product development processes, fostered collaborations and helping SMEs, in what was a very challenging period for many companies involved in bringing innovations to market.

ii. Sustainable Supply Chains through Innovation (SUSCIN)

SUSCIN was a South East England Competitiveness programme funded by ERDF and SEEDA (now DCLG) providing business support, events and activities aimed at building the skills and innovation capacity of SMEs in relation to developing eco-innovative products, services, and technologies. Support offered to SMEs in the SEEDA region (Oxfordshire, Buckinghamshire, Berkshire, Surrey, Hampshire, Isle of Wight, West / East Sussex or Kent) through the programme included:

Training workshops

These workshops were designed to provide high levels of added value to SMEs with a range of presenters, panel discussions, networking and an innovation workshop session. Through SUSCIN, CfSD held 17 events for SMEs (attended by 182 SMEs) addressing eco-innovation and related topics such as green marketing, IPR and ISO14006 (guidelines assisting organisations in establishing, documenting, implementing, maintaining and continually improving their management of eco-design). Sessions included: Marketing your Eco-Products, Selling to the Public Sector, Understanding the Green Buyer, and Research and Development.

One to one business support

One to one support was delivered via a consultancy format and covered areas such as development of sustainability policies and action plans, writing successful pre-qualification questionnaires and tenders, marketing, selling, sustainability, and interview techniques.

Meet the Buyer events

These events provided the opportunity to meet face-to-face with buyers and procurement managers of large public and private sector companies actively looking to source

The Centre for Sustainable Design® works with partners in Europe, North America, and Asia to deliver high quality results and has become an internationally recognised centre of excellence. Photograph © CfSD®

sustainable products and services. In addition, these more conventional events were adapted into 'Meet the (Green) Buyer' brokerage sessions whose focus was specifically on brokering the buying and selling of eco-innovative products, services, and technologies.

Greenthink!©

This is a programme that focuses on the development of innovative and sustainable products or services. It achieves this by providing a mechanism for small companies to increase their competitive edge by linking resource and energy efficiency to product and service innovation. Specifically, a series of unique workshops were designed around the individual needs of SMEs and helped highlight new business opportunities, as well as develop new eco-innovative solutions. In all 36 workshops were delivered and were very well received (combined feedback scores from participating SMEs equaled 88 out of 100 for overall satisfaction) with both forms of events being recognised as key central platforms for commercial relationship building. The 'Meet the Green Buyer' events were also valuable for CfSD and SUSCIN partner Action Sustainability in engaging SMEs in follow-up workshop and one-to-one activities – activities which led to new business / product / service ideas and applying sustainability to products / services / business.

Forward Commitment Procurement services

This service was aimed at stimulating the development of environmental products and services. It was a new and innovative approach to matching demand with supply, which is now being used to stimulate new sustainable solutions and better value for money to improve public services.

In addition 'Green Dragons' was set up as a practical approach to complete such Forward Commitments. It was a unique workshop and consultancy process designed to enable pre-vetted eco-innovative SME suppliers to pitch to buyers, supported by further follow-up consultancy that helped convert interest into sales.

Project impact, value and benefits

SUSCIN supported a range of SMEs in reducing the environmental impact of *products* – highlighting the value of the project in the early stages of the innovation process. Key benefits from SUSCIN were seen in the early innovation stages, where both networking and new business / product ideas are of most value. However, the severe economic recession that began in 2008 has meant most SMEs are focused on survival rather than growth. Despite this £2.3m business was won (£1.9m identified as public sector contracts, £0.4m as private sector). After participating in SUSCIN, 39 SMEs are moving to a deeper level of engagement with CfSD through participation in separately organised and funded projects, such as Towards Zero Waste in Industrial Networks (ZEROWIN) funded by European Commission's Framework 7 Programme.

From the semi-structured questionnaire sent to 566 SMEs, data was collected on impact value and benefits resulting from SUSCIN. 195 responses were received (34% of the total) the findings can be seen in Table 1.

Table 1: SUSCIN Outputs, Results and Impacts

SUSCIN impact, value and benefits	Cumulative value for project
Business won	£2.3m
Net increase in Gross Value Added	£0.99m
Additional employment among SMEs engaged in SUSCIN	114.35 Full time equivalent jobs in 31 SMEs
Number of businesses improving performance	18
Number of businesses increasing percentage of turnover attributable to new and improved products by 5%	17
Number of SMEs tendering for public sector contracts	50
SMEs tendering/bidding for public or private contract opportunities or tenders for in the following 4-6 months	23 (11 identified indicative values totalling £9.4m)

SUSCIN impact, value and benefits	Cumulative value for project
Number of businesses within the region engaged in new collaboration with UK knowledge base	249 documented links
Number of businesses in the region developing R&D links with other businesses	53 documented SME-SME links
SMEs confirming SUSCIN helped to identify reductions in the environmental impacts of products/services/ technologies	44
Buyers engaged reducing the sustainability impacts of their supply chains	340 buyer attendances from over 120 buyer organisations

III. Conclusion

Through both the EcoMind and SUSCIN projects CfSD has provided eco-innovation business support to over 590 SMEs in the South East of England through targeted workshops, Greenthink© sessions, and one-to-one support. This interaction builds on the CfSD team's understanding of the often difficult trading conditions faced by SMEs, as well as potential strategies that can be employed to respond to a range of eco-innovation challenges and opportunities.

In addition to the numerous benefits delivered to the economy and wider environment detailed in the previous cases, it is clear that significant progress was made in facilitating growth in both eco-product / service, or technology development, as well as the application of sustainability thinking to SMEs' business models. CfSD is continuing to work with 36 SMEs as part of an EC Interreg IVA funded eco-innovation project titled FUSION (2012-2014) and are applying many of the lessons learnt from EcoMind and SUSCIN.[170]

The CfSD presents a compelling example of the close-to-market research that can connect emerging technologies and basic research with those businesses and industry players who can be shown how to make use of them. The Centre has taken a regional approach, identifying a potential growth area amongst a vibrant local economy, and through demonstrating excellence, grown an international reputation. The innovative approach to business problems - often pinpointing issues that weren't even considered problems in existing mind-sets - has directly assisted in creating a more sustainable future for those they have engaged. It is also important to note the key contribution of this small and specialist university to the comprehension of a global economic and societal challenge. By engaging businesses across many different sectors at a grass roots level with the green agenda CfSD has a potentially vital role to play in the green economy, an area in which the UK is urged to increase its efforts to compete.

169 eco-innovation observatory (EIO) and Centre for Sustainable Design (CfSD), *Eco-Innovate! a guide to Eco-innovation for SMEs and business coaches*, University for the Creative Arts: Farnham, 2013

170 Further information regarding CfSD can be found at: www.cfsd.org.uk or contact Martin Charter, Director, The Centre for Sustainable Design, University for the Creative Arts, Farnham Campus, Farnham, Surrey, GU9 7DS, UK. Tel: + 44 (0) 1252 892772 Fax: + 44 (0) 1252 892747 Email: mcharter@ucreative.ac.uk

Case Study 3: Mobile Experience Innovation Centre at Ontario College of Art and Design University

Dr Nicola Hepburn, University of Toronto, Canada[171]

I. Introduction

The Digital Media + Research Innovation Institute (DMRII) is the research and incubation component of OCAD U's Digital Futures Initiative. The DMRII consists of nineteen multidisciplinary research laboratories, virtual collaborative teams, accelerators and incubators that generate applied research in digital media and advance commercialization and knowledge transfer across a wide range of areas including ambient experience, digital painting, gaming, physical computing, and social media research.[172] Students and faculty affiliated with the DMRII work with industry and other research partners, sharing and exchanging human and physical capital. Matters related to the DMRII are managed by OCAD U's DFI implementation office.

II. Range of support services for the mobile business sector

OCAD U offers an assortment of support services for the business sector to interact and collaborate with students and faculty across multiple areas of focus, including mobile and digital media. In light of its research and development strengths in design, the university plays a critical role in forging linkages with local industry partners to advance innovation in these two sectors. OCAD U offers support services to facilitate academic-industry research and commercialization partnerships in digital media and mobile[173] through by two initiatives: DMRII and the Mobile Experience Innovation Centre (MEIC). In this case study MEIC will be examined more closely. For further details on DMRII refer to Chapter II: Enterprise and Innovation.

The MEIC (Mobile Experience Innovation Centre) was founded in 2007 by OCAD University as a mobile sector strategy and lobbying initiative[174]. With President Diamond as the inaugural Chair, over time MEIC evolved into a research and development collaboration between major industry, small- and medium-sized enterprise, and academic research partners, with a focus on analyzing and strengthening local capacity for research and commercialization, facilitating the activities of start-ups and early-stage entrepreneurs, and promoting strategic foresight for Ontario's mobile content industry. In 2011 MEIC became a not-for-profit, industry-based organisation, and retained strong partnership ties with the university: MEIC is housed on the OCAD U campus; it has access to OCAD U's computer technology and network; President Diamond is the organisation's co-chair; and MEIC is funded 'as a coalition by OCAD U and [Ontario Media Development Corporation]'.[176] Further details of MEIcs activities can be read in Chapter V: Smart, Creative and Sustainable Business where the centre is more fully explored as a separate case study of such HEI / business sector collaboration.

MEIC supports design leadership, experience innovation, and applied research in the mobile and wireless sectors. The organisation engages with industry to help facilitate investment and nurture the mobile talent pool; leads lobbying initiatives intended to secure increased financial and policy support from policy-makers; and provides incubator and accelerator programmes for business sector partners. In particular, MEIC provides the business sector with a breadth of services to strengthen their activities and working relations with OCAD U and other research

institutions. MEIC's Mobile Accelerator Programme (MAP) identifies high potential Ontario mobile start-ups and provides them with access to research infrastructure and commercialization support in order to assist these mobile business entrepreneurs in developing the business skills they need to succeed. A series of workshops are organized to discuss market trends, business models, accessing markets, financing, attracting and retaining talent, and sales strategies; these events also provide mobile businesses with the opportunity to connect with talent (i.e. mobile developers, producers and designers) and mentors, and discuss the potential for incubation.

MEIC's Mobile Forums provide mobile entrepreneurs with a platform to launch a new business or product; full support is provided, from social media marketing to event logistics. MEIC also manages a Mobile App Camp which brings together content brands and the wider mobile community over a summertime start-up weekend to create and pitch new product ideas.[177] Additionally, MEIC has organized a Mobile Developers and Designers of Toronto user group comprised of mobile professionals who meet up to discuss issues related to mobile media content and platform development; this initiative aims to nurture the skills and competencies of mobile developers and designers in the Toronto area.[178] Finally, as advocates of the local mobile industry, MEIC is working towards securing increased financial and policy support for its research and business sector partners in the form of government procurement strategies in capital investment and increased tax credit initiatives targeted at mobile content, services and application developers.[179]

MEIC has also had success in establishing productive partnerships between mobile industry business and research partners. Acting as an intermediary or 'match-maker' between researchers and industry partners, MEIC identifies and leverages opportunities for advancing an innovative idea, product, process, or service, and/or growing a mobile company. By 2011, the organisation facilitated over twenty research and prototyping projects between SMEs, corporations, and research institutes (MEIC, 2011). Indeed, a number of the industry partners DMRII collaborated with through the ARC initiative also worked with MEIC and/or had their ideas incubated by MEIC[180].

One of the most successful and publicly profiled industry-academic collaborations MEIC enabled was the partnership between OCAD U and Guardly. Guardly Inc. is a Toronto-based mobile start-up company and a platform for emergency communication that facilitates rapid social, mobile, and location-aware responses to calls for assistance.[181] Smartphone users with access to the Guardly application can, in an emergency situation alert, connect with local authorities, and campus security, as well as their own safety groups by launching Guardly. This technology instantly connects users to their contacts through conference call, instant messaging, and real-time location tracking. MEIC and OCAD U were major partners in developing the Guardly technology. Guardly Inc. is 'a graduate' of the Mobile Experience Innovation Centre incubator programme. Over the six-month incubation period with MEIC, starting in 2010, the company developed its core infrastructure and its first mobile application for iPhone working with designers and

developers from OCAD U. Around this time, OCAD U's campus security and security teams at other universities acknowledged the extent to which this technology could help students and faculty at higher education institutions remain safe on campus. In turn, OCAD U became Guardly's first HEI client in 2012. Most notably, OCAD U and Guardly worked together to launch the Guardly Safe Campus Programme which is accessible free of charge to students, faculty and staff across Canada's higher education community.[182]

The concentration of talent associated with OCAD U and their industry partners has also helped to attract increased investments into the local economy. Local start-ups that have partnered with OCAD U's DMRII and MEIC are provided with the services and support they need to grow and intensify commercialization efforts, including leads to access risk capital from angel investors and venture capitalists. The success that these young companies associated with OCAD U have had in developing their innovations contributes to enhancing the private investor community's confidence in the growing digital and mobile sectors of the Toronto region.

III. A specialist approach to mobile industry engagement - benefits and recommendations

Mobile and digital media technology is constantly progressing, and private sector actors from these industries can realize a number of advantages by establishing relationships with a specialist higher education institution on the cusp of creativity.

A. Benefits of working with a specialist HEI

Firstly, business representatives collaborating with OCAD U are often engaged with young student researchers who are, in a number of cases, the target market for many of the innovations companies are developing. By working closely with a particular cohort of consumers with specialised skills in a given area of focus, private sector partners are positioned to better understand current demand and identify growth opportunities for the future.

Secondly, many of the digital media and mobile companies that OCAD U works with may not have sufficient funding to conduct extensive in-house R&D. These smaller industry partners benefit from the applied research culture and experimental development strengths OCAD U has built up in the arts, design, and media. Moreover, these institutional attributes encourage OCAD faculty and students engaged with industry to work towards ensuring that their collaborative research efforts are successfully applied in the real world.

Thirdly, many larger companies have a corporate responsibility to work with students, and partnerships forged with specialist HEI institutions like OCAD U readily enable industry partners to fulfill this mandate. In the process, participating business sector representatives have the opportunity to learn more about the innovative ideas OCAD U students and faculty are generating that are relevant to their industry and valuable to their organisation.

B. Lessons to learn - Formalised structures for strengthening research-industry collaborations

OCAD U has enabled industry to engage with its faculty and students by institutionalising ways in which business sector representatives can approach the institution, develop a partnership and move projects forward. Vehicles like DMRII and MEIC have been particularly influential in bringing together industry partners and academic researchers within and outside of OCAD U, and facilitating the flow of ideas, human capital and technology between these actors in order to take advantage of research and innovation collaborative opportunities in the mobile and digital sectors. It is worth noting that structures that are developed should be 'industry-friendly', providing business sector representatives with the support services required to collaborate and some substantive incentive for partnering with the institution. Access to the university's state-of-the-art technology and equipment and the option of hoteling are a few of the many services MEIC and DMRII offer to demonstrate a partner-friendly approach to working with industry. Specialist institutions seeking to establish or strengthen their working relationships with industry may also develop internships, co-op programmes and work placement programmes, all of which draw the institution's faculty and students closer to local industry actors who value their specialised knowledge and skills.

IV. Conclusion: Smart, creative and sustainable - the small specialist HEI and business

This case study of the Mobile Experience Innovation Centre combines and reinforces elements previously discussed in the report, namely the ability of small and specialist institutions to embed industry engagement into curricula to create meaningful and profitable outcomes, and to create leading roles for their research, staff and graduates in emerging technological and economic areas. OCAD U is an established arts institution in Canada and one of the leading art and design specialists in the country. Through committed leadership and a nimble attitude OCAD U has developed a role in Ontario as the incubation, research, and development hub for digital and mobile technologies. This is an emerging field for the region, and in fact Canada's mobile industry is not the most sophisticated globally. However, particular local conditions, including the proximity of excellent and ambitious emerging small and medium-sized technology businesses, shows the potential for OCAD U to leverage its resources, expertise, and deep knowledge to create significant impact in this area, locally, nationally, and potentially globally.

These examples demonstrate the key benefits to the economy of engaging with institutions whose talent, fresh thinking, and cutting edge research enables the realization of smart, creative, and sustainable business models. Moving far beyond the linear model of supply and demand, and the fallacy highlighted by Richard Florida that the pathway from 'university research to commercial innovation (is) to an ever-expanding network of newly formed companies', the approaches detailed above lead to a more circular and iterative innovation cycle, assisting existing business to reinvigorate, question their methods and approaches, and move towards a more sustainable future.

By creating formal mechanisms for commercial engagement with a single contact point, these three institutions have successfully promoted their expertise and commercialised it in a way that results in benefits for the institution, the business, staff, and students, primarily by not divorcing these operations from curricula and the teaching and learning nexus which small and specialist universities deliver so effectively. A great deal may be learned from the direct hands-on approach of the art school. Long standing pedagogical models such as Live Projects in the UK and 'experiential learning' through internships in Canada are extremely effective in enabling students and staff to develop their understanding of the sectors of which they are a part, and in identifying the relevant sills and aptitudes which need to be developed. This authentic 'embeddedness' of university-industry connections in the curricula is key to their success.

These examples also illustrate the wide variety of roles that potentially exist for specialist creative institutions and creative graduates across a vast array of sectors. Once we leave behind a fixed idea of the creative industries per se and adopt a more expanded view of the relevancy of good design, creative thinking, and applied imagination in all sectors of the knowledge economy, regional growth looks far more connected up and dynamic, pivoting on all regional players in a broad ecology of actors. If this openness can be combined with a focus on what localities specifically need, and an understanding of where the strengths exist, as in the case of OCAD U's local network of technology businesses and a gap in the national market for mobile excellence, the results may be transformational.

171 This paper has been prepared for the OECD LEED Programme. See http://www.oecd.org/cfe/leed/ for further details.

172 OCAD U website: http://www.ocadu.ca/research.htm. For a full list of DMRII labs, incubators, and accelerators refer to the Appendix.

173 The majority of mobile content, services and applications companies in Ontario are located in the GTA. Source: MEIC, 2012a.

174 MEIC website: http://research.ocadu.ca/meic/home

175 MEIC, 'MEIC Inaugural AGM' Slideshow presentation, MEIC, Toronto, 2011.

176 MEIC, 'MEIC Annual General Meeting' Slideshow presentation, MEIC, Toronto, 2012.

177 MEIC website: http://research.ocadu.ca/meic/project/mobile-app-camp

178 MEIC, 'MEIC Annual General Meeting, Slideshow presentation, MEIC, Toronto, 2012.

179 OCAD U, *Innovation and Insight: Mapping Ontario's Mobile Industry*, OCAD U, Toronto, 2009.

180 Some of these industry partners include Echo Mobile, Media Lab Toronto, Normative, Guardly and Albedo Informatics. Source: MEIC, 2011: slide 37

181 OCAD U, 'OCAD University partners with Guardly to put code blue emergency phones directly

182 into students' pockets', Press Release, OCAD U, Toronto, 22 February 2012.

183 According to an assessment conducted on emergency response times on campus, it was reported that Guardly Safe Campus cuts incident response times by 44% from start to finish. Source: Guardly Inc., 2012.

184 Office of Health Economics and Alzheimer's Research Trust

Health and Wellbeing Agendas: Addressing Grand Challenges and emerging priorities

By being locally centred and locally engaged, small and specialist institutions have a unique opportunity to enhance the lives of people in their communities, perhaps most tangibly so in the field of healthcare. In a recent report on the complementarity of public and charitable research and private research spending by the Alzheimer's Research Trust and the Office of Health Economics (OHE) it was recognised that 'for those university outputs and mechanisms transmitting the knowledge across different stakeholders that are more tacit (i.e. knowledge that can be difficult to write down in such a way that is meaningful and readily understood) in nature (social sciences in human capital), geographic proximity plays a greater role in accessing and absorbing university knowledge'.[183] The close-to-market research which characterises the approach described in the case studies below enables institutions to develop excellent networks with local partners, and build the trust necessary to create the long-term engagements often required for rigorous, evidence-based research in health.

Health and wellbeing is more than a local issue. Whilst there will be variations in need for specific services, general trends exist nationally and internationally. Universities addressing health agendas therefore deal with a dynamic set of priorities – local, national, and global. The case studies below, both from the University of Worcester, are examples of a smaller institution making significant waves through specialist applied research centres in the Grand Challenge of an ageing population, and emerging priorities resulting from environmental shifts. By being at the forefront of applied research these research centres are the standard-bearers for tackling global agendas in macro terms through micro actions.

183 Office of Health Economics and Alzheimer's Research Trust, Forward Together, Office of Health Economics: London, 2009, p.15

Case Study 1: The Association for Dementia Studies, University of Worcester

Professor Geoffrey Elliott and Debbie Lambert, University of Worcester, UK

I. Introduction

A research centre for studying dementia at University of Worcester (UW) illustrates well how engagement between the university and local government, local health care agencies, patients, and carers has led to tangible benefits, not only to health and wellbeing in the immediate community, but equally to larger global economic concerns over the needs of an ageing population.

Dementia and care for the elderly has become a Grand Challenge for all European economies as they adapt to an increasingly ageing population. It is a public and political priority; in 2009 the Department of Health launched a National Dementia Strategy; this was followed in 2012 by UK Prime Minister David Cameron announcing his personal dementia challenge, and the intention to bring together key partners in a close network. The impact of dementia on the economy are significant, as outlined by the Alzheimer's Society in their recent annual summary Dementia 2013: The hidden voice of loneliness:

> *'Dementia currently costs the NHS, local authorities and families £23 billion a year (Alzheimer's Society 2007, updated to reflect 2012 figures), and this will grow to £27 billion by 2018 (King's Fund, 2008).*
>
> *670,000 people in the UK act as primary carers for people with dementia, which saves the state £8 billion per year' (Alzheimer's Society 2012).'* [184]

The Association for Dementia Studies (ADS) is leading the UK's approach to applied research in this area.

II. The Association for Dementia Studies (ADS)

The ADS was established in 2009 at the University of Worcester as a multi-professional group of educationalists, researchers, and practitioners who are expert in the field of person-centred dementia care and support within the fields of health, housing, and social care.

A. Project design and partners

The ADS was established and jointly funded by a partnership of University of Worcester, Worcestershire Primary Care Trust, and Worcestershire County Council. Their aim was to make a substantial contribution to building evidence-based practical ways of working with people living with dementia and their families that enables them to live well. They work with a range of health, housing, and social care professionals to educate and support them to be able to provide appropriate, specialised support for people living with dementia and their families and carers. Projects develop evidence-based, practical ways of supporting the health and well-being of people with dementia and their families through research, education, and scholarship. In the 2011 / 2012 academic year, ADS provided 29 short courses, which amounted to 175 days of face-to-face teaching to around 550 practitioners. It currently contributes teaching to eight different nursing, health, and care related undergraduate courses, and hosts a day conference for first year nursing students.

The key objectives of the ADS are:

1. Research and lead knowledge and practice in its field and, through education and scholarship, build evidence-

based practical ways of working with people living with dementia and their families that enables them to live well;
2. Make a difference to the experience of people living with dementia by working proactively, and ensuring real knowledge transfer at the interface between:
   - the experience of those living with dementia;
   - those developing care practice;
   - those undertaking research;
3. Improve the lives of people living with dementia through working professionally with those living with dementia, those developing care practice and those undertaking research;
4. Advise on, influence, and bring about improvements in policies relating to dementia at a local, regional, national, and international level;
5. Enhance care standards through skills development of those working in training and education in dementia care and the promotion of positive values.

ADS was built on a strong foundation partnership between the University, NHS Worcestershire, Worcestershire County Council, and the national charity Dementia UK. ADS is guided by an external steering group that reports into the University. It includes representatives from:

- Worcestershire Joint Commissioning Unit;
- West Midlands Strategic Health Authority;
- Dementia UK;
- Uniting Carers;
- Service users.

