Mapping Design for Innovation Policy in Wales and Scotland

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ABSTRACT

In 2014, design featured in 15 of the 28 European Member States’ innovation policies. Design strategies were in operation in Denmark, Estonia, Finland, France and Latvia. The European Commission has also developed an Action Plan for Design-driven Innovation. While design is gathering momentum as a driver of innovation in EU and national policy, there is a gap at regional levels. In Wales and Scotland there is infrastructure to support enterprises to use design, so arguably there is an opportunity for them to lead the regional design policy agenda in Europe. However, this raises the question of how to develop effective policies for design. Innovation policy is based on analysis of the Innovation Ecosystem; can the concept of Design Innovation Ecosystems be useful for design policy development? Through four Design Policy Workshops and surveys in Wales and Scotland, this article presents the concept of Design Innovation Ecosystems as an approach to inform policy-making for design-driven innovation.

KEY WORDS: DESIGN POLICY, INNOVATION, EUROPE

INTRODUCTION

Design is increasingly being recognised by governments across Europe as a factor for innovation in enterprises, the public sector and society. In 2014, 15 of the 28 European Member States had design included in national innovation policy. Explicit design strategies were in operation in Denmark, Estonia, Finland, France and Latvia (Whicher, 2014). The European Commission (2013) has also developed an Action Plan for Design-driven Innovation calling for a more systematic use of design for innovation.

The action plan aims to accelerate the up-take of design in innovation policies at all levels across Europe. This article presents the outcomes of research funded by the Arts and Humanities Research Council (AHRC) that explores the development of a framework and methodology for informing design policy. Innovation policy is based on an analysis of the Innovation Ecosystem – the actors, assets and initiatives supporting innovation in a country or region. By transposing established innovation theory into the design domain, the concept of Design Innovation Ecosystems has been created.

In Wales and Scotland there are active programmes to support the private and public sectors to use design, so arguably there is an opportunity for them to lead the regional design policy agenda in Europe. Although design does not yet explicitly feature in Scottish innovation policy, it already forms part of Welsh innovation policy (Welsh Government, 2013).
Both the Welsh Government and Scottish Enterprise are making efforts to be design aware. However, the route to effective regional design capabilities is not clear. To bridge this gap in knowledge, PDR, the International Centre for Design and Research at Cardiff Metropolitan University collaborated with the Welsh Government and Scottish Enterprise to explore the Design Innovation Ecosystems in Wales and Scotland. Through four ‘Design Policy Workshops’ and surveys of designers and businesses, the authors have 1) mapped the Design Innovation Ecosystems in Wales and Scotland, 2) analysed their strengths and weaknesses and 3) co-developed a set of policy proposals for enhancing performance. The results demonstrate that both the framework and method could be implemented to develop design policy in different countries and regions; indeed it has already been applied in Thailand to provide input for a National Design Policy.

DESIGN AND INNOVATION – THEORY AND POLICY

In the knowledge-based economy, the understanding and application of innovation is expanding from a technology-focus to include a broader set of drivers like design (European Commission, 2010). Policy-makers, business managers and academics are embracing this paradigm shift in innovation, and thus design has become more relevant to the innovation debate because both design and innovation are converging on a common factor – the user (von Hippel, 2005). Design can act as the bridge between technological, service, public sector and social innovation because it is a people-centred process. The link between design and innovation has long been recognised by academics (Walsh, 1992; Roy, 1994; Thompson, 1994; Borja de Mozota, 2002;) but has only more recently been acknowledged by policy-makers. Design is an approach to problem-solving that can be used to drive innovation in products, services, society and even policy-making by putting people first (Whicher and Walters, 2014). Design as factor for innovation is increasingly being recognised at multiple levels of governance across Europe including by the UK government (BIS, 2011).

It is the European Commission’s vision that by 2020, design should be a ‘well-recognised element of innovation policy across Europe’ (Dröll, 2011). There is a vibrant design scene in Scotland and Wales but a feeling among design stakeholders that Scottish Enterprise and the Welsh Government are not capitalising on these strengths as factors for competitiveness. If design has been integrated into EU and UK innovation policy and Wales and Scotland have design assets, what evidence do Scottish and Welsh policy-makers require in order to further embrace design as driver of innovation policy?

