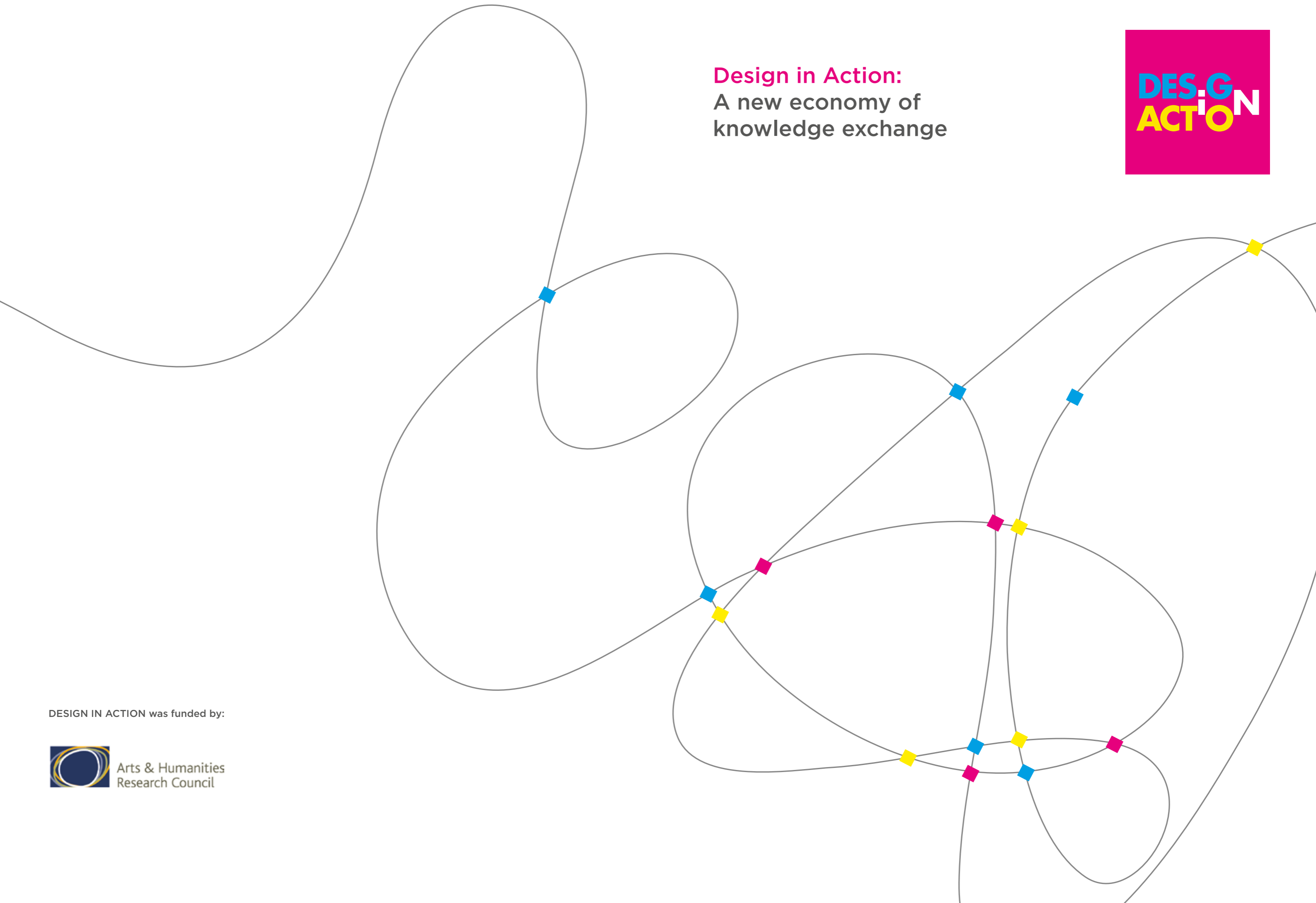


Design in Action:
A new economy of
knowledge exchange



DESIGN IN ACTION was funded by:





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Foreword

Design in Action (DIA)

by Georgina Follett, Director of Design in Action
March 2012 - November 2016.

Design in Action (DiA) was conceived to articulate design principles and practices, to exemplify their value to the economy and to build the opportunity to use Arts and Humanities thinking in the establishment of businesses fit for the new 'pull economy'.

DiA built a team of 29 academics and professionals committed to developing a programme in support of new business development, positioning design at the heart of each business and enabling its values to drive the process. This introduced new ways of innovating through co-creation, with the customer as an asset responding to the expectations of thoughtful consideration of the purchaser of business products by delivering for them. This process not only repositioned how a business is perceived in the new economy, it built its practices by seeing the customer as the business, a change from the 'push' business model.

DiA processes built upon existing 'best practice': it took the full team's expertise to successfully accept the challenge of a high-risk strategy of seeking to deliver a viable co-creation process called Chiasma; introduce it into five diverse sectors, with no prior knowledge of how they functioned; and work within the most difficult part of the economy the micro and small SMEs, where all previous policy initiatives have proven unsuccessful.

DiA moved into this space using the design principles it was expounding. Professional design expertise underpinned the work, DiA operated as a research and professional facilitation team at each stage of the process. Its role was to build knowledge of the ideation process, move from this to a grant assisted development phase, into a viable business proposition, and from there into a sustainable market ready business.

Knowledge Exchange (KE) was core to the research teams approach and a KE model was developed as part of the research. Intellectual Property (IP) structures were a common concern among the external participants, and the academy became a solution to working with diverse groups of varying scales, aims and expectations.

The academy is neutral ground, in that it is in "public ownership" is impartial and offered security in its probity, this too delivered a "shelter" for IP. The response was generally positive, but not universally so, as IP protection goes against collaborative co-creation, and open source software. IP needs new architecture, one that fits new economic imperatives and business models that operate in the pull economy.

The academy as a facilitator to the development of small and micro businesses is a step change, DiA discovered that the academy and its different knowledge domains came fully into play, almost every academic disciplines knowledge was sought by the fledgling businesses. Complexity and managing complexity was a key consideration, without the academy as a support agency the businesses would not have achieved their aspirations, received the support or accessed the right knowledge. It took not just DiA's team to manage this but the wider support systems and infrastructure of the Higher Education sector.

Universities operate in the public good and are possibly the only system with the capacity, diversity, knowledge, structures and impartiality to deliver for the SME community, which equates to approximately 98% of the UK economy. Higher Education is charged with and funded to deliver learning and generate knowledge, yet has underdeveloped channels of exploitation, and by capitalising on knowledge exchange these should be built to extract the public investment value of the academy in support of the economy, DiA offers a model for achieving this.

The Arts and Humanities Research Council took a risk in supporting four centres to test different models of working within the creative economy, it provided a unique opportunity to test the value of these practices to the whole economy. DiA believes that it has achieved significant results in a very short timescale. DiA took the approach to build a hard metric to advocate the value of the creative economy to the wider economy. DiA has found that design acts as a facilitator, catalyst, disruptive agent, provides peer support, networks, interestingly its own diversity is a real strength within the wider economy. Design's strengths are drawn from the fact that it is always context driven, and its context is business, the customer, collaboration and reflective practices.

DiA is an academic construct, which builds upon the knowledge inherent in the academy, offering this to the business community, especially the small and micro SME. DiA acknowledges the value of each team member in its achievements, a full list of those involved in the project are found at the back of the publication.



Executive Summary



This Final Report distils the key strategic learning arising from Design in Action – an Arts & Humanities Research Council Knowledge Exchange Hub for the Creative Economy (2012-16). The report draws on reflective evidence from the key participants, economic impacts arising from the interventions in the chosen field of study and case studies arising from four years of diverse practice

DiA has spent four years making sense of its own agency in a complex environment of knowledge exchange, HEIs, economic development agencies and government policy. These reflections and recommendations arise from this work rather than through exhaustive power and ecosystem mapping.

Key findings and recommendations

1 The application of design as a strategy for business growth is a proven success through the Design in Action (DiA) model. However, it is not a universal growth machine – no such thing exists. Public policy and economic development practice must be a plural pursuit. It far too often fails to be so – to the cost of society at large.

- All relevant public and private sector bodies should ensure that they pursue a diverse approach to economic development or are supportive of diversity in their ecosystem rather than being hostile and overly competitive for funding and policy space.
- The dying frame of the push economy must be up-ended in favour of a new normative pull economy placing primacy on the agency of the consumer.
- The DiA KE process model should be widely scrutinised and adapted as an aid to diversity rather than merely applied in every situation.

2 The current practice of UK Universities in the mobilisation of knowledge to productive economic ends is systemically limited in both concept and policy. The market for arts and humanities knowledge and insight is vast and fertile. DiA has found scant limit to the demand.

- HEIs must ensure that they have a diversity of approaches beyond STEM to fully mobilise the tax-payer's investment in knowledge assets. Process must not be bound by discipline and instead be truly interdisciplinary accessing multiple knowledge sets simultaneously.

3 Micro-businesses are strategically vital to the health of the economy but are chronically neglected by the KE environment.

- HEIs should ensure that their KE relationships are founded on a robust civic and economic understanding beyond the short-termism of the dominant HEI business model.

4 A protective culture of intellectual property is limiting the collaborative and creative capacity in the economy. IP cultures vary by business sector. DiA's IP shelter model re-imagines the HEI as a public good through an emphasis on trust and relationships.

- Those working in economic development practice should consider the limitations of fetishized intellectual property over true collaborative processes.

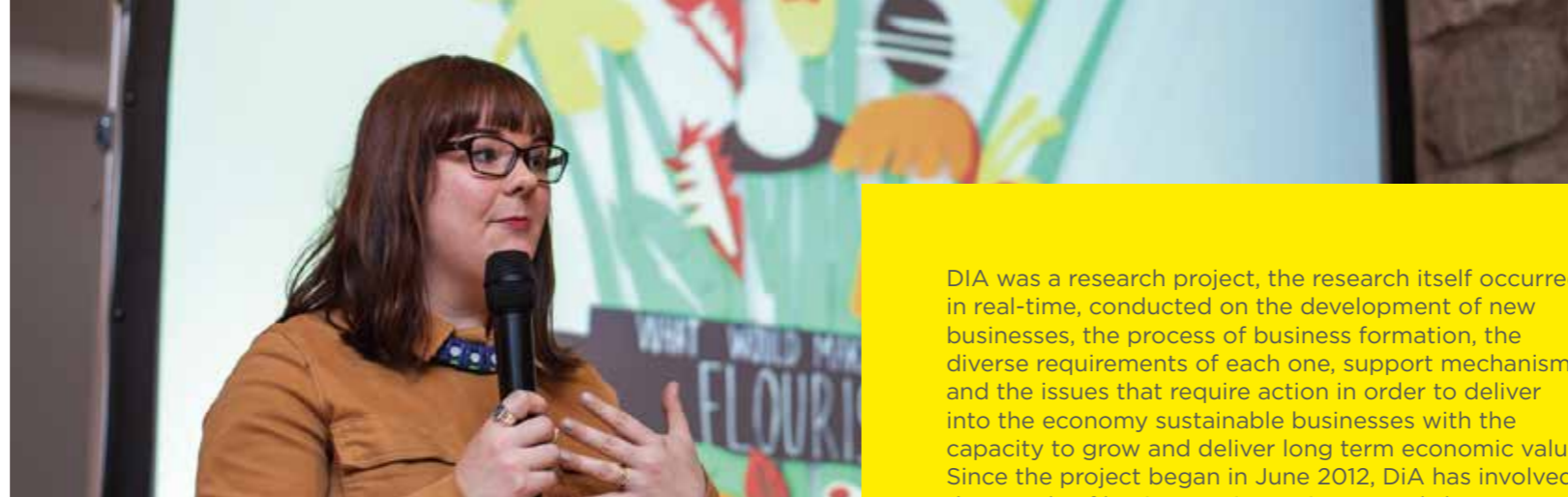
5 The conceptual field of knowledge exchange is limited by its policy-shop origins. There is no intellectual under-pinning and little expression of values expressed or created

- The literature under-pinning KE practice must be developed to understand the internal-external horizon to open knowledge beyond learners and to those with a principal purpose of application.

DESIGNBUSINESS
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Context



Dots connected in unexpected ways in order to have the chance of leading to unexpected outcomes.

Design in Action (DiA) was a £5m Arts and Humanities Research Council (AHRC), Knowledge Exchange (KE) Hub for the Creative Economy. The project was also awarded £400k from Creative Scotland to support small and medium enterprises (SME) to utilise design as a strategy for innovation, within and outwith the creative economy.

Duncan of Jordanstone College of Art & Design at the University of Dundee was the lead institution with partners drawn from across Scotland. Given that the overarching premise was to test the value of design as a strategy, the partnership drew upon the expertise of the four Scottish colleges of Art and University of Abertay whose knowledge in the digital domain complimented the design knowledge and St Andrews University who provided the business expertise.

DiA comprised of a transdisciplinary team of Doctoral students, Post Doctoral Researcher Assistants and Co-Investigators from a variety of backgrounds including art and design, computer science, ethnography, entrepreneurship, digital humanities and technology, a Director and Deputy Director. A core professional services team provided comprehensive business support, media coverage, events and administrative support to facilitate the research and ensure that sound processes underpinned the engagement with all external agencies.

DiA's priority was to bring innovation capacity to Scottish SME's, 99% of the country's businesses;

- Scotland's Business Enterprise Research and Development (BERD) rate was consistently amongst the lowest in the OECD, due in part to the lack of private sector firms of scale with the capacity to invest in research and development.
- The usual definition of SME is any business with fewer than 250 employees of which there were 5.2 million SMEs in the UK in 2014.
- Micro-businesses are business with 0-9 employees and an annual turnover of less than 2m Euros and there were 5 million micro-businesses in the UK in 2014, accounting for 96% of all businesses (Source: BIS, Business population estimates, 2014).