It has worked with a range of other partners in the delivery of a range of local and national projects including:

- Alzheimer's Society (Focussed Intervention Training and Support (FITS);
- NHS South of England (Central) (Development programme for leadership and expertise in dementia);
- Health and Social Care Partnership (Development programme for leadership and expertise in dementia);
- Personal Social Services Research Unit (PSSRU) at the University of Kent (Adult Social Care Settings project, ASSET);
- School for Policy Studies at the University of Bristol (ASSET);
- Housing 21 (ASSET);
- Housing Learning and Improvement Network (ASSET);
- Equip 4 change (Care for VIPs);
- Crystal Presentations Ltd (Care for VIPs);
- ExtraCare Charitable Trust (Enriched Opportunities Programme, EOP);
- Admiral Nurses (Evaluation of the Admiral Nurse role);
- Coventry & Warwickshire NHS Partnership Trust (Intergenerational Schools project);
- University of York (Dementia and Sight Loss project);
- University of Bournemouth (Dementia and Sight Loss project);
- Thomas Pocklington Trust (Dementia and Sight Loss project);
- Housing and Dementia Research Consortium (Dementia and Sight Loss project);
- University of East Anglia (Care Homes Organisations Implementing Cultures for Excellence (CHOICE);

The Association for Dementia Studies aims to make a substantial contribution to building evidence-based practical ways of working with people living with Dementia and their families that enables them to live well. Photograph © University of Worcester

- Stirling University (CHOICE);
- Cardiff University (CHOICE).

B. Project strands
The project is organised around the following thematic strands:

i. Early interventions, Primary Care & raising awareness
An example project is the in-depth evaluation of the Worcestershire Early Intervention Dementia Service and the Dementia Advisor Service. By diagnosing early and providing appropriate support, it is possible to maximise the quality of life, tailor care packages for specific needs, and slow down the need to access the more costly services.

ii. Excellence in person-centred care in care homes
An example project is PIECE-dem (Person Interaction Environment Care Experience in Dementia) which was developed by ADS as part of the PANIOCA (Prevention of Abuse and Neglect in the Institutional Care of Older Adults) programme, which is a joint-funded research initiative between the Department of Health and Comic Relief, designed to enhance the dignity of older people in institutional settings. It focuses on supporting research that addresses the issue of abuse, neglect and loss of dignity in care for older people. PIECE-dem is an observational process that illuminates the experience of those people with advanced experience of dementia and high levels of need, who are most vulnerable in long-term care settings to experiencing a poor quality of life.

Another example is the FITS programme. ADS has been commissioned by the Alzheimer's Society to deliver the Focussed Intervention Training and Support (FITS) programme. An initial trial found the programme reduced the use of antipsychotic medication in care homes by 50%. These drugs, which are inappropriately prescribed to 144,000 people with dementia, double the risk of death, treble the risk of stroke, and can leave people unable to walk or talk. The savings from not prescribing them could be up to £84 million per year. They will be providing training, supervision, and mentoring to 100 staff working across 150 care homes in England and Wales to become 'dementia coaches'.

iii. Dementia-friendly acute hospital care
ADS is delivering a development programme for leadership and expertise in dementia within seven Acute Trust organisations on behalf of NHS South of England (Central), in partnership with the Health and Social Care Partnership. The aim of the programme is to develop expertise and leadership within the acute settings via Dementia Champions, and a sustainable area-wide dementia champion's network.

iv. Supporting choice and control at home and in supported housing
An example is the Adult Social Care Settings Project (ASSET). This is an independent research project commissioned and funded by the Department of Health's NIHR School for Social Care Research. The project runs from February 2012 to January 2014 and is being led by

ADS in partnership with the Personal Social Services Research Unit (PSSRU) at the University of Kent, the School for Policy Studies at the University of Bristol, Housing 21, and the Housing Learning and Improvement Network. The overall aim of this project is to explore how best to provide adult social care in housing with care schemes in England, in order to maximise quality of life for residents and make the best use of resources.

v. Understanding the diversity of experiences of people living with dementia & their families

The Care Fit for VIPS toolkit and website was created and developed by ADS, Equip 4 change (a Community Interest Company), and Crystal Presentations Ltd. The work was commissioned and funded by the West Midlands Strategic Health Authority as part of their programme to reduce the use of antipsychotic medication in dementia.

vi. Creative therapies and activities for people living with dementia

The Director of ADS, Professor Dawn Brooker, has a long standing practice and research interest in creative activity and dementia. She worked in partnership with the ExtraCare Charitable Trust to develop the Enriched Opportunities Programme as a means of engaging people with dementia through activity and occupation. This proved to significantly improve quality of life, decrease depression, and decrease hospitalisations for people living with dementia. For the group of 135 in the trial, hospitalisations decreased by 42% over the 18 months of the study.[185]

vii. Advocacy for people with dementia

Dementia UK and the ADS have a strategic and collaborative partnership which was developed in 2009. Both organisations are also members of the Dementia Action Alliance and signatories to the National Dementia Declaration, and are actively seeking opportunities to support each other in national projects. An example of this is the proposal to the National Institute for Health Research Service Delivery and Organisation programme to undertake an in-depth evaluation of the Admiral Nurse role and an assessment of the outcomes associated with this service for people living with dementia, their families, and the wider health and social care community

C. Participants and process

The centre works with service users and carers, service providers (practitioners, commissioners and manufacturers), as well as fellow academics through research collaboration, publication, and conference activity.

The work of the centre usually takes the form of applied research, working with and for partners to provide evidence for changing working practices. Increasingly, due to the reputation of the team, it is commissioned to carry out studies and reports. The ADS is regularly invited to contribute advice on national policy on dementia care. Such activities currently include invited membership of the National Dementia Strategy Internal Reference Group, and being the lead partner in an important EU development, Alzheimer's Cooperative Valuation in Europe (ALCOVE) , for provision of evidence advice for EU policy and decision makers on early diagnosis of dementia (ADS were

invited to tender for this by the Department of Health). As part of ALCOVE, ADS is contributing to assessing the performance of the UK against other European countries. Last year, Professor Brooker was invited to 10 Downing Street as part of a reference group for the Prime Minister's Challenge on Dementia. ADS was mentioned in a House of Commons debate on Dementia in January 2012. Furthermore ADS was a founder member of the National Dementia Action Alliance, whose new board has now assumed responsibility for the on-going national focus on the development of dementia care: Professor Brooker was elected as the Board Member with responsibility for research in March 2013.

The research conducted generally results in a practitioner report and an academic article alongside other tangible outcomes, such as a toolkit for practitioners. The Royal Surgical Aids Society has commissioned ADS to work with them to develop their ideas, through further research, into a project or service model designed to support carers and families of people living with dementia at home. The aim will be to ensure that families can maintain their independence, and their dignity, and remain living together for as long as possible.

D. Funding

ADS is now self-supporting, through a combination of project funding, commercial funding, and income from training. The four main activity strands comprise generation of new knowledge, education and training, practice development, and policy influence. ADS acquire funding for each of these strands (they are often approached directly with proposals). The activities are inter-connected, for example, the training results from or is informed by the project work.

Funding providers include:

- Department of Health;
- Comic Relief;
- Alzheimer's Society;
- Department of Health's NIHR School for Social Care Research;
- West Midlands Strategic Health Authority;
- European Union.

The ADS Annual report for September 2011 to August 2012 reports that:

> *'During this period we have submitted 16 bids for external research funding. Of these, 6 were as sole applicant, 2 were as lead applicant and 8 were as co-applicant. Of the 16 submissions, 8 were successful, 5 were unsuccessful and a decision is awaited in relation to a further 3. The 8 successful submissions brought an overall income of £805,634 to ADS.'*

ADS is at the core of the University's strategy to develop applied research excellence in areas beneficial to its community. The New Strategic Plan (2013 to 2018) commits University of Worcester to make a Major Contribution through research and Knowledge Exchange to Society and the Local Economy:

'Research and advanced scholarship includes original investigation in a particular discipline or disciplines, and applied, professional, and practice-based research which reflects the University's broad mission. Knowledge exchange is the application and exploration of research and scholarship activities in society, and includes within its scope innovation, enterprise and entrepreneurship. Research of a high standard already exists in many parts of the University and we will seek to continue and extend this work. Through the further promotion of a culture which values first rate scholarship and research, the University will seek to increase the range and quality of the contribution that it makes to society and the local economy.'

E. Impacts

As well as the usual evaluations, research papers, consultancy, conference outputs, and project reports you would expect from such a centre, the projects have tangible products which are used by practitioners to improve practice for the community. For example:

i. ALCOVE (The EU Joint Action on Alzheimer's initiative)

This is a European Union funded project that aims to share best practice in dementia diagnosis and care. ADS are leading a package of work to develop detailed recommendations and an online toolkit to assist professionals across Europe in the diagnosis of dementia.

ii. PIECE-dem (Person Interaction Environment Care Experience in Dementia)

This is an observational process and tool for staff in care homes that illuminates the experience of those people with advanced experience of dementia and high levels of need, who are most vulnerable in long-term care settings to experiencing a poor quality of life. The outcomes include a framework and instruction manual designed to prevent abuse and neglect. The framework is being used in a follow up project called Care Homes Organisations Implementing Cultures for Excellence (CHOICE) which aims to examine the links between organisational cultures and the care experiences of older people living in residential and nursing care.

iii. New Cross Acute Hospital

Work with New Cross Acute Hospital to deliver excellence in dementia care. A dementia care bundle of interventions was developed, and has been followed up with a programme to develop expertise and leadership within the acute settings via Dementia Champions, and a sustainable area-wide dementia champion's network. The project improved services for patients with dementia who are admitted to hospital with a physical illness, and focuses on the hospital environment, nutrition and hydration, and communication. As a result of the programme, there has been a significant increase in the number of patients discharged home, a rise in the number of patients who gain weight while in hospital, a halving of the number of patients falling, and a significant improvement in the levels of patient staff and visitor satisfaction. To illustrate

the tangible benefits of the intervention: if a patient stays in the hospital for five days longer and as a result this puts off admission to a care home by three months, the cost benefit could be £7,000 per patient; if the overall length of stay can be reduced in the future by an average of just one day per patient with dementia across New Cross hospital, the direct gain to the Trust could be over £300,000.

As a result of its success, this project came top in the Patient Safety in Clinical Care category of the Patient Safety Awards 2012. These awards recognise excellence in patient safety and identify the best initiatives that can be shared across the health service, and the Patient Safety in Clinical Care category recognises organisations that have successfully introduced a specific patient safety initiative into an area of clinical practice and have seen incidents of actual or potential harm to patients significantly reduced as a result. The results of this work have had impact regionally in hospitals within the West Midlands; within the South of England Region; nationally through the Institute of Health Innovation Call to Action programme and the Royal College of Nursing Dementia programme; and internationally through the Japanese Society of Person Centred Care and in Germany through the Robert Bosch Foundation.

iv. Care Fit for VIPS

The Care Fit for VIPS framework, concepts, toolkit, and website to reduce the use of antipsychotic medication in dementia. This is used in specialist training offered by ADS. To date, it has 1529 people registered as users. In addition, the VIPS framework underpins the set of reflective questions in the resource pack which accompanies the Stand By Me training DVD, produced in partnership with ADS. ADS have distributed 1816 copies of the Stand By Me resource pack.

It is estimated that there are currently over 800,000 people in the UK with dementia[187], rising to over 1.5 million by 2051.[188] With this significant increase in the number of people living with dementia, the predicted national financial cost is £34 billion per year by 2026 (National Audit Office, 2010).[189] The economic impact of dementia is already substantial with the national cost estimated at £23 billion per year in 2008 and an average cost of over £27,000 for each individual over the age of 65 with dementia.[190]

It is widely acknowledged that there is also a profound personal cost to the experience of dementia, for both the person living with the diagnosis and their families. Personal costs include increased risk of admission to institutional care for the person with dementia, and poor physical and mental health for the family member providing care.[191] In spite of the recognition of the significant challenges experienced by people living with dementia and their families, it is suggested that current services frequently fail to provide effective support.[192] Indeed, the National Audit Office estimated that less than half of people with dementia in the UK received a formal diagnosis or had any contact with dementia specific services throughout the course of their illness.

'Diagnosing more people and doing so earlier may be cost-effective by enabling more to be done to delay progression of the disease. Having a clear diagnosis, could also reduce the number / length of acute hospital episodes and delay the need

for admission to more expensive long-term care. In addition, using therapies that reduce behavioural problems is known to reduce carer stress, which is often the trigger for unplanned entry into care homes. NICE estimates the costs of cognitive behavioural therapy for unpaid carers at 27 million'.

Specific economic impacts include:

- The ASSET (Adult Social Care Settings Project) project aims to explore how best to provide adult social care in housing with care schemes in England, in order to maximise quality of life for residents and make the best use of resources. It has 4 main stages, one of which is to carry out in-depth case studies of housing with care schemes to explore in detail how they work with adult social care, the experiences of residents and relatives of receiving services, and the cost of different models of care.
- The in-depth evaluation of the Worcestershire Early Intervention Dementia Service (EIDS) and the Dementia Advisor Service will lead to tailoring of specific care packages which will slow down the need to access the more costly services. The ADS has led an education programme that enabled the EIDS team to deliver specialist assessment of 1000 people annually, sensitively communicate the results of that assessment to the person with dementia and their families, offer interventions.
- The FITS programme reduced the prescribing of antipsychotics in care homes by 50%.These drugs which are inappropriately prescribed to 144,000 people with dementia double the risk of death, treble the risk of stroke, and can leave people unable to walk or talk. With two-thirds of people in care homes having dementia, it is estimated that the training programme could reach and benefit 5,000 people with dementia while also protecting those in the future. According to the World Health Organisation, the savings from not prescribing the drugs to the 144,000 people would be £84 million per year. The programme is providing training, supervision and mentorship to 100 staff working across 150 care homes in England and Wales to become dementia coaches.
- The Enriched Opportunities Programme has been shown to significantly improve quality of life, decrease depression, and decrease hospitalizations for people living with dementia. Of the 135 people on the programme, there was a 42% decrease in hospital in-patient days over the 18 month period, reducing the costs for the group from £58,794 in the first six months to £34,177 in the final six months.
- The ALCOVE project to produce recommendations and an online toolkit to support the diagnosis of dementia will increase the diagnosis rate from 40%, which will lead to early access to services, preventing the need to use more expensive services.

The work of ADS has a local, regional, national, and international impact. Staff have delivered keynote addresses at conferences around the world including the Netherlands, New Zealand, Japan, and South Africa. ADS work with the Japanese Society of Person-Centred Dementia Care. Japan has the largest concentration of people with dementia in the world.

ADS have been commissioned to carry out the following research and evaluation projects for wider public benefit during 2011 to 2012:

- The Intergenerational Schools project funded the Strategic Health Authority as part of the Prime Minister's Challenge on Dementia, and works with West Midlands Strategic Health Authority and Coventry & Warwickshire NHS Partnership Trust to develop an Evaluation Pack to capture changes in pupils' attitudes, beliefs, and values in relation to dementia. The project will consist of curriculum enhancements to be delivered nationally to schools across Key Stages 2, 3, and 4. The Association for Dementia Studies will collate and analyse data from the baseline phase early in 2013;
- A new three-year evaluation of the Carers as Educators project, as part of monies awarded to Dementia UK under the Voluntary Sector Investment Programme: 'Innovation, Excellence and Strategic Development Fund';
- A project which will make the business case for an innovative model of supporting people with dementia and their families, commissioned by Shared Lives South.
- An exploration of services to improve the lives of people with both dementia and sight loss, in collaboration with the University of York, the University of Bournemouth, the Thomas Pocklington Trust and the Housing and Dementia Research Consortium.

F. Education and dissemination

The ADS provides staff development for those working with dementia via bespoke educational programmes, action learning sets (ALS), and negotiated modules. It is developing a master's course. The programmes of learning can be taken as an action learning set experience or as a 'negotiated learning module' worth a minimum of 20 university credits. The course participants' level of educational achievement would be discussed with them and a suitable assessed piece of work set for them to achieve over the period of study. The following courses are currently being promoted:

- Specialist Practice in Dementia (Mental Health) ALS;
- Specialist Practice in Dementia (Early Intervention) ALS;
- Specialist Practice in Dementia (Leadership) ALS;
- Specialist Practice in Dementia (Person Centred Care) ALS;
- Specialist Practice in Dementia (Acute Hospital Dementia Care) ALS;
- Improving Dementia Practice Short Course.

During September 2011 to August 2012, ADS delivered 9 Leading Dementia Care courses; 15 Specialist Dementia Practice courses; 5 Fundamentals of Dementia short courses. These have been both commissioned and won by competitive tender, and have included Local Authorities, private providers, Acute Hospital Trusts, and Mental Health Trusts. This accounts for approximately 175 days face-to-face teaching (1,225 hours) to around 550 course participants.

Research is a central tenet of ADS's work, its primary aim being to research and lead knowledge and practice in its field. All of the research projects undertaken within ADS

There is a profound personal cost to the experience of dementia, for both the person living with the disease and their families. The largely tacit knowledge held by health practitioners, patients and carers has found a locus in ADS, with the centre acting as a hub for developing and disseminating best practice in dementia care in and far beyond Worcestershire. Photograph © 2013, University of Worcester

are collaborations with external organisations, spanning a range of sectors including health, housing, and social care. During 2011/12, the ADS team collectively published 12 peer reviewed journal articles, 4 practice journal articles, prepared 7 research reports, published 1 book, and contributed 1 book chapter. They provided 6 invited conference presentations, contributed 25 refereed conference presentations, 3 academic conference workshops, 16 professional conference workshops, and 6 public lectures.[193] ADS currently host two part-time and two full-time research studentships and contribute to the supervision of another six in other universities in the UK and overseas.

III. Conclusion

Although now self-funded, the partners remain committed to supporting the Association for Dementia Studies to continue to provide high quality applied research which has an important social impact, and which contributes to a topic of growing international importance. The University of Worcester remains committed to supporting research centres which provide high quality applied research which has an important social impact and which will be sustainable over time. The new Strategic Plan states that UW has a mission:

> *'to make a transformational contribution to the positive development of the cultural, social and economic life of the City of Worcester and our wider region [...] The University aims to be an exemplar of how an institution of higher education can organise its activities to deliver outstanding public benefit, and to maximise opportunities to impact positively on its community, and society generally'.*

The area of dementia will continue to be of utmost importance to the other partners in ADS, and their continued involvement in the Steering Group will ensure that the work of the centre continues to be embedded in practice.

The ADS project is therefore also embedded into local government, social and health care networks, informing decision-makers by developing evidence-based approaches to dementia care across the region.

As the research process and outputs are incorporated into teaching and learning at the University of Worcester, the project exposes graduates to hands-on health and social care research through student conferences, and engaging the next generation of health professionals in evidence-based approaches to policy making, especially significant in the Grand Challenge' of ageing and care for the elderly.

The largely tacit knowledge held by health practitioners, patients and carers has found a locus in ADS, with the centre acting as a local hub for both developing and disseminating best practice in dementia care in and beyond Worcester. The positive, tangible results of ADS' open structure and excellent research, based on local trust and engagement, has been felt beyond the UK and beyond, including across Europe through their contribution to the ALCOVE project, illustrating the ability of small and specialist universities to have a lasting impact through applied research and innovative approaches to fundamental global issues.

184 Alzheimer's Society, *Dementia 2013: The hidden voice of loneliness, Alzheimer's Society*: London, 2013, p.62

185 See: Brooker, D. and Woolley, R. (2007) *Enriching Opportunities for People living with Dementia: The Development of a Blueprint for a Sustainable Activity-Based Model of Care.* Aging and Mental Health, 11(4): 371-383; Brooker, D., Woolley, R. and Lee, D. (2007) *Enriching Opportunities for People living with Dementia in Nursing Homes: An evaluation of a multi-level activity-based model of care.* Aging and Mental Health 11(4): 361-370; Brooker D., Argyle, E., Clancy, D. and Scally A. (2011) *Enriched Opportunities Programme: A cluster randomised controlled trial of a new approach to living with dementia and other mental health issues in ExtraCare housing schemes and villages*. Aging and Mental Health. 15 (8); 1008-1017

186 www.alcove-project.eu/

187 Luengo-Fernandez, R., Leal, J., & Gray, A. (2010). *Dementia 2010: The economic burden of dementia and associated research funding in the United Kingdom.* London: Alzheimer's Research Trust.

188 Knapp, M., Prince, M., Albanese, E. et al. (2007) Dementia UK (A report to the *Alzheimer's Society on the prevalence and economic cost of dementia in the UK produced by King's College London and London School of Economics).* London: Alzheimer's Society.

189 National Audit Office (2010) *Improving Dementia Services in England: An interim report.* NAO Report. London: NAO.

190 Luengo-Fernandez, R., Leal, J., & Gray, A. (2010). Dementia 2010: *The economic burden of dementia and associated research funding in the United Kingdom.* London: Alzheimer's Research Trust.

191 See: Banerjee, S. and Wittenberg, R. (2009) 'Clinical and cost-effectiveness of services for early diagnosis and intervention in dementia'. *International Journal of Geriatric Psychiatry,* 24 (7), 748 – 754; Brodaty, H. and Donkin, M. (2009). 'Family caregivers of people with dementia'. *Dialogues in Clinical Neuroscience*, 11(2), 217-28.

192 National Audit Office (2007) *Improving Services and Support for People with Dementia*. NAO Report. London: NAO.

193 See Appendices: University of Worcester, ADS for a list of some relevant research publications.

Case Study 2: National Pollen and Aerobiology Unit (NPARU), University of Worcester

Professor Geoffrey Elliott and Debbie Lambert, University of Worcester, UK

I. Introduction

The National Pollen and Aerobiology Unit (NPARU) is a research centre at the University of Worcester and is internationally recognised for its work on allergens, including pollen, and aerobiology. The centre directly addresses growing concerns about the impact our changing environment, climate, and agricultural practices may have on the health of populations. A 2003 report by the Royal College of Physicians reported that the number of allergy sufferers has increased threefold in the United Kingdom in recent years[194]; NPARUs research and network of partners are vital in managing an evidently growing problem. The Unit has a strong history of research into aspects of hayfever, together with allergic and irritant reactions including asthma, rhinitis, conjunctivitis, chronic obstructive pulmonary disease (COPD), and ocular allergies.

With a distinct focus on applied research NPARU attracts a range of partners and as such all funding for research projects is commercial. The research activities are closely allied to pharmaceutical companies, the health care industry, and manufacturers of products for allergen reduction. Examples include: studies into a range of allergy and respiratory conditions and collaborations with consultants and clinicians from Worcestershire Acute NHS hospital; trials, both for research purposes and on behalf of manufacturers of medical devices relating to allergies and other items such as bedding and breathing masks.

II. The National Pollen and Aerobiology Research Unit

The National Pollen and Aerobiology Research Unit (NPARU) is a national centre of excellence and a dedicated research centre at the University of Worcester with facilities that include a controlled environment test room, laboratories, and a monoclonal antibody production and diagnostics unit.

NPARU was first established at University of Worcester in 1995, and comprised one academic member of staff, a researcher, and a research student. Initially, it focused on research in aerobiology which led to the development of the national pollen forecast and later into the area of forensics. The unit displayed innovation in the development of the pollen forecast, building up a network of experts around the country to produce the first forecasts. Whilst other centres can produce pollen counts, NPARU developed the modelling which allows it to produce the pollen forecast for the Met Office. The many years of research and consultancy undertaken by NPARU placed it in a unique position to become a leading product testing facility for Allergy UK. The unit expanded into a new building (partly funded with £2.25 million by Advantage West Midlands (AWM)) in 2009, and a change of Director in 2010 came with a team of leading scientists and brought with him research into pathogen diagnostics.