Policy-makers require an economic rationale to justify policy intervention in favour of design and its integration into innovation policy. Since the 1980s, political theorists such as Freeman (1982) and Lundvall (1985) have instigated a shift in the justification for innovation policy away from the neo-classical market failure theory to embrace a broader systems failure theory. An innovation system is a theoretical construct to examine the interplay between actors in a network and inform targeted policy action to enhance systemic performance. Innovation policy is based on an analysis of the innovation system and a number of academics have proposed that systems failure theory also provides an economic rationale for design policy (Love, 2007; Moultrie and Livesey, 2008; Raulik-Murphy and Cawood, 2009; Sun, 2010; Swann, 2010; Whicher and Cawood, 2012; Hobday et al, 2012; Finnish Ministry of Employment and the Economy, 2013; and Chisolm et al, 2013). Crucially,
Raulik-Murphy (2010) asserts that the design process enables identification of insufficient interaction between stakeholders that could be useful to better inform policy making.

Design policy, government intervention to stimulate the demand for and supply of design, is gaining traction globally (Er, 2002; Heskett, 2009;). However, it is only more recently that innovation systems theory has been transposed into the design domain to justify policy intervention. Moultrie and Livesey (2008) pose the question: ‘The concept of a National Innovation System is well established, but can this concept be of use when considering design?’

Ironically, design was a consideration in Freeman’s (1982) first address on National Innovation Systems stating that ‘when considering national innovation systems, central to innovative success are invention and design’. Since it has largely been overlooked in innovation circles due to the difficulties in measuring impact. Nevertheless, as interest in design as a driver of innovation began to grow in the late 2000s, researchers adapted innovation system theory to provide an economic rationale to integrate design into innovation policy. The terminology has evolved from ‘Design Infrastructures’ (Love, 2007) to ‘National Design Systems’ (Moultrie and Livesey, 2008; Raulik-Murphy and Cawood, 2009; Sun, 2010; Swann, 2010; Hobday et al, 2012; Whicher et al, 2012), to ‘Design Ecosystems’ (Finnish Ministry of Employment and the Economy, 2013; Chisolm et al, 2013). In this article, the authors have adopted the term ‘Design Innovation Ecosystem’. This hinges on the rationale that the design ecosystem should not operate in isolation from the broader innovation ecosystem in the country or region. In the policy arena, Finland was the first country to adopt the concept of a National Innovation System to inform innovation policy in 1992 (Sharif, 2006) and it was also the first country to adopt the concept of a ‘Design Ecosystem’ to inform national design policy in 2013 (Finnish Ministry of Employment and the Economy, 2013). Design is already a component within the UK innovation ecosystem:

‘The UK innovation ecosystem contains deep and varied capabilities in science and technology, creativity and design.’

Academic theory on innovation systems is well established for informing innovation policy (Smits et al, 2012). Therefore, the question arises: can design-driven innovation ecosystems – or Design Innovation Ecosystems – be a useful concept for design-driven innovation policy? And if so, what components are included in a Design Innovation Ecosystem? Table 1 deconstructs the components of the design system models in anticipation of testing such an ecosystem.

Table 1: Components of a Design Ecosystem

<table>
<thead>
<tr>
<th>Model</th>
<th>Components</th>
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<tbody>
<tr>
<td>Love (2007)</td>
<td>1) Design businesses, 2) design centres, 3) design education services, 4) design promotion organisations, 5) design research investment, 6) design researchers, 7) design support technologies, 8) design support technology suppliers, 9) design teams, 10) designers, 11) design-focused investment, 12) distribution services, 13) drive to improvement in society, 14) government policy organisations to support design and</td>
</tr>
<tr>
<td>Source</td>
<td>Components</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
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<tr>
<td>Moultrie and Livesey (2008)</td>
<td>1) Firms, 2) education, 3) design agencies, 4) government bodies, 5) academia.</td>
</tr>
<tr>
<td>Raulik-Murphy and Cawood (2009)</td>
<td>1) Funding source, 2) design policy, 3) design education, 4) design support, 5) design promotion, 6) research and development, 7) professional associations.</td>
</tr>
<tr>
<td>Sun (2010)</td>
<td>1) Designers, 2) public sector, 3) private sector, 4) trade associations, 5) government, 6) higher education institutions, 7) design promotion.</td>
</tr>
<tr>
<td>Whicher and Cawood (2012)</td>
<td>1) Design users (public and private), 2) design support, 3) design promotion, 4) design actors, 5) professional design sector, 6) design education, 7) research and knowledge exchange, 8) design policy, governance and regulation, 9) design funding.</td>
</tr>
<tr>
<td>Finnish Ministry of Economy and Employment (2013)</td>
<td>1) Design policy, 2) funding, 3) public sector, 4) design centres, 5) businesses, 6) citizens, 7) research and education, 8) design promoters.</td>
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</table>