Policy makers also held the view that the creative economy was entirely made up of creative enterprises and it was not seen as part of the wider economy. DiA sought to build design knowledge into new sectors and demonstrate its power and value as a strategy for economic growth. DiA had to move the agenda from the creative industries to the creative economy, a distinct change, and a poorly understood one, and certainly not understood at a policy level, where the arts in particular are valued purely as aesthetic products.

The development of the small and micro businesses have traditionally eluded or been excluded from support systems to facilitate their development, Elusion because of the volume, diversity and geographical spread involved. Exclusion because of a monotheistic view of economic development focused on scaled return on enterprise investment and a policy level fascination with corporations. DiA endeavoured to provide a tailor made service, achieved through the multi-disciplinary knowledge nested within universities. Businesses accessing DiA support had a remit to build long-term economically sustainable businesses, which had a need for a solidity of operational frameworks, with an understanding of how they can be adjusted and adapted over time. The ambition was to be there for the long term.

DiA deliberately sought to work specifically with design to explore its value as an engine for the creative economy. DiA advocated design values in every aspect of its work, positioning design processes at the core of its strategy and operational model by working continuously with the design profession. The ambition was to establish businesses that held design at their core and to see the value extracted from them via job creation, turnover, and investment in R&D.

DiA was a research project, the research itself occurred in real-time, conducted on the development of new businesses, the process of business formation, the diverse requirements of each one, support mechanisms and the issues that require action in order to deliver into the economy sustainable businesses with the capacity to grow and deliver long term economic value. Since the project began in June 2012, DiA has involved thousands of businesses in seminars, workshops, Design in Business summits and 14 residential Chiasma events, and created 17 design-led businesses, turning over £3m+, creating employment for 113 people.

The key focus of the project was to demonstrate design as strategy for economic growth and innovation, testing the value of design-led innovation across fields of knowledge, business boundaries, technology and current policy. Initially delivering across five sectors - food, sport, rural, information and communications technology (ICT) and wellbeing, identified by the Scottish Executive as areas with high potential growth, the project widened its focus to include legal services, digital imaging, crypto currencies and the circular economy as a result of externally commissioned partnerships and contracts. Design in Action developed a process of collaborative co-creation between SME's, academia, customers and designers, creating a fluidity of knowledge to overcome cultural and infrastructural silos that may have restricted business development in the past. This was delivered in a number of ways by:

- Engaging a sector fully within the scoping process, listening to their assessments of the issues affecting their progress and development, and developing a call that responded effectively to their needs
- Designing a process that advocated design in every aspect of engagement, including sensitivity to the venue, locating it outwith the academy, identifying world leading experts to provoke a re-assessment of ways to think about issues, building a model that was responsive and respectful of individuals, and providing professional peer feedback to enable ideas to advance productively
- Developing a time sensitive responsive grant process, that facilitated and enabled applications for funding within a 3 month timeframe, linked to support the Business Partnership Team, who could offer advice and identify sources of relevant information
- Building a series of events that advocate for design practices and articulated and advanced design knowledge in public fora, to help develop insights into the opportunity offered by strategically building design into core business processes
- By building confidence in the academy to support the SME sector and advance their opportunities, by providing access to knowledge, introducing SMEs to experts in support of their idea, helping them make the transition from idea into a viable and sustainable business
- Offered an arts and humanities framework from which to construct a business proposition - one that works within the pull economy.

Steering Group

Chaired by Sebastian Conran, a designer of international renown with an influential network in commercial and policy circles, the membership included key stakeholders such as funders and referencing partners from public agencies as well as business representation. The group sought to act critically, monitoring progress and providing a strong external reflection on the operational context of DiA. The Steering Group had a core membership that remained in place throughout the project. In the past year, more businesses were introduced to the Steering Group to reflect on the practice of DiA and its broader applicability.



Created employment for

113
people



Design as a Strategy

Process Model

DiA sought to demonstrate design as a key strategy for economic growth and innovation, focusing on the value of design-led innovation in business. Knowledge of the value of design (its processes, methods, models and tools) is widely limited to that of a generator of tangible, functional aesthetic objects. The evolution of service design has helped reposition designs' values. Engaging with the DiA innovation process has provided better understanding of the entire design process. By focusing on process, designers gained insight and a new perspective on the intellectual assets they hold, their value and how these can be mobilised within a business context. Using the whole of the design portfolio enabled designers and businesses to understand the full value of design, expanding its use when building it into their core business processes and thinking:

- By scoping current issues affecting each sector via workshops, round tables and interviews with market experts in both business and academia, tailoring each Chiasma call to ensure it was both on point and purposeful
- By curating and facilitating intensive residential design-led, knowledge exchange events, Chiasma, around a specific sectoral call, encouraging co-creation as a method of innovation
- By allowing Chiasma participants the opportunity to apply for KE grant funding including further business and design support to take the resultant (and sheltered) intellectual property (IP) to prototype and launch stage, providing a cohesive and complete pipeline process from conception to market and beyond
- By hosting a series of high-profile design speakers in the form of public lectures across Scotland, including cross-institutionally with our academic partners, and hosting the first ever Scottish Design Summit in May 2014;
- By, all the while, creating and maintaining a network of designers, academics, policymakers, funding organisations and businesses; promoting to them the benefits of adopting design within their infrastructure via networking events, seminars and think pieces.

Design in Action Knowledge Exchange Model

DiA used co-creation methods to understand its own practices and collectively agree on a model of KE that developed and underpinned the work.

Scoping

Identifies the critical challenges for near future businesses opportunities in specific sectors. Participants include academics, businesses, agencies, communities, government and non-government organisations.

Interpretation

Is the framing of key challenge areas for an industry sector and the forming of the innovation call for participation for the ideation phase, includes the creation of the methods and tools for the next stage. Participants include academics and invited experts.

Ideation

Is the event where design facilitates and supports ideation and enables the inception of new business concepts. Participants include academics, businesses, designers, and wild cards.

Formation

Is the development of the business model, where user testing refines details and uncovers new opportunities. Participants include business teams, academics, designers, external experts and target consumers. Is the launch of the product or service into market, and when the businesses evaluate targets and gather insight from consumers. Participation is wide open.

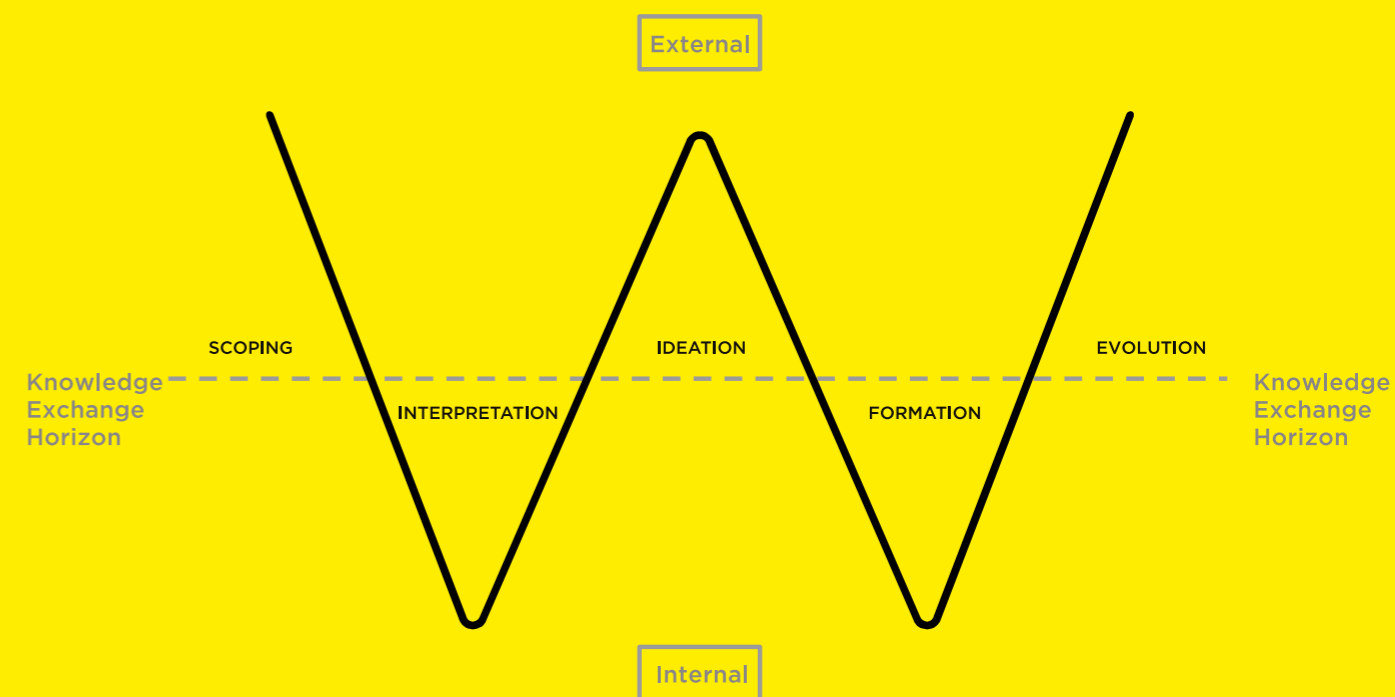


Figure A: Design in Action Knowledge Exchange Process Model for design-led innovation (Double "V").

The model illustrates the DiA process, which is understood as the process of design-led innovation delivered through five stages of variable types of knowledge exchange. The *knowledge exchange horizon line* represents the boundary between the different understandings of knowledge exchange, namely, that it can be identified by either *external* or *internal* participation. Above the horizon are the activities, which facilitate mainly processes of external engagement with an open uptake of communities, academics and businesses, government and non-governmental organisations. Below the horizon are the internal activities, which mobilise innovation through self-selected teams and nominated individuals who contribute additional knowledge, constructive criticism and expertise.

The identification of the problem or challenge is widely recognised as the first step in the design process, as demonstrated in renowned models such as IDEO's Design Thinking Process and the Design Council's Double Diamond. During the initial phase of the DiA project, we identified a need for collective research and development to help support problem articulation and opportunity identification across DiA's five economic sectors. This first step, which we labelled scoping, provided us with the information to position the focus of our innovation events (Chiasma). To achieve this, DiA merged the methodological principles of co-operative inquiry with design methods and brought together key stakeholders to collectively identify the relevant complex problems. For DiA, scoping was found to be pivotal in the establishment of scenario planning and strategic thinking.

Primary methods of scoping were:

- **Lightning talks** which were quick presentations from renowned speakers in the sector.
- **Likert scale** activity was used to measure participants' attitudes, and to help the group reveal and exchange worldviews early on.
- **Critical conversations** were small discussion groups, formed with participants around a certain theme or broad challenge for a specific sector.
- **Opportunity mapping** was an activity undertaken either at scoping events with participants or conducted internally as part of the research team activity.
- **Critical friends** were the experts in the specific sectors, often outside of academia, who provided essential feedback to the DiA research team once the initial sector challenges and opportunities had been formed.

From the capture and analysis of the scoping activities, five guiding principles were defined:

- **Knowledge Exchange** is the collaborative creation of new knowledge facilitated by design through the interaction of academics, businesses, individuals and communities; it is achieved when value is manifest.
- **Co-Creation** is the activity of collaborative creativity.
- **Equality** is the recognition that everyone has an evenly balanced contribution to make in the scoping process.
- **Engagement** is the open and active participation of everyone involved.
- **Impact** is the outcome of scoping and comes in many forms and from different participants. It can be realised at different times during and after scoping takes place, e.g. a new business or a new research trajectory for an academic.

Furthermore, four organisational competencies were identified as essential in the facilitation of the process of scoping:

- **Managing expectations** is the ability to assess and adapt to the needs and demands of the project stakeholders.
- **Effective communication** is the clear facilitation of which ideas and the processes are projected to participants and wider audiences.
- **Agility** is the ability to adapt to the situation as and when it evolves.
- **Identifying mutuality** is the ability to draw logical inferences, which connect ideas and help others acknowledge them and act on it.

The next steps for scoping were to:

- further develop an understanding and theoretical concepts around the value of scoping as the first phase in the design-led innovation process;
- to conduct future scoping events for collective research and development for entrepreneurs, and micro-, small- and medium-sized enterprises;
- use scoping as a method for new research pathway identification and partnership forming.

DiA established an overall management tool for the development of the call, including scoping, and applications. Applications to attend the event tended to be received just prior to the deadline. We established a 6-week window to capture applicants and to spread the call amongst the right communities.



Ideation

chi•as•ma (kahy-az-muh) *n.*

1. Where ideas meet at the point of creation.
2. *Cell Biology*. a biological term where two Chromatids overlap in the process of meiosis.
3. *Design in Action*. residential innovation events where people often with wildly different skills come together to solve complex problems by generating new and often elegantly simple ideas.

Chiasma, a Co-Creation Process for Open Innovation

The locus was to understand "Design as a strategy" for business growth. How design when embedded at the core of the business, changes and advances successful entry into the market. DiA's approach was Chiasma, a co-creation process for open innovation.

Within Chiasma a research room was established. Initially the research was visible to the Chiasma participants however some commented that they felt intimidated so the decision was taken to move the research room to a behind-the-scenes facility, run by the PhDs. Throughout Chiasma, the facilitators (Co-I and PDRAs) would monitor and write notes that identified how the process was developing, where issues were arising, and other observations on the process. The PhDs operating the research room kept track of developments, which provided the basis for iterative developments of the process, and provided supporting information on how design was functioning within the process of Chiasma. The opportunity to see events unfold in real time, and to build an analytical framework of a process, helped support an understanding of how practice based research could be identified and used.

All Chiasma participants were part of a group who formed a potential commercially viable idea. Those who chose not to develop the idea came because they wanted to experience an innovation model, one that could be applied in their existing business context, whilst others relished the opportunity to hear and meet with the world-class experts present at Chiasma. We understand, anecdotally, that many participants who originally met at Chiasma have kept in contact with each other and many still meet and/or work together in new business networks.