NPARU aims to lead applied research in its areas of expertise, to contribute to the well-being of the population with its clinical trials, pollen forecasts, research and product testing, and to contribute to the economy with its crop protection research, and product testing. It works closely with bodies such as the Department of the Environment Food and Rural Areas (DEFRA), the Horticultural Development Council (HDC), and the Agriculture and Horticulture Development Board (AHDB),

and with manufacturers of products for allergen reduction through AllergyUK which provides the recognised seal of approval, based on the testing by NPARU. Items such as washing machines, vacuum cleaners, bedding, mattress covers, air purifiers, and floor washers have all been tested by NPARU on behalf of Allergy UK. The relationship between NPARU and the manufacturer remains an indirect one, but their work is essential for the allergen reduction claims which make them commercially viable.

The Centre works with public bodies, practitioners and manufacturers, as well as fellow academics through research collaboration, publication, and conference activity; clinical trials involve members of the public. Clinical trials are carried out in association with a number of organisations including the Worcestershire Acute NHS Hospital Trust, the Met Office, Aston University, police forces nationwide, the Australian Government and Health Protection Agency (HPA), and other academic institutions.

A. Research Themes
NPARU undertakes research in topics relating to human, animal, and plant health. Existing research can be classified into six areas.

i. Allergen reduction systems
This area combines research with commercial work testing products on behalf of manufacturers. These rigorous tests take five to six weeks to complete, and an average of 15 products are tested each year. The commercial testing is undertaken through a company called UW Enterprises Ltd; the funding for this area is all commercial. There are two main areas of testing:

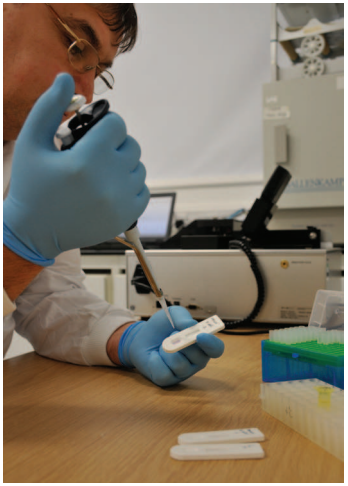
a. Allergen Reduction Testing
NPARU has dedicated facilities for testing a variety of products which can be used by allergy sufferers to control or prevent their allergies becoming worse. The main client is AllergyUK who provide manufacturers with a Seal of Approval for products that have been scientifically tested for allergen reduction. NPARU acts as their test house for allergen reducing products. Examples of products they have tested include washing machines, vacuum cleaners, anti-allergy bedding including sheets, pillows, mattress covers and duvets, and tissues;

b. Volatile Organic Compound (VOC)
These can be found in building materials, furnishings, paints, office equipment, consumer products, motor vehicles, aircraft, and many other environments. Their ability to release into the indoor environment (air) can cause eyes, nose, and throat irritation, headaches, loss of co-ordination, nausea, dizziness, and fatigue. There is growing EU legislation being introduced with regard to Indoor Air Quality, and this is increasing the need for monitoring VOCs in a whole range of product areas.

ii. Atmospheric Science
This area produces the National Pollen Forecast on behalf of the Met Office and other outlets and pharmaceutical companies; they deal with enquiries and conduct interviews with media outlets about pollen and spore levels.

The centre participates in UK and European projects such as the European Health Impacts of Airborne Allergen Information network (HIALINE) project, the objective of

Technicians and academics at NPARU test a wide range of items for AllergyUK, and run clinical trials in association with public and private sector organisations. Photographs © 2012-2013, University of Worcester



the National Pollen and Aerobiology Research Unit is a national centre of excellence with facilities that include a controlled environment test room, laboratories, and a monoclonal antibody production and diagnostics unit. Photograph © 2013 University of Worcester

which was to evaluate the effects of climate diversity and change on airborne allergen exposure, and to implement an outdoor allergen early warning network, and the Sclerotinia project which was sponsored by DEFRA and looked at the effects of the plant pathogen Sclerotinia sclerotiorum on arable and vegetable crops.

The balance of funding for this area is 50% commercial: 50% EU and UK Government.

iii. Health & Allied Services

NPARU is a renowned research centre and has a strong history of research into aspects of hayfever, together with allergic and irritant reactions including asthma, rhinitis, conjunctivitis, chronic obstructive pulmonary disease (COPD), and ocular allergies.

The unit conducts studies into a range of allergy and respiratory conditions and collaborates with consultants and clinicians from Worcestershire Acute NHS hospital. It runs trials both for research purposes, and on behalf of manufacturers of medical devices relating to allergies and other items such as bedding and breathing masks. Current research includes looking into the efficacy of treatments for Seasonal Allergic Conjunctivitis. The unit works closely with pharmaceutical companies, the health care industry, and manufacturers of products for allergen reduction; the funding is all commercial.

iv. Crop Protection and Diagnostics

The crop protection and diagnostics team at NPARU combine research such as investigating the detection and control of plant pathogens within cropping systems, together with the commercial element of providing crop disease forecasts for growers of onions and brassicas. Many fungal spores which cause plant diseases also produce allergic responses to humans.

Past work has included: looking at methods of forecasting light leaf spot and powdery mildew in vegetable brassica crops based on 'in field' detection of airborne spores; predictive models, for management of white blister; development and calibration of detection tests for conidia of onion downy mildew.

Current research includes the validation of the lateral flow detection devices for the light leaf spot and powdery mildew vegetable brassica pathogens, testing of white blister detection test prototypes, the development of in field tests for the resting spores of clubroot, and the development of clubroot control based on detection.

There is future potential for the detection devices to be sold on a commercial basis with a commercial partner. Funding is provided roughly two thirds by government type agencies and one third by the commercial sector.

v. Plant Science (including Plant Breeding)

The Plant Science group at NPARU specialises in host pathogen interaction and investigates signalling mechanisms in plant pathogen interactions such as the PAMP (Pathogen Associated Molecular Patterns) system and effector triggered immunity.

NPARU has received a Leverhulme Trust grant to study the plant immune system, to investigate components of plant immune systems, and to investigate ways of preventing plant diseases by manipulating DNA.

vi. Forensics (serious crime, expert witness function)
NPARU is leading in research and application in Forensic Palynology (the study of particles in the air). Pollen evidence can be used to link a person or objects to a location. For example, in serious crime cases, pollen can help to determine whether death occurred at the location where a body was found or whether a body has been moved to that location. Also, pollen deposited in the nose can also indicate whether a victim was alive when deposited at a location and can help by determining the season in which death occurred. The department works with 15-20 police forces nationwide who fund the work.

B. Funding
NPARU has developed from a base where it relied heavily on funding from the university, to one where it is now self-funding (UW still provides accommodation). It provides an example of how HEFCE funding has been used to leverage in other partnerships and investment. The interdisciplinary nature of the research enables it to apply for research funding from a great many government bodies, charities, and companies. The product testing strand is carried out under a commercial company, UW Enterprises Ltd. In 2013, the submission of research proposals was most active in the Crop Protection and Diagnostics research area and in Plant Science. Research income has increased over the reporting period in line with financial estimates provided in the NPARU Business Plan. During the last academic year, the Centre received £350,000 in funding, and made successful bids for a further £375,000, with bids worth £250,000 pending.

Funding providers included:

- Agriculture and Horticulture Development Board (AHDB)
- Australia (Victoria) Department of Primary Industries
- Department of the Environment Food and Rural Areas (DEFRA) LINK
- European Commission - EAHC
- European Commission - FP7
- Home Grown Cereals Authority
- Horticultural Development Council
- Leverhulme Trust
- MY Genetic, Seed Co.
- Royal Society School Partnership Grant
- Sygenta Seeds BV

C. Impacts
Outcomes of the research of the department include health impact clinical trials, research papers, consultancy, conference outputs, and project reports. Examples include:

i. Allergen reduction
NPARU has worked with AllergyUK for many years on the testing of products and has helped to build the reputation of the AllergyUK Seal of Approval for allergen reducing products.

ii. HIALINE project
The expected outcomes are the implementation of a network of European outdoor allergen measurements to better predict airborne allergen exposure. Also, the climatic

factors that govern allergen exposure in outdoor air will be established. These can be used to calculate the effect of climate change on exposure to airborne allergens. Climate change has already facilitated the spread of ragweed (a potent allergen) from Southern Europe northwards to the UK which will have an impact on the population.

iii. Ocular allergy

By 2015, half of the population of Europe will be affected by eye allergies such as hay fever. NPARU are working with Aston University on a study looking at the effect of non-pharmaceutical cold compress and lubrication management of ocular allergy signs and symptoms, as compared to pharmaceutical management. Local businesses, such as optometrists and pharmacists, are developing their businesses through engaging in the project and improving their knowledge and skills. This will lead to improved advice and better treatment for sufferers. The outcome of the study is to see whether patients can treat themselves effectively without the need for prescription medication.

iv. Crop protection and diagnostics

NPARU have developed a diagnostic test for a range of crop pathogens affecting particular brassicas (*Albugo candida, Mycosphaerella brassicicola, Alternaria brassicae*) and onions (*Peronospora destructor, Botrytis squamosal*). These can used in the field by farmers. They have also developed an on-farm test kit for clubroot for use in Australian horticultural production.

v. Forensics

The collection of pollen evidence has a wide range of applications within a scene of crime setting, and NPARU have worked on a number of serious crimes cases in the UK.

The research undertaken in NPARU has an economic impact locally, nationally, and internationally. For example, on a local / regional level, AWM required certain economic outputs in the West Midlands in return for their funding of the facilities. The obligation is for 5 years (2009-2014) and covers jobs created, business assists / collaborations, and skills transferred:

- Over the 5 years, 16 jobs (0.8) lasting 12 months or more have to be created;
- Business assists/collaborations – NPARU have to assist 257 businesses in the west midlands region through consultancy / education using their knowledge base. They have achieved this mainly through consultancy with individual businesses or by hosting business seminars targeting particular types of business such as Horticulture Growers;
- Skills transferred - They have to transfer 525 skill-sets of at least NVQ3 and above, and have done this through a combination of work experience, teaching modules, hosting training days etc.

The targets are broken down into annual targets which they are expected to keep to and report on, and so far have been able to achieve.

Table 1: Jobs created in NPARU

Jobs created in NPARU	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Targets for jobs created	3	6	2	3	2	16
Jobs created each year	3	6	2	2	0	13

Table 2: NPARU Business Supports Outputs

Business Supports Output	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Targets for business assists/collaboration	2	50	65	65	12	257
Achieved	2	60	68	118	0	245

Table 3: NPARU Skills Outputs

Skills Outputs	2009-10	2010-11	2011-12	2012-13	2013-14	Total
Targets for skill transference	31	99	110	135	99	525
Skills transferred	31	126	133	138	0	426

The research in crop protection and product testing has a national and international impact, particularly in Europe and the Far East.

The National Pollen Forecast is widely distributed via the media and is a long established outcome of the unit. The unit is contacted regularly by different types of media outlets looking for information about the pollen forecast and pollen levels, and the effects of pollens and fungal spores on human health and quality of life. The unit is also contacted by members of the public looking for advice, for example, the potential causes of their hayfever, where they can go on holiday if they suffer from hayfever, and the pollen count during exam periods. Recently a new collaboration has been established with the Allergy Clinic at Worcestershire Acute Hospital with a twitter feed[195] giving advice about allergies and the pollen forecast in the Worcestershire area.

D. Education

NPARU runs short courses, seminars, and undergraduate modules, and has launched an MSc in Airborne Infectious Agents and Allergens. NPARU is fully integrated into the Institute of Science and the Environment, and staff teach on modules, such as one on Allergens and in Plant Science. They support five undergraduate students per year in independent studies, and three PhD students. Seminars open to professionals and the public have included food allergy, ocular allergy and Rhinitis. They are all free to attend. Example courses are included in Table 4 overleaf.

NPARU has research as a central tenet of their work, its primary aim being to research and lead knowledge and practice in their field.[196] NPARU also currently supports 4 research students at NPARU and 1 jointly with a university in Denmark.

E. Sustainability

NPARU is one of the University's leading research centres, internationally known and respected, and at the core of the University's strategy to develop applied research excellence in areas beneficial to its community. The centre makes a leading contribution to the University's commitment to applied research and knowledge transfer:

> *Research of a high standard already exists in many parts of the University and we will seek to continue and extend this work. Through the further promotion of a culture which values first rate scholarship and research, the University will seek to increase the range and quality of the contribution that it makes to society and the local economy.*[197]

NPARU will continue to be self-funded and to bid for funding to support research activities and to supply commercial services through UW Enterprises. Examples of new projects include: new grants from the Horticultural Development Council will support five-years' work looking at crop protection issues, enabling expansion into new plant groups; the unit is working with clinicians at Worcester Hospital to secure funding from the National Institute for Health Research to jointly work in the allergy and respiratory areas; the Simple Unified Pollen and Spore Release Model (SUPREME) project is just starting which will make use of an advanced custom built unmanned

Table 4: NPARU Short Courses

Short Course	Date	Attendance
Allergic rhinitis	March 2010	24
Aerobiology	May 2010	12
Pollen and fungal Spore Identification	May 2010	4
Food Allergy and Intolerence	September 2010	23
Food Allergy and Intolerence	October 2010	18
Ocular allergy and dry eye	February 2011	2
Aerobiology	Feb 2011	23
Physiological Support of the Elite Athlete in extreme conditions	March 2011	23
Thermal Desorption GC-MS	April 2011	3
Crop protection	June 2011	11
Crop protection	October 2011	10
Food Allergy and Intolerence	Two dates in January 2012	95
Physiological Support of the Elite Athlete in extreme conditions	March 2012	23
Allergens and infectious agents	April 2012	20
Plant Breeding and Gene Technology	September 2012	6
Crop protection	November 2012	10
Allergens and infectious agents	February 2013	35
Allergies and contact lenses	March 2013	76
Total		444

airborne vehicle to map the vegetation which contributes to the atmospheric pollen. This mapping will be used in a new mathematical model to describe the release and dispersion of pollen, which will be tested across England and Denmark. It is anticipated that this drone will have applications in other strands of the NPARU work.

F. Conclusion

Similar to the University's Association for Dementia Studies (ADS) research centre, NPARU has leveraged its applied research expertise, access to specialised tools and skills, and connections to distinct yet numerous communities, to carve out a niche for its work. By partnering with key organisations, in this case the Met Office to deliver the national pollen count and Allergy UK to test products for their Award programme, NPARU and the University of Worcester have positioned themselves as the go-to experts in this field. Their work is commercially funded, effectively leveraging the public funds used in the original set up of the Centre, and delivers services to the public good which are unlikely to have come about otherwise from the marketplace.

194 See *Allergy: the unmet need. A blueprint for better patient care. A Report of the Royal College of Physicians Working Party on the provision of allergy services in the UK.* (June 2003): http://www.bsaci.org/pdf/allergy_the_unmet_need.pdf.

195 http://twitter.com/Worcs_Allergy

196 A summary of some of the research papers produced last year is attached in Appendices: University of Worcester, NPARU.

197 See www.worcester.ac.uk/documents/university-worcester-strat-plan-2013-18.pdf

Cultivating Entrepreneurship: Developing models to deliver enterprise education and impacts for business

Future economic growth is likely to originate from the knowledge-based industries. Ideas-based enterprises which generate innovative solutions to social and economic problems are increasingly prevalent, and the emergence of alternative models of doing business, such as social enterprise, are suggestive of a shift in approach to addressing market failures across a broad range of economic problems post-recession. A key factor in driving such changes is the availability and employability of graduates, and retaining those graduates in the UK economy. Cultivating entrepreneurial approaches to enterprise and employment is a major concern of small and specialist universities in addressing how best to equip their students for entering a contracted and difficult job market.

Small and specialist HEIs are well positioned to make the most of the current surge in demand for entrepreneurial experiences and enterprise skills. These can be broadly defined as those skills and connected experiences which have direct application in the 'real world' beyond the confines of academia, and that expose students to enterprise environments and practices of which they are likely to become part and / or create once graduated. The inclusion of entrepreneurial education in curricula amongst UK HEIs is increasing yet disparate. In a recent report for the Department of Business Innovation and Skills Williamson et al. assert that no evidential link has been identified between enterprise / entrepreneurial education and graduate entrepreneurialism (i.e. setting up of a new business), and more research into the effectiveness of this 'training' is needed to better understand it's role and impact.[198] However, the case studies below demonstrate that small and specialist universities approach enterprise skills in an integrated way, building upon the existing curricula and proactively repositioning career services towards experiential learning and tangible skill development, and this approach has led to graduate employability and local business growth.

Demand for employability and enterprise skills emerges not only from students, who arguably apply to these specialist institutions in order to benefit from a more 'applied' approach to study, but also from government, third sector, and business. In a recent speech, David Sweeney, Director (Research, Innovation and Skills) at HEFCE, highlighted the unique position universities have to bring transformative benefits to their communities via their pool of talented and fresh thinking graduates.[199] This view is supported by the keen interest being taken in the nature and performance of enterprise education by BIS: '*Entrepreneurs make a considerable contribution to the UK economy and society. New and exciting SMEs help drive economic growth by raising competition and stimulating innovation. Those that grow make a disproportionately large contribution to job creation.*' [200]

In some senses, cultivating enterprising graduates is a significant part of what specialist HEIs have always strived to do through their focus on applied, close-to-market research: this renewed focus on employability and enterprise skills suits them well.

Case Study 1: Royal Agricultural University, RA Entrepreneurs

Simon King, Royal Agricultural University, UK

I. Introduction

Entrepreneurial activities are in evidence across the full spectrum of disciplines amongst specialist institutions, from the 'creative' subjects to STEM. In the case of agricultural studies there is an intertwining, interdependent relationship between the institutions' research activities, teaching environment and student-led demand for skills and real experience. This existing teaching and learning environment lends itself well to an entrepreneurial, business mind-set as it is core to the hands-on programmes such institutions provide. Royal Agricultural Entrepreneurs is a student-led scheme for encouraging student entrepreneurship with its own awards, business relationships, and bursaries. By developing a commercial vehicle, a student-led business called Muddy Wellies, the group's activities are self-sustaining.

II. Muddy Wellies

Muddy Wellies is a range of branded alcoholic drinks which are marketed and sold by students and staff at the Royal Agricultural University (RAU) in Cirencester. Muddy Wellies is committed to promoting responsible drinking as part of its message, therefore a separate marketing campaign has been designed to promote sensible drinking; this is called 'Tread Carefully'. [See figure 1]

The project was started in 2007, when the Student Entrepreneur Club (RAU Entrepreneurs) decided they wanted to develop their business skills, whilst also raising money to help support the budding entrepreneurs at the RAU through the since named First Steps Fund. The fund is open to all RAU students and allows them to apply for up to £250 to help them test and develop their business ideas, in the hope it will help them take the next stage in starting up their businesses. The project has been running since 2008. The funding for the dedicated resource is for an initial one year period, but will be extended once the project has proved it is a viable business proposition.

The Muddy Wellies name and the Tread Carefully message were initiated by the student founder and other group members. The team was involved in all aspects of the project including the product sourcing and negotiation with the brewery, and the branding of merchandise. They were helped by a steering group who advised and provided guidance, especially on copyright and other legal issues.

The aim is for Muddy Wellies to become synonymous with student enterprise and lifestyle, whilst developing a strong brand with significant financial value, and to:

- develop a clear brand identity which is easily recognizable, and can be quickly distinguished from our competitors:
  - The brand guidelines need to be applied to all areas of the business and to all marketing materials;
  - All event and exhibition material to be consistent with the brand guidelines;
  - Up to date social media sites with relevant material and information should be maintained;
- develop an in-depth strategic relationship with our suppliers to provide Muddy Wellies with commercial support:
  - Bath Ales for the Original and Golden Ale;
  - Westons for the Cider;

Figure 1: Muddy Wellies logo

- strengthen the relationship with the University's distribution company and maximize the use of their support network and increase the sales potential to their customers:
  - A contract with a Midlands based company has been secured but at least one other is required;
- support student entrepreneurship, initially at the RAU, by providing a proof of concept fund (First Steps) for student entrepreneurs:
  - Re-investing some of the profit from the sale of the Muddy Wellies product range into the social enterprise fund;
- maximise all potential and existing opportunities in order to increase turnover:
  - Bulk Distributor sales;
  - Small Volume trade sales;
  - Direct event sales;
  - University roll-out;
- work closely with our customers to ensure there is sufficient demand and awareness of our products to ensure repeat orders.

Along with the above, one of the main objectives in 2013 is for Muddy Wellies to work in conjunction with Bath Ales to produce its own unique brew. Tasting and feedback sessions will be arranged by the Muddy Wellies ambassadors and students within RAU Entrepreneurs. Involvement in all areas of the process will be undertaken and will include learning about the brewing process, design of the beer pump clip, and marketing.

Further developments will include the launch of a 330ml bottle of Golden Ale to appeal to the female market, and a further enhancement to the range could be including a new cider range. Guest ales for limited periods are also be considered, especially for the launch of the University title for RAU and Christmas markets. A bid to secure money from the NACUE [201] Enterprise Society Innovation Fund was successful and this will be used to promote and sell the concept to Universities through-out the country.

A. Project Partners

The project is funded through the Royal Agricultural University and assisted by a number of internal partners, namely the Student Ambassadors and Entrepreneurs Club. The first product the team identified to brand under Muddy Wellies was draught ale which was brewed at Severn Vale Brewing and supplied to the RAU bar in draught form. In 2008, RAU Entrepreneurs sought to brand a bottled ale and following a student selection process selected Bath Ales Gem, as their bottled ale to brand under Muddy Wellies.

This also helped to achieve a constantly good quality product by moving the production to Bath Ales, who also bottled the product. Once the product was in bottled form the Muddy Wellies team sold it to local pubs and hotels, as well as attending local events.

In 2011, a new Muddy Wellies team was put in place and since then Muddy Wellies has under gone a re-branding process as well as adding new products to the family such as a cider and golden ale. As from January 2013 a full time resource has been employed to concentrate on driving the business forward by building on current relationships, identifying new opportunities and products and moving towards independence from the University. A secure lockable container is situated on site for stock. All orders, apart from those through the distribution company are placed through the dedicated resource and delivered by a member of the team. The distribution company place orders for stock through the dedicated resource and stock is delivered by a member of the team to their distribution hub.

B. Impacts

Tangible outcomes of the project to date include:

- A number of loyal retailers within the local area. These consist of three key customers who purchase due to customer demand;
- Present at a number of local country fairs and Christmas shows which promotes brand awareness for Muddy Wellies and the Royal Agricultural University;
- Strong brand name and supporting marketing material;
- An unique selling point regarding student enterprise and social responsibility;
- Added revenue into the First Step student enterprise fund;
- Opportunity for students to gain business experience and enhance their CV.

The project is still at a pilot stage and net profit will be allocated to support the enterprise fund. The fund provides awards to Royal Agricultural University Students, staff and local entrepreneurs in a variety of different schemes. [See table 1]

The management of the funds is the responsibility of the Awards Steering Group. The application process is either by formal application or by competition and judged by the Awards Steering Group.

Entrepreneurship is at the heart of Muddy Wellies and as such it continues to drive forward the founding aim to support student entrepreneurship. Since it was founded, several students have worked over the summer on the business, helping them to gain experience and skills of working with suppliers, customers and developing the marketing and strategic view for the business. This has provided them with a wealth of skills which they have been able to transfer to both employment after graduation and knowledge which they can invest in their own businesses.