There is a high degree of commonality between components of the different systems. The models by Raulik-Murphy and Cawood and Sun exhibit significant overlap; however, both overlook components identified by the other. For example, the Raulik-Murphy and Cawood model excludes the professional design sector as well as design users, which are core components included by Sun. Alternatively, Sun omits funding sources and design support, which are integral to the Raulik-Murphy and Cawood model. Therefore, the authors combined these models to create a framework Design Innovation Ecosystem. The implications being that by modelling design ecosystems, investigating the interactions between components of the ecosystems, researchers and policy-makers can assess the performance of a Design Innovation Ecosystem and propose policy actions. Based on the literature, the nine component of the conceptual Design Innovation Ecosystem model identified were:

- Design users
- Design support
- Design promotion
- Design actors
- Design education
- Design research
- Design sector
- Design funding
- Design policy
Innovation Ecosystems research is a recognised academic field and is well advanced for informing policy (Smits et al, 2012), but the theory of design-driven innovation ecosystems is still nascent. The authors explored and refined a framework for Design Innovation Ecosystems to advance the understanding of how design can contribute to innovation policy. Mapping and analysing the Design Innovation Ecosystems in Wales and Scotland generated insight to support other countries and regions to examine their Design Innovation Ecosystems. Advancing Design Innovation Ecosystems theory has the potential to create a more compelling case for the integration of design into innovation policy.

**METHOD**

The authors undertook an investigation into how the conceptual Design Innovation Ecosystem model as well as design methods can be employed as a tool for stakeholder-led policy development. As design policy is an emerging domain there are no well-established methodologies for its formulation. Neoclassical policy-making is dominated by quantitative methodological paradigms (Hill, 2009); however, the authors identified an opportunity to apply qualitative design methods for informing policy. This is, in effect, policy for design by design. Design methods as an approach to inform policy is still nascent but nevertheless gaining traction in government as demonstrated by the rise of ‘Policy Labs’ across the UK. Policy Labs are multidisciplinary teams using design methods to jointly develop policy and public services in closer collaboration with citizens. Examples of government groups using design methods include the Cabinet Office Policy Lab, UK Trade and Investments Ideas Lab, the Government Digital Service, the Scottish Government Creativity Team and the Northern
Ireland Innovation Lab. Nevertheless, according to the Design Council (2007) there is still no identified best practice for design research.

The ‘Double Diamond’ framework, generally attributed to the Design Council, is an example of codifying professional practice as a design research framework.

![Double Diamond Design Framework](image)

**Figure 2: Double Diamond design framework**

For Clune and Lockrey (2014), a design research framework can act as a broad guiding principle of divergent and convergent thinking. By its essence, design is about challenging entrenched approaches and re-framing the questions. With this in mind, an opportunity arose to explore whether a design approach to inform design policy could be appropriate. As such the following tasks and methods were adopted:

1. Establishing the state of design policy through the literature review;
2. Mapping the Design Innovation Ecosystems for Wales and Scotland through four design policy workshops;
3. Validating the workshop findings through two surveys among stakeholders;
4. Reviewing the conceptual model and findings through peer-review by an advisory committee.

In this approach, the literature review and workshops represent divergent thinking, gathering broad input, and the surveys and consensus building by the peer-review group constitutes convergent thinking. As previously asserted, the literature review established the current state of the art and defined the initial nine components of the Design Innovation Ecosystem.
The research was guided by an expert panel of stakeholders including policy-makers from the Welsh Government and Scottish Enterprise, design sector representatives from Rose-Innes Design and the Design Wales Forum, and design and policy academics from the Universities of Dundee and Lancaster. The expert panel advised on the workshop format, academic rigor, relevance to policy-making and representative stakeholder selection. To ensure a robust candidate selection criteria for the workshops, initial stakeholder mapping was conducted with the expert panel to ensure representation by policy-makers, designers, small and medium-sized enterprises (SMEs), academics and support organisations. The Design Innovation Ecosystem construct was examined in Wales and Scotland and involved stakeholders who would be potentially be affected by any resultant policy proposals. The following table presents the breakdown of stakeholders that participated in the workshops:

Table 2: Participants in the design policy workshops

<table>
<thead>
<tr>
<th></th>
<th>Policy-makers</th>
<th>Designers</th>
<th>Businesses</th>
<th>Academics</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangor 22.04.14</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>Cardiff 19.05.14</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>10</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Glasgow 21.05.14</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Dundee 23.05.14</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>7</td>
<td>6</td>
<td>30</td>
<td>5</td>
<td>64</td>
</tr>
</tbody>
</table>

Participants in the Welsh workshops included, among others, representatives of the Welsh Government, Enterprise Consulting, Creative and Cultural Skills, Nesta, Business Wales, the Design Wales Forum and Rose-Innes Design. Participants in the Scottish workshops included, among others, representatives of Scottish Enterprise, the Scottish Government, Creative Scotland, V&A Dundee, Skills Development Scotland, the Lighthouse, MAKLab and Taylor Haig. It should be acknowledged that the bias towards academia was acknowledged from the outset and these individuals were selected due to their involvement in knowledge exchange between the design sector and industry.

The authors sought to synthesise the positions of a broad range of stakeholders and used design techniques to engage participants in active discussion using A1 poster tools. Four ‘Design Policy Workshops’ took place in Bangor, Cardiff, Glasgow and Dundee to test both the conceptual model as well as a design approach to policy development. The workshops were composed of three hands-on exercises: 1) Mapping design stakeholders and initiatives; 2) Identifying the strengths and weaknesses of the Design Innovation Ecosystem and 3) Co-developing policy proposals. To capture the data from the workshop, the posters were photographed, transcribed and processed using content analysis. A film of the workshops is available on the PDR website (www.pdronline.co.uk).
The first exercise involved mapping the stakeholders and initiatives in the ‘Design Innovation Ecosystem’ according to the nine components. In both Wales and Scotland a multitude of design activities already exist ranging from government design support programmes, to sector-led promotion initiatives, a strong professional design sector through to design networks, knowledge transfer into industry and design-led businesses. This provided a ‘stock-taking’ of current initiatives to enable participants to build on existing design infrastructure. In the second exercise, the groups identified strengths and weaknesses of each component of the Design Innovation Ecosystem. This enabled delegates to assess the level of systemic interaction between actors and initiatives in the system to identify gaps and opportunities. The third exercise involved brainstorming policy proposals to tackle the gaps and capitalise on the strengths. Following the initial brainstorm, the proposals were clustered thematically and refined. By involving representatives from government, the design sector, industry, academia and third sector organisations in jointly developing policy, the proposals were tangible and realistic.

To validate the workshop conclusions, two surveys were developed for designers and enterprises in Wales and Scotland. The survey focused on specific aspects of the Design Innovation Ecosystem such as, whether companies have accessed government support for design and whether they supported the policy proposals developed in the workshops. In Wales, the survey was disseminated through the Design Wales Forum and South Wales Chamber of Commerce and in Scotland, through Scottish Enterprise and the Design in Action network. In Wales, there were 53 respondents, including 25 categorising themselves as designers and 27 as enterprises and 1 as ‘other’. This represents 2.8% of the members of the Design Wales Forum (889) and 2.3% of the South Wales Chamber of Commerce (1,200). In
Scotland, there were 78 respondents, including 39 categorising themselves as designers and 39 as enterprises. This represents 13% of the companies (301) and 26% of the designers (152) in the Design in Action network. Therefore, a total of 202 stakeholders (64 in the workshops, 131 in the surveys and seven in the expert panel) were involved.

**FINDINGS**

The four Design Policy Workshops took place in Bangor, Cardiff, Glasgow and Dundee and focused on three exercises: 1) Mapping design stakeholders and initiatives; 2) Examining the strengths and the weaknesses of the Design Innovation Ecosystems; and 3) Co-developing policy proposals to tackle the gaps and capitalise on the strengths. The purpose of the research was not to assess which Design Innovation Ecosystem is stronger but to identify opportunities for shared learning and the transfer of good practices between Wales and Scotland. Simplified versions of the Design Innovation Ecosystem maps of Wales and Scotland are presented in figures hereafter. To validate the workshop findings, two surveys were disseminated to Welsh (n=53) and Scottish (n=78) designers and companies. Despite the unique and diverse actors and initiatives in place in Scotland and Wales, there are remarkable synergies between the strengths and weaknesses of the Design Innovation Ecosystems as well as the policy proposals generated. The findings section combines the outputs from the workshops and surveys.