Chiasma participants were introduced to design-led approaches and provided with design methods, tools, and techniques, to support the co-creation of innovative business ideas. Knowledge exchange was inherent in outputs, enabled through a set of assumptions, practices and tools forming Chiasma design principles methodology. This recognised the fluid character of knowledge structures enabling a trans-disciplinarily process of open-endedness fostering collaboration with a mind-set geared towards purposeful discovery.

The design process success depended on the participant team's capacity to approach the problem from a user perspective, to visualise information and rapidly evaluate ideas. Design offered creative and generative visual methods including drawing, illustration, and three-dimensional making which enhanced communication and idea generation and rendered the design process open to participation and development from a range of stakeholders.

Design helped overcome the disciplinary divides and conceptual binaries (mind versus body; theory versus practice; design versus business etc.) vital to the integrative function of design using "locally" established structures allowing individuals with different frames of reference and exploratory approaches to settle on a shared path of inquiry. Design fulfilled a brokering function aligning different 'ways of knowing' along the processes of collaborative exploration, embedded in a network of mutually influencing actors. Chiasma connected separated systems of thinking and acting, building an integrated development process.



Surviving and Thriving
Technology Food
Accelerator 2013
#FoodFutures
Scottish Circular by Design
Legal Creative Currencies
Services **Canny Consumer**
Sustaining Rural Scotland
Inclusion in the Outdoors
Living Well
Beyond Mobile Wellbeing 2013
Made in Scotland

Whilst building a singular model (Chiasma) for innovation DiA also successfully experimented with alternative models. Working with the Intellectual Property Office and Dundee University's Research and Innovation Services team to look at ways to commercialise the science knowledge locked within the university. Chiasma was delivered over an extended period, with two separate days some weeks apart of formal delivery. We tested this via a Technology Accelerator Chiasma. This model called for academics to come forward to unlock and commercialise their IP. The resultant business, Tusi, developed a unique patented interface for smart watches enabling text input. Tusi's Director, Dr Tim Willis, has subsequently built the business via a Fellowship from the Royal Society of Edinburgh.

DiA also piloted a franchise model of Chiasma, delivered in partnership with Northumbria University in North East England. The funding of businesses available via DiA was limited to Scotland. Northumbria University acknowledged the successful outcome of the trial:



By increasing the opportunity for designers to move into new sectors of the economy, DiA helped to identify new business opportunities for design, enabling diversification and extending the range of opportunities for design when viewed as a business strategy rather than a product.

“It was genuinely impressive to see a room full of strangers, with very different skills sets, backgrounds and knowledge of Health and Wellbeing, move through the process of exploration and identification of areas of opportunity, form rounded teams and ultimately pitch some very clear and robust product/service propositions. To go from a blank piece of paper to 15 novel concepts and ultimately finish with 4 clear proposals, all in 24hrs, highlights the focus of energy that the process was able to create and the calibre of facilitation we had from the team”.

Bruce Watson,
Head of INNOVATE at Northumbria University
6.11.15

“I don't think the business idea would have worked, it would be nowhere near where it is just now and that is an absolute fact. No, it would be nowhere near because I did not understand how you needed to create a brand or create an image, or create something/ design something which speaks to people and I did not really get it and I did not realise how much work would go into creating something like that. I could not do it without them, on my own it would never have happened so they transformed it and created it to what it is today”.

Anonymous Chiasma participant identifying the difference design made to their eventual business

Chiasma Speakers

DiA sourced speakers for Chiasma, and established an experienced peer feedback panel with a depth of knowledge of the sector and the call. The list of Chiasma experts we worked with are as follows:

Wellbeing '13

Speakers: Diabetes Sufferer, Diabetes Clinician.
Panellists: University TTO, Design Company, Design Professor, Wellbeing Investor, Wellbeing Clinician

Food '13

Speakers: Food Entrepreneur, University Principal.
Panellists: Food Support Agency, Art School Dean, Angel Investor, Food Academic

Rural '13

Speakers: Harris Tweed.
Panellists: Start-up Consultant, CEO of Interface, Rural Support Agency

Sport '13

Speakers: Extreme Sportsman, Design Policy Director of Ikea.
Panellists: Sport Support Agency, University TTO, Investor, Sport Academic

ICT '14

Speakers: Design Entrepreneur, Tourism Entrepreneur, ICT Entrepreneur.
Panellists: Sport Support Agency, University Professor, VC Investor, ICT Consultant

Food '14

Speakers: Food Entrepreneur, Food Entrepreneur,
Panellists: Scottish Enterprise Food Manager, Design Project Director, Cultural Enterprise Office Director

Wellbeing '14

Speakers: Wellbeing Expert, Designer and Entrepreneur.
Panellists: Design Academic, University TTO, Wellbeing Clinician, Wellbeing Investor, Design Agency



Rural '14

Speakers: Sustainability expert.
Panellists: Research Consultant, Rural Support Agency, Scottish Enterprise Sustainability Manager, RBS Business Manager

TAC '14

Speakers: Toshiba Technologist, Tech Entrepreneur, Design Academic.
Panellists: Scottish Enterprise Digital Manager, Creative Scotland Project Manager, Investor, Innovation Centre Director, Academic

ICT '15

Speakers: Designer, University TTO, Bitcoin Expert consultant, RBS Head of Technology.
Panellists: Creative Scotland Project Manager, ICT Investor, RBS Project Manager, RBS Technology Manager, Design Academic

Rural '15

Speakers: Design Academic, Rural Entrepreneur, Sustainability Academic, Designer.
Panellists: Scottish Enterprise Textiles Manager, Textiles Academic, Design Project Director, University TTO, Design Consultant

Food '15

Speakers: Food Entrepreneur, NESTA Director, Food Consultant/Innovator.
Panellists: Food Entrepreneur, Director Scottish Food and Drink, Art School Dean, Nutritionist academic, Food Entrepreneur

Wellbeing '15

Speakers: Design Academic, Well Being Entrepreneur, LEP Director.
Panellists: Research Council project manager, Design Academic, Support Agency

By using university contacts, DiA was able to bring in experts on aspects of the Chiasma call, demonstrating to the small and micro SME that exposure to such important information and knowledge was a key factor in their ideation and business process.

Designing Knowledge Exchange

The initial concern was: 'Is there a market for Arts and Humanities knowledge within the business community?' However, this proved to be the wrong concern. The real issue was how to manage expectation, volume and need against the imperatives of delivering to the five interrelated elements of partnership, business, KE, advocacy and research. Managing this required some remodelling of the human capacity within DiA including additional administration support to cope with volume and ensure a prompt response to all queries, and a Business Partnership Assistant to add client-facing capacity as well as documenting and capturing metrics as they evolved and developed. The process built relationships and established networks between the academy and external partners and resulted in places in Chiasma being readily taken up by representatives from industry.

Chiasma mixed businesses, academics, consumers and designers (each team had to have a designer) which offered participants the opportunity to experience "design in action"; to absorb design values, understand a design process, and participate in an innovation model that utilises design methods. To ensure that a wide range of small and micro businesses could engage optimally with Chiasma, all event costs were covered and, because design was the heart of the experience, the time of the designers was reimbursed at a nominal rate. There were 430 applicants for 14 Chiasma, which increased from an average of 27 applicants per Chiasma in 2013 to an average of 33 in 2015 (increase of 22%) as the process gained external credibility.

Anonymous quotes in the Chiasma Attendee Survey (June 2015).

430
applicants
for **14**
Chiasma



applications
for Chiasma places

+22%
by 2015

“ A Facebook group was set up by attendees for us all to keep in touch. ”

“ I've kept in touch with almost everyone who attended, via social media. ”

“ I connected to several people via LinkedIn and still remain in touch. ”



Tools - Design KIT

Design in Action's work has highlighted the challenges SMEs and micro businesses face when learning and adopting new processes and carrying out research and development tasks with the aim of innovation and new thinking. The challenges included:

- Lack of time
- Appropriate resources and methods
- Reliant on intuitive thinking based on existing working processes
- Diversification within the business
- Availability of expert knowledge

The feedback from Chiasma participants (particularly those from a non-design background) identified the need for information to take back to the business setting on how to further use design methods within their business context. There was a plethora of existing design-led innovation toolkits to support design thinking. The Design KIT prototype was developed to offer an open source approach to refining KE methods by encouraging peer review and collaboration throughout.

In order to facilitate and enable SMEs to continue carrying out these tasks outside of Chiasma, the "Design Knowledge Innovation Toolkit" - or Design KIT - was designed to support SMEs, designers, stakeholders and academics in the use of KE methods. Design KIT supported a 4-stage KE design process; 'Inspiration, Ideation, Conceptualisation and Refinement' and included a sample selection of existing KE methods which were being used by DiA. The methods used paper-based recipe cards and digital downloads available through an interactive HTML 5 interface / app. The digital interface was iteratively expanded, to enable SMEs to apply KE design methods to support innovation within their own practice.

The Design KIT provided a shared resource of KE methods that could be strategically applied by those from a non-design background including SMEs, academics, designers, stakeholders and those working in the public sector. They explained the requirements for use including an outline of the materials, skills and time required. The open source platform allowed for user feedback, peer review and shared experiences and encouraged the uploading of new individual methods shared with the wider KE and business community.

Design KIT was developed mid-way through the DiA project and was initially showcased at the AHRC Creative Economy Showcase in March 2014 before it was distributed at a workshop during the inaugural Scottish Design Summit and then at several DiA Chiasma. The feedback was positive. Concerns do remain as to how successfully businesses integrate these new tools into their existing practice. Further development needed to be undertaken.





Grant funded businesses

From the 78 original ideas created via the Chiasma process 17 were funded. The scale of the grant was up to £20,000. This funding was proportionate and enabling for the micro and small SME sector. All grants were awarded to businesses by a panel who scrutinised the bids for commercial potential.

Funding was staged and awarded against agreed criteria, setting the business achievement targets and ensuring progress.

Grants were awarded to the following projects (described in their own words):

78 ideas funded



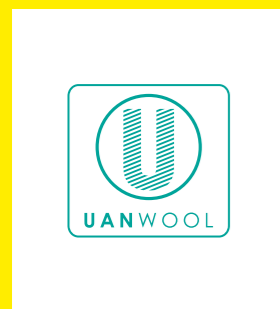
Beer52

A discovery club supporting small craft beer brewers. Beer52 delivers a monthly selection from the best independent microbreweries around the world.



T2U

A single platform for integrating the multitude of proprietary health monitoring hardware devices and software apps, specifically relating to Type 2 diabetes in the first instance.



Uan Wool

Design and manufactures high quality products which utilise wool as a 21st century super material. Initial products include cushions and pillows.



Know Sugar

Focused on raising awareness of Scotland's ticking health time bomb. The idea behind Know Sugar is simple; to make it easy for you to live a low sugar lifestyle.



Tappstory

An augmented reality app that is activated automatically when a mobile device (smartphone or tablet) touches a product label to reveal its provenance and authenticity.



The Shadow Books

An interactive game that layers a magical world over the scenery outdoors and transports the young person into an adventure-filled-land. "The Shadow Books" mix inside and outside play 8me.



ScrAPPbook

An app-based, community scrapbook that encourages anyone, anywhere to collaborate in the creation of a meaningful and durable 'snapshot in time' of a place or experience.



Tusi

A smartwatch chat app that features a unique keyboard interface that makes typing on tiny screens fast and simple. The interface will enable users to input text easily via smartwatch screens.



Kitchen Table

A community-based restaurant in areas affected by poverty, which encourages social interaction through healthy eating and affordable food in a well-designed setting.



Squidz

A rewards system for high quality social media interactions, designed to enable brands to achieve a more direct relationship with fans, and encourage high quality interactions on social media.



Stonesoop

A meal-sharing community founded on the principle that every interaction is better if it takes place around a table. By collaborating together we can make mealtimes memorable, meet new people and learn something new.



SEINCLLN

A fashion brand that creates balanced fashion collections using traditional design methods mixed with innovative technology. Supporting slow fashion and working with skilled artisans to create garments of exceptional quality.



TableFarm

Urban Farm Company has designed Table Farm, a smart, educational toy aimed at the pre-teen market. The toy gamifies growing plants through an app; encouraging children to learn about where food comes from.



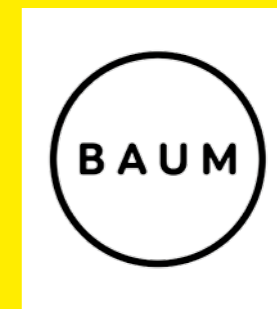
MuscleCake

A range of freshly baked nutritionally balanced protein rich sweet treats for the fitness market, delivered through your letterbox by subscription.



WoodWorks

An initiative that encourages young people (aged 16-25) to realise the potential of Scotland's woodlands and challenges them to create new products and processes using only natural and renewable resources.



Baum

A physics-based game with platformer aspects and reaction-based puzzles in a hand painted art style. Players use the power of the wind to carry a tiny droplet of water through the twisting branches of a great tree.

DiA has encouraged and supported the evolving businesses to be proactive in accessing other funding available, evidenced by the following successes:

Beer52, our first launched business, which looks to be entirely sustainable within the market and continues to grow. Its growth is exponential (70% y-o-y) and its programme of development continues to be successful and impressive. The business itself has been awarded several accolades including Start-up Business of the Year 2014 by Startups.co.uk and Forbes UK listed the founder, James Brown, as one of the Top 30 Entrepreneurs under 30 in 2014. The business also has its own in-house craft beer magazine, Ferment, which is stocked in a high-profile news retailer and major supermarket.

A Fox Wot I Drew, creators of Baum, launched globally in January 2016. Baum was featured in 122 App Stores worldwide and sold an impressive 7,000 copies in the first week! The team were nominated for a Develop Award for Best New Studio and won Scottish Young EDGE funding of £5,000 to develop Baum for Apple TV.

SEINCLLN was selected to showcase its menswear range at New Designers London and has recently launched (November 2016). The collection has received very positive press coverage in the Guardian and beyond and SEINCLLN won the Scotland Redesigned New Talent Menswear Award 2016.