Muddy Wellies is committed to promoting responsible drinking as part of its message, therefore all of the promotional material and labels bear the Tread Carefully message. This is a marketing campaign which promotes sensible drinking. [See figure 2]

Table 1: RAU Entrepreneurs scheme descriptions

Scheme	Type	Amount awarded
First Steps	Proof of Business Concept Fund	£250 - £500 Total Amount awarded to date £1,100
Next Step	We hope to develop this award for use in starting up own companies	£500 - £750
Grand Idea	Business Plan Competition	£1,000 First award in 2014
Giant Leap	Launch in December 2013	£2,500 - £5,000
Social Enterprise	Proof of Concept Application	£250 to £8,000 3 to be awarded in 2013

To date there is no information regarding how Muddy Wellies has benefitted the brewery companies involved other than by association. However, as the project progresses and is rolled out, the impact on the breweries and any benefits will be monitored.

The main retail outlets are currently based in the Cirencester area. The distribution company covers the Heart of England and the products have been sold in the following counties to date:

- Gloucestershire;
- Oxfordshire;
- Staffordshire;
- Herefordshire;
- Cheshire;
- Warwickshire;
- West Midlands.

National coverage will be easier to achieve once the University roll-out has been launched and when another distribution company has been secured.

By producing a high quality premium product the brand promotes excellence and social responsibility. The student experience is enhanced as this proves the opportunity to improve skills and gain business knowledge whilst being part of a successful, supportive, and engaging learning environment. The project also encourages the interaction between staff and students and allows for joint responsibility and ownership. The University's reputation is also enhanced and highlights the commitment and belief in the students to reach their full potential.

C. Education

Participating students gain experience and knowledge in a number of key areas and also build a network of contacts. The development of their employability skills and enhancement of their CV is achieved and shows a commitment to learn and take responsibility. There are between four and six students working on Muddy Wellies at any one time.

Knowledge and experience is achieved by providing an all-round exposure to business ideas and principles with concentrated emphasis on the following:

Event management:

- Liaising with the Student Union to ensure Muddy Wellies is included as an option at organized events;
- Create new events for students and staff;
- Check stock levels in advance of events so orders can be placed if required;
- Organise timetables for students to cover external events including setting up and dismantling of stall;

Sales:

- Telephone existing customers on a regular basis;
- Follow-up warm leads with local businesses;
- Identify and establish relationships with new buyers and discuss sales opportunities;
- Contact outlets that have ordered stock through the distribution company and gather feedback and upsell;

Marketing:

- Update website and other social media with news, events, and other relevant information;
- Work with other team members to produce any marketing materials required for their activities i.e. posters for events and flyers for point of sale;
- Database management;
- Liaise with the graphic designer on the production of labels and externally printed materials;
- Team membership of the University roll-out model and assist in training.

There are also opportunities to receive training from external suppliers including:

- Visiting the brewery and gain understanding and be involved in the brewing process;
- Sales training from the distribution company's telemarketing team;
- Financial advice when setting up a business.

III. Conclusion

The current project will be self-supporting by making a small profit after taking into account the dedicated resource wages, other expenditure, and revenue into the student enterprise fund. As the business grows in subsequent years, more revenue will be generated to add to the student enterprise fund as well as an increase in expenditure and profit.

Figure 2: Tread Carefully Logo

198 Williamson, N., Beadle, S. and Charalambous, S., Enterprise Education Impact in Higher Education and Further Education, June 2013, London: Department for Business Innovation and Skills and ICF GHK, p. 6

199 David Sweeney, The Social, Cultural, and Economic Contribution of Higher Education, HEFCE Annual Conference 2013: http://hefceac2013.tumblr.com/post/48283150546/david-sweeney-the-social-cultural-and-economic

200 Williamson, N., Beadle, S. and Charalambous, S., Enterprise Education Impact in Higher Education and Further Education, June 2013, London: Department for Business Innovation and Skills and ICF GHK, p. 12

201 http://nacue.com/

Case Study 2: Student Employability and Impact on Society, University of Worcester

Professor Geoffrey Elliott and Debbie Lambert, University of Worcester, UK

I. Introduction

The University of Worcester (UW) actively seeks way in which its students can 'earn as they learn', gain employability skills and have a positive social and economic impact upon society. The main focus of this social impact is through children, but other Voluntary and Community Sector Organisations (VCSOs) also benefit. The Partnerships and Outreach and Recruitment offices work with academic institutes to develop these opportunities which benefit the students as well as society.

This project has four related strands of activity:

- Learning through sport: an innovative range of initiatives that have inspired, included and enthused over 10,000 children and young adults nationally and internationally;
- Theatre in Education: Students performing science-themed or Higher Education-themed drama in schools to 5,000 pupils so far;
- Earn as you Learn: an ambitious programme to create paid employment opportunities for students within the University (650 employed last year) and externally (700 vacancies sourced) including students becoming paid sports coaches for schools in after school clubs;
- Working in partnership with Voluntary and Community Sector umbrella organisations to send students into their members to carry out beneficial projects.

The strands draw on each of the six university institutes, as well as the central services, in some cases, for example the drama project resulting from cross-institute collaboration.

The approach taken by the university is innovative in that it is embedding the need to support students to conduct these activities within the ethos of the whole institution in a drive led by the Vice Chancellor himself. Indeed, the very first statement in the newly published Strategic Plan is a commitment from the Vice Chancellor that: *'We aim to make a truly transformative contribution to the lives of our students, staff, and the people of our region and to make a very positive impact on society more broadly.'*

II. Project Strands

A number of the strands of this project have the University's mission to widen participation in their origins, others the enhancement of student employability through first class placements and opportunities to earn whilst they learn.

The University Strategic Plan 2007-2012 set out a number of key ambitions, three of which are key to this case study to:

- produce highly employable, innovative, professional and entrepreneurial alumni;
- play an outstanding part in the economic development of our region and to the growth of the knowledge economy, in partnership with employers and strategic partners;
- make an internationally renowned contribution to the development of the education, care and support of children and young people.

A. Learning through Sport

Learning through Sport was the first strand to be developed. During the early 2000s The University established an externally recognised philosophy and strategy of embedding education through sport into all of its outreach activities. To date, it has reached 10,000 young people. Indeed, in support, Lord Faulkner of Worcester wrote:

> *'I first became aware of the University of Worcester's 'Learning through Sport' project in 2003 in my role as a trustee of the Foundation for Sport and the Arts, and we were pleased to offer the basketball club a sizeable grant to help them create new facilities which have had the effect of significantly increasing local community interest and participation [...] I know that the University is a byword for excellence and outreach, and I admire all that they do to ensure that their innovative work relating to sport and education makes a real impact locally, nationally, and indeed internationally.'*

B. Theatre in Education

Theatre in Education was developed at UW as a result of a partnership with the Biochemical Society. Initially the Institute of Science used drama as a means of engaging schoolchildren and FE college students in science and promoting access to Higher Education. In 2010 and 2011, plays commissioned by the Biochemical Society were performed in the University. In 2011, the project expanded to include a play on higher education itself, and grew to encompass the drama area.

C. Earn as You Learn

The Earn as You Learn initiative was launched in September 2011 as a strategic response to the University's determination to ensure that the employability skills of students are maximized during their time at UW, and to assist them to earn money alongside their studies in preparation for the introduction of the new fee regime. Rather than create a central employment agency, the University chose to embed responsibility for creating relevant Earn as You Learn Opportunities, and the development of employability skills within the academic institutes, embedding the philosophy throughout the institution.

Much work with Voluntary and Community Sector Organisations (VCSOs) has taken place over the years, without any real university infrastructure. This is now being addressed with the creation of partnerships with the lead agencies, such as Community First (which represents health and care voluntary and community sector organisations in Herefordshire and Worcestershire), Worcester Community Trust, and the Association for Care Training, and a new plan for the University and Students' Union to work together to provide greater linkages between the students and the sector, to provide access to projects, and work experience modules and independent studies for potential joint working. Each organisation concerned pays its own costs, but benefits from the outputs of the students. The students benefit from gaining work experience and enhanced employability.

Each strand has an objective to have a local positive economic and social impact:

Theatre in Education was developed at the University of Worcester in partnership with the Biochemical Society. It has since expanded, and from 2011, has also delivered plays on higher education and the aspirations of young people. Photograph © 2012 University of Worcester

i. Learning Through Sport
The principal purpose has been to create and embed exciting inclusive opportunities for communities to benefit from the combination of Higher Education study and elite level sport in order to widen access and maximise engagement with learners at all ages and levels. The main objective has always been to maximise the student athlete's own academic and performance potential whilst inspiring the next generation in sporting, social, and academic arenas. Whilst many still believe that Higher Education institutions remain isolated from their communities, the work at Worcester demonstrates that sport and Higher Education can work collaboratively to break down barriers and develop positive life skills in young people through focused and targeted approaches. The LTS philosophy is entirely unique in its requirements within the student athlete's programme of study to design and deliver extensive community outreach work to ensure that HE is not an alien concept, is visible as a progression route, and is in the vocabulary of young people and their families.

ii. Theatre in Education aims to inspire the next generation of scientists by engaging secondary school and college students in science, using drama as the vehicle to prompt discussion and to raise awareness of science. The plays are centred around subjects that some see as controversial and challenging (such as evolution in 2010, stem cell therapy in 2011). They formed the centre piece of a four-hour HE experience which also included a contextual lecture, debate around the issues, and a practical, all led by students. They also aim to expand participation in science to include students from low participation backgrounds. The more generic HE play, *Is it Worth It?*, considers how year 12 pupils make decisions about a university education. By choosing to work with students, these projects improve the employability skills of the students.

iii. EAYL and the **VCSO partnership** both aim to create links between micro-businesses, SMEs, schools, and VCSOs in the region and the students of the university. The University has over 10,000 registered students, all of whom will have some form of Live Project, work experience, or independent study element to their course. In addition, many will need to find part-time work in order to contribute towards their living expenses. The aims of these projects are to link the students who are looking for live experience (either unpaid if it contributes to their course, or paid if not) with the thousands of local employers and voluntary and community sector organisations in need of additional skills on a short term basis. Each independent study focusing on a particular aspect of work for a local organisation will have an economic impact on that organisation, as well as enhancing the employability of that student. Students working with VCSOs will provide benefits to the local people who use their services. By providing sports coaches, we aim to have a positive impact on the health of the local children by supporting them in taking extra-curricular exercise.

B. Project Partners
Delivery partners for EAYL and VCSO projects, providing support regarding communication with local organisations:

- Chamber of Commerce – delivery partner for EAYL;
- Worcestershire Association of Voluntary Organisations in Community Care;
- Community First;
- Association for Care Training;
- Hewett Recruitment (provides the invoicing / payment function for student coaches);
- University of Worcester Students' Union.

Delivery partners for Learning through Sport include:
- English Federation for Disability Sport;
- Npower;
- Worcestershire County Cricket Club;
- Dyspraxia Foundation Worcester group;
- Great Britain and England Blind Football teams;
- Masaryk University, Czech Republic;
- Dines Green Community Primary School and Nursery;
- English Federation of Disability Sport;
- Lithuanian Basketball Federation;
- Coachwise Ltd;
- Worcestershire & Herefordshire Attendance Centre;
- Education Committee of Biochemistry Society.

Learning Through Sport initiatives include:
- Over one hundred able-bodied and disabled student athletes per year aiming to maximise their own academic and sport performance potential whilst acting as educators and role models inspiring the next generation in sporting, social, and academic arenas;
- Creation of the nationally acclaimed 'Learning Through Sports' DVD designed to develop coaching and mentoring support to enhance the school curriculum and support the delivery of core subjects in schools with Year 6 learners prior to sitting their Statutory Assessment Tests (SATs);
- Internationally acclaimed models for empowering delivery of life changing sport projects to thousands of school children in the Gambia;
- Nationally acclaimed programmes for children with dyspraxia or visual impairment;
- A unique partnership with young offenders that is currently being promoted as a national model.

During May and June 2013, the University also toured two plays:
- *Is it Worth It?*, a production developed by students, aimed at year 8 pupils to help them think about making decisions regarding their futures. The play is followed by a workshop also run by students. It will tour local schools and colleges from 12th June to 29th June. In the previous year it was delivered in 19 schools and colleges.
- *A life worth living: Why should we care about animals?*, a production incorporating play, debate, and experiment, all designed and delivered by students. It is aimed at pupils in year 10-12, and is touring between 22nd May and 1st June. It will also be performed at the Three Counties Show (a very large agricultural-based show) and at The Hive. In the previous year it was delivered in 25 schools.

Students from across the university participate, as do local employers, organisations, and schools in these projects.

The new VCSO partnership involves the three partners promoting the student workforce to their members, and those members providing details of placements to go onto the bespoke website, from which students are able to identify and apply for placements. Hewett Recruitment are providing the mechanism by which student coaches can be paid and the schools are invoiced for their time. Initially all schools within Worcestershire have been approached with the new service. The Chamber of Commerce actively support and promote EAYL raising the awareness of their members of the potential for KT. Some of the EAYL roles contribute towards achievement of the University's OFFA Access Agreement commitments, for example, working with college and school students on access and outreach activities, and providing paid work for eight (soon to be sixteen) Hive Mentors, students who provide a programme of events, activities, and educative experiences that all young people who engage with The Hive and other partners schools and colleges can access and enjoy throughout the year.

C. Funding

Learning through Sport:

The Institute of Sport have successfully bid for funding over the last 10 years, with money provided by for example:

- AimHigher;
- Wickes Estate (in Lithuania);
- British Basketball League Foundation;
- Sport England;
- Charities;
- Community Innovation Fund (bid result pending);
- Some funding of activities by small payment from participants;
- Support from students undertaking some roles on a voluntary basis;
- Worcester Wolves;
- Aiming High for Disabled Children;
- Awards for All.

Theatre in Education:

- AimHigher;
- VETNET;
- UW Access Funds.

EAYL and VCSO:

Funding is paid direct to students in the case of paid part time jobs. The University is funding the development of the infrastructure for the expansion of these projects. Schools fund the coaches.

D. Impacts

Learning through Sport has been operating for 10 years, Theatre in Education is in its fourth year, Earn as You Learn has operated 18 months. Over 10,000 pupils have benefitted from Learning through Sport, and the majority of the sport students at UW have been involved in some capacity. In 2012, approximately 2000 pupils participated in one of the Theatre in Education productions (the target for 2013 was 3,500). The key achievements are details below.

- Since 2004, 281 young offenders have attended the re-socialisation scheme run at the University.

- Since 2004, 103 five to eleven year old children with dyspraxia have been engaged in learning and development through basketball, rebound therapy, movement to music, and trampolining funded by the University and delivered by student athletes. Through evaluation of the project the Dyspraxia Foundation identified that children's confidence and self-esteem had increased.
- In 2008 the University, the Worcester Wolves, and a local FE College led the national pilot of the Advanced Apprenticeship in Sporting Excellence (AASE) for basketball in collaboration with England Basketball and the Learning & Skills Council. In the pilot year 21 AASE apprentices successfully completed the programme.
- The annual one-day learning through sport celebration event has grown from 200 children participating in 3 sports represented by local clubs in 2008 to 300 children (including visually impaired pupils) participating in 10 sports represented by local clubs in 2009.
- The learning through sport disability focus has inspired numerous graduates to progress into careers to develop disability sport and disabled athletes in local, regional and national organisations
- The collaboration with the English Federation for Disability Sport will enable the creation of the Worcester Wolves wheelchair basketball team, and enable disabled people in the south of the region to participate in recreational and competitive sport, and in doing so will enhance representation and opportunity for sport participation regionally. Student athletes, through the Sport & Disability module, will be further targeted to develop and deliver this unique HE disability sport partnership.
- University student athletes provided organisational, sports science and volunteer support for the 2010 Blind Football World Cup.

During 2011/12, EAYL:

- Promoted 74 business related part time jobs to business students;
- Promoted 170 work placement opportunities to business students;
- Promoted 50 specialist humanities / science part time jobs;
- Promoted 450 part time sports related jobs;
- Promoted 160 general local part time jobs;
- Promoted 650 paid roles within the university;
- Received 100 enquiries from local employers using the newly established employers@worc.ac.uk email address;
- Developed a new University website for employers.

Table 1: Theatre in Education audiences and participants

	Science-based play		HE play	
	Number of schools	Approximate number of pupils	Number of schools	Approximate number of pupils
2010				
2011			19	3000
2012	19	1475	8	317
2013				

Students working with local businesses and the VCSO contribute towards the economy and towards the transfer of higher level skills. If half of students undertaking an independent study worked with a local organisations, that could contribute up to £80k of economic benefits.[202] The free basketball coaching sessions provided to local children by the institute of sport is the equivalent of £25K a year for local schools and children.

A major aim is to have a social impact on the lives of local children and users of services provided by the third sector. In the long term, the effect of widening participation and raising educational attainment will have an economic impact on the region. In the short term, the employment of 7 drama and biology students per production provides an economic impact for the students.

Longer-term impacts include:

i. Learning through Sport [203]
Improved reading amongst some target groups of primary children;

- Improved fitness for those children partaking in sport;
- The Basketball initiative has: increased the number of applications for basketball study and play opportunities from under-represented groups from 1 per year to over 120; elite ambassadors mentoring four national Summer Schools; delivered learning activities through basketball coaching sessions and sports related reading activities to over 2000 children in more than 70 schools per year; led the Advanced Apprenticeship in Sporting Excellence for basketball in the pilot year and mentor all colleges and clubs throughout the UK;
- The visually impaired football LTS initiative has: empowered elite players to mentor youngsters with visual impairments in local and regional primary schools and centres of excellence to inspire them into sport and study; inspired hundreds of able bodied university students over the past ten years to develop skills to support youngsters with disabilities to learn through sport across the UK, many of whom were inspired by the 'sport & disability' module opportunities to undertake careers in disability sport;
- The Dyspraxia initiative created Dizz-Kidz, working to develop learning through sport opportunities for with children with dyspraxia
- Wheelchair basketball: UW is the Centre for excellence for Wheelchair Basketball for the West Midlands, and delivers coaching to able bodied and disabled youngsters;
- Young Offenders: a partnership between UW and the Worcestershire & Herefordshire Attendance Centre was formed to use sport as a vehicle to develop social skills & healthy lifestyles in 10-17 year-old offenders. this LTS initiative has been recognised by Darren Beattie at the Ministry of Justice as a unique example of partnership working: 'this is now a successful model that has shown the rest of the country that there is no need to ostracise or segregate young people from the rest of the community.' The initiative has expanded and moved to a central site.

The achievements in Learning Through Sport have been recognized with the World Leisure and Innovation Award, and the Worcestershire Ambassadors Corporate Social Responsibility Award.

ii. Theatre in Education

- 81% of pupils who participated in the science activity thought that the play was a good way of making them aware of the issue of animal welfare.
- 38% of college students agreed that the experience had made them think more seriously about studying science at university
- 72% of school students agreed that the experience had made them think more seriously about studying science at university

iii. Earn as You Learn and Voluntary and Community Sector Partnerships

- Extra support for companies and VCSOs in the area.
- Increase profile for VCSO

E. Education

The University aims to provide positive impacts on local school children, whilst also providing benefits to the students.

The following feedback has been received from the LTS DVD pilot undertaken with 7 'trial' schools in Worcestershire:

- 100% of teachers would recommend the materials to other schools;
- 100% of teachers said pupils looked forward to Maths and English sessions when the materials were used;
- 75% of teachers thought the project made a difference to pupils' learning in a positive way;
- 100% of pupils thought the basketball players were positive role models and the materials would help friends at other schools;
- 94% of pupils enjoyed SATs revision more with the use of materials and found learning more enjoyable through sport;
- 76% of pupils looked forward to being taught by basketball players;
- 74% of pupils thought their maths and English had improved;
- 71% of pupils enjoyed the basketball players helping them at homework club.

Since its inception as a unique HEFCE funded programme in 2003, 302 academically able 16 year olds, identified as unlikely to progress into HE have graduated from the annual Learning Through Sport, sports science summer school.

It is planned that the collaboration between the two academic teams involved in Theatre in Education will form the basis of a new research centre concerning the relationship between science and drama. The centre will have a particular focus on utilising and further exploring innovative methods of introducing young people in schools and colleges to the research area through specific

A collaboration with the English Federation for Disability Sport has enabled disabled people in the region to participate in recreational and competitive sport. Photographs © 2013 University of Worcester

projects. The first academic article on the use of Theatre in Education and its positive outcomes is currently in preparation at the time of writing.

III. Conclusion

Plans are being made to secure the funding for each of these initiatives. The University will always want to play a social and economic role within its community and will continue to identify new methods of achieving this. The new Strategic Plan commits the University to continue with these activities. In the mission, it states that UW has a mission 'to make a transformational contribution to the positive development of the cultural, social and economic life of the City of Worcester and our wider region'.

It also commits to having a Positive Impact on Society:

> *'The University has a duty to deliver public benefit and to make a positive impact on society. The University of Worcester is an engine of opportunity, creativity and economic prosperity. The University aims to be an exemplar of how an institution of higher education can organise its activities to deliver outstanding public benefit, and to maximise opportunities to impact positively on its community, and society generally. The Hive is helping realise the University's vision for providing educational opportunity and inclusion. A higher than average proportion of our graduates progress to employment in the region, and contribute across a broad range of sectors, in health and education, sport and culture, business and voluntary organisations. Through our Earn As You Learn programme and our work with employers we will seek to make the knowledge and skills of our students and graduates even more widely available.'*

202 0.5 x 5300 students in UMS x 30 hours to the local economy = £79500

203 See Appendix for full details

Earn as You Learn (EAYL) aims to create links between micro-businesses, SMEs, schools, and VCSOs in the region and students of the university. The University has over 10,000 registered students, all of whom will take part in some kind of Live Project, work experience, or independent study element to their course. Photographs © 2013 University of Worcester

Case Study 3: Creative Advantage at University for the Creative Arts

Uwe Derksen, University for the Creative Arts, UK

I. Introduction

A number of small and specialist institutions have recognized the key benefits of focusing their activities around enterprise through a consultancy framework. This provides both a mechanism to deliver commercial services and a point of exchange to engage businesses with students and vice versa. The consultancy acts as a springboard to exposing graduate talent and enabling local, national, and international businesses to access the expertise of both the university staff and students. Through Creative Advantage the University for the Creative Arts have effectively carved out a niche for their creative knowledge and enterprise expertise in a region host to a dynamic and growing creative economy.

II. Creative Advantage: Adding value to creative businesses

Echoing the findings of *Creating Prosperity* that illustrated how HEIs play a central role in supporting the creative industries and wider British economy[204], this case study outlines the impact of recent work undertaken by the Business & Community School, part of the Faculty of Research and Innovation at the University for the Creative Arts (UCA), which specifically highlights how small specialist higher education institutions (HEIs) can positively impact on specific creative businesses and individuals, as well as the wider macro environment. In order to achieve this the study will focus on the key activities of the Creative Advantage Graduate and Business Development Programme whose mandate was to work with university and industry partners to support the needs of businesses and individuals working in the creative industries across Dorset, Hampshire, and Surrey.

The project built on the evaluation and experience of numerous similar regional related projects, such as Creative Lead, Creative Leaders, Women in Film and Television, Creative Entrepreneurs etc., which were all concerned with the professional and technical training and development of recent creative arts graduates, women returners, and freelancers, as well as small creative businesses. For example, the Creative Futures project, through its interactive web-portal, provided a careers resource for creative and performing arts, design, and communications students and graduates to connect with arts and creative industry employers. Between 1st August 2005 and 31st July 2006 1,523 students from UCA had formally registered with 318 new employer profiles and 538 new vacancies / placements / projects opportunities listed within the academic year.