![Figure 4: Simplified Design Innovation Ecosystem map of Wales](image-url)
According to the survey respondents, 82% believe that there is an increase in demand for design in the private sector in Wales compared with 60% who believe the same for Scotland. Alternatively, 59% of Scottish respondents felt that there is growing demand for design in the public sector compared with 50% in Wales. From the workshops in both Wales and Scotland respondents reported a lack of clarity of understanding among both the private and public sectors regarding design. The Scottish Government is looking to lead by example in using design thinking to improve public services and policy through the Creativity Team. The Welsh Government appears to be slower to embrace design as an approach to public sector innovation. Two Welsh Councils – Cardiff and Monmouth – were highlighted as design users, both testing design as an approach to service development. There was remarkable synergy between the systemic strengths and weaknesses identified by workshop participants in Wales and Scotland as well as overlap in the policy proposals generated. Participants recommended collating case studies, demonstrating the impact of design in different industry and public sectors in order to communicate the value of design. Furthermore, there is no clear picture of how companies in Wales or Scotland use and invest in design. For example, has design use by companies increased as a result of government programmes and grass-root promotion? Both groups also independently arrived at the
proposal to conduct research on how companies use design – whether purely for branding and communication, for product design or more strategically as part of their business model.

SUPPORT
Design support programmes have traditionally focused on enabling SMEs to use design by providing mentoring, assistance in writing briefs, and advice on procuring and managing design. More recently, different design support mechanisms have arisen including tax credit schemes, subsidy and voucher schemes and export promotion programmes. In Wales, the main business support mechanism is Business Innovation (£35 million over five years), which includes a number of sub-programmes including Innovation Vouchers, in which design is an eligible cost as well as the Design Advisory Service operating since 1994. The Design Advisory Service is a three-year contract currently worth £794,000 per year with targets to assist 150 companies annually. However, over half of survey respondents – 53% – were not aware of the Welsh Government funded Design Advisory Service. In line with this, 76% of designers have not referred a client to the Design Advisory Service due to the perceived barrier of a ‘three quotes’ tendering process. Similarly, 57% were not aware that Welsh Government innovation credits could be spent on design. As such, it was proposed that design should be a component of all innovation programmes to simulate demand for design among SMEs.

In Scotland, Scottish Enterprise provides design support through two programmes: New Product and Service Development and Design Mentor Support. The first involves awareness raising workshops followed up with two days of 1-2-1 support from a design expert to help identify design opportunities and develop a design brief. In 2012, over 40 Scottish SMEs participated and a budget of £216,000 was allocated. Design Mentor support uses Scottish Enterprises Innovation Support Grant to appoint a Design Mentor to work with a company for up to five days. Design is also eligible as part of the Business Gateway programme but data on up-take of design within this programme was unavailable. Of the Scottish survey respondents, 57% claimed not to know where to point a client to access design support versus 23% who do.

Insight from the workshop and the survey results in both Wales and Scotland would suggest that there is a gap in communicating design within business support programmes and that the programme landscape is not easy to navigate. Workshop participants in Scotland identified that Scottish Enterprise could conduct a journey mapping exercise to ascertain how businesses access design support. It was also proposed by participants that additional provision of training to the Innovation Specialists within Scottish Enterprise and Welsh Government in the value of design would ensure more effective promotion of design.

PROMOTION
In Wales, the Design Wales Forum, funded by the Welsh Government, is the main design promotion body ensuring that the design sector has a voice in industry and government. Of the Welsh survey respondents, 50% felt that the Design Wales Forum effectively supports designers (8% felt it was not effective). Furthermore, 65% of respondents were aware of Welsh design promotion activities such as the Cardiff Design Festival versus 35% who were
not aware. Alternatively, 35% responded that Welsh design promotion activities do not communicate a common message. In addition to Welsh Government and HEI sponsored activities, there are a significant number of grassroots promotion initiatives and design award schemes in operation including the Best of Welsh Design Awards, Insider Magazine Awards and the Design Management Europe Award. In Wales, policy proposals included appointing design champions to different Welsh Government industry committees, setting up a Welsh Government award for successful design projects and feeding successful case studies back to the civil service and to Ministers.