Tapstory secured £40,000 of additional funding to further build out their technology platform and is running pilots with Totseat and Knockandoo to then lead onto securing commercial contracts with larger brands and products. They are in advanced negotiations with an Angel Investor group to secure a six figure investment.

Table Farm managed to secure an impressive number of academic and support partners to help their busy journey along with mentoring from Chris Van Der Kuyl (a prominent Scottish Entrepreneur/investor). We expect Table Farm to launch in 2017.

Woodworks launched its training programme and mobile app in April 2016. They have now helped a number of 16-25 year olds to start their own enterprises in the woods and are now seeking further funding/investment for sustainability.

The DiA grants were supported by a contract that gave access to the developing business by a researcher and allowed DiA to follow the process of progress with the business before and after launch. Voucher schemes have traditionally provided access to university knowledge and their value is typically £5,000 giving limited opportunity to solve a particular problem, gain expertise or acquire a new skill. DiA supported businesses to apply for these funds when a particular discrete problem was identified.

The £20,000 grant provided business with the opportunity to invest in itself and its future through expanding the knowledge of design and its processes, methods, models and tool kits. DiA supported the entire process of building a business, from ideation to business modelling, to launch, and then followed the progress as the business began the journey of establishing itself within the economy. DiA took the supported businesses on a journey to maximise their chance of success when entering the marketplace. Gaps in expertise or knowledge were identified and an appropriate academic then approached to help support a robust review of the business product, process or service.

Knowledge Disciplines Disciplines DiA engaged with:

Aeronautical Engineering	Law and Legal Services
Applied Health Research	Life Sciences
Applied Sciences	Linguistics
Biochemistry	Managements
Biology	Marketing
Business Studies	Materials Science
Chemistry	Mathematical Engineering and Mechatronics
Civil Engineering	Media and Computer Games
Clinical Exercise Physiology and Visualisation	Medical Physics
Computer Networks	Medical Science and Nutrition
Computer Science	Metabolic Medicine
Dentistry	Microbiology
Design	Migration and Ethnicity
Diabetic and Cardiovascular Medicine	Nano Science
Education and Social Research	Natural and Built Environment
Electronic and Electrical Engineering	Natural Sciences
Energy, Petroleum and Mineral Law and Policy	Nursing and Midwifery
Engineering (Medical Devices)	Nutrition and Dietetics
Engineering & Materials Science	Otolaryngology (Head and Neck Medicine)
Engineering & Physical Sciences	Philosophy
Enterprise, Innovation and Knowledge Transfer	Plant Biology
Entrepreneurship	Plant Molecular Physiology
Environmental Psychology	Primary Care and Rural Health
Environmental Sciences	Psychology
Environmental Sustainability	Public Health Nutrition
Exercise and Health Sciences	Rural Health and Wellbeing
Food and Nutrition	Rural Society
Food Chemistry and Human Nutrition	Science and Engineering
Food Development and Innovation	Semiconductor Physics
Forensic Human Identification	Social and Political Philosophy
Geochemistry	Social Research and Sustainability
Geography	Social Science
History	Sociology
Informatics	Sport and Exercise
International Relations	Sport Rehabilitation
	Sustainability
	Sustainable Rurality
	Synthetic Biology
	System Engineering

Jobs created by the DiA funded businesses:

Seamstress

Data Analyst Graphic

Chief Marketing Officer Designer

Telemarketer

Workshop Leader

Groovy on Rails Developer

Creative Backend Developer

Director Workshop Leader

Operations and Purchasing Manager

Digital Designer

Customer Care Manager Production

Social Media Expert Coordinator

Digital Content Creator

Business Development Manager

UX Web and Print Designer

Advancing the Development of the Businesses

The Hub's Business Partnership Team was the cornerstone of the relationship with the businesses. They built a very specific knowledge set geared entirely towards advancing the development of the businesses. The BPT, post-Chiasma, worked closely with those selected for grant funding, and established a set of metrics to be achieved by each business, supporting the businesses in achieving them. They mentored, sourced knowledge, advised on potential further funding, co-ordinated and facilitated focus group sessions, conducted pre-presentation sessions to build confidence when presenting to panels, and generally acted in a brokerage manner connecting and sourcing information.

The networks created were extensive and linked academics to business, business to business, business to funders/investors etc. Each business was initially met with initially weekly, moving to monthly, then bi-monthly. This was reciprocated, with those businesses successfully in the marketplace, taking the time and trouble to report back into DiA with some even using the DiA website to advertise for specific expertise, jobs, users and participants.

The BPMs also actively paired businesses with market opportunities. Examples include:

- Helping with the soft launch of UAN at the Scottish Highland Show at Ingliston, assisting in the planning of PR, branding and sales message
- Introducing A Fox Wot I Drew (BAUM) to Apple who then worked within the university environment to meet all the requirements specified by Apple including the localisation of the game in a number of languages. BAUM is now being developed according to the new requirements for Apple TV. The director of A Fox Wot I Drew was coached prior to presenting for a successful Scottish Young Edge award of £5,000
- Know Sugar Shop - securing the space in the Wellgate shopping centre in Dundee that the enterprise, with the university's backing, was able to leverage using the university's public liability insurance for the prototype phase, which would ordinarily be too costly for the business
- Introducing the Shadow Books team to DC Thomson to pitch the idea for investment
- Scoping and securing a space for the Kitchen Table prototype to take place
- Table Farm introductions including to CENSIS Innovation Centre, who helped with the technology of the product and developing contacts at various academic institutions for specialist knowledge
- Introducing SEINCLLN to a well-known fashion PR expert who is now working closely with the business for a global launch
- Introduction of Tappstory to an Angel Investors group with whom they are now in advanced negotiations.

Showcases enabled the businesses to access new clients and test their products in the public domain across Scotland and the UK. All DiA businesses were regularly provided with this opportunity. These included the AHRC Creative Economy Showcase London (Mar 2014), The Lighthouse in Glasgow (Dec 2014), the Dundee UNESCO City of Design official launch (Jan 2015), Innovate UK Conference, London (Nov 2015), Design Summits Dundee and Edinburgh (May 2014 - 2015) and throughout the Dundee Design Festival (May 2016).

“**Innovate 2015 was a great chance to hear from experts, meet peers and potential investors alike. The support from Design in Action provided us with the unique opportunity to showcase ourselves amongst bright sparks and kick starts.**”

Crispin, TappStory

“**The event was a great opportunity for us to showcase our unique user interface for typing on smartwatch screens. We are seeking partners and investors and had a lot of interest from people potentially fitting both categories, as well as a lot of feedback on our app. We're following up on this now.**”

Dr Tim Willis, Tusi

All the businesses were supported with how they develop and make a pitch to external organisations. In fact, the DiA Chiasma funding process provided a number of opportunities to practise their pitching both during the Chiasma event itself and post Chiasma when some were asked to pitch to our panel for funding. The Business Partnership Team supported the businesses in the writing of numerous funding applications and the businesses raised over £1.1 million of additional funding.



£1,121,000
OF ADDITIONAL
FUNDING RAISED
BY THE PROJECTS

DiA sought to evidence and advocate for the adoption of design as a strategic development opportunity for the Scottish economy. Contributions were made by:

- Sebastian Conran (Sebastian Conran Associates)
- Josephine Rydberg-Dumont (Former IKEA CEO, design strategist and consultant)
- Ian Callum (Jaguar)
- Alexandra Deschamps-Sonsino (Designswarm)
- Wayne Hemingway (Hemingway design)
- Katharine Hamnett (Fashion Designer)
- John Thackara (Author, Doors of Perception)
- Deyan Sudjic (Director, Design Museum)
- Alice Rawsthorn (Author)

DiA saw partnership as an important element of the work and built upon these to deliver and capture different audience including: the V&A Museum of Design Dundee (Callum, Rawsthorn) and each lecture was given to an audience of several hundred members of the public. One of the most diverse – and largest – audiences was for Ian Callum, which was attended by many father and sons, something we had not witnessed at previous events. Creative Clyde on a public panel session chaired by Deputy Director DiA, ‘Designing the Commonwealth Games’ featuring: Artem, IC MobileLab, ISO Design, Graphical House and 4c Design. Leisure and Culture Dundee, a round table to celebrate Dundee’s UNESCO City of Design status, with a panel including Deyan Sudjic, (writer, broadcaster and director of the Design Museum), Laura Aalto, (Communications Director, Design Driven City, Helsinki), Gillian Easson (Creative Dundee) and Philip Long (Director of the V&A Design Museum, Dundee).

Design in Action showcased its design-led businesses at the UNESCO City of Design Launch, which was opened by the Cabinet Secretary for Culture and External Affairs, Fiona Hyslop. UKNC’s Andrea Blick gave a speech on behalf of UNESCO and the UKNC at the launch, passing on a number of congratulatory messages received from the global Creative Cities network. She emphasised the value of the internationalism the designation represents, and the collaborative opportunities afforded through membership. Stewart Murdoch, Leisure and Culture Dundee shared his hopes for the UNESCO designation, ‘Our vision is simple – to use design to improve people’s lives’.

Scottish Design Summit

In 2014 and 2015, DiA hosted two Design Summits, these events that were focused on showcasing international excellence in design in business to exemplify how using design has developed, influenced and successfully advanced businesses. A showcase of DiAs businesses at the summits gave them important exposure to new audiences allowing them to demonstrate and discuss their ideas.

The 2015 Design Summit - hosted by Kate Russell, BBC technology writer & broadcaster - was addressed on the support for the design economy and the value accrued to business by Fiona Hyslop MSP, Cabinet Secretary for Culture and External Affairs in the Scottish Government. The event attracted 224 attendees.

Other contributory speakers in business and industry included senior representatives from Rolls Royce, Spotify, Diageo, Harris Tweed as well as science fiction writer Madeline Ashby, Design Council CEO John Mathers, artist and designer Jason Bruges, Frog Design Creative Director David Cleaves, ROLI CEO Roland Lamb and Sebastian Conran.

In 2016, DiA helped launch A Fox Wot I Drew’s iOS game ‘BAUM’ (January) to an audience of policymakers and school children with an event focused on creative business skills aligned to design. In 2016 DiA collaborated with the Intellectual Property Office (April) to produce a workshop for creative companies around IP frameworks.

DIA Events	No. of attendees
Launch Events: Glasgow, Edinburgh, Aberdeen, Dundee (Wayne Hemingway)	374
Alice Rawsthorn	300
Ian Callum Lecture	268
UNESCO How Design Can Change A City	263
Katharine Hamnett	257
Deyan Sudjic	250
Design Summit 2015	224
John Thackara Talk: Creativity and Innovation: Making a Difference	201
Baum Launch	200
John Thackara Lecture	193
Josephine Rydberg-Dumont Lecture	186
Design Summit 2014	180
Design Revolution (co-hosted with UNESCO and V&A)	150
Alexandra Deschamps-Sonsino	117
Rural Stimulation	115
Impact by Design - In collaboration with Graphic Design Festival Scotland - Glasgow	100
New Business Showcase	94
Design in Action Showcase (Scottish Parliament) - Edinburgh	91
Designing The Commonwealth Games	73
Restarting Britain 2	60
Sebastian Conran Industry Workshop	37
IPO Digital Creative IP Workshop	29
TOTAL	3762
Sponsorship of monthly Edinburgh Creative Mornings (Dec 14 - Jun15)	200+
Sponsorship of Global Service Jam events (Dundee, Glasgow, Aberdeen)	100+



“

In 2014 and 2015, DiA hosted two Design Summits, these events that were focused on showcasing international excellence in design in business to exemplify how using design has developed, influenced and successfully advanced businesses.

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Collaborative Intellectual Property

Intellectual Property Rights in Collaborative Settings

DiA was founded on the concept of a co-creation innovation model for knowledge exchange and business development. Early development work quickly raised questions of intellectual property rights in collaborative settings. The Director and Deputy Director consulted with many businesses as the concept was fleshed out and concerns over IP were perceived by business people as a significant barrier to participation. Questions raised were: What about the IP my business/I already hold? Will others steal my IP in a collaborative space? Will participants hold back their knowledge? Who will own the resultant IP? What if the team I am in splits apart after new ideas are produced? Who will have the chance to exploit the concepts in the marketplace then? It was clear that a comprehensive IP policy was required before the innovation events began, to establish a stable and fertile basis for multi-partner co-creation.

Policy Evolution

Throughout the development process the core team conceptualised the IP policy as a means of governing incentives to:

- Apply
- Co-create
- Commercialise

All of this underpinned the need to create confidence and parity of opportunity within our processes, enabling concerns to be answered clearly and with authority. The development work was crystallised in AHRC supported workshops led by Martin Brassell of Inngot IP, based on the underpinning philosophy of incentivised co-creation supported by a number of tools:

- Contracts – for participants, observers and the institutions involved
- Communication – a core visual representation of the IP process
- Core script for staff to answer key questions and display confidence in DiA process.

The IP Shelter concept was initially drawn from the annual 'Dare to Be Digital' video games competition at the University of Abertay, which brought together students from many countries to create new games concepts and prototypes. Similarly to DiA, participants were often working together for the first time. The University of Abertay takes legal ownership of the concepts to ensure team conflict is reduced.

The concept evolved by DiA was developed into a full life IP capture, bidding, licensing and assignation approach.

This allowed DiA to address and incentivise collaborative practices and build a model that underpinned its' work:

- Security provided to applicants on the status of their background and foreground IP and the value that might be obtained from being part of the process
- Co-creation had a clear governing structure, participants understood their role within process and the method for conflict resolution
- Equity and parity was established where participants and their concepts would be judged on potential commercialisation

At its core, the IP Shelter worked because the University was a public good with a reputation for service, permanence and probity. The University had scale and structures that enabled it to defend its market position, and thus act on behalf of the business community, however they were never called to take action. It appears that the presence of the university as the IP holder was sufficient, to act as a deterrent. This innovative use of a publicly funded institution acting as a trusted intermediary to correct for market failure in the private sphere held enormous potential as the future role of HEIs in the innovation sphere continued to evolve.