Between 2004 and 2007 UCA generated over £3m for the direct support of creative arts graduates and creative businesses similar to the Creative Advantage initiative.

A. Project Outline

The project was initiated following a successful bid to HEFCE's 'Economic Challenge Investment Fund' (ECIF) that bought together The University for the Creative Arts (UCA), Arts University Bournemouth (AUB) and The University of Winchester (UoW) to support creative businesses, executives and alumni in the South East to meet the challenges created by the economic downturn. Working closely with key regional stakeholders, the project

was designed to deliver a programme of high quality, yet free, professional training and development, innovation services, and networking events from 2009 to 2010. UCA felt that it could play a key role based on previous CPD projects carried out through the Knowledge Transfer Office that focused on combining the University's insight into the needs of creative professionals with its network of business experts. Total HEFCE funding received for the project was £435,374.08 with an additional £443,208.35 being match-funded through a combination of small-medium enterprise (SME) contribution plus each HEI's own resources and 'in-kind' partner contributions.

The project was designed around the following five strands with target numbers and indicative provision drawn up for each:

i. Continuing Professional Development (CPD) – responding to the need to compete more effectively, deliver greater value, and ensure financial stability;

ii. Creative Technology Up-Skilling – fulfilling the ongoing need for businesses to continuously update their knowledge of new media technologies and acquire skills to help maintain a competitive edge;

iii. Entrepreneurship & Employability for Creative Graduates – providing support and training for both creative business start-ups and alumni pursuing new business opportunities;

iv. Problem Solved – supporting businesses in the development and launch of new products and services;

v. Creative Networking Events – designed to allow creative businesses in the region to collaborate, generate new business and exchange knowledge.

The entire project was managed by the Business & Community School part of the Faculty of Research & Innovation in the Creative Arts at UCA and the Research + Enterprise department, who developed monitoring and reporting mechanisms to support successful project delivery. Project Managers and Administrators were appointed within each HEI with an additional Project Coordinator at UCA whose role was to co-ordinate the programmes between the partners as well as specific activities at UCA. An Operational Group comprising of representatives from each of the HEI partners met on a monthly basis to plan, report on progress, discuss ideas, and share best practice. The original target to provide support to 1255 participants was exceeded with 2115 attendances at activities organised by the partner institutions with this increase being attributed to the rise in demand for CPD and Technology Up-Skilling. In some cases, the partner Universities were able to service this extra demand by simply increasing class sizes, but they were also able to put on new events by drawing on a contingency fund that had been created at the start of the project.

B. Project Implementation: UCA's Contribution

UCA invested a great deal of time developing professional networks and working with business partners to help it both understand the needs of creative practitioners and businesses and develop an effective series of programmes

that would meet those needs. To aid the co-creative process the Business & Community School purchased a database of creative industries businesses (advertising, design, digital media, product design, and publishers) and undertook a Training Needs Analysis Survey to better understand demand needs and associated capacity to deliver. From this work a series of new programmes and events were created and scheduled. The response from audiences was very positive with demand being so high that a number of workshops ran more than once

As part of this CPD activity, the University partnered with Business Link to deliver three workshops. All other workshops were organised and run directly by UCA who engaged relevant specialists to design, refine, and deliver programmes. The majority of these workshops were held on site at the University's Epsom and Farnham campuses bringing many regional creative businesses and executives into contact with the University for the first time. Summary details of the entire UCA activity are outlined below.

i. Continuing Professional Development (CPD) – a substantial bespoke programme of Continuing Professional Development was delivered to 369 creative executives and practitioners over the life of the project. Each course was designed in response to articulated demand identified by the Training Needs Analysis Survey and included: *Understanding & Developing Your Business, Surviving the Early Years, Prospering in Today's world, Marketing for the Creative Professional, Finance for Creative Businesses, An Introduction to Sponsorship* and *Project Management*. Due to high demand, all but one of the programmes was run twice with each class being made up of 20 delegates per session. Demand was such that two further iterations of the programmes could have occurred had additional funding been available.

In addition to these specifically designed units, a suite of courses was also delivered in conjunction with Business Link, aimed at leveraging the many opportunities opened up by London 2012, as well as other workshops addressing issues such as: *New Markets for the Creative & Digital Sector, Bid Writing for Public Sector Contracts and Forming and Bidding as a Partnership / Consortia*. Each gave key advice to help creative SMEs grow and develop their business in the downturn and maximize on the opportunity spaces that major infrastructure projects and national events offered.

Gaining feedback from stakeholders was seen as a key part of the process as it helped the team modify existing services and direct the development of new ones. Post-CPD programme feedback highlighted a further need: one-to-one mentoring and business surgeries. As a result 24 creative businesses took part in this mentoring / consultancy service with a UCA business consultant that provided detailed advice on business problems and solution strategies. Funding to deliver this service was drawn from the project's contingency fund as well as 'in kind' services from the consultant. The surgeries were highly popular, with a number of longer-term relationships being developed and an additional 28 businesses signing up to the waiting list within a few weeks of its inception.

Echoing this direct one-to-one business support strategy the UCA team also became involved with the

Crafts Council on the national *Hothouse* programme focused on supporting emergent craft makers in starting up and developing their business. As a result 16 'craft entrepreneurs' were given support by the School, making use of the National Endowment for Science, Technology and the Arts' (NESTA) Creative Business Start-up Toolkit (also called the *Creative Enterprise Toolkit*) in a full one-day programme followed by a second 'Pitch Your Business Day'. Each of the presenting entrepreneurs was also supported with craft business mentors and personal development coaches.

ii. Creative Technology Up-Skilling
In consultation with Business Link, this strand focused on how emergent technologies such as viral marketing, crowd sourcing, data capture, and web optimisation could enhance market competitiveness. A three-day workshop on *Web Design and Marketing for Artists* and a two-day course on understanding a leveraging *Online Social Networking* were run twice due to high demand, with waiting lists still remaining for both courses. Delegates on both courses reported immediate positive impact on their ability to increase customer interest, interaction, and sales.

iii. Entrepreneurship & Employability for Creative Graduates
Over the course of the programme, UCA guided over 200 graduates who were developing a new business idea, providing workshops and advice on opportunities and options available to them. A key aspect of this was the delivery of the NESTA Creative Enterprise Toolkit, an intensive 6-week programme that was run twice and directly helped 40 graduates set up their own creative business.

iv. Problem Solved
The objective of this project was to support SMEs in the development or launch of new products and services by providing graduate internships. The programme created ten six-month internships for current UCA students at ten different local creative businesses and arts organisation, with five of the interns subsequently being offered full time employment. Feedback was again sought from both graduates and businesses, helping UCA further refine the offering.

v. Creative Networking Events
UCA worked closely with formal business networks and support agencies - Surrey Chamber of Commerce, Waverley Business Forum, South East Innovation & Growth Team and Business Link – in developing two creative business networks – *the Surrey Contemporary Artists Network* (SCAN) and *Digital Surrey.* Each group member was given direct access to creative advantage bursaries, CPD, and skills training. Over the life of the programme an additional 110 creative businesses became members and networks are continuing to grow at a substantial rate.

C. Project impact, value and benefits
Specific examples of the value created illustrate the type of impact such a project can have on developing creative businesses:

i. Isy and Peeps[205]

Israel Imarni, owner of Fashion Brand Isy and Peeps, believed that the CPD training delivered by UCA helped her define a clear value proposition that would help generate a clear point of differentiation, while the technical skills she learned enabled her to communicate with business contacts and potential customers worldwide through Twitter, Facebook, and LinkedIn, as well as furnishing her with the tools to set up and manage a low cost website.

Although the brand was only launched in August of 2011, it immediately received orders from the USA, Spain, Greece, Ireland, Hong Kong, and Canada with turnover reaching in excess of £40,000 in the 6–8 months of trading. Conservative cashflow estimates predicted turnover would increase significantly within the first 12-18 months of business and the firm is still successfully operating today.

As Israel noted: *'Creative Advantage enabled me to keep my overheads low and grow the business during these challenging times.'*

ii. iBundle Ltd

iBundle is a business that invests in and builds highly innovative software and web-based companies. In 2010 it was able to employ two recent graduates due to the Creative Advantage employment bursary scheme. Both graduates worked on a £1m project providing comprehensive home network and metadata management designed to allow users to organise and share digital information such as photographs, music, and movies. This work had previously been outsourced to a business in the Ukraine, but the addition of the two interns allowed the project and associated revenues to be brought back to the UK. Both graduates were seen as contributing significantly to the project and one is now a full time employee of iBundle.

iii. Immediate Network

Immediate Network is an independent creative communications agency creating content for use online, in social media, and in print communications. They also made use of the Creative Advantage employment bursary scheme and employed recent graduate Michael Christie. Michael's main role was to help develop a new customer communication system for Peugeot Fleet that allowed them to gauge the reaction to the company's products so helping inter-company communication. As a direct result of the success of this project Immediate Network won another contract worth £42000 from CBS Outdoor (the UK's leading outdoor advertising agency) to provide them with a similar system. Michael also worked on this project and has now been employed full time by Immediate Network.

Ann Sampson, Immediate Network's Operations Director observed that the bursary *'gave the business support to grow and expand at a time when it was needed most. Our expectations were exceeded. The quality of Michael's work is excellent and we have achieved more that we imagined.'*

iv. Isle of Wight Radio

Isle of Wight Radio (IW Radio) is the most listened-to commercial radio station broadcasting to the Isle of Wight: the station has more listeners than any other commercial or local BBC station and, according to The Isle of Wight

Through its various events and initiatives the Creative Advantage programe has helped UCA become a vital focal point within the region for creative professiponals, executives and practitioners. Photograph © 2013 University for the Creative Arts

Residents Survey 2010, 3 times more people listen to IW Radio than their nearest rival. IW Radio reaches over 30% of the available audience and has 16% market share. As a result of changes in consumer expectation, IW Radio decided to prepare and implement a new media strategy that would help it to engage more effectively with its existing audience and attract new audiences. Through the Creative Advantage bursary scheme, they employed Emily Wells (a UCA graduate) as a New Media Co-ordinator.

Her primary role was to develop the IW Radio website and optimising social networking opportunities, whilst also covering on-air news shifts and developing news stories. Initially Emily upgraded the station's website allowing it to forward-promote stories and follow-up interviews online before going onto explore better and quicker ways to promote the station via Facebook and Twitter. In addition, Emily was also responsible for developing the *Listen Again* feature and the iPhone App which the Station are now planning to implement due to their positive impact on the listener experience.

As a result of this work and the role she performed supporting the news function of the station, Emily was offered a full-time position at the end of her bursary. Not only have listener numbers increased directly as a result of her online promotional strategy, advertising revenue is also expected to develop further. Claire Willis (IW Radio Director) firmly believes that Emily's new media skills have made her indispensable to the organisation.

v. New Ashgate Gallery

New Ashgate Gallery is a non-profit-making Charitable Trust primarily financing its cultural and educational remit through the sale of contemporary art and craft. After conducting some preliminary research in 2010, the Gallery decided to develop its textiles programming recognising that while this was an area often undervalued within the organisation significant income generation potential existed.

As a result they employed Alison Woodley (a UCA graduate) through the Creative Advantage bursary scheme to develop, promote, and curate a three-month Winter Contemporary Textiles exhibition running from November 2010 to January 2011. As a result of Alison's extensive work the Winter Contemporary Textiles exhibition increased sales of textiles by 47% year-on-year, which represented 7% of the total Gallery's sales. Not only did Alison drive new revenues she also increased awareness amongst Gallery staff, volunteers and customers of the value contemporary textiles.

D. Key impacts

Delivered by three specialist higher education institutions, Creative Advantage supported the professional development of over 2000 individuals and their associated businesses during 18 months of activity. Specifically, UCA helped fledgling start-ups, fuelled innovation in already established businesses, helped make connections between creative leaders, practitioners, researchers, and students, and helped organisations to significantly grow audiences and reach new customers.

In the area of professional development, UCA has

helped to develop a detailed understanding of how creative professionals and their firms can compete and succeed in today's highly competitive marketplace. This knowledge has fed directly into the design and delivery of their master's level management programmes as well as the University's consultancy services. Through its workshops and mentoring programmes it has increased the skills, competencies, capabilities, and confidence of creative professionals, and helped them and their businesses: develop clearer value propositions; increase revenues; become more effective and efficient; and identify and penetrate new markets. Moreover, 46% of attendees commented that the workshops and mentoring provided had exceeded their expectations, with 85% of participants said they had used the skills and knowledge acquired since attending Creative Advantage workshops to the benefit of their organisation. Finally, 18% of the professionals stated that they had used them a great deal to improve their business.

UCA has also helped facilitate business innovation and growth through the Creative Advantage bursary scheme. New audiences and customers have been developed as a direct result of the work of graduate interns who have offered new ways of working and alternative views to untapped markets. In addition, the majority of the bursaries have led directly to the graduates gaining full-time employment.

III. Conclusion

Through its various events and initiatives the Creative Advantage programme has helped UCA become an important focal point and knowledge hub within the region for creative professionals, executives, and practitioners, as well as their customers. UCA continued to build on the experience of the Creative Advantage and similar initiatives, such as the Graduates into Creative Industries project, training consultancy projects, and industry talks to potential creative industries inward investors from Asia. In addition, the success of this element of the programme illustrates that such networks not only facilitate cross-industry collaboration and knowledge and learning dissemination, so enabling SME's to compete at a global level, they also generate revenues within the region by introducing local suppliers and customers to each other.

204 Universities UK, *Creative Prosperity: the role of higher education in driving the UK's creative economy,* 2010, London: Universities UK

205 www.isyandpeeps.com

Economic Assessment: Market failure and the role of small, specialist and regional Higher Education Institutions

Jonathan Todd, Economic Consultant

I. Introduction

This reflective analysis:

- explains the relevance of the concept of market failure;
- illustrates this concept with reference to classic market failures.
- provides some other examples of market failure;
- considers which market failures are most relevant to GuildHE member institutions and the projects covered in this study. It groups these market failures thematically.

A. Why are market failures relevant?

Impact assessment is an important part of the policy making process, and an important stage in an impact assessment is establishing a rationale for the policy. This rationale might exist in terms of regulatory / government failure (i.e. the policy efficiently addresses the costs generated by regulatory/government policy), or equity considerations (i.e. the policy efficiently enhances social mobility or some other equality goal). In these contexts, recognising that all policy will be cost-generating in some way, 'efficiently' indicates that these costs do not outweigh whatever benefits accrue by securing the rationale of the policy, whether this exists in terms of regulatory / government failure or equity considerations.

Market failure is another kind of rationale for policy. It is an important category, in that policy interventions that efficiently address market failures must improve the functioning of the economy and are likely to increase the productivity of the economy and its growth. Again, efficiency denotes the qualification that the costs of the policy do not outweigh the benefits that follow from satisfaction of its rationale. The market failures that are assessed here are distinct from those which are appealed to in general parlance, which is to say some kind of outcome that is deemed undesirable on the basis of some kind of value judgement. Instead, the market failures considered here are circumstances in which free markets are unable to achieve economic efficiency.

Economic efficiency may be defined as a situation in which no one can be made better off without someone else being made worse off. In relation to HEFCE research funding for GuildHE members institutions, and similar small and specialist HEIs, which are the policies under assessment here, market failure arguments in favour of these policies must demonstrate that economic efficiency would not be achieved in the absence of this funding. By demonstrating that economic efficiency would not be achieved without this funding, it is shown that the functioning of the economy is undermined without such funding, tending to limit the productivity and growth of the economy.

B. What are the classic market failure arguments?

There are certain circumstances in which markets do not function well, and in which policy intervention may improve efficiency if the benefits outweigh the costs. Market failures occur in well-defined circumstances, and can be placed into the following four categories.

a. Public goods — these are goods such as national defence which are *non-rival*, i.e. consumption of the good by one person does not diminish the ability of others to consume the good. Many public goods are also *non-excludable*, i.e. it is not easy to prevent anyone from consuming the good. Where this is the case, consumers have an incentive to free-ride by receiving the benefits of the public good but leaving others to pay for its provision. The consequence is that free markets are unlikely to provide an appropriate level of the public good.

b. Externalities – these occur when consumption of a good gives rise to impacts on other people which are not reflected in the market price. Externalities can be either positive or negative:

   - Negative externalities, such as pollution, impose costs on other people which are not reflected in market prices. Free markets will tend to encourage over-consumption of goods which give rise to external costs;
   - Positive externalities, such as the amenity value of good architectural design, provide benefits to others which are not reflected in market prices. Free markets will tend to under-provide goods which give rise to external benefits.

c. Market power – markets may be distorted if they are dominated by a monopoly supplier or a small number of large firms.

d. Imperfect information - an example of this is asymmetry of information, which occurs when one party to a market transaction has more information than the other party. Another example are situations of moral hazard, in which the actions taken by one party in a transaction are not observable by the other party and this gives rise to an incentive for the 'wrong' action to be taken.

The knowledge generated by universities is to some extent public goods and also a form of positive externality. Arguments about market power and imperfect information seem less relevant, however. Positive externalities may take various forms, including network effects and innovation spill-overs.

Network effects are a type of externality: the benefits from the network are only achieved after a certain number of people are part of the network. After a critical mass has been achieved in terms of membership of the network, the value of joining the network compared to the cost becomes favourable, leading to more people joining. However, up until this tipping point, it can be difficult to attract members. This type of effect can occur with telephone networks or online social networks.

Spill-over effects from innovation can be such a positive externality. These occur when innovation by a firm leads to benefits for other firms that copy the innovation, or that build on it to come up with an innovative approach of their own. Since the innovating firm does not capture all the benefits of innovation, this may sometimes mean that innovation does not happen even though it would be socially beneficial.

C. Are there any other kinds of market failure arguments?
Mainstream economics assumes that agents are rational. By 'rational', it is meant that agents such as consumers and workers take decisions which maximise their objective function (e.g. consumers are assumed to maximise their 'utility' or satisfaction), subject to the constraints that they face (e.g. the information they have available, their budget constraint, and so on). By contrast, behavioural economics explores the implications of non-rational or boundedly rational decision-making by economic agents. A behavioural bias may, for example, lead consumers to act in a way which does not maximise their utility in a given situation.

Some behavioural biases include:
- Oversensitivity to upfront costs;
- Inertia and preference for the status quo;
- Availability of examples;
- Probability misjudgement;

One can now consider each of these biases in turn. When evaluating an option, in order to account for the fact that people place a higher weight on benefits and costs that occur sooner rather than later, it is commonplace to apply a discounting technique. A company would estimate its future benefits, applying what is known as a 'discount rate' to transform the future streams of benefits into a present value. The discount rate is the rate at which the agent is willing to trade off present for future benefits. There is oversensitivity to upfront costs when this discount rate is excessive and future benefits are undervalued relative to present costs.

The status quo bias refers to the tendency of agents to prefer options which are currently being used, above the objective value of those options. Most real-life decisions have a status quo alternative i.e. the possibility of 'doing nothing' or maintaining a previous decision. The impact of status quo bias is that agents can display inertia and not adopt new technology or processes even though it would be beneficial for them to do so.

Social and organisational capital, defined as the value of relationships and a network, can be considered as an additional form of capital to natural, physical, and human. If this is considered as a key input to enable the production of goods, then it could be argued that production may be prevented if a status quo bias means that the necessary social and organisational capital is not developed.

It is important to recognise that there can often be rational reasons for preferring the status quo. For example, in some cases there may be significant costs or risks associated with the implementation of changes. More generally, the tendency to stick with previous choices, or not to modify the existing situation, may sometimes be rational because it saves time and resource in determining the 'optimal' choice. Preferring the status quo in such circumstances is not what is meant by the status quo bias; rather, the status quo bias refers specifically to situations in which a person prefers the status quo even though it would be rational for them to move away from it.

Availability of examples is the idea that people's probability judgements are skewed by the mental 'availability' of examples. For example, perceptions of the danger in different activities can be skewed by a few memorable examples (e.g. people may view flying by

aeroplane as more dangerous than it actually is following an air crash in the news). Probability misjudgement is the concept that people over-weight small probabilities in decisions involving uncertainty. For example, people may over-estimate the value of a lottery ticket which has only a small probability of winning.

D. Which market failure arguments are most relevant to the case studies presented in this report?

Having reviewed each of the projects analysed in this report against the market failures, certain themes emerge. There is a recurring theme of these projects seeking to bring universities and businesses, as well as the staff and students within both universities and businesses, closer together. This tends to form networks, which might also think of as ecosystems: structures of mutual benefit to those that form these structures. Sometimes these networks are formed through the provision of a public good. This provision in itself corrects a market failure and also acts to bring relevant parties together, forming further networks. Furthermore, some projects seek to stir institutions, businesses, and students out of status quo bias - either by providing them with examples that make it easier for them to move beyond the status quo or by growing their organisational capital. There are also examples of projects generating positive externalities and correcting imperfect information - two classic market failures.

II. Networks and Ecosystems

For example, Harper Adams University's WiRE creates a network. Knowledge, behaviours, and practices become known to members of this network that otherwise would not be known to them. This makes them better able to prosper in and develop the rural economy. BG Futures has also created networks: between students and their potential employers upon graduation (through the careers service) and between the university – in terms of its facilities, staff, and students – and the local business base (through the enterprise service). These networks generate positive externalities in terms of:

- Business appreciation of the skills that university students and staff hold;
- Academic and student understanding of the needs and aspirations of these businesses, in particular SME and microenterprises, which might otherwise be harder to understand.

All of this is concerned with a closer and deeper understanding between business and academia. This might be thought of as an ecosystem in which the different participants in the system mutually benefit from this shared participation. BG Futures was designed around meeting an identified local need (lack of facilities for SMEs) and a sector of local economic importance (childcare). This focus upon local need makes strategic sense, but the benefit that it has generated exceeds simply the satisfaction of these needs. Through satisfaction of these needs, something more substantial has been created, which is the ecosystem of the networks that BG Futures now sustains.

Southampton Solent University (SSU) is another

example of an ecosystem. It has particular strengths in the creative industries, maritime and marine industries, and sports science. In all of these sectors, the university has developed a range of close relationships with local businesses.

Other generated ecosystems include the following examples:

- Each college within University of the Arts London has extensive engagement and relationships with industry partners that promote dense linkages between working and learning;
- The University of Worcester formed an ecosystem by creating a multi-professional group of educationalists, researchers, and practitioners who are expert in the field of person-centred dementia care and support within the fields of health, housing, and social care in the form of the Association for Dementia Studies (ADS);
- The National Pollen and Aerobiology Research Unit (NPARU) is a national centre of excellence and a dedicated research centre at the University of Worcester with facilities that include a controlled environment test room, laboratories, and a monoclonal antibody production and diagnostics unit.

What all of these ecosystems have in common is that they bring together practitioners and academic experts. This acts both to ground research in the latest experiences in 'the real world' and makes it easier for business to draw upon this research.

Ideasfactory@NUA is a form of captured innovation spill-over. When businesses or others behave in ways that can be productively copied by others, then this, as described above, is known as an innovation spill-over. Local businesses – Archant, Williams and Maxwell – have identified NUA as an institution that they can productively learn from, integrating ideas generated by NUA into their business practices. By formalising the relationship between local businesses and the NUA, these local businesses are capturing these innovations. This is to say that they are ensuring that they benefit exclusively from them, rather than their market rivals. In this sense, this example is less about the correction of a market failure and more about a mutually beneficial market transaction. The benefit to NUA takes the form of a deeper understanding of business requirements and culture among staff and students.