The DiA approach was not without critics especially from sectors favouring an open source approach to innovation such as ICT developers. DiA was clear that the approach is not a catch-all solution to co-creation or collaborative innovation. It will not work for everyone and that is implicit in the conceptual framework of governed incentives. The project outputs indicate that the IP Shelter was met with conspicuous success for those who have chosen to participate.



New Business Models

The establishment and development of DiA threw up some misconceptions at an early stage, including:

- Take up
- Capacity
- Processes beyond the conceptualisation of an idea
- Business models

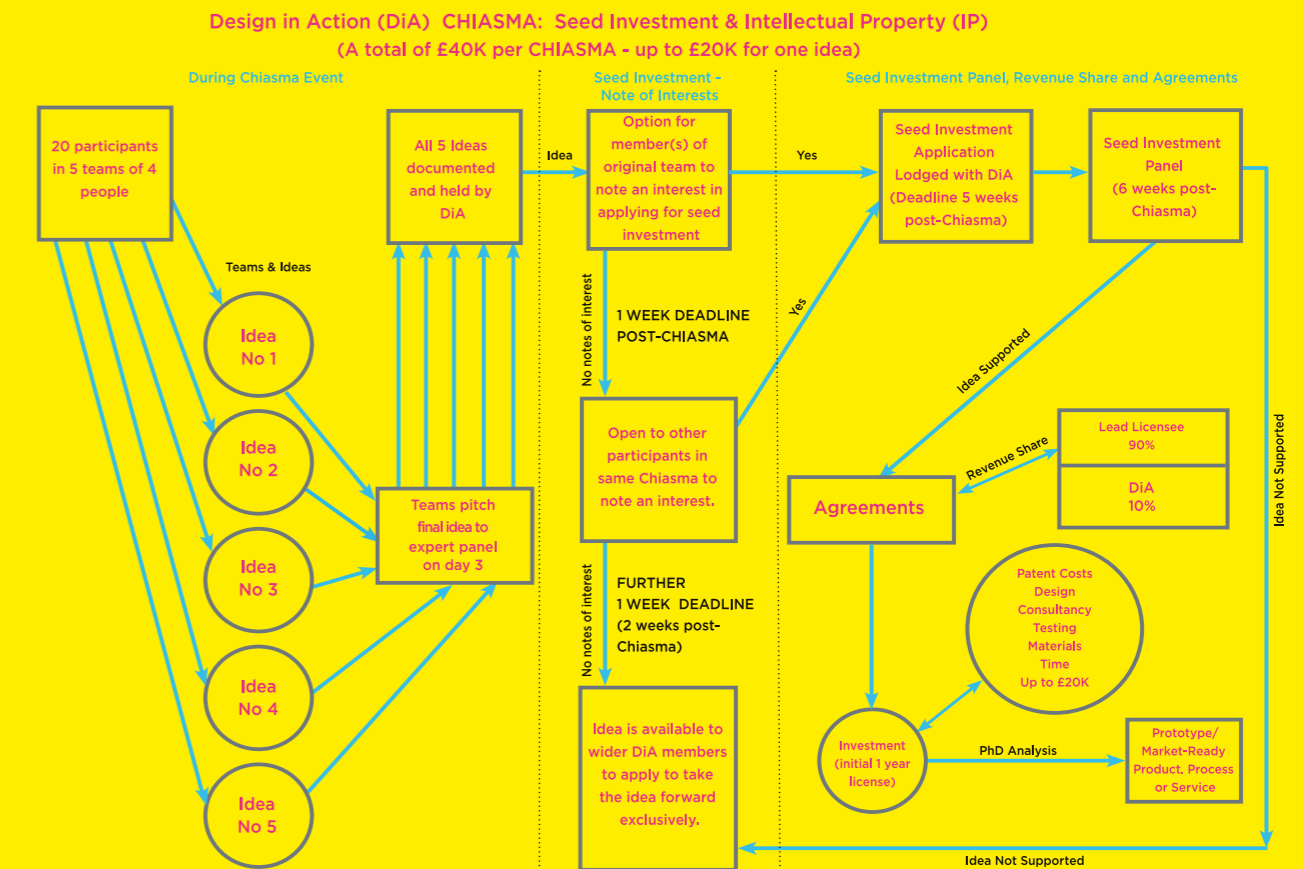
It became very evident, as DiA progressed that we only had half a process model and needed to build an entire pipeline. The scoping and ideation model were constantly evolving and were operating very effectively however the process from ideation to business required further development as the existing frameworks for this were based on lean start-up exploitation models such as: incubators, accelerators, Business Gateway, Cultural Enterprise Office and others advocate, hitting the market hard with a product, and do so until the market dries up before going out of business. An approach to effectively bridge this gap was needed and many great ideas were not emerging successfully into the marketplace. A refined process needed to be built to ensure that the rich potential was enabled to transform

itself into economically viable businesses. This would have the benefit of enabling growth and sustainability, achieving longevity. The internet as a business tool has disrupted existing 'safe' business practices and new economic models are emerging, particularly in less established economies such as India, Mexico, Africa, as well as in the USA and UK.

The pipeline created new business models all of which had to move from a push economy to a pull economy, by repositioning the consumer as a key player within the business model through purposefully broken pipe- lines. These built the needs of the local economy, supported local economic growth, gave access to knowledge and expertise, and built value chains. Interestingly, many of the models were about the local economy with the overarching business operating globally.

The pipeline was established based on core features including the IP model, co-creation process, grant funding and building a sustainable business, it allowed for variations from the generic model and was a flexible method applicable to a variety of different contexts.

Design in Action IP Flowchart



For further reading please refer to:
 Berthold, H., Chillias, S. and Townley, B., Business Innovation and Disruption by Design.
 Burns, Cottam, Vanstone and Winhall, 2006, p.18-19.
 Hanington and Martin, 2012; Sanders and Stappers, 2014.
 Speed, C. and Maxwell, D., Designing through value constellations.
 Woods, M., Marra, M. and Coulson, S. (2015). Design in Action Knowledge Exchange Process Model: Design-led Knowledge Exchange for Business Innovation.
 Coulson, S. and Woods, M. (2016). Scoping: Exploring a collective R&D process for entrepreneurs, micro enterprises and SMEs. Proceedings in the 2016 (in review).
 Jack, L. & Coulson, S. 'Design in Action Knowledge Exchange Hub.' Presentation at the James Hutton Institute, Invergowrie on May 5th 2016.
 Berthold, H. and Townley, B., For what it's worth: Explorations into early-stage IP.

Impact on Universities and Academic Development

Next generation Academics

KE between Multi-Disciplinary Researchers and the Creative Economy

Matching the capacity of Scotland's universities with business had been a Scottish Government priority for over a decade yet this ambition was not fully realised. Expertise was sourced from across the university sector matching knowledge and expertise with identified need. DiA specifically tasked itself to understand what design knowledge was needed, how it would be used and the value of different knowledge sets within business development. Complexity and managing complexity was a major issue facing all of the newly funded businesses therefore DiA did not restrict its engagement to disciplines within the Arts and Humanities, engaging with knowledge domains appropriate to need.

The chart below identifies the discipline sectors engaged with DiA, by research council. They span the spectrum of UK research councils, indicating that the creation of new business is complex and no longer silo focused. The diversity of need indicates strongly that the only potential supplier of knowledge that could facilitate this is the university sector. It takes specialist knowledge to identify exactly the specialism with which a business needs to engage, and then to locate an individual willing to engage with the business. It should be noted that academics received no payment, they simply gave their knowledge willingly, when it became obvious that a sustained engagement was necessary.

DiA worked across the following disciplines within the academy (see table below). Further research needs to be conducted into the process of building a business, to understand the nature of the construction, the input from the different specialisms and their individual role in the formation of the proposition, and whether this forms a pattern.

Inter-Institutional Collaboration

The partnership, particularly between the 4 Scottish Colleges of Art and Design, has been very fruitful and strengthened previously fragile channels of communication and collaboration. Working together, as commented on by a colleague, removed the 'antagonistic relationship', replacing it with trust, partnership and collaboration.

Knowledge generating commercial value

DiA purposefully positioned design, to test its ability to operate as a ubiquitous engine for innovation, renewing design's locus as a core tenet and strategy for business practice. Benefits varied in scale; one of the most vital aspects was the academy working externally in a business context, repositioning knowledge to generate commercial value, building the academy into a gateway for all business sectors enabling their navigation of the multi-platforms within and external to the academy, as a productive exercise (expertise, funding, network's). Opening the doors to knowledge not just to those wishing to learn, but to those who wish to apply knowledge to a business opportunity.

Academics had the rare opportunity to position their research externally, using their research processes and skills to understand the different contexts and imperatives for primary knowledge within the Micro and SME communities. The business partners had in general either no experience of working with Higher Education partners or had previously engaged with fellow businesses. The value of the hub was apparent in the opening and validation of the research 'scoping' process, facilitating open dialogues across sectors, which enabled engagement with organisations who would have otherwise been leery of holding forthright conversations concerning the state of their sector. It also highlighted the imperative for new knowledge and change within individual researchers as well as the Hub's own infrastructure.

Knowledge Disciplines - academics who have engaged with DiA

Discipline (by research council)	AHRC	BBSRC	EPSRC	MRC	ESRC	NERC	Total
No. of academics	298	38	88	23	79	14	540
% of academics	55.2%	7.0%	16.3%	4.3%	14.6%	2.6%	100%



“The partnership, particularly between the 4 Scottish Colleges of Art and Design, has been very fruitful and strengthened previously fragile channels of communication and collaboration. Working together, as commented on by a colleague, removed the ‘antagonistic relationship’, replacing it with trust, partnership and collaboration.”

New Markets

DiA took the risk to enter entirely new fields of knowledge, ones that none of the partners had had experience of before, it did this to test the theory of the value of design as a strategy for economic growth. Entering these fields (ICT, Rural Economies, Sport, Food and Wellbeing), enabled a fresh approach, without precedent and prejudice, and opened up new networks, forming new conversations within a sector and framing a sectoral question identified through dialogues.

New Fields of Research and Knowledge

New fields of research and knowledge were generated in a variety of areas including the circular economy, block chains, cryptocurrencies, food and wellbeing. These were proven to be the most fruitful in terms of future grant success:

Aberdeen - focussed on H2020 and the food sector; having held pan European meetings the aim was to consolidate them into H2020 funded bids. An application around the food sector was in progress with the Newton Fund - a UK Government initiative funded by the Department of Business, Innovation and Skills - together with Turkey (building on the links established with colleague Professor Özlem Er following her presentation at the DiA Business Summit in 2015) and other partner funders from around the world. The specific call the RGU - DiA Hub proposal responded to was the Research Links: Workshop Call, which covered a number of challenges including: Food and Nutrition and Food Security. Title of the Proposal: 'Design Entrepreneurship -Why Creatives Need to Become Entrepreneurs for Economic Growth and International Competitiveness' (£35-45K).

Dundee (via DiA Co-I Woods) - built several working partnerships with European partners. GROW, under Dundee - Design in Action, is listed in the related projects in the H2020 application, and discussed in organisation profile for Dundee. Participatory design as well as financial instrument was learnt from DiA and applied into GROW campaigns. This was underpinned by Design and key direction setting and contacts were forged through conversations at scoping as well as coming from Chiasma (Dundee secured £699,021 of the total grant which was £3,999,858.66). That being said, the withdrawal of the Co-creation H2020 portfolio bid (Woods: EUR 5,777,597.5) for technical reasons until autumn 2016 was costly with the requirement to reframe and rewrite the bid having serious consequences on the Hub. The development of the circular economy as a platform for Masters provision and engagement with second order science was building a dynamic that will deliver future grant funding.

Edinburgh - developed both RCUK grants as follows: EPSRC Digital Economy Ox-Chain Ref: EP/N028198/1. Total value: £1,238,245; EPSRC Digital Economy PACTMAN Ref: EP/N028228/1. Total value: £1,262,703. Edinburgh: £302,175.00. EPSRC Digital Economy Cyber Security of the Internet of Things. Ref: EP/N02334X/1. Total value: £4,559,841. Edinburgh £247,000. ESRC After Money, £250k ESRC Ref: ES/N007018/1.

Glasgow - The Institute of Design Innovation at the Glasgow School of Art developed new fields of research in the context of health and wellbeing with a specific focus on age related issues and the role design can play in healthy ageing. This was in addition to new research agendas regarding the role of design in knowledge exchange between HEI's professionals and practitioners in public health and policy contexts.

The very first Chiasma, held in Glasgow in February 2013, addressed the wellbeing sector and focused on the topic of 'Type 2 diabetes'; the second, 'Living Well' was delivered in June 2014 and the third; 'Surviving and Thriving' was delivered in November 2015 in partnership with Northumbria University, with a focus on health self-management, at the Northern Design Centre in Gateshead. This led to the development of a paper with InDI colleagues accepted for DRS as well as an accepted submission for DMI and for an ESRC-funded knowledge co-production conference in Sheffield. It was the intention to develop these conference papers as journal submissions. Champion, the DiA Research Fellow carried out empirical work regarding the value of design in Scottish SMEs and micro-businesses using DiA participants.

St Andrews - The research team at St Andrews (School of Management) focused on the role of design in stimulating new business ventures. The research drew on management and organizational literatures in relation to business models, entrepreneurship and innovation. These areas of interest were shared in, and contributed to, the School's Creative Industries and Knowledge and Practice thematic groups. Key learning points that consolidate existing knowledge and stimulate new avenues for research with colleagues in the School and in the wider community related to the value of interdisciplinary research with reference to knowledge and practice, and the pragmatics of business start-ups in creative industries.