It is often claimed, though, that the UK is relatively weak in terms of converting academic research into business products and processes. The mutual benefit between NUA and local businesses also has a wider benefit in the sense that it creates a relationship that encourages the conversion of academic research into forms that are useful for businesses, which means that it acts to minimise what has been thought to be one of the weaknesses of the British economy.

III. Public Goods

The textile focused resource hub at UCA is a network built around access to a series of public goods. These goods are 3D printing, digitization, and laser cutting to Gerber pattern cutting and Digital textile printing. These are

public goods in the senses that they are subsidised by the taxpayer and are largely non-rival and non-excludable. Obviously, these goods are of more relevance to those in the creative industries than in other parts of the economy. Equally, the use of a 3D printer, say, excludes others from using this printer for the period of time that it is in use in a way that does not apply to a pure public good, such as the general public's consumption of the security provided by the armed forces. While not being pure public goods and being focused on a particular economic sector, the resource embodies certain public good characteristics, which are especially relevant to an economic sector (the creative industries) generally thought to be important to the UK's future economic growth. By providing these public goods, the resource brings together practitioners in this sector and those studying and researching related issues at the UCA. Thus, creating a mutually beneficial network: practitioners gaining closer knowledge of relevant research and academics and students being better able to integrate the challenges facing the businesses in their studies.

Creative Advantage is another set of public goods made available through UCA. These public goods are also focused on the creative industries and take the following forms:

- Continuing Professional Development (CPD) - responding to the need to compete more effectively, deliver greater value and ensure financial stability;
- Creative Technology Up-Skilling - fulfilling the ongoing need for businesses to continuously update their knowledge of new media technologies and acquire skills to help maintain a competitive edge;
- Entrepreneurship & Employability for Creative Graduates - providing support and training for both creative business start-ups and alumni pursuing new business opportunities;
- Problem Solved - supporting businesses in the development and launch of new products and services;
- Creative Networking Events - designed to allow creative businesses in the region to collaborate, generate new business and exchange knowledge.

As with the public goods provided through the textile focused research hub, the fact that these public goods are of most relevance to a particular sector brings participants in this sector and researchers together in a way that strengthens their shared networks.

A more public good is The Hive – Europe's first University and Public Library – that has been opened by the University of Worcester. Economic theory suggests that such goods would be under-consumed and under-produced in free markets, which is why the provision of them corrects a market failure.

Both the translating and disseminating of research findings by OpenFields to the land-based industries and the regional food academy create new kinds of public good. Anyone can access the knowledge generated and information provided, so they are non-excludable. They are also non-rival in that consumption by one person does not reduce the amount available for someone else to consume. While these services satisfy the two criteria of public goods (non-excludable and non-rival), they are likely to be of most interest to those in the relevant industries.

These public goods are, therefore, forms of positive externality to these industries. They are, in other words, benefits that would be under produced by a free market. It may that innovation spill-overs are generated - new products and processes within these industries that improve their productivity and/or attract new customers.

IV. Availability of Examples

UCA's support to an alumnus and their KBLE venture also brings business and academia closer to one another. In doing so, it potentially addresses two kinds of market failure that might hamper UCA students:

- Availability of examples: The fact that the venture has been begun, owned and managed by a UCA graduate creates an example for the students of what they might go on to achieve. In the absence of this example, their perceptions on what career possibilities may exist for them may be unnecessarily limited.
- Oversensitivity to upfront costs: Such costs can deter some business ventures, even when the return to these ventures should justify meeting the cost. By contributing to KBLE the students have an outlet for their business concepts that does not require upfront costs to be met, as these costs have already been met by KBLE, which means that more business concepts will be generated by the students than would otherwise be the case.

Another instance of examples being made available is the Earn as You Learn scheme at the University of Worcester. This is a programme to create paid employment opportunities for students within the University (650 employed last year) and externally (700 vacancies sourced) including students becoming paid sports coaches for schools in after school clubs. The scheme has created links between microbusinesses, SMEs, schools, and VCSOs in the region and the students of the university. In this sense, it is a form of ecosystem. However, by integrating employment into the student experience it may also be thought of as creating examples for these students to replicate, i.e. establishing employment as a norm and pointing towards future careers. These examples are likely to make future labour market decision easier and the experiences gained on the work placements will also make the students more productive workers.

V. Organisational Capital

The Centre for Sustainable Design® (CfSD) at UCA builds the organisational capital of organisations through two areas of focus: sustainable innovation and product sustainability. Lack of organisational capital can result in a sub-optimal preference for the status quo, which is a market failure in the sense that an outcome exists that it rationally makes sense for the firm to transition to but their lack of organisational capital prevents them from doing so. This lack can be particularly prevalent in parts of businesses that outside of the core activities of the business. These core activities are the main focus of managers within the business, while non-core activities might be changed in ways that improve business outcomes but these are less focused upon by managers. There may be ways in which, for example, the design of the office space could be made

more energy efficient - reducing the costs of the business and their carbon footprint - but these issues are outside the day-to-day focus of managers and so go unaddressed. These areas outside the day-to-day focus of managers are parts of business activity in which organisational capital is diminished and which CfSD acts to correct.

The work that RAU have done on an alternative food supply chain can similarly be seen as an exercise in growing the organisational capital of the businesses that they work with and enabling them to overcome status quo biases preventing them from improving their performance. This performance was improved not simply in respect of reducing the carbon footprint of the businesses concerned but also through increased profitability. These increased profits came via replacing artificial fertilizer with digestate by-product and also by receiving an elevated rate of return on the methane generated electricity from the government's Renewable Heat Initiative. These changed practices make a difference to the bottom-line of the businesses concerned but lack of organisational capital, particularly outside of the day-to-day focus of management, means that even the most profit-orientated businesses can miss opportunities to increase their profits.

VI. Positive Externality

Muddy Wellies has deepened the business experience of the students involved, which is a benefit to these students, and those trading with Muddy Wellies are engaging in mutually beneficial transactions. This is another example, therefore, that is as much about mutually beneficial transaction as a targeted correction of a particular market failure. Nonetheless, the emphasis of Muddy Wellies upon responsible drinking creates a social benefit that is not fully valued in these transactions, which means that it is an example of a positive externality. The impact that Muddy Wellies has increased responsible drinking and reduced drunkenness and associated health and social problems is not fully factored into the market prices at which its products trade.

VII. Imperfect Information

ZSSG[206] provided appropriate technical support to ensure that the smallholders produce meets the specifications for the high-value UK markets. Without this support the specifications would not be met and the markets would not be accessed. Therefore, by correcting the imperfect information held by the smallholders, ZSSG enables them to secure better market outcomes than would otherwise be the case. This benefit largely accrues in Zambia but British consumers benefit from increased supply and choice of avocados and Royal Agricultural University deepens its cultural ties and grows its international reputation.

206 See 'Zambian Small Scale Growers (ZSSG) First Avocados Delivered to the UK.' Accessed at http://www.rau.ac.uk/news/college-news/zambian-small-scale-growers-first-avocados-delivered-to-the-uk. This case study detailed a consultancy project delivered by Royal Agricultural University to enable ZSSG to explore alternative routes to market for their produce. The full case study not been included in full in this report.

Royal Agricultural University Consultancy facilitated the establishment of Zambian Small Scale Growers (ZSSG), a Zambian company limited by guarantee. ZSSG is a commercial, not for profit, produce marketing organisation (PMO) helping small scale growers to access high value markets, as well as increasing their marketability locally and regionally. Photographs © ZSSG / Royal Agricultural University

Project Design: A Template for HEIs

The research conducted and case studies collected for this report highlight some excellent examples of driving innovation and engaging with external partners. Identifying and collating data to demonstrate the impact these projects can have is central to both the success and sustainability of such projects, and vital to the institutions and funders that support them.

Small and specialist institutions often 'punch above their weight', in that they take on ambitious projects in response to local needs and gaps, and a diversity of opportunities that come their way as a result of both strategic planning and organic outreach. Having wide-ranging impact which may not have been anticipated from the outset is common. Small and specialist institutions are also often growing rapidly, nimbly developing new operational models and curricula to meet institutional and student needs. The imperative to maintain currency in procedures, processes, and metrics is clear.

The Toolkit below has been developed from the case studies presented in this report and brings together the best practice found amongst those examples in measuring and recording impact-related data. It is aimed at project leaders, whether academics in research centres or business managers within the university administration. It also draws upon experience of delivering knowledge exchange projects amongst GuildHE staff, and the economic analyses provided by Jonathan Todd. It is intended to act as a functioning 'crib-sheet' and a prompt throughout projects.

Knowledge Exchange Projects – Toolkit for Project Leaders

This toolkit of questions is aimed at project leaders of knowledge exchange initiatives, or those designing projects which engage external partners, such as businesses and individuals from the community, to assist them in embedding data collection into their activities from the outset. By collecting data before, during and after project completion project leaders are better able to measure and demonstrate the impact these activities have had, providing valuable evidence about the activities, those who participate and coordinate them, and the institution overall.

The toolkit sets out a range of questions, with examples of data you may wish to collect, or provocations for actions you might want to take to bolster the evidence for your project at each stage. It is not exhaustive and should be used as both a guide to good practice and as a prompt for developing data collection that is appropriate for each unique project.

Design Stage

Does this project build on activities the institution has run previously? If so, can you:

1. Gather quantitative data such as number of students involved, external participants involved, scales of change (e.g. business profit increases)?
2. Use your alumni network to gather relevant data around the impact these had?

3. Contact past external participants to gather relevant data around the impact these had?
4. Access any existing research about similar projects to demonstrate success/weaknesses in approaches?
5. Demonstrate why this new project fills a gap/extends expertise?

Why do this? By demonstrating previous experience of similar activities, and identifying gaps in provision or evidence, you can indicate where work needs to happen and why. It will also give the project a form of benchmarking, helping you to firmly establish where you started from and how things have changed as a result of your intervention.

What are your indicators of success? What results do you want to achieve for the following:

1. General Participants/Audience; number, type
2. Engaged Participants; number, type, number of engagements, type of engagements
3. Academic/student participants; number, type,
4. Sustainability; autonomy achieved by engaged non-academic participants, follow on funding achieved, how the project is adopted by those that participated, spin-offs
5. Outputs; number, type, variation (i.e. presentations, public events, academic papers)
6. Businesses/Organisations engaged; profit, turnover, changes to business practices

Implementation Stage

What quantitative measures have you pinpointed in your 'success indicators'?

Create ways of collecting numeric data on for every activity you do for:

1. General Participants/Audience; number, type
2. Engaged Participants; number, type, number of engagements, type of engagements
3. Academic/student participants; number, type,
4. Outputs; number, type, number reached – e.g. website hits, page views
5. Businesses/Organisations engaged: Change in profit/ turnover – establish what their starting point is, collect data with consideration to sensitivity and company account / tax timetables
6. Financial indicators; money in / money out for the project

What qualitative measures have you pinpointed in your 'success indicators'?

Create ways of collecting qualitative data on for every activity you do for:

1. General Participants / Audience; who they are, why they are interested, their perceptions before, during, and after.
2. Engaged Participants; who they are, why they are involved, their perceptions before, during, and after.
3. Academic/student participants; who they are, why they are involved, their perceptions before, during, and after.
4. Outputs; what it adds the project and why?

5. Businesses/Organisations engaged: changes in processes, perceptions and models.

Concluding Stage

How will your project live on after completion of the grant/anticipated activities?

Do you have any sustainability factors in mind, such as:

1. Autonomy/self-direction of engaged non-academic participants: e.g. will they take the project on together / alone? Will the institution be involved?
2. Ownership of ideas and transmission / transfer into new domains: in which case, who would be your ideal 'owner', and where is your ideal place for 'transfer'?
3. Follow on or sustainable funding – what's your model after the end of the project? Is the intention to be income generating / self-sustaining?
4. Online legacy – if there's a website, where does it live afterwards, and (how) will it be kept current?

When to consider this? From the very beginning it is worth considering, reflecting and revisiting what sustainability means for your project. Many grants are time-dependent in a way that is arbitrary to the external world, and also to the research process.

Reflective practices – how are you going to evaluate your project and its impact? Over the short –, medium-, or long-term, and what do those mean for your project?

Could you do the following:

1. Evaluative interviews, group discussions to monitor short term/immediate effects
2. Evaluative surveys to gauge short-medium term effects, delivered online
3. Leverage alumni networks to gauge medium-long term effects
4. Incorporate reflections on anticipated changes in behaviour or goals – have your participants shifted their plans as a result of engagement?
5. Arrange to gather data from participating businesses over the next accounting year (and possibly further into the future if relevant)

Appendices

OCAD U - Tables

Table 1.1 OCAD University 2011-12 operating budget, revenues and expenses

Type of Revenue	Description
Government Grants	
Operating	The allocation of operating funds for all Ontario universities is based on a corridor funding system established by the Ontario government. Each institution has a targeted level of enrolment, and an institution must keep their five-year moving average enrolment levels within the ±3% corridor around the mid-point target set by the Ministry of Training Colleges and Universities to guarantee receiving funding according to that targeted level of enrolment (mid-point of the corridor).
Performance Fund	Funding is based on each higher education institution's ranking within three performance measure areas: employment six months after graduation, employment two years after graduation, and graduation/completion rate. Institutions that fall into system average ranges receive funding based on their share of overall system undergraduate basic income units (BIUs).
Enrolment Growth Fund	Funding is granted for year-over-year change in domestic enrolment.
Accessibility Fund for Disabilities	Funding is intended to help HEIs provide supports and services to students with Students with disabilities.
Quality Investment Fund	This grant is part of the annual multi-year accountability agreements institutions have entered into with the provincial government to improve quality, access and accountability.
Graduate Studies	Funding is derived from $12,680 per FTE of domestic regulated students.
Aboriginal Visual Culture-Growth Initiatives	This grant is an annual commitment towards the implementation of a new curriculum program

[Table 1.1] Sources: OCAD, 2012b; Ernst & Young, 2012; OUSA, 2010; COU, 2010

Type of Revenue	Description
[Government Grants continued]	
Digital Futures grant	The Ontario government provided OCAD U with a permanent $2M differentiation grant Differentiation to implement the Digital Futures Initiative.
Other Grants	Other revenue is received from successful grant applications to federal and provincial sources
Tuition Fees	Undergraduate and Graduate Studies: included in tuition fees are full-time, part-time and summer student fees
Miscellaneous Fees	Included: Ontario University Application Centre fee rebates, and other admission fees, class fees, user fees an Academic Equipment and New Technology fee, Production Materials fees and Student Support fees (e.g. literacy, laptop program, Health & Wellness, Career Centre, Orientation fees, etc.).
Investment Income	Investments consists of fixed income securities, Provinces of Ontario, British Columbia and New Brunswick
Rental Income	Rental income received from the tenants at 205 Richmond St. W. and Aboveground Art Supplies
Donations/ Scholarships	Unrestricted external donations/sponsorships towards university operating funds from the OCAD U Foundation[1] is included as well as externally restricted and unrestricted donations/sponsorships from upcoming philanthropy campaigns. Not included: donations associated with scholarships, bursaries and gifts-in-kind.
Other Income	This includes revenues from Continuing Studies, business development initiatives, the Grange Bistro, sale of supplies in the Academic Computer Centre, facility rentals, library membership fees, fines, book sales, ATM rebates revenues from the 317c computer and book store and Research overhead.

Type of Expenditure	Description
Academic Compensation	This expenditure includes salaries, benefits and professional development for faculty, technicians, teaching assistants, class assistants, markers, and staff in the Library, Visual Resources, Academic Computer Centre, Lap Top Program, Graduate Studies and Fabrication Studios.
Academic Administration Compensation	This expenditure includes salaries, benefits and professional development for Deans, Assistant and Associate Deans, Program Chairs, Faculty Support Staff, Studio Manager, Centre for Innovation in Art & Design Education, Professional Gallery, Centre for Advising and Campus Life, and Office of the Vice-President Academic
Non-Academic Compensation	Funding includes salaries, benefits and professional development for administrative staff in: Registrar's Office, Student Affairs, Finance, Human Resources, University Relations, Development and Alumni Relations, Marketing and Communications, Facilities Planning and Management, IT Services, Risk Management, Campus Services and Security, Admissions and Recruitment, Offices of the President and Vice-President, Finance and Administration.
Non-Compensation	This includes physical plant maintenance, class supplied, travel, memberships, visiting lecturers, office supplies, printing, program development, publications, marketing, legal and audit fees, utilities, insurance, overtime, temporary help etc., plus compensation for models and student monitors.
Restructuring/ Retirement Incentive Plan	Applications are submitted for this faculty voluntary retirement incentive plan, and they must meet financial, curricular and faculty compliment planning
Student Assistance Fund	The Ontario Ministry of Training Colleges and Universities introduced a 'student access guarantee' policy which requires the university to finance any direct educational costs above what is provided through government assistance programs (unmet need).
Long-term Debt-Service Costs	This cost is the interest on long-term debt.
Capital Expenditures	Funded from the operating budget
Contingency	

Table 1.2 A sampling of OCAD University's DMRII projects funded by the ARC initiative

Project Name	Industry Partner	OCAD U Collaborators	Project Description
Haptic Holography	Entact Robotics Inc.	Assistant Professor Michael Page, Faculty of Art	To develop haptic holography technology, allowing users to interface with 3D displays that provide sensory feedback.
Extend Lead	Mablemedia	Assistant Professor Emma Westecott (Team Lead)	To leverage OCAD U's expertise in design thinking and independent game development with the aim to develop original IP, market opportunities and business models.
With You	GestureTek Inc.	OCAD graduate, Haniyeh Khosravi Fard (Project Lead) and Associate Professor Suzanne Stein, Director of the Super Ordinary Lab (Principal Investigator)	To develop an interactive stool to enhance a socially interactive experience through design of a passive diagnostic tool for children with Autism Spectrum Disorder (ASD).
Tecla for MyVoice	My Voice	OCAD U Faculty of Design Professor Jutta Treviranus, IDRC Project Manager Jan Richards, Dr. Jorge Silva.	To adapt Tecla Access technology to the iOS mobile platform for use with the MyVoice Communication Aid. NB. These inclusively designed products, enabling its users to manipulate technology that might otherwise not be accessible to them due to disease or disability.
Mantiro	Farhad Shabani Designs	OCAD U graduate Farhad Shabani and Associate Professor Dianne Crouteau of OCAD U Faculty of Design	To further develop swimming device prototype Mantiro, which was intended to replace the typical flutter board used during learn-to-swim instruction. This multi-functional patent pending swim aid also enables physically challenged people and the elderly to have a safe water experience.

Project Name	Industry Partner	OCAD U Collaborators	Project Description
Visible Campus	DuROCK Alfacing International Ltd.	Professor Job Rutgers of OCAD U's Faculty of Design	To explore pavement elements, street furniture and wayfinding to express the connection aesthetically of the 12-building campus.
My Toshi	Albedo Informatics Inc.	OCAD U alumnus Trevor Haldenby, MDes and Assistant Professor Emma Westecott (Principal Investigator)	To assist Albedo in positioning its business ideas and to secure additional design and development financing. Haldenby led the foresight research project. This research, as well as extensive design consultation conducted during the software development process, supported the development and marketing of Albedo Informatics Inc.'s My Toshi product alongside other Albedo products.
InfoViz for social media	Echo Mobile	OCAD U alumnus Gabe Sawhney, MDes and OCAD U Associate Professor Judith Doyle (principal investigator/ Director of SMAC lab)	To map contributions and conversations on social networks, using information visualization.
Surpise, Wonder and Delight	Media Lab Toronto	OCAD U alumnus Gabe Sawhney, MDes and OCAD U Associate Professor Judith Doyle (principal investigator/ Director of SMAC lab)	To investigate the next generation of interactive technologies for playful engagement. The team studied challenges of language, client communication, and metrics for gauging success. The findings will inform a new generation of interactive technology products for experiential marketing, retail and fundraising.
Neutral Carbon Product	Zerofootprint	OCADU alumnus Peter Rose, MDes; and OCAD U Principal Investigators, Assistant Professor Suzanne Stein and Professor Dr. Barbara Rauch	To benchmark visualization aesthetics that could communicate the carbon footprint of a product, and to give consumers information leading to greener choices.

[Table 1.2] Source: OCAD U website: http://www.ocadu.ca/research/arc-feddev-projects.htm

Project Name	Industry Partner	OCAD U Collaborators	Project Description
Alarm X	Guardly Corp	IDRC's Jan Richards and Dr. Jorge Silva	To further develop and commercialize a mobile personal/home alarm and monitoring security services and extend its supported devices including Google android smartphones to run its new app.
Sousveiller	Normative	The roots of the Sousveiller came from an OCAD-Normative project called 'Red Rover' which used design and technology explorations to understand how technology could be applied to senses to help individuals play simple games in different urban environments.	To explore the relationship between people and visual surveillance technologies. This web and mobile application is focused on creating a publicly accessible data set of urban locations that contain visual surveillance technology.

OCAD U – Annex I.I

List of DMRII Labs, Incubators and Accelerators[2]

Ambient Experience Lab specializes in ambient experience design and research is focused on integrating ambient technologies (image, light, technology, scent, sound) into architectural environments.

Art Research Centre supports and promotes innovative and interdisciplinary art explorations and collaborative research by faculty and graduate students.

Black Box Lab supports integrated media research; performance art (incorporating movement, sound and light); prototyping of realistically scaled environments that can accommodate testing equipment, sensors, etc. to record interaction, gesture and motion; the creation of immersive art installations and virtual space design; and the exhibition and presentation of all manner of digital media performances.

Centre for Information Visualization and Data-Driven Design (CIV-DD) develops the next generation of data discovery, design, and visualization techniques through the development of new computational tools, representational strategies, and interfaces. This is a research partnership with York University, University of Toronto, health care institutions, not-for-profits and industries.

Digital Drawing and Painting Lab (DDPL) supports leading contemporary art practices that engage experimentation in photogenic painting, contemporary abstraction, digital projection painting and the digital manipulation of imagery that resides in popular culture.

e_MOTION Lab supports research in the domain of affective computing, which involves the use of computational means to quantify emotions.

Game:Play Lab explores (through play), critiques (through theory) and expands (through practice) the nature of the gaming experience.

HCI Lab explores ubiquitous and tangible interfaces for collaboration and experience. It addresses the collision of the digital and physical worlds while exploring how interaction with the digital will occur through the physical tools and spaces that surround people.

Inclusive Design Research Centre (IDRC) conducts research into adaptive technologies of emerging information and communication systems and practices.

Imagination Catalyst aggregates OCAD U's innovation research activities and expands industry collaboration in applied research and commercialization.

MEIC Convergence Centre is the industry mobile incubator under the direction of the MEIC, used to develop innovative mobile technologies and companies.

Mobile Experience Lab supports research in the fields of platform design, content delivery, multimedia interfaces, context-aware applications, sensor interfaces, multi-screen connectivity, mobile gaming, wayfinding, and augmented reality.

Physical Hybrid Computing Lab is a nexus prototyping studio for all DMRII laboratories supporting electronics and robotics development projects, including interactive sculpture, multi-touch sensors, smart materials, lighting and wearables technologies. It houses and supports coding and programming electronics, embedded

computer development stations, fabrication of objects with materials using cloth, plastics, wood and metals, and has assembly work stations to connect, test circuits and devices.

Social Media and Collaboration Laboratory (SMAC Lab) is an interdisciplinary production pipeline and test bed for social media and collaboration structures.

Social Body Lab takes the human body as a starting point from which to consider how humans interface with and relate to the world around them. Beyond the basic functionality of incorporating technology into clothing, the Social Body Lab focuses on meaningful and provocative interactions, questioning the relationship between humans and technology through working prototypes and fully manifested projects.