As a result of participation in the Design in Action KE Hub researchers and academics in the School of Arts, Media and Computer Games with Abertay University developed and implemented new approaches to knowledge exchange with professionals and commercial organisations across an increasingly diverse range of sectors. By adopting ideation and co-design techniques similar to the projects 'Chiasma' to engage non-digital/design organisations with design-led approaches to the development of digital solutions the school saw an increase in Research & Development and Knowledge Exchange activity of this nature over the duration of the project.



Research Grants and Further Funding

EPSRC Digital Economy Cyber Security of the Internet of Things (Edinburgh)	£4,559,841
H2020 GROW (Dundee)	£3,999,858
EPSRC Digital Economy PACTMAN (Edinburgh)	£1,262,703
EPSRC TIPS: Ox-Chain that explores the potential for DLTs within Oxfam (Edinburgh)	£1,238,245
ESRC After Money (Edinburgh)	£250,000
CREATE (St Andrews)	£245,060
Scottish Insight Institute (GSA)	£18,000
Goldsmiths (Dundee)	£15,000
AHRC Design Kit (Dundee)	£10,000
AHRC/Creative Scotland (GSA)	£10,000
AHRC Innovate Conference Showcase (Dundee)	£7,500
Total	£11,616,207

Career Development of Young Researchers

Career development of young researchers (PDRAs) was a major achievement of DiA and we witnessed their growth and movement into secure tenured academic posts which increased our networks and built real collegiality within the wider project team, who are still in contact with each other. The PhDs were also moving forward upon completion, and we have, where possible, retained their input into the project through RA or PDRA posts, this was enabled by the movement of the PDRA group. One PhD won an RSE fellowship and was building a knowledge based business. The Co-I group also changed substantially, with academics moving posts, enabling new expertise to be sourced and increasing the wealth of knowledge that DiA was privileged to have access to. The PDRAs were second supervisors to the two PhDs in each institution. A bespoke certificated training programme was arranged and delivered prior to any supervisory activities.

The PDRAs were tasked with establishing the Chiasma model and were internally supported through discussion, exemplars, papers and mentoring from the Director and Deputy Director. Additionally, external consultation was supported by Frank Boyd (1 day) Director of the KTN, who facilitated a discussion and talked through models in existence, their construction method and the outcomes. Know Innovation (3 days), a private consultancy, who developed EPSRC sandpit method, discussed the response to innovation by business and the different approach required from that of an academic process. Sebastian Conran (1 day) identified the business community requirements and the type of response that would be generated. This enabled the PDRA as a group to explore co-creation first hand, experience other models, construct an analysis, gain essential analytical skills and evaluate best practice. It also exposed them to working in three different contexts; the public sector, private sector and SME.

The PDRAs were tasked by their Co-Is to make the initial searches and contacts with the agencies, organisations, individuals and businesses within their allocated sector, to establish and build a network that would facilitate the scoping process.

Delivery of Chiasma was initially through external experienced facilitators. The PDRAs acted in a support role undertaking research in real time throughout the process. This helped them to understand how the model they had articulated functioned in action, its weaknesses, strengths and opportunities for improvement, including the evaluations from the attendees. This refined and enabled the iterative building of both the delivery process and the model. Chiasma was a process that facilitated ideation for commercial value, so the experience of building, testing and refining the process delivered the academic entrepreneur.

The PDRAs were tasked by their Co-Is to make the initial searches and contacts with the agencies, organisations, individuals and businesses within their allocated sector, to establish and build a network that would facilitate the scoping process. They spoke or met with all key external organisations and built relationships to help identify potential market opportunities within their sector. These experiences provided a real experience of the needs and requirements operating within a commercially imperative environment. The PDRAs had to be speculative and future focused to understand the market and the potential key opportunities in order for DiA to construct a call that was supportive of the sector and business.

Conference Presentations

DiA facilitated conference attendance, initially to witness others presenting and enable the establishment of a professional approach to the PDRA and PHD presentations. All the PDRAs received mentoring from the Co-Is on construction and delivery of papers. DiA established an internal agreement that no name could be attached to any paper unless there was a tangible contribution of over 20%, the rationale was to establish each member of the team as researchers within their own right, irrespective of academic standing. All PhDs were provided feedback on their papers given advice and support to enable a clear articulation of their research.

All the PDRAs were supported in the writing of grant proposals to build their confidence in making applications. There was an allowance of 6 hours per week to enable individuals, to take on a day a week teaching, many individuals initially took advantage of the opportunity and these roles expanded into assessments, tutorials and examination duties, which meant that the timeframes also expanded.

PhD Engagement with Business

All the PhDs were engaged with the businesses in one form or another. None acted as designers - our policy was to always engage with the design profession for design services - but all were engaged in undertaking research on the process or evolving business from the work of DiA.



Career development of young researchers (PDRAs) was a major achievement of DiA and we witnessed their growth and movement into secure tenured academic posts which increased our networks and built real collegiality within the wider project team, who are still in contact with each other.



Wider Impact on the Creative Economy

The Director and Deputy Director of Design in Action represented the University of Dundee on the steering group which built the strategies for the UK City of Culture 2017 bid. Dundee was one of four cities shortlisted. DiA focused on strategies available to the bid and existing and future design attributes, helped to reform the city partnerships and gave voice to the next generation of designers, including independent producers and business people from the design community. These lived values of design transformed the outputs of the group and had huge ripple effects in the way city business is done.

A debate was held in the Scottish Parliament, given cross-party support and led by Fiona Hyslop, Culture Minister, wishing the city every success in its bid but Dundee was, sadly, unsuccessful in achieving City of Culture Status (ultimately missing out to Hull). The collaboration built a considerable dynamic and appetite for raising the profile of Dundee with the partnership going on to successfully deliver for Dundee the designation of UNESCO City of Design.

Dundee hosted its first Design festival in May, 2016. 'Design Revolution: Innovative Cities and Business' was a day of design and industry talks and workshops, run in partnership with the V&A Museum of Design Dundee and UNESCO City of Design (who invited speakers from Shenzhen, Helsinki, Graz and St Etienne to discuss their City of Design status) under the Dundee Design Festival banner.

This festival was the 2016 flagship event for Dundee's membership of the UNESCO Creative Cities Network as an international city of design. This designation was won following significant intellectual contributions, time and guidance from the DiA directorate. 'Design Revolution', a natural progression from DiA's previous Design Summits in 2014 and 2015, brought together representatives from the UNESCO global network of cities to showcase and discuss best practice around design economies and the strategic application of design approaches to business growth. The event was attended by a range of policy makers, non-government organisations and academics from a global audience with some ten countries represented. The UNESCO cities of Design have subsequently come together to make a collaborative bid to the co-creation call for EU funding.

V&A Museum of Design, Dundee (VADD)

The University is one of the founding partners and led the project until the appointment of a full-time Director in July 2011, conceived as a "centre for design for the 21st century," to establish for Scotland an infrastructure to give visibility to design and designers, as part of the creative economy. The aim was to showcase design's values both economically and on society, a collaborative agreement was developed to cement the partnership, part of which contained an agreement to deliver "Design-Led Business Innovation (DLBI)", which will be permanently situated within VADD, in partnership with the university and Scottish Enterprise, to give a visible core of design as a driver of economic value.



Chiasma Original Ideas Generated: not just the traditional creative industries



Impact in the Public Policy Domain

Design in Action sought to make positive change in the public policy environment through audience-appropriate articulation of research. DiA also sought to play a mixed public role in design advocacy, being a sounding board for the design industry and constructive critic in the development of the creative economy policy space. This work was undertaken through a wide-ranging events programme, media contributions, and responses to parliamentary enquiries. The thematic area covered by this work was wide. The following was an attempt to draw broad thematic groupings around this activity:

Design in Action submitted written evidence to the Scottish Affairs Committee enquiry on the creative industries in Scotland. The final report of this enquiry was published in January 2016. This followed on from a similar enquiry held by the Scottish Parliament's Economy, energy and Tourism Committee into the economic impact of the creative industries. DiA submitted written evidence and was called to give oral evidence as part of a roundtable with industry and academic leaders. The final report was published in March 2016.

The economic role of design is closely related to the societal role of the design industry and more broadly the applicability of design approaches to the production of public goods and the processes and outcomes of public service reform. Although this arena is not the core concern of the DiA research, the work of

the project frequently touched on these agendas and we sought to contribute knowledge where possible, not least where it might help to stimulate demand for the design sector in Scotland for the services it provides.

This work began when DiA hosted a roundtable policy discussion on the Design Commission's 'Restarting Britain 2 - Design and Public Services' report in the Scottish Parliament in June 2013. This brought together Scottish Government civil servants, design companies and service providers along with DiA academics to consider the implications of the report's analysis for Scottish public service reform. The roundtable was followed by a panel discussion with a public audience and was hosted by Jenny Marra MSP (Labour) and Richard Lyle MSP (SNP).

More recently, in December 2015, Jenny Marra MSP hosted a public roundtable discussion following a DiA presentation on our design innovation model in the Scottish Parliament in December 2015. The discussion covered the broad applicability of design innovation methods across a variety of governmental portfolios, societal needs and detailed necessary change in HEI approaches to innovation work around mobilising tacit and latent knowledge. This was followed by a Business Showcase of DiA pipeline businesses in the Garden Lobby of the Scottish Parliament. The event was attended by over 150 invited guests from the policy community along with ten individual MSPs. The event was hosted and addressed by Michael Russell MSP, with support from Ben Gray of DC Thomson.

Design Values, Papers and Publications

DiA will continue to produce papers based on its work. It has a number currently pending publication, two books in discussion with publishers, and further journal and conference papers, some 80 research outputs will emerge from DiA.

Designers had the opportunity to engage in new dialogues, look at new issues and use the unseen knowledge of the designer. Within the team's remit was facilitation and enabling of open innovation, bringing insight into the value of co-creation, the consumer, communication and visualisation. This opportunity introduced design to new sector businesses, and introduced designers to new business opportunities moving from the creative industries to the creative economy.

Co-creation was the most widely adopted research process used as a business tool. It formed the basis of the ideation process and was then transformed within the businesses to build trust with their customers. Its appeal is that it brings to the problem many different lenses that allow for divergent thinking and therefore has an element of change inherent within it. Co-creation has been used both within the business and, interestingly, it is being expanded and extended into a business process where the customer is becoming involved in the evolution of the business itself. This practice ensures that the customers build loyalty to a brand/individual/product, enabling the business to use the skills available within its team and giving value and parity to knowledge supportive of individual engagement.



TAC (Technology Accelerator Chiasma)

Funded by the Intellectual Property Office via the University of Dundee's Research and Innovation Services team, this was to understand the commercial potential of science locked within academia. Two awards were supported with one - Tusi - formally taken up by Nautilus Beam led by a recent doctoral student who sought to commercialise the value within his PhD. The other the academic team declined the award offered. This team was led by more senior academics, which had a bearing on the outcome. The second team were unwilling to make a career shift and the knowledge remains locked within the academy. The model ran over an extended timeframe with design as core, delivered on 2 single days with a two-week gap between them. This was to enable a wide range of take-up and allow further time for the designers to develop the idea within the two-week hiatus (when the academic participants returned to their teaching and research responsibilities). The model appears best suited to early career academics, given a single experience, and it would be worth extending this approach to the HE sector.

Contracts for SMEs

DiA built within the university a set of contracts for small and micro SMEs, which are now available to the university going forward. It's not the contracts per se that have had the impact, it's been working within a sector that they have not really entered before that they have seen that there is a need and potentially a new vehicle for future research and an investment framework (DiA takes a share in each business launched). It's a completely different way of working, one that had not been tested before.



For further reading please refer to:

Follett, G. and Rogers, J. 2016, Articulating Co-Creation for Economic and Cultural Value
 Gulari, N. and Fremantle, C., Are design-led innovation approaches applicable to SMEs?
 Woods, M., Marra, M., Coulson, S. and Nevay, S. Designing Knowledge Exchange: How Scottish HE and Businesses Can Innovate Together.
 Kearney, G. and McHattie, L. 2014, Supporting the open innovation process in small and medium enterprises
 Follett, G. and Rogers, J. 2015, Identifying an Arts and Humanities Business Model
 McHattie, L.; Prior, S. and Ballie, J. 'Developing a Scoping Framework, VI2'
 Follett, G., Rogers, J., Gomez, L. and Shorter, E. 2016, Identifying an Arts and Humanities Business Model and Practice





Case Studies Foreword

by Sebastian Conran,
Chair of Design in Action Steering Group 2012 - 2016



It has been a singular privilege to chair the Design in Action steering group over the last four years but it has also been hugely enjoyable to work with the Design in Action community and see it flourish. I have gained valuable insights from the many stakeholders and I trust that the feeling is mutual.

Coming from a mainly commercial innovation background it has been really refreshing working with creative thinking academics who often have completely different perspectives and agendas. But this is of course why we are all here as a team: to unlock the IP and talent in a creative Scotland and empower it to become the engine of success of so many ingenious and innovative enterprises.

The obvious success of the Chiasma innovation support system needs to be advertised, recognised and valued not just in Scotland, but throughout the UK. We need to remember that every business, however large, originally started small and is often the legacy of a seed of creative thought that grew to become a successful idea-driven business. Design in Action has encouraged and supported entrepreneurs both young and old to grow their own ideas into businesses. The project has demonstrated that that approach can create productive jobs in the exciting new economy that is resulting from the digital revolution.

Not all these enterprises will on the face of it seem to have a direct relationship with technology - my Shetland wool UAN pillows for instance - but they are all taking advantage of the opportunities that modern communications and emerging attitudes provide, as old models of industry and retailing painfully and irrevocably change. Innovative new business models will need to flourish in the ingenious minds of entrepreneurs. And these will need nurtured with a fertile and stimulating environment, if not by Chiasma then something else like it all over Scotland and the UK, built on the imaginative research and experiences we have learned over the recent years.

The following case studies reflect some of Design in Action's innovation success in business and research.



Case Study

Beer52

A multi-million pound business with Design at the Heart

By Brian McNicoll DiA



Projected turnover of **£41m** by 2019



The idea behind Beer52 is a simple one. For £24 a month customers are sent a mixed case of eight craft beers, from independent microbreweries. As well as providing the consumer with something new, this is a service that really helps the small brewers who struggle to get their name out. There are over a thousand microbreweries in the UK, who, despite having a world-class product, often produce only on a very small scale, and sell only locally. They don't have the marketing budget to compete with the major brands, or to get onto the shelves of the big supermarkets. But this way, they don't have to.

The model for Beer52 and its founder James Brown was fully-established during the 2013 Food Chiasma in Elgin that was focused on the artisan food and drink sector in Scotland, and the question of how design could be used to help it grow, without losing the unique nature of the produce that was being sold. The event brought entrepreneurs together with designers, academics and food producers, to collaborate and develop innovative ideas. Beer52 received £20,000 of grant funding to help with the process of commercialising the idea.

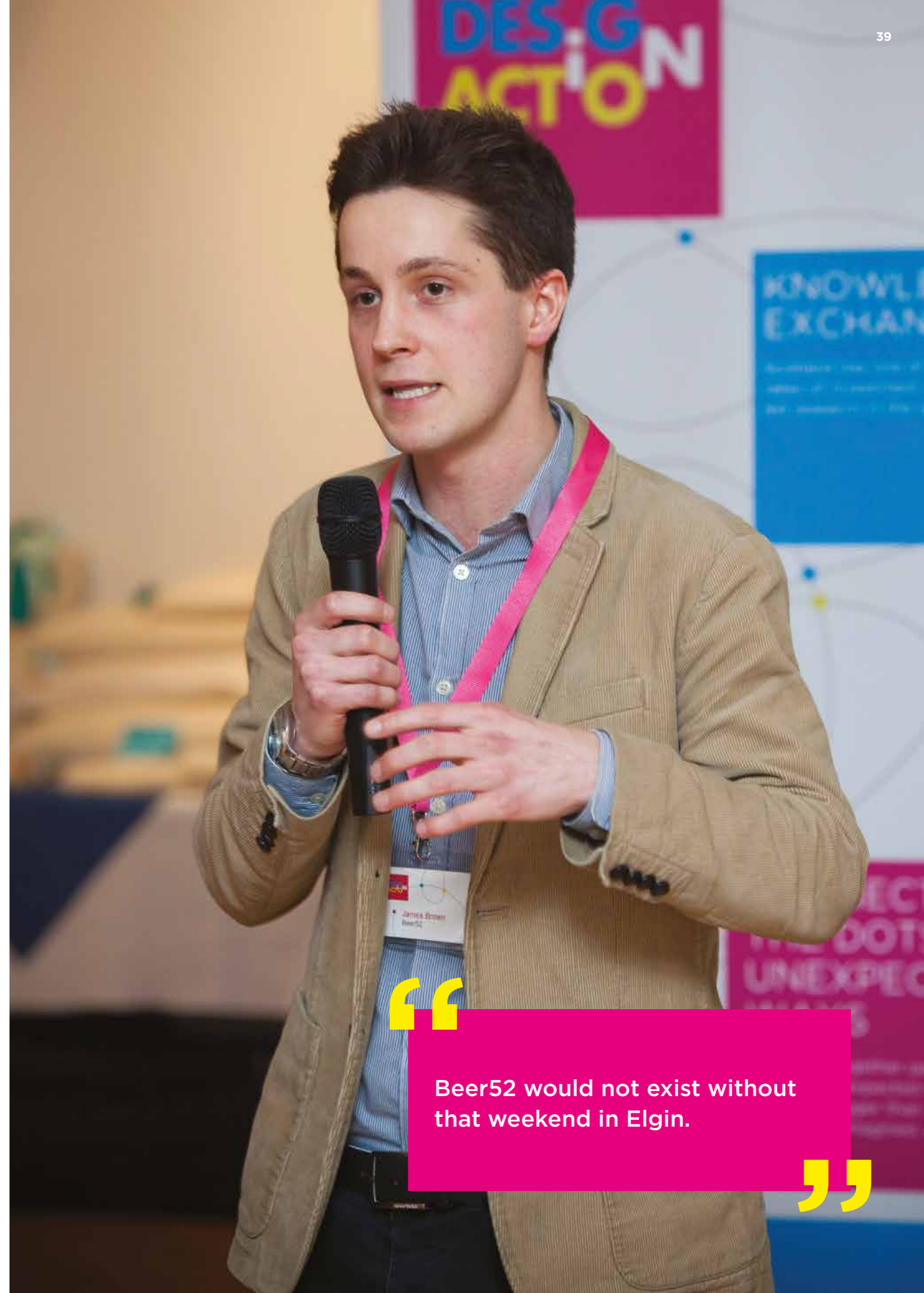
At the Chiasma James, who has a background in online marketing, found the input of designers and academics enormously helpful, in fleshing-out his original concept: 'having the chance to test the idea, with people from different backgrounds, was invaluable. Beer52 wouldn't have existed without it.'

The contribution of design and academic research to Beer52 was very much in fine-tuning the business model, which it is based on. It involved thinking about the different kinds of customers who the service might be aimed at, about how regularly the orders should go out (as the name implies, Beer52 was originally planned as a weekly service), about how the beer should be packaged, and about how the website should look and flow in order to funnel people through to become paying customers. It also involved the academics examining the research evidence for all of this, showing what works.

Alongside the beers there are little snacks that are included, for free, with every delivery. There's the emphasis on the social aspects of subscribing – visitors to Beer52's website are encouraged to give subscriptions as presents, for example, as well as to discuss the beers they like with other subscribers. Beer52 also has a monthly magazine called Ferment (<https://issuu.com/fermentmag>) with a 50,000 monthly circulation due to launch in WH Smith. These things, together with a constantly varying mix of beers, with different flavours and from different kinds of breweries, are designed to keep people interested – to make the process of sampling craft beers fun.

“having the chance to test the idea, with people from different backgrounds, was invaluable. Beer52 wouldn't have existed without it.”

James has surrounded himself with business and industry experts; his staff has previously worked at Brewdog, virgin wines and amazon. He has Fraser Docherty from Super Jam fame and Andrew Bredon founder of Secret Escapes, and Ben Hopkins founder of Naked Wines on his board as well. He has hired 4 designers in his business to date and sees them as one of his competitive business advantages. To date he has secured a six figure investment and is the UK's largest beer club. Beer52 aims to have launched in US (by mid 2017) and to have a projected turnover of £41m by 2019.



“

Beer52 would not exist without that weekend in Elgin.

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Case Study

TableFarm

Supporting innovation

By Jason Morenikeji
DiA new business 'TableFarm'



recipient of
£20,000
grant funding



In the age of virtual existences and on-line experiences, TableFarm aims to use technology to bridge the gap with nature. During the 2014 Food Chiasma, TableFarm proposed a promising gamified smart plant growing device and received £20,000 grant funding.

The expanding accessibility and falling costs of IoT-technology opened up the opportunity to gamify TableFarm as a Tamagochi-like plant-growing incubator. TableFarm offers 'green finger' support by facilitating traditional indoor plant cultivation using a gamified app, beneficial LED lighting and an automated irrigation system.

The TableFarm incubator perfectly reflects DiA's support strategy. For Urban Farming Company, DiA provides a safe space support - an environment facilitating the growth of fledgling design ideas. The DiA network allowed contacts with Scottish academics, technologists, IP experts and commercial decision-makers. Within that structure, the TableFarm idea has taken root and grown into an attractive product proposition using design-thinking and user-centred design.

TableFarm now exists as a working prototype, a registered trade name and an investment ready business proposition. With £20,000 seed funding and an IP for equity stake, Design-in-Action's equity/milestone model offered a secure 'bank' or 'back-office' for IP protection. This adds a layer of security for negotiations with larger stakeholders.

Design in Action has introduced/assisted the Urban Farming Company to engage with the following HE institutions/organisations:

- DJCAD, Dundee - Working with the prototyping lab to build the initial version of the product including electronics, sensors and 3D printed designs.
- Edinburgh University - Commissioning focus groups with the Edinburgh University MBA course (12 x children aged 7-10) which explored childrens connection with growing.
- Edinburgh University - Quantitative Plant Phenotyping research. TableFarm's IoT-connection enables the gathering of valuable plant growth data for beneficial commercial and academic plant phenotyping science research. Working in collaboration with Dr. Alastair McCormick's department of plant biology.
- MIT Open Agriculture (MIT Open Agriculture) - Developing proprietary Software-as-a-Service (SAAS) built on MIT Open Agriculture's open data software platform. Re: care opportunities (LED lighting, moisture) optimizing plant responses outputs.
- Abertay University - Gamified Software development: TableFarm's sensors and control and management offers the potential for modelling relevant plant growing analytics - simulation, forecasting, data visualisation for a gamified user experience.
- Strathclyde University - Adaptive LED grow lighting: Collaboration with the Intelligent lighting Centre at Strathclyde University. Funded by a £12,000 IAA grant and £5,000 Urban Farming Company contribution.
- CENSIS - collaboration with Connected Devices Development Centre (CDDC): Fast tracking low cost commercial IoT product development with micro controlled management, hybrid Low Energy Blue Tooth (LEBT) and Wifi remote management and communication. Eco Schools citizen science initiative: Through the app, software and connected play, a Citizen Science programme allows plant care opportunities to be created/shared via social networks.
- James Hutton Institute - Discussions regarding plant biology to look at a project for better understanding the effects of LED lighting on plant growth.

TableFarm is entering a commercial validation phase (2017 launch) with a working prototype having been designed, fabricated and researched alongside initial focus groups.

Case Study

2016 Dundee Design Festival

Dundee Design Festival & Design Revolution

By Anna Day,
Cultural Projects Manager,
University of Dundee / Leisure
and Culture, Dundee City Council



Attracted
7,000
visitors



Design In Action were a key partner in the delivery of the 2016 Dundee Design Festival in two separate ways, detailed below. The festival was the first of its kind in Dundee and attracted 7,000 visitors in four days. Statistics are being compiled now, but initial figures show that 59% of visitors came from Dundee City, 40% from the rest of Scotland and 1% from the rest of the UK / World. More than one fifth of visitors stayed overnight and 11% stayed for three days.

Design Revolution

Design Revolution was a joint forum, produced by Design In Action, V&A Design Museum Dundee and UNESCO City of Design, Dundee. Speakers came from Pottsdam, Helsinki, Graz, Shenzhen, St Etienne and the Design Council, to speak to an audience of businesses, designers, academics and students from across the UK. 150 attendees each day, which included workshops on 'how to brief your designer', speed dating for designers and information on Bitcoin.

Initial figures show that 59% of visitors came from Dundee City, 40% from the rest of Scotland and 1% from the rest of the UK / World. More than one fifth of visitors stayed overnight and 11% stayed for three days.

Knowledge Exchange

There was a direct dissemination of design and business related knowledge to an interested and engaged audience. We engaged with local businesses to deliver workshops and case studies (including MTC Media, a local media and design business, Nicoll Russell, a local architecture firm, and WL Gore, an international company with a local head office). We also engaged with DiA businesses and designers such as Ali McGill and Professor Jon Rogers. The day was completed with a panel discussion, which gave opportunity for knowledge exchange and information gathering.

Speakers included:

- Stephen Miller, Design Council
- Eberhard Schrempf, UNESCO City of Design, Graz
- Anu Mänttari, UNESCO City of Design, Helsinki
- Claudia Nicolai, Hasso Plattner Institute, School of Design Thinking
- Rebecca Thompson, Squidz / Hot Tap Media
- Prof. Jon Rogers, DJCAD
- Ting Xu, UNESCO City of Design, Shenzhen
- Josyane Franc, UNESCO City of Design, St Etienne.

Dundee Design Festival - Exhibition

The Dundee Design Festival consisted of three main gallery space, all held within the repurposed building, West Ward Works. WWW had previously been a Jute Mill and a print works, where more than five million annuals - including The Broons and Oor Wullie - were printed in its hey-day. It closed in 2006 and this was the first time it had been open to the public.

The Design In Action exhibition was in Gallery No2, and consisted of a main DiA stand and four business exhibits (representing Beer52; SEINCLLN; BAUM and Tusi) with each displaying the elements of design that were at their heart. The stands were custom made for the DiA businesses and over the four days, there was time to engage with the audience, talk about the DiA journey and how each business had developed from an idea to an enterprise. The businesses were each at a different stage of the development journey, so allowed people to discuss and debate how they might take their ideas forward. There was also a chance to pick up and read information about DiA and to exchange information with the DiA team and business developers when they were available.

Case Study

A Fox Wot I Drew

Launching a Business in an Academic Environment

By Brian McNicoll, DiA



total funding
received
£30,000

A Fox Wot I Drew received funding of £30,000 in total from Design in Action in order to bring their 2D puzzle game to market. The prize, in association with Creative Scotland, was conceived by Design in Action and Abertay's Dare to be Digital competition to not only recognise the innovation, talent and hard work that is displayed by the Dare entries but also to assist in the commercialisation of a potentially popular and lucrative game utilising a design led approach.

Along with prize money of £20,000, the team were provided space, software and computers at Abertay University in order to develop the game from its prototype form to a release product along with business advice and expertise from Design in Action to form a successful company and get the finished product to market. Additionally the company was paired with a design expert who looked at all aspects of the game and company's development including brand, level design, user appeal, business model and marketing plan.

DiA aimed to identify a team that has the intention and ability to finish their Dare prototype and bring it to market as a commercial project.

BAUM with its tagline ("Drop into a branching experiment in time and nature"), offers some clues to the game's objective which, like all good games, initially seems simple yet is incredibly tricky in its execution; to guide a droplet of water through the branches of a great tree by drawing gusts of wind with your finger. The team encompassed a programmer, artist and game designer who all moved to Dundee to take up this exciting studio of starting their own games company.

The game launched end of Jan '16 to critical acclaim selling ~10,000 copies in it's first week which is an impressive number for an entirely new games start-up.