Smart Materials and Lighting Laboratory consists of a research and teaching space for materials investigation initiatives and courses, including smart and sustainable materials research and a new signature interdisciplinary courses.

sLAB: investigates the intersections of human behaviour, new technologies and organizational capacities. It develops and applies strategic foresight, design research, visualization and prototyping methodologies in order to clarify and feed the front end of the innovation process.

Super Ordinary Lab looks at near-to-market or just-in market technologies to understand their social significance and possibilities. Research projects track broad-based trends and deploy ethnographic methods to understand the originating (and exploratory) cultures of production, as well as potential users of specific products and/or technologies.

Zero Lab focuses on applied academic research and commercialization of environmental and clean/green technologies to affect behaviour and reduce carbon footprint.

OCAD U – References

COU (Council of Ontario Universities) (2010), *Framework for Planning and Funding of Enrolment*, Council of Ontario Universities Position Paper, Toronto.

Ernst & Young (2012), *Financial Statements – Ontario College of Art and Design University*, Toronto.

Geiger, R and Sá, C. (2008), *Tapping the Riches of Science: Universities and the Promise of Economic Growth*, Harvard University Press, Cambridge.

Government of Canada. Industry Canada. (2009), *Improving Canada's Digital Advantage: Strategies for Sustainable Prosperity*. Consultation paper on a Digital Economy Strategy for Canada. Industry Canada, Ottawa.

Guardly Inc. (2012). 'Assessment of Emergency Response Times on Campus when using Guardly Safe Campus versus Existing Methods of Reporting, Monitoring and Responding to Incidents,' Customer Pilot Study, Guardly, Toronto.

MEIC (Mobile Experience Innovation Centre) (2012a), *Mobile Innovation: Ontario's Growing Mobile Content, Services, and Applications Industry 2012*, MEIC, Toronto.

MEIC (2012b), 'MEIC Annual General Meeting' Slideshow presentation, MEIC, Toronto.

MEIC (2011), 'MEIC Inaugural AGM' Slideshow presentation, MEIC, Toronto.

Mitacs (2012), 'OCAD University partners with Mitacs to offer funded internships,' (October 15) News Release Mitacs, Vancouver.

OCAD U (2013a), 'OCAD University Honours Top Students with Medals,' (May 1) Press Release, OCAD U, Toronto.

OCAD U (2013b), 'Taking Ontario Mobile: An Action Plan for Leadership in the Mobile Revolution: OCAD University's Landmark Research Shows How a Mobile Ontario Will Improve Productivity, Competitiveness and Public Services,' (January 16) Press Release, OCAD U, Toronto.

OCAD U (2012a), *Advancing Excellence at OCAD University for the Age of Imagination, 2012 – 2017,* OCAD University's Strategic Plan, Toronto.

OCAD U (2012b), 2012/13 *Operating Budget - Proposed*, OCAD U, Toronto.

OCAD U (2012c), *Institutional Proposed Mandate Statement, Priority Objectives and Vision: A submission to begin the process of developing strategic mandate agreements*, Submission to the Ministry of Training, Colleges and Universities, Ontario (October 12), Toronto.

OCAD U (2012d), 'OCAD University partners with Guardly to put code blue emergency phones directly into students' pockets,' (February 22) Press Release, OCAD U, Toronto.

OCAD U (2012e), *Taking Ontario Mobile: Research-based recommendations for how mobile technologies are part of the financially responsible solution to providing better access to services for Ontarians*. OCAD U, Toronto.

OCAD U (2011), *Academic Plan 2011-2016*. OCAD U, Toronto.

OCAD U (2009), *Innovation and Insight: Mapping Ontario's Mobile Industry*, OCAD U, Toronto.

OCAD U (2008), 'OCAD receives OMDC funds towards Mobile Experience Innovation Centre,' (Jan 29) News Release OCAD. Toronto.

OCAD U (2007), 'Backgrounder on OCAD's Digital Futures Initiative,' (May 1) OCAD, Toronto.

OUSA (Ontario Undergraduate Student Alliance) (2010), *Global Examination of Post-Secondary Education Cost Recovery Models*, Research Paper, Toronto.

OUSA (2011)*, System Growth*, Policy Paper, Toronto.

Wolfe, D. (2005), 'Innovation and Research Funding: The Role of Government Support,' in F. Iacobucci and C. Tuohy (eds.) *Taking Public Universities Seriously*, University of Toronto Press, Toronto, pp. 316-40.

Wolfe, D. (2009), *21st Century Cities in Canada – The Geography of Innovation*, The Conference Board of

1 The core objectives of the Foundation 'are to solicit, invest, receive and distribute monies and other property to support education and research at the University.' Ernst & Young (2012), Financial Statements – Ontario College of Art and Design University, Toronto, p. 1

2 This is the current list of DMRII labs as of April 2013. Source: OCAD U website: http://www.ocadu.ca/research/digital_media_research_innovation_institute.htm with updates provided by an interviewee.

Southampton Solent University – Appendix 1

SSU KTP Portfolio & Pipeline

Updated 08/03/2013

Projects Funded Completed	Faculty	Type of KTP	Academic Subject	Total Value	Duration	Proposal Writers	Academic Supervisor	Funder	Grant Offer Ltr	Start
Business in the Community	FBSE	S	Bushess Devebpment	£27,023	40 wks	Serkan / Martyn	Steven Henderson	SEEDA	22/03/2011	09/05/2011
CUPE (1)	FBSE	S	e-Marketng	£38,000	40 wks	Serkan / Martyn	Tmothy Jackson	SEEDA	30/06/2011	03/10/2011
Projects Funded & Running										
CUPE (2)	FBSE	S	e-Learnng	£38,000	40 wks	Martyn	Ashok Ranchhod	TSB	27/06/2012	01/08/2012
Strategic Audiology Services	MarTech	S	Acoustics	£38,000	40 wks	Martyn / Bl	Chris Barbw	TSB	06/12/2012	04/03/2013
Russell Play	MarTech	S	Procurement Processes	£38,000	40 wks	Martyn / Bl	Ramesh Marashl	TSB	14/02/2013	N/A
Lubetech (1)	FBSE	S	e-Learnng	£42,750	45 wks	Martyn / Bl	Ashok Ranchhod	TSB	01/11/2012	
Proposals Submitted for Funding										
Total Logistics	FBSE	S	Performance Measurement	£38,000	40 wks	Bl/ Martyn	Le Meng	TSB		
Proposals in Development										
Debut Services	MarTech	S	Reabity Centred Mahtenance	£38,000	40 wks	Martyn / Bl	Ramesh Marashl	TSB		
Lubetech (2)		C	e-Learnng					TSB		
Projects Not Proceeding										
Lubetech (3)	MarTech	S	Fltratbn Systems		40 wks	Bl/ Martyn	TBC	TSB		
Anvil Group	MarTech	S	Intelgent Systems		40 wks	Martyn	Kah Penev	TSB		
Running Total of Projects (Excluding those not proceeding)				**£297,773**						

Note: Shorter KTP (S) and Classic KTP (C) are being combined together by approx Easter 2013. shorter KTP funding submission dates in 2013: 24th April, 19th June, 21st A
0329

End	NOTES	KTP Cross Selling: Origin	KTP Cross Selling: Future Developments
12/02/2012		HEFCE / GJS Internship	Fulltime Graduate Job
08/07/2012		HEFCE / GJS Internship	Cupe(2) KTP, Consutancywith FBSE
07/05/2013	Ongoing project due to complete 7th May 2013.	Cupe (1) KTP	2 xSSU Internships
08/12/2013	Project Initied on 4th March 2013.	Academic Supervisor	
N/A	Companyin process of restructuring. Recruitment and project postponed. Funding awarded but prospects uncertain.	GJS Newsletter from E&E	Possible SSU Internship, Placement & Work Experience
26/02/2013	Unable to recruit suitable candidate. Exploring the possibty of collaborathg with UoS to workon a Classic KTP.	GJS Newsletter from E&E	Possible SSU Internships. Collaboration with UoS. *
	Submitted end of Jan 2013. Approval Decision to be confirmed end of Mar/Apr.	Academic Supervisor	
	Awaiting companydecision to proceed.	Consutancywith Martec	
	Possible collaboration with UoS, and considering converting project to a Classic.	SSU	* Potentialfor continuing workwith growing company.
	Academic expertise not found within faculty. Passed to UoS for action.	Lubetech (1) KTP	*
	Concentration on other priorities at the moment. On hold for the time being.	SSU Business Breakfast Event	1 xSSU Internship

ug, 02nd Oct & 20th Nov- Further Contact: Bill Acharjee bill.acharjee@solent.ac.uk / 023 8031

Southampton Solent University: References

Clark, B. (1998), *Creating Entrepreneurial Universities: Organizational Pathways of Transformation*, Oxford: Pergamon-Elsevier Science

HEFCE (2011a) *Higher education innovation funding 2011-12 to 2014-15; policy final allocations and requests for institutional strategies*, HEFCE, Bristol, 2011/16, May

HEFCE (2011b) *Higher education innovation fund; information note 1-2011-013*, May 2013

Mondragon University: References

This review was heavily based on interviews and materials gathered as part of the forthcoming OECD Review of Higher Education in Regional and City Development in the Basque Country, conducted in September 2012.

Martínez-Granado, M.; Greño, P. and Oleaga, M. (2012) 'The Basque Country, Spain: Self-Evaluation Report', OECD Reviews of Higher Education in Regional and City Development, http://www.oecd.org/edu/imhe/regionaldevelopment

Wright, S., Greenwood, D. and Boden, R. (2011) Report on a field visit to Mondragon University: a cooperative experience/experiment, *Learning and Teachin*g, 4, 38-56.

University of Worcester and The Hive: References

Andre, I.; Carmo, A.; Abreu, A.; Estevens, A. & Malheiros, J. (2009). *Learning for and from the city: the role of education in urban cohesion*. Retrieved from http://www.socialpolis.eu/uploads/tx_sp/EF07_Paper.pdf

Dearing, R. (1997). *The National Committee of Inquiry into higher education (The Dearing Report).*

Independent Government Report, Retrieved from http://www.leeds.ac.uk/educol/ncihe/.

Department of Business, Innovation and Skills (BIS). (2012). *A review of business — university collaboration,* (The Wilson Review). London: BIS.

Elliott, G. (2013) Character and impact of social innovation in higher education. *International Journal of Continuing Education and Lifelong Learning* 6 (1) XXX

Hannaford, A and Fairman, R. (2011) URL XXX

Jura Consultants (2008) Worcester Library and History Centre: Economic Additionality Impact Study. Available in electronic format from Strategic Partnership Office, University of Worcester.

Kelly, U.; Marsh, R. and McNicholl, I. (2002) *The Impact of Higher Education Institutions in the UK*. University of Strathclyde

MEDC (2002) *The Economic Impact of Michigan's Public Universities,* Michigan: Michigan Economic Development Corporation

MnSCU (2002) *The Economic Impact of Minnesota's State Colleges and Universities*

University of Baltimore (2006) *The Economic Impact of Indiana State University on the Terre Haute Region*

PACEC (2004),*Economic and Social Impact of University of Hertfordshire on Welwyn Hatfield,* University of Hertfordshire, Welwyn Hatfield Council

University of Maine (2007) *The Connection Between the University of Maine System and the State of Maine*

University of Worcester (2012). *Strategic plan 2013–18.* (http://www.worcester.ac.uk/documents/university-worcester-strat-plan-2013-18.pdf)

Milwaukee Institute of Art and Design (MIAD)

Appendix A: On-Site and Phone Interviews

MIAD

Neil Hoffman, President
John Caruso, Industrial Design
Pascal Malassigne, Industrial Design
Phil Belair, Chair of 2D/4D Design
Eric Vogel, Interior Architecture and Design
Cynthia Lynch, Associate Vice President for Assessment
Leslie Fedorochuck, Liberal Studies
Mary Schoop. Vice President, Enrollment
Matt Southem Admissions Counselor
Duane Seidensticker, Director Career Services
David Martin, Vice President
Carol Masse, Executive Director of Financial Aid
Madeleine Lubar, Board of Trustees
Informal discussions with students

Other Interviews

Julia Taylor, Executive Director, Greater Milwaukee Council
Jill Morin, Executive Director, Creative Alliance Milwaukee
Matt Levatich, CEO, Harley Davidson
Bob Schwartz, GE Healthcare, Manager of Global Design
Kristina Ropella, Chair, Biomedical Engineering, Marquette University
Judd Lord, Delta Faucet, Director of Industrial Design
Jim Weimer, DCI
James Ludwig, Vice President for Design, Steelcase
Nick Waraska, Partner, Blend Studios
Jeremy Shamrowicz, CEO, Flux Design

MIAD: Appendix B:

Arts and Design at Other Milwaukee Institutions of Higher Education and Selected Specialties

University of Wisconsin - Milwaukee Peck School of the Arts, Studio Art, Crafts, Museum Art. Digital Arts, Photography, Music, Film, and Communications.
University of Wisconsin-Parkside, Studio Arts, Digital Arts, Music, Museum Studies, and Communications Arts
University of Wisconsin-Waukesha, Theater, Communications Arts
Marquette University, Fine Arts, The.ater Arts, Broadcast and Multimedia.
Concordia University, Interior Design, Graphic Design, and Communications.
Mount Mary College, Art Therapy, Interior Design, and Fashion Design.
Cardinal Stritch University, Visual Arts and Photography,
Alverno College, Studio Art, Art Therapy, and Dance.
Wisconsin Lutheran College, Art.
Carthage College. Studio Art, Art History.
Art Institute of Wisconsin, Culinary Arts, Fashion Design, Studio Arts, Digital Filmmaking and Video, Media Arts & Animation, and Advertising.
Milwaukee Area Technical College, Photography and Digital Arts.
Gateway Technical College, Digital photography, Multimedia, and Interior Design.

BG Futures Tenants (March 2014)

Tenant	Status & Description
Tots on Tour	Tots On Tour works with parents, carers and their children and early years' professionals both locally and nationally, helping all children to become confident communicators.
Skills Reach	Provides consultancy advice on HR/Training and Skills funding together with business/training needs analysis. Skills Reach also provides project management.
Lime Lolly	Lime Lolly is an on-line retail outlet for gifts and home wares.
NBV	NBV provide business start-up and growth support with up to 6 advisors working from two offices in Futures.
Multi Sport Pro	MSP is a sports coaching company offering sports coaching to primary school children. They use the sports facilities at BG and are offering student placements.
Blink Creative	Blink Creative is a video and event design company that considers clients 'message' and how that is communicated by thinking differently and producing something that impacts an audience in the most relevant and effective way possible.
ibex	International Cooperation and Development in Education, Learning, and Training Internationalisation in Learning Skills, Higher Education and Research Links, Innovative Learning, Professional Training and Culture Exchange
Creative Hope Studio	Graphic design, Web design, web apps.

Tenant	Status & Description
Skills4Lincs	Skills4Lincs. Vocational and professional trainer/assessor up to Level 7.
Lincs Psychotherapy and Counselling	Psychotherapy and Counselling services
EPIX Media Ltd	Digital media, web and app design
ISN	ISN is a new-start journal aimed at linking global supermarket buyers with suppliers.
Vstockz	Vstockz is a web portal linking retailers with suppliers.
Rhodes Recruitment Ltd	A recruitment business with an initial focus on the provision of drivers and training, particularly HGV.
The Acorn Group	Virtual Tenant. A glazing and general maintenance company.
Squirl.Com	Virtual Tenant. A Peer – Business lending company.
New Youth Theatre	Virtual Tenant. Rachel Jerem, joint owner of NYT with her husband Jason, graduated from BG in 2000, with a BA in Drama. NYT work with children from pre-school age up to 19 years putting on musical productions across the county and have now franchised their business.
Sambat Management Ltd	Virtual Tenant. Interim management and consultancy for the food sector.
Lincoln Diving	Virtual Tenant. Christopher Ray is setting-up a small charity/business, Lincoln Diving, promoting healthy recreation, well-being and amateur sport.

Aalesund University College: References

Asheim, B. T. (2007): Differentiated Knowledge Bases and Varieties of Regional Innovation Systems. *Innovation – The European Journal of Social Science Research*, 20, 3, 223-241.

Asheim, B. T. (2010): Contribution of research organisations, in Potter, J., Proto, A., and Marchese, M. (eds.), SMEs, *Entrepreneurship and Local Development in the Marche Region*, Italy. OECD, Paris, 70-80.

Asheim, B. T. (2012): The changing role of learning regions in the globalising knowledge economy: A theoretical re-examination. *Regional Studies*, 46, 8, 993-1004.

Benneworth, P., Coenen, L., Asheim, B. T., Moodysson, J. (2009): Exploring the Multiple Roles of Lund University in Strengthening the Scania Regional Innovation System: Towards Institutional Learning? *European Planning Studies*, 17, 11, 1645-1664.

Etzkowitz, H. and Leydesdorff, L. (2000) The Dynamics of Innovation: From National Systems and 'Mode 2' to a Triple Helix of University-Industry-Government Relations. *Research Policy*, 29, 109-123.

Gibbons, M. et al. (1994) *The new production of knowledge: The dynamics of science and research in contemporary societies.* Sage, London.

Gunasekara, C. (2006) Reframing the role of universities in the development of regional innovation systems, *Journal of technology transfer 31 (1),* 101-111.

Isaksen, A., 'The innovation dynamics of global competitive regional clusters: the case of Norwegian centres of expertise', *Regional Studies*, 43 (9), 2009: 1155-1166.

Lundequist, P. and Waxell, A. (2010) Regionalizing 'Mode 2': The Adoption of Centres of Excellence in Swedish Research Policy. *Geografiska Annaler: Series B*, 92 (3), 263-279.

Narula, R. (2002) Innovation systems and 'inertia' in R&D location: Norwegian firms and the role of systemic lock-in. *Research Policy*, 795-816.

Nowotny, H. et al. (2000) *Rethinking science: Knowledge and the public in an age of uncertainty.* Polity, Cambridge.

Harper Adams University, Women in Rural Enterprise (WiRE)

Project Description: Establishment of the only national UK membership organisation to promote, support and develop rural business women

What initiated the project? Research conducted at Harper Adams University during the late 1990's identified that a significant number of farm diversifications were being established by women, but they were coming up against a number of barriers, including lack of access to finance and appropriate business support. The WiRE programme was established and in February 2000 the first WiRE conference attracted over 400 delegates from as far as Devon and Scotland.

Objectives: WiRE aims to help female entrepreneurs network, share best practice and take part in higher level skills programmes of direct relevance to the rural context of their business. Through a range of services, including training, workshops and conferences, WiRE helps rural women start, develop and grow their businesses and aims to aid innovation and growth through enabling these tiny

businesses to associate with each other.

Project Partners: WiRE has worked with numerous private sector partners including: BiTC, HSBC Bank, RBS Bank, BT, Country Living Magazine, Davies and Co, BiB Insurance, Dyke Ruscoe and Hayes, Evans Easyspace: gaining both specific expertise into WiRE programmes and preferential services for members.

Participants and process: Developed by Dr Izzy Warren-Smith OBE. WiRE is part of the Land, Farm and Agribusiness Management Department at Harper Adams. Currently directed by Polly Gibb OBE with assistance from two part-time staff.

Funding: Previous funding from Hefce (Higher Education Innovation Fund), between 2001 and 2011 enabled match funding to be drawn down from Regional Development Agencies and the European Social Fund (circa. £1.5 million). WiRE is currently funded by membership subscription, a small grant from the Prince's Countryside Fund, training course fees and Harper Adams University.

Time scale: Established in 1998 – ongoing.

Impacts

Tangible outcomes: Membership currently (November 2012) stands at circa 6000, including 700 who pay for additional services. There are 60 volunteer network leaders across the country organising local meetings for some 1800 business women each month. Dr Izzy Warren-Smith was awarded the OBE in 2005 for services to female entrepreneurship. Harper Adams was also awarded the Queen's Anniversary Prize in 2005, in recognition of the contribution that WiRE has made to supporting women-owned rural businesses. WiRE has been cited in best practice case studies including UK Government's Strategic Framework for Women's Enterprise and Stairways to Growth, and an OECD regional study. The WiRE approach has featured in international work in South Africa, China and the Middle East and as an exemplar of 'socially innovative women entrepreneurship' in an OECD/CEI joint international conference in Slovenia. In January 2013 Polly Gibb was awarded the OBE for services to rural enterprise.

Economic impacts: WiRE works with women at every stage of their business: 30% new start businesses; 40% growing businesses (1-3 years); 30% mature businesses (3+ years). The following examples from 2010 data give a measure of the scale of the economic impact of WiRE over the last 10 years: 2010 turnover data from 334 of the 1,300 subscribing WiRE business members indicates that they generate in direct income nearly £35.3m annually. During 2010 WiRE trained 117 start-ups within the West Midlands with a cumulative projected turnover of £1m (within two years).

Location and geographical reach: Events and Networks operate throughout England, and also have a presence in parts of Wales and Scotland.

Intangible outcomes (short and longer term): Encouraging links with local and national government bodies and large companies in order to enhance the range of business services available to women in rural business. Innovation, business growth and improvement, through the agglomerative effects of creating a community

of businesses together, enabling association and networking.

Education: WiRE offers business start-up training. HAU accredited training has been delivered to 195 students since November 2011. Most of WiRE training is non-accredited and up to 200 delegates per year have benefitted from this non-accredited skills development and knowledge transfer (including all training courses, workshops and conference but excluding network meetings).

Underpinning Research (where relevant): Warren-Smith, I. and C. Jackson (2004), Women Creating Wealth through Rural Enterprise. *International Journal of Entrepreneurial Behaviour and Research* 10:369-383.

Sustainability: Networks run by volunteers. Largely self-funding through membership payments for additional services and training course fees.

Harper Adams University, Regional Food Academy

Project Description: To create a Regional Food Academy (RFA) for the West Midlands blending training, consultancy, research and provision of new product development incubator facilities to support the food industry.

What initiated the project? Recognition that in the West Midlands region there was a shortage of staff with higher level food technology and business management skills needed for new product development, and a lack of new product development rental facilities. This deficiency was recognized to be contributing to a lack of innovation and exploitation of new technologies in the West Midlands.

Objectives: To improve the economic performance of the region's food sector by developing its food technology and business management skills base and in addition providing coordinated access to knowledge transfer and innovation facilities, whilst raising the profile of food and drink within the region.

Project Partners: Initiated by Harper Adams University and funded largely by Advantage West Midlands(AWM - the former Regional Development Agency for the West Midlands). The following partners contribute expertise on a case-by-case basis: , Campden BRI, Heart of England Fine Foods, International Agri-Technology Centre, Reaseheath College, Shropshire Food Enterprise Park, Transforming Telford, University College Birmingham, Walford and North Shropshire College, Telford College of Arts & Technology

Participants and process: Led by Ralph Early at Harper Adams and managed by Martin Anderson. The RFA works with SME food businesses and larger businesses to identify and deliver education and training needs, technical support, mentoring, and pilot plant facilities.

Funding: AWM provided £3.2 million together with £0.6 million from Harper Adams University to convert former farm buildings at Harper Adams and to employ food technologists to deliver training and advice.

Time scale: Project commenced 2008, facility opened 2009 – ten year project reporting end date 2018, but activity is planned to continue (see sustainability section below). [following]

Impacts

Economic impacts: Advantage West Midlands quantified this aspect using a value for money tool prior to ceasing operation. The value for money tool indicated an £8 return for every £1 of investment over the ten year project lifetime.

Location and geographical reach (i.e. local, regional, national and / or international impacts): Mainly regional, but some national

Intangible outcomes (short and longer term):

- The development of a quarterly farmers market in the Newport area, stimulating economic growth, business creation and student entrepreneurship.
- Engagement in local schools liaison activity, through demonstration days and guest teaching activity.
- Engagement in professional development of school teachers, to increase food technology knowledge and skills.
- Work with Sandwell Primary Care Trust to allow access to healthier foods in that borough
- Assistance in bid writing for the Employer Ownership of Skills Pilot for businesses
- Provision of pilot plant for large and small businesses to develop product outside of the constraints of normal production.
- Assist with the development of over 20 new food and drink products into the market place.
- Seeded the development of a distinct Food Science and

Tangible outcomes: Standard RDA categories

Output Type	Previous Years	2012/13 actual	Total Project	Contract	Difference + or –
Jobs Created	27.0	13.0	40.0	33.0	+ 7.0
Jobs Safeguarded	28.0	13.0	41.0	41.0	–
Job Assists	34.0	17.0	51.0	49.0	+ 2.0
New Businesses	7.0	0.0	7.0	4.0	+ 3.0
Business Assists	301.0	1.0	302.0	118.0	+ 184.0
Knowledge Transfer	301.0	31.0	332.0	330.0	+ 2.0
Skill Assist	730.0	12.0	742.0	388.0	+ 354.0
Graduates into Private Sector	50.0	0.0	50.0	49.0	+ 1.0
Skill Mgmt	136.0	0.0	136.0	107.0	+ 29.0
Skill Upskill	226.0	0.0	226.0	52.0	+ 174.0

Agri-Food Supply Chain department within Harper Adams University.
- Working with Local Enterprise Partnerships (LEPs) to meet future needs in the food sector within Herefordshire, Shropshire and Worcestershire through partnering a recent ERDF priority 2 bid with the Marches LEP
- The RFA has acted as a venue for many nationally significant events and conferences, including British Pig Executive / Meat Management product judging, The British Bee Keepers Association annual conference, A Biopolymer packaging conference.

Education: Development of bespoke training and education for businesses, including:

- A University Foundation Certificate in Cheese Grading - 9 graduates to date with a potential 9 students graduating year on year
- A Post Graduate Certificate in Meat Business Management - 10 graduates to date with 24 students enrolled and a potential 15 students graduating year on year This is a part-time blended learning course (combination of distance learning and block release courses at Harper Adams) for employees in the meat industry needing higher level skills. This course has been named 'Meat Course Training Scheme of the Year' in the Meat Management Industry Awards 2012
- A Post Graduate Certificate in Poultry Business Management - 3 enrolled and a potential 15 students graduating each year.
- A Post Graduate Certificate in Dairy Business Management - to start 2013/14
- Post Graduate Diploma and MSc Programs in Meat, Poultry and Dairy Business Management - to start 2013/14.
- Field to Fork level 4 & 5 modules for students from Morrison's Supermarkets studying a Foundation Degree with Bradford University.
- Accredited and unaccredited short courses in:
  - Quality and Sensory Analysis in Artisan Food - 40 Students
  - Sensory Analysis - 20 Students
  - Food Safety - 100+ students PA
- Strengthening practical provision of skills and development of food technology aspects of Harper Adams current food course offering.

Underpinning Research (where relevant): Original market research was undertaken through a food cluster group of stakeholders facilitated by Advantage West Midlands into the demand for training, consultancy and business incubator facilities in the West Midlands. Shortages identified by the Sector Skills Council for food manufacture (IMPROVE) were also considered at the time.

Sustainability: AWM funding has now ceased, and the RFA is self-sustaining, with income achieved through fee paying activities, small project funds and voucher schemes facilitated by Manufacturing Advisory Service, Technology Strategy Board and local government. The project still reports to government through the Homes and Communities agency.

Example of sustainability. The Regional Food Academy (RFA) was engaged by Sandwell Primary Care Trust as

part of in order to improve access to healthier food in Sandwell Borough. This is being achieved by assisting in a project designed to develop Sandwell's integrated offer to grow the food and drink business sector. The main aims of the project were as follows:

1. Establish business requirements for, and barriers to growth and innovation
2. Identify opportunities to develop healthy food and drink options
3. Identify opportunities to develop supply chain
4. Food Processing development
5. Food Product development and reformulation
6. Training to fill current and future skills gaps
7. Accreditation to achieve necessary standards to enable growth into new markets

150 businesses in the Sandwell borough were contacted for interview and survey activity and 5 businesses were identified that showed great interest in taking some of the opportunities forward with up to 5 days' worth of direct consultancy activity with the RFA, these were;

1. A Caribbean fusion restaurant wanting to develop ready meals and move into manufacturing. The RFA are working with this business to develop 3 market ready products as well as 3 healthier options.
2. A Caribbean bakery, the RFA are helping this business optimise its' process to give extended shelf life of product.
3. A conferencing and event catering company. The RFA are assisting this business to apply full nutritional information for their entire menu, allowing healthy choices in menu selection to be more easily made.
4. A 'cream liquor' business. The RFA are assisting this business to start up as well as establish physical stability of its product and development of a non-alcoholic alternative.
5. A group of 17 butchers shops, 2 of which are in the borough, looking to establish a manufacturing base in Sandwell. The RFA will initially assist bid writing and in nutritional labelling work.

All of these businesses as well as every company that undertook the initial survey were offered a CIEH level 2 food safety qualification and / or a CIEH level 3 HACCP qualification.

Other local authorities and Local enterprise partnerships are showing great interest in the work that was undertaken with Sandwell.

University of Worcester, Association for Dementia Studies (ADS) References

Banerjee, S. and Wittenberg, R. (2009) Clinical and cost-effectiveness of services for early diagnosis and intervention in dementia. *International Journal of Geriatric Psychiatry*, 24 (7), 748 – 754.

Brodaty, H. & Donkin, M. (2009). Family caregivers of people with dementia. *Dialogues in Clinical Neuroscience*, 11(2), 217-28.

Knapp, M., Prince, M., Albanese, E. et al. (2007) Dementia UK (A report to the Alzheimer's Society on the

prevalence and economic cost of dementia in the UK produced by King's College London and London School of Economics). London: Alzheimer's Society.

Luengo-Fernandez, R.; Leal, J. & Gray, A. (2010). *Dementia 2010: The economic burden of dementia and associated research funding in the United Kingdom*. London: Alzheimer's Research Trust.

National Audit Office (2007) *Improving Services and Support for People with Dementia*. NAO Report. London: NAO.

National Audit Office (2010) *Improving Dementia Services in England: An interim report*. NAO Report. London: NAO.

ADS: Research Publications

Peer reviewed journal articles (academic journals) – some examples

Arber, A., Hutson, N., de Vries, K. & Guerrero, D. (2012). Finding the right kind of support: A study of carers of those with a primary malignant brain tumour. *European Journal of Oncology Nursing* [Available online doi:10.1016/j.ejon.2012.01.008]

Brooker, D. (2012). Understanding dementia and the person behind the diagnostic label. *International Journal of Person Centred Medicine*, 2(1), 11-17.

Brooker, D., Argyle, E., Clancy, D. & Scally, A. (2011). Enriched Opportunities Programme: A cluster randomised controlled trial of a new approach to living with dementia and other mental health issues in ExtraCare housing schemes and villages. *Aging and Mental Health*, 15(8), 1008-1017.

de Vries, K., Brooker, D. & Smith, P. (2012). Dementia skills and competencies for Primary Care Liaison: a model for improving identification and timely diagnosis. *Primary Healthcare Research & Development.*, November, 1-10

de Vries, K. & Nowell, A. (2011). Dementia deaths in hospice: A retrospective case note audit. *International Journal of Palliative Nursing*, 17(12), 581-585.

de Vries, K., Wells, J. & Plaskota, M. (2012). Evaluation of an admission and discharge programme at a UK specialist palliative day hospice. *International Journal of Palliative Nursing*, 18(6), 275-281.

Evans, S., Corley, M., Corrie, M., Costley, K. & Donald, C. (2011). Evaluating services in partnership with older people: Exploring the role of 'community researchers'. *Working with Older People*, 15(1), 26-33.

Evans, S., Hills J. & Orme J. (2012). Doing more for less? Developing sustainable systems of social care in the context of climate change and public spending cuts. *British Journal of Social Work*, 42(4), 744-764.

Means, R. & Evans S. (2012). Communities of place and communities of interest? An exploration of their changing role in later life. *Ageing & Society*. First View access online.

Moore, D. & Jones, K. (2011). Promoting self-directed support for people living with dementia: Overcoming the challenges. *Social Care and Neurodisability*, 2(2), 66-70.

Røsvik, J.J.; Kirkevold, M.; Engedal, K.; Brooker, D. & Kirkevold, Ø. (2011). A model for using the VIPS framework for person-centred care for persons with dementia in nursing homes: A qualitative evaluative study. *International Journal of Older People Nursing*, 6, 227-236.

Suzuki, M.; Mizuno, Y.; Sakamot, R.; Tsuya, M.; Maruta, R.; Oku, Y.; Tokita, Y.; Kanamori, M. & Brooker, D.

(2011). Efficacy of the development evaluation intervention of Dementia Care Mapping (DCM) aiming at implementing Person-Centred Care. *Journal of Japanese Society for Dementia Care*, 3(3), 356-368. (Article in Japanese with English abstract)

West, E.A.; Jones, P.; Chambers, D. & Whitehurst, T. (2012). A Multi-Perspective Collaborative on Teacher Learning for Teachers of Students with Autism Spectrum Disorder. *Journal of International Special Needs Education*, 15 (1), 24-40

Peer reviewed journal articles (professional journals) – some examples

Cullen, L. & La Fontaine, J. (2012). Reflections on establishing and delivering a dementia adviser service. *Signpost*, 16 (3), 6-10.

de Vries, K. & Green, A. (2012). Therapeutic use of cannabis. *Nursing Times*, 108(9), 12-15.

Evans, S. (2012). Taking part counts. *Nursing Older People*, 24(5), 11.

Jutlla, K.; Graham, S. & Jolley, D. (2012). The care of older people with dementia and other mental disorders when they are admitted to General Hospitals: Learning from a network of Mental Health Liaison teams. *The Journal of the Institute of Ageing and Health* (West Midlands), 1(18), 29-30.

Books and Chapters in books – some examples

de Vries, K. (2011). Becoming a person in society: the person with dementia. In P Jarvis (Ed.), *The Routledge International Handbook on Learning* (pp.157-161). Oxon:[,] Routledge, Taylor & Francis Group.

Jones, P., Whitehurst, T & Egerton, J. (eds) (2012) *Teachers Stories of Research; Meaningful Inquiry in the Classroom.* London:[,] Routledge Publications

Moore, D. & Jones, K. (2012). *Social Work and Dementia: transforming social work practice*. Exeter:[,] Learning Matters Ltd.

Conference contribution in published proceedings

Brooker, D. (March 2012). Old hats and new brooms: Bringing together person centred care and BPSD. Royal College of Psychiatrists: Faculty of Old Age Psychiatry Annual Meeting, Cardiff, UK. (National, internally-focused)

Research report

La Fontaine, J. (2011). Herefordshire Dementia Forum. Alzheimer's Society, Herefordshire.

La Fontaine, J.; Brooker, D; Bray, J & Milosevic, S.K. (2011). A Local Evaluation of Dementia Advisers (National Demonstrator Site) Worcestershire. Report for Dementia Adviser Service Implementation Team.

La Fontaine, J.; Brooker, D.; Wallcraft, J. & Vickers, H. (2011). Evaluation Report, Early Intervention Dementia Service. Worcestershire.

La Fontaine, J., Wallcraft, J. & Brooker, D. (2011). Evaluation Report Action Learning Set: Early Intervention Dementia Service for Worcestershire Health and Care NHS Trust.

Upton, D.[;] Krishnan, N.[;] Bray, J.[;] Bowen, T. & Foote, C. (2012). An evaluation of quality and cost effectiveness

of a newly defined suite of care interventions for patients with dementia and their carers in the acute hospital setting developed by The Royal Wolverhampton Hospitals NHS Trust: Report Phase 1. Institute of Health and Society, University of Worcester, UK.

Upton, D.; Krishnan, N.; Bray, J.; Bowen, T. & Foote, C. (2012). An evaluation of quality and cost effectiveness of a newly defined suite of care interventions for patients with dementia and their carers in the acute hospital setting developed by The Royal Wolverhampton Hospitals NHS Trust: *Report Phase 2 – Volume 1.* Institute of Health and Society, University of Worcester, UK.

Upton, D.; Krishnan, N.; Bray, J.; Bowen, T. & Foote, C. (2012). An evaluation of quality and cost effectiveness of a newly defined suite of care interventions for patients with dementia and their carers in the acute hospital setting developed by The Royal Wolverhampton Hospitals NHS Trust: *Report Phase 2 – Volume 2: Supporting evidence.* Institute of Health and Society, University of Worcester, UK.

Selected digital or visual media – some examples

Worcestershire Health and Care NHS Trust (2011). Stand by Me: DVD assisted education resource for promoting good communication with people living with dementia and their families. (D. Brooker, K. de Vries, J. La Fontaine, I. Latham, J. Bray & B. Coupe) Association for Dementia Studies, University of Worcester: Worcester.

The University of Worcester, National Pollen and Aerobiology Unit

Appendix 1: Research publications and outputs

Selected peer reviewed journal articles (academic journals) – some examples

Paula Robson-Ansley, Glyn Howatson, Jamie Tallent, Kelly Mitcheson, Ian Walshe, Chris Toms, George Du Toit, Matt Smith, Les Ansley (2012), Prevalence of allergy and post-event URT symptoms in runners of London marathon 2010, *Medicine and Science in Sports and Exercise*, 44, 999-1004

Jeroen T Buters, Prof. Dr.; Michel Thibaudon, Ph.D.; Matt Smith, Ph.D.; Roy Kennedy, Prof et al. Release of Bet v 1 from birch pollen from 5 European countries. Results from the HIALINE study. *Atmospheric Environment Volume 55, August 2012,* Pages 496–505

Sadyś, M.; Myszkowska, D. and Smith, M., Charakterystyka badań aeromykologicznych i wstępny opis badań prowadzonych w Worcester w Wielkiej Brytanii w ramach współpracy wieloośrodkowej (Characteristics of Aerobiological research and preliminary description of the research carried out in Worcester in the UK multicentre cooperation).

Doctoral Research Society, Jagiellonian University , 3(2), 19-31

Selected chapters in books – some examples

Wakeham, A.; Keane, G. ; Proctor M. and Kennedy, R. Monitoring infection risk for air and soil borne fungal

plant pathogens using antibody and DNA techniques and mathematical models describing environmental parameters. *Microbes in Applied Research: Current Advances and Challenges*. P152-156

Professor Roy Kennedy. Hayfever Seasons Worldwide. *Travellers' Health: How to Stay Healthy Abroad* P495-500

Selected research reports – some examples

Chris Niles. Thirteen reports of results of tests on equipment used for reduction of allergens in the home. AllergyUK Ltd

Noel Egginton. Five reports on VOC emissions from products. Report for clients

Beverley Adams-Groom. Processing and analysis report. Expert witness statement for Staffordshire police

Wakeham et al. Limex clubroot trials report

Wakeham et al. HDC-PE001. Horticultural Development Company

Wakeham et al. HDC-FV333. Horticultural Development Company

Wakeham et al. HDC-FV333 (modified April 2012. Horticultural Development Company

Wakeham et al. Syngenta Report. Syngenta Seeds, The Netherlands

Wakeham et al. Harper Adams Report, Harper Adams University College,

Louise Robertson, Comparison between Haymax pollen barrier balm and another similar brand on the market, Haymax Ltd

University of Worcester Student Employability

Appendix 1: Impacts of Learning Through Sport as identified in 2009

Since 2004, 281 young offenders have attended the re-socialisation scheme run at the University. The power of this initiative to turn-around young people's lives is exemplified by a 16 year old former young offender who has set-up and runs a junior basketball coaching programme for local children who previously had no opportunity to engage in sport.

Since 2004, 103 five to eleven year old children with dyspraxia have been engaged in learning and development through basketball, rebound therapy, movement to music and trampolining funded by the University and delivered by student athletes. Through evaluation of the project the Dyspraxia Foundation identified that children's confidence and self-esteem had increased.

In 2008 the University, the Worcester Wolves and a local FE College led the national pilot of the Advanced Apprenticeship in Sporting Excellence (AASE) for basketball in collaboration with England Basketball and the Learning & Skills Council.[1] The aim of the apprenticeship is to enable students between the ages of 16 and 18 to continue their full-time education whilst also receiving coaching for elite performance and preparation for successful participation in the national basketball leagues. In the pilot year 21 AASE apprentices successfully completed the programme. Following national acclaim the pilot scheme developed and led by the University has now been emulated by 12 other English basketball clubs. The student and coach handbooks have been adopted as a

model of good practice to be used by all AASE participants.

Since the original submission the University has now signed a partnership agreement with Masaryk University, Czech Republic. The partnership is focussed on promoting the integration and inclusion of disabled students in mainstream education, academic life and civil society and aims to promote the University as a Centre of Excellence for Disability Sport throughout Europe.

The annual one-day learning through sport celebration event has grown from 200 children participating in 3 sports represented by local clubs in 2008 to 300 children (including visually impaired pupils) participating in 10 sports represented by local clubs in 2009.

Since submission university student athletes secured England the second place at the 2009 Blind Football European Championships (26th June to 4th July) in France. One of the elite players, following a LTS mentoring project, now works as a learning support mentor for a visually impaired pupil in a local school.

The learning through sport disability focus has inspired numerous graduates to progress into careers to develop disability sport and disabled athletes in local, regional and national organisations e.g. Specialist Sports Coordinators for Disability, Sport Development Office (Disability), PE Teacher at a RNIB College and a Community Disability Participation Officer for a professional football club.

The LTS model of basketball study and play is due to be showcased at the EuroBasket Championships in September 2009 in Poland with additional requested presentations to Chinese delegates. This model is currently being developed further to support blind football initiatives involving elite student athletes mentoring disabled school pupils in mainstream schools.

In July 2009 the University secured £35,000 Aimhigher funding to deliver health and education through sport via the LTS basketball programme and an extension of the programme, Read & Play for primary school reception classes. This funding will enable the programme to be delivered to an additional 1500 pupils throughout the region. Additionally £20,000 club sponsorship has been devoted to the expansion of the LTS outreach programme to a further 1000 pupils.

The University is collaborating with the English Federation for Disability Sport in the creation of the Worcester Wolves wheelchair basketball team and during summer 2009 secured £50,000 of funding from Aiming High for Disabled Children to provide 15 wheelchairs. The initiative will enable disabled people in the south of the region to participate in recreational and competitive sport and in doing so will enhance representation and opportunity for sport participation regionally. Student athletes, through the Sport & Disability module, will be further targeted to develop and deliver this unique HE disability sport partnership. Student ambassadors will also play a key role in the 2010 World Wheelchair Basketball Championships with the University bidding to host an international team. The collaboration will involve leading the development and delivery of a disability sport and educational programme for primary and secondary schools in the region in order to further embed knowledge and understanding of disability sport and to inspire children.

University student athletes will be providing organisational, sports science and volunteer support for the 2010 Blind Football World Cup and staff and students from the Institute are developing a two-day international conference on International Disability Sport to be held in the summer 2010.

Outcomes for the Wider Public Benefit

The Basketball LTS initiative has:

1. Increased the number of applications for basketball study and play opportunities from under-represented groups from 1 per year to over 120 from aspiring players in the UK and in excess of 40 per year from around the world;
2. Led to elite ambassadors from the LTS programme mentoring four national HEFCE funded Aimhigher Summer Schools for Sports Science designed to raise the awareness, aspirations and attainment of young people from disadvantaged social and economic backgrounds.
3. Led to the inception of Dizz-Kidz – a programme now in its 5th year of inspiring youngsters with dyspraxia to develop co-ordination, fitness and understanding through engagement in sport with basketball scholars;
4. Delivered workshops for numerous Aimhigher visit and taster days for schools throughout the region;
5. Empowered student athletes to work alongside elite players to deliver learning activities through basketball coaching sessions and sports related reading activities to over 2000 children in more than 70 schools per year;
6. Led the joint initiative with the region's other leading professional sports clubs including premier league cricket, rugby and basketball to engage over 200 youngsters in a one day event of playing and Learning Through Sport with the region's elite athletes;
7. Led the Advanced Apprenticeship in Sporting Excellence for basketball in the pilot year and mentor all colleges and clubs throughout the UK;
8. Led the LTS joint initiative with the Association for Physical Education to produce the innovative nationally available DVD teaching aid for youngsters preparing for SATS tests in maths and English in UK primary schools.
9. Led the 'Hoops for Health' initiative that encourages youngsters in 20 primary schools to get active and learn more about healthy living.

The visually impaired football LTS initiative has:

1. Attracted visually impaired students to participate in the university's study and play concept;
2. Enabled elite 4 university students and one member of staff the opportunity to represent GB in the 2008 Paralympic games in Beijing and the World Cup in 2006;
3. Empowered elite players to mentor youngsters with visual impairments in local and regional primary schools and centres of excellence to inspire them into sport and study;
4. Enabled the elite university students to present the LTS model to the national Podium conference 2008;
5. Contributed to individual success for visually impaired student athletes receiving the Edexcel National Sport Student of the Year 2008, the Midlands Disability Sports Personality of the Year 2008, the British Asian Sports Awards Outstanding Achievement Award 2008;
6. Impacted nationally through staff representation as

the Football Association adviser for disability football development within Higher Education;
7. Inspired hundreds of able bodied university students over the past ten years to develop skills to support youngsters with disabilities to learn through sport across the UK, many of whom were inspired by the 'sport & disability' module opportunities to undertake careers in disability sport.

These two primary LTS initiatives have inspired the University to develop numerous complementary innovative and community driven sporting initiatives for groups either disengaged from sport and/or under-represented in Higher Education.

The Dyspraxia LTS initiative
Following the national media coverage of the University's LTS initiatives, the University was approached by the regional group of the Dyspraxia Foundation to lead the development of LTS opportunities for children who were seen as 'clumsy and disruptive', yet who were clearly in need of understanding and help. Consequently an 'Awards for All' bid was secured for assistance with equipment and the University provided students with specialisms in basketball and trampolining to form the 'Dizz-Kidz' club. Significantly, a platform has been built for all of the parents and families to engage in interact with each other. The dyspraxia LTS initiative is now in its fourth year and the model has recently been presented for development at regional and national levels for Further Education and Higher Education institutions.

Wheelchair Basketball
The University acquired 30 wheelchairs and appropriate trailers and consequently deliver a road show to schools throughout the region. The coaching sessions are delivered to both able bodied and disabled youngsters by qualified University of Worcester and Worcester Wolves wheelchair basketball coaches. The University of Worcester is now the Centre of Excellence for Wheelchair Basketball for the West Midlands. Plans are in place to create a national centre of Excellence at the Worcester Arena.

Young offenders
A partnership between UW and the Worcestershire & Herefordshire Attendance Centre was formed to use sport as a vehicle to develop social skills & healthy lifestyles in 10–17 year-old offenders. This LTS initiative has been recognised by Darren Beattie at the Ministry of Justice as a unique example of partnership working *'This is now a successful model that has shown the rest of the country that there is no need to ostracise or segregate young people from the rest of the community'*. The initiative has expanded and moved to a central site.

1 http://www.englandbasketball.com/news/default.aspx?newsid=1200

Cover photographs:
Milwaukee Institute of Art & Design
Southampton Solent University
University of Worcester