Once the game reached a point it was ready for industry scrutiny Design in Action arranged and funded a vital meeting with Apples European Games Portfolio Manager down in London. Apple do not usually entertain such requests but DiA used its contacts to facilitate the meeting. Apple loved the game but had said it requires more levels and up to 12 different languages for a global launch. Design in Action at that point utilised the unique academic environment in order to advertise for students within it's population from Korea, Turkey, China, France, Spain, Italy, Germany etc. in order to test the game for the team to ensure the translated text made sense.

Design in Action also extensively worked with the team in robustly testing the game and providing feedback at each key stage in the games development looking for any bugs or gameplay issues. Leading up to launch DiA connected the company with a Games journalist who co-ordinated the launch whilst DiA in parallel arranged a public launch lecture at Dundee University to help promote the game which led to coverage from STV and beyond.

The game launched end of Jan '16 to critical acclaim selling ~10,000 copies in it's first week which is an impressive number for an entirely new games start-up. The company is going from strength to strength and Apple have requested that the team bring the game to the Apple TV platform next which DiA assisted the company with in applying for and to practice pitching for a Scottish EDGE award which they successfully achieved meaning that the game will come out on this platform this year.

From providing funding, space to work, design and business mentorship, academic expertise, localization assistance, testing and marketing/launch support there were so many areas that a start-up not connected to the DiA process and university environment would have struggled which positions DiA and the HE setting as a highly effective way to launch a design-driven business to the economy.

“

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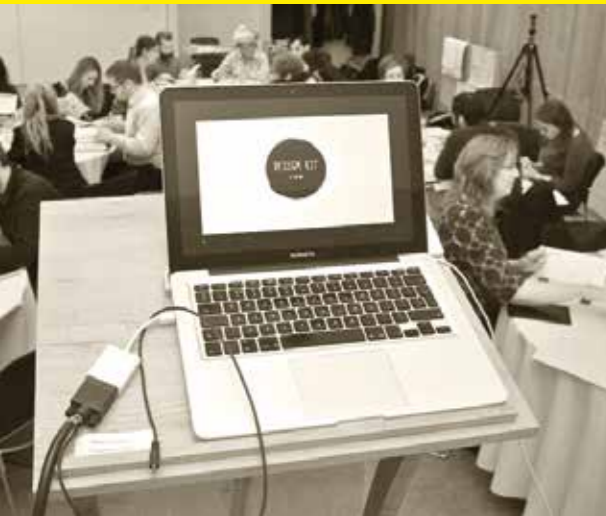


Case Study

KE Hub

Perspective of a PDRA

By Debbie Maxwell
PDRA/Lecturer University of York



DIA PDRA's

Jen Ballie
Suzy Prior
Gemma Kearney
Debbie Maxwell
Henning Berthold
Nil Melhat Gulari
Sue Fairburn
Dan Allan
Saskia Coulson
Michael Pierre Johnson
Katherine Champian
Cara Broadley
Ella Tallyn



As a postdoctoral research fellow since the beginning of the KE Hub, based at one of the DiA institutions (Edinburgh College of Art), the project offered a variety of ways to further my career as an Early Career Researcher (ECR). One of the fundamental challenges of an ECR is that of uncertainty – short term contracts that often only last 12 months or less, whether in research or teaching, ensures that the life of an ECR is one of constant pressure, always looking for the next role in a fiercely competitive marketplace. This is exacerbated within the Arts and Humanities (A&H), which has seen a disproportionate increase in the number of doctoral studies within arts and creative practice (HEFCE, 2011). In addition, Arts and Humanities ECRs may operate in emerging research contexts with few employment opportunities. For example, for those pursuing research in the field of Art and Design, this is a relatively new practice in comparison to other academic subjects. It is therefore imperative that A&H ECRs take any opportunities to widen potential future career options.

As an AHRC KE Hub, Design in Action offered an unrivalled opportunity in terms of scale and scope, as evidenced by the strong peer network of researchers across the six institutions. In comparison to postdocs in humanities (Price et al, 2014), DiA provided, and indeed by necessity required, significant networking and collaboration throughout the entire duration of the project. By attending and organising knowledge exchange events across academic disciplines and sectors, connections and networks were built and reinforced. This enabled a better understanding by the postdoc team of the needs and incentives for each sector and discipline – essential knowledge for developing future collaborative research, teaching, and funding applications.

By attending and organising knowledge exchange events across academic disciplines and sectors, connections and networks were built and reinforced. This enabled a better understanding by the postdoc team of the needs and incentives for each sector and discipline – essential knowledge for developing future collaborative research, teaching, and funding applications.

Teaching experience for the research team was enhanced through the opportunity of co-supervising DiA doctoral students. DiA was on a scale almost unheard of for a design led research project, and as the project team naturally evolved over the four year project duration, it was informative to observe, understand, and work within a range of management and communication styles. In particular, due to Co-I change, integrating into an interdisciplinary research centre (Design Informatics) was very valuable. One related, critical element of DiA was the support and recognition of ECRs pursuing independent research trajectories and funding by the management team. For instance, the AHRC ECR network Skills in Action, which was aligned to DiA, enabled the postdoc cohort to explore issues around KE for ECRs and extend our peer network not only across the UK but internationally (Kearney & Maxwell, 2015).

All these components aided the original postdoc cohort to progress their careers, e.g. from postdoc to permanent lecturer in my case.

Case Study

Technology Accelerator Chiasma

By John MacKenzie
CEO Roslin Biocentre



The Technology Accelerator Chiasma (TAC) became a new strand of the Design in Action programme of residential innovation events otherwise known as Chiasma. This work was funded by a grant from the Intellectual Property Office to pilot radical modes of mobilising latent IP in HEIs. Design in Action already valued the exchange of knowledge and recognized that by collaborating across disciplines and sectors, we can action radically different use cases and applications for commercial market situations.

TAC in particular sought to address the challenges of realising the full potential of University IP by bringing agility and design techniques to new applied contexts and world challenges.

Digital Imaging was identified as an enabling technology for a wide spectrum of very diverse, existing and future applications.

Participant applications were invited from areas of science and businesses which had a strong digital imaging focus e.g. medicine, genetics and omics, biomedical imaging, biotechnology and biometrics, forensics, (2D-4D), environmental, agriculture and geotech, civil engineering, computing science and mathematics (big data, statistics and modelling), psychology, orthopaedics and dentistry. In addition, leading researchers and businesses in design with interests in interaction, animation and visualisation, mobile and physical computing, games theory, wearables and sound were also invited.

Expertise in user-led experiences, processes and methods, agile development, prototyping (low-fi and state of the art), design, ethnography and social science methods were also welcomed from businesses with manufacturing and technology expertise in line with the above.

TAC in particular sought to address the challenges of realising the full potential of University IP by bringing agility and design techniques to new applied contexts and world challenges.

The Designers role was critical to the success of the event and they were invited from known DiA database of designers and retained for the two days of the event plus reserved for 2 days work in-between to lead team activities and/or generate materials for day 2.

Information for participants was provided for by way of a clear briefing pack for delegates (designers attended a pre event briefing about their role) covering matters from where values lie in people taking part to how IP is handled. A FAQ factsheet was developed.

A scoping call helped identify and secure the necessary involvement from the Industry, Business and Entrepreneur sectors.

As a result, 'Our Digital Imaging Futures' TAC brought world-renowned scientists and designers from University of Dundee together with businesses, industry and user-led organisations (ULO's) to capitalise on respective collective assets of knowledge, patents, connections and reputation.

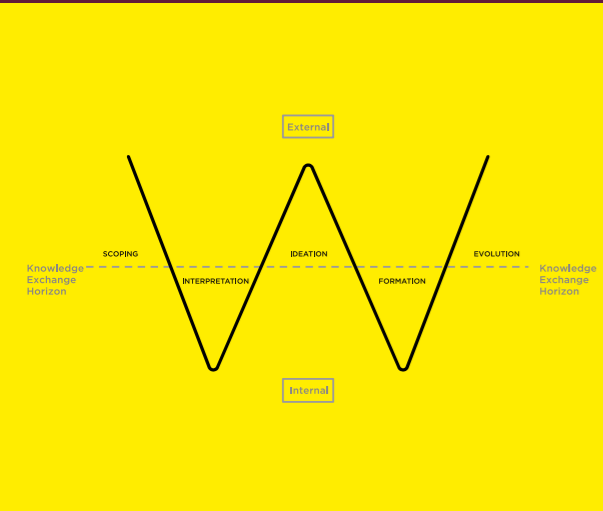
Participants were facilitated over the course of 2 separate days and formed teams to prototype ideas arising from the Chiasma process into viable ideas for business or 'in the wild' research. The invited experts were on hand to advise on specific innovation aspects e.g. IP, digital platforms, economics and systems that are enabling new forms of service and models for business.

An entirely new network of different fields and sectors was therefore very effectively brought together to ideate and create, compete and cooperate whilst leveraging the value of IP that underpinned this whole experiment.

Case Study

Developing a Scoping Framework

By Dr Suzy Prior, DiA



Prior to the development of any Chiasma call it was necessary for the Design in Action team to develop an in-depth understanding of the industry sector in question. A key starting point in understanding the five industry sectors with Design in Action came from a comprehensive scoping process. This involved determining sector boundaries and overlaps; looking at the key issues affecting stakeholders both in Scotland and globally; and identifying the major companies and groups within sectors. This enabled the evaluation of sectors' potential to make use of design as a strategy for innovation. In order to begin work in developing a framework for scoping within Knowledge Exchange, three separate case studies were produced by individual Design in Action Postdoctoral researchers, detailing the scoping process used within their respective sector's Chiasma call. For the three scoping processes, different approaches were taken that combined traditional and contemporary methods, which were perceived to be most appropriate for each sector. Methods used included literature studies, policy and market analysis, time in the field, netnography, and make-a-thon events.

The three case studies within this research each took a different approach to understanding their audience and producing a call which would appeal to a wide group of participants. These different sectors presented a different challenge to the research team and this appears to have steered the direction that each scoping approach took. Each approach had roughly four stages during which time the researcher moved from limited understanding of the sector, to a broad but shallow understanding to finally a drilled down and deep understanding of the challenge faced by one audience category within their sector. The commonalities between the three approaches led to the development of a framework for researchers wishing to scope an industry sector within a Knowledge Exchange context.

The framework we suggested was based on a traditional design process with the discovery phase including understanding of the sector. In the defining phase, the issues of the sector are identified and converged to identify the current key issue. This key issue is then opened up in the development phase as the call is produced. After production of the call, it is presented to the Design in Action stakeholder network, which is then converged to select participants for the Chiasma.

This research led to a published conference paper and presentation, which presented the challenges in scoping for Knowledge Exchange, and discussed the initial framework. This was presented to an audience from a variety of sectors with an interest in the media and communication industry. The scoping process was also presented at several Chiasma in order to demonstrate to participants that the chosen themes had been carefully selected and that the Design in Action team had taken the time to understand the issues being faced by any particular industry.

This process has contributed to the project aims by developing a framework for examining the potential for Knowledge Exchange to be used for innovation in various areas of an industry sector.

The study has assisted in the development of a framework for the scoping process, which can be used by each partner institution and adapted to their own sector and scoping needs.

For further reading please refer to:

Higher Education Funding Council for England (HEFCE), 2011, PhD Study Trends and Profiles 1996-97 to 2009-10.
 Kearney, G., Maxwell, D. (2015). The Universities' 'Third Mission' and the Experiences and Perceptions of Early Career Researchers in the Arts and Humanities. Consortium of Higher Education Research (CHER), Lisbon, Portugal, 7- 9 Sept 2015.
 Price, E., Coffey, B. and Nethery, A., 2014, An Early Career Academic Network: What Worked and What Didn't, Journal of Further and Higher Education, DOI: 10.1080/0309877X.2014.971106.

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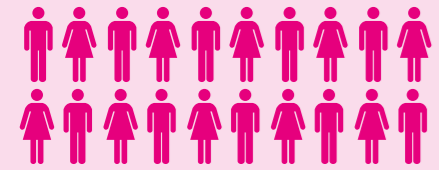
THE GLASGOW
SCHOOL OF ART

Design in Action in Numbers

Operational

5,172

ORGANISATIONS & INDIVIDUALS



ENGAGED WITH DESIGN IN ACTION

3,762

ATTENDEES AT



EVENTS

633

SME's

ATTENDED DESIGN IN ACTION

EVENTS



300

CHIASMA

PARTICIPANTS FROM BUSINESS, ACADEMIA & DESIGN

£318,937

OF DESIGN IN ACTION GRANT FUNDING APPROVED FOR PROJECTS



£672,400

OF PARTNERSHIP FUNDING/SUPPORT

RAISED BY DESIGN IN ACTION

FOR THE PROJECTS

14

CHIASMA

Post-Operational

17 FUNDED PROJECTS

WITH **13** (76%) PREDICTED TO LAUNCH



£3,068,000

ANNUAL TURNOVER OF THE FUNDED BUSINESSES

(LAST YEAR)



£3.44



LEVERAGED BY THE BUSINESSES FOR EVERY £1 INVESTED BY DESIGN IN ACTION

£1,121,000

OF ADDITIONAL FUNDING RAISED



BY THE PROJECTS

113

DEVELOPED



PRODUCTS SERVICES PROCESSES

113 CREATED

81 BY THE FUNDED PROJECTS

32 AT DESIGN IN ACTION

7

TRADE MARKS

2

RSE FELLOWSHIPS

1

PATENT FILED

Research

£11,616,207

OF ADDITIONAL RESEARCH GRANTS & FUNDING AWARDED



101

RESEARCH PAPERS PUBLICATIONS & CONFERENCE PRESENTATIONS



298

ARTS & HUMANITIES RESEARCHERS ENGAGED WITH DESIGN IN ACTION



242

MULTI-DISCIPLINARY RESEARCHERS ENGAGED WITH DESIGN IN ACTION