There is an array of design promotion bodies in Scotland – Creative Scotland, the Lighthouse, Architecture and Design Scotland and of course, the eagerly anticipated V&A Museum of Design Dundee. There are also a number of active promotion initiatives. In addition, 2016 will be the Year of Innovation, Architecture and Design in Scotland and Dundee has been awarded the UK’s first Unesco City of Design. The Design in Action project funded by the AHRC has also played a significant role in promoting design across Scotland including through their Scottish Design Summit in May 2014. From the survey, 57% of respondents were aware of Scottish design promotion activities versus 41% who were not aware. Alternatively, 45% responded that Scottish design promotion activities do not communicate a common message. Policy proposals included promoting design to the public sector via the Scottish Leaders Forum - a network of top civil service executives, creating an online portal with case studies, funding opportunities and design resources for SMEs, the public sector, designers and academics as well as creating a ‘Good Design Scotland’ stamp.

**ACTORS**

In Wales, design representation is dominated by the six design-active HEIs - Bangor, Cardiff Met., Glyndwr, Royal College of Music and Drama, University of South Wales and the University of Wales Trinity St David’s Swansea. In Scotland there are four design-active HEIs, although there are a larger number of publicly financed institutions such as Creative Scotland, the Lighthouse and the Cultural Enterprise Office. In terms of Welsh Government funded organisations, these are limited to the Design Commission for Wales, which focuses predominantly on architecture and Arts Council Wales that also has a small design portfolio. A number of other actors are also now enhancing their focus on design such as Creative and Cultural Skills and the Wales-based branch of Nesta. In both Wales and Scotland there are also an array of business and innovation networks that have an intermittent interest in design. There is an opportunity for design stakeholders to cooperate more systematically with these players. In this way, design can move from the periphery of the innovation debate to a more central role. The issue of a single actor being the voice of design in Wales and Scotland was a contentious one. In Wales, 64% of respondents thought that there should be a ‘single centre’ proving the voice for design compared with 53% of Scottish respondents asserting that there should be a ‘single centre’. Workshop participants in Scotland were supportive of the idea to appoint a single body to represent design in Scotland to not only support designers but also to raise awareness among enterprises. A number of possible actors were discussed including the V&A Dundee, Lighthouse and GSA. In Wales, it was proposed to appoint a number of centres of excellence in design across Wales. In both Wales and Scotland there appears to be a dearth of design champions from industry promoting design to companies and the public sector.
DESIGNERS
In Wales, the professional design sector is represented by the Design Wales Forum with over 1,000 members (at the time of publication). According to research by the Design Council in 2010, there are 11,147 designers in Scotland – an increase of 51% since 2003 while in Wales, there are 3,865 designers – a decrease of 8% on 2003. There is no equivalent of the Design Wales Forum and the Design Directory Wales in Scotland. There is a drive in both Wales and Scotland to upskill designers – particularly regarding service design expertise. Design has been incorporated into the skills agenda in Wales through a move by Creative and Cultural Skills to set up design apprenticeships as an alternative to higher education. In Wales, only 33% of survey respondents felt that Welsh designers work at the cutting edge of the practice. For Scotland, 42% of representatives stated that the Scottish design industry is unable to communicate the return on investment in design compared with 23% who felt that it could. Therefore, proposals in both Wales and Scotland focused on continuous professional development opportunities for designers focused on service design and business processes.

EDUCATION
In Wales, there are six HEIs currently active in design and in Scotland, according to the workshop respondents, there are four HEIs deemed to be strategically active in design – the Universities of Aberdeen (Gray's School of Art), Dundee (Duncan of Jordanstone College of Art & Design), Edinburgh Napier (Faculty of Engineering, Computing & Creative Industries) and Glasgow School of Art. Concerns were raised by Welsh and Scottish workshop participants about the relationship between academia and industry. For example, 42% of respondents identified that there is not an effective relationship between design education and the design sector in Wales compared with 32% who believe there is. Alternatively, in Scotland, 54% of respondents do not believe that there is enough of a link between design education and the sector in Scotland. Equally 48% of Welsh respondents and 55% of Scottish respondents asserted that design graduates do not have an appropriate level of experience when entering the job market. Of the Scottish survey respondents, 63% agreed that Scotland has an international reputation for good design higher education. From the workshops and surveys it was clear that design education needs to better understand SME requirements both in terms of course content and practical capabilities of graduates. As education is a devolved power, Wales and Scotland are in a position to revise the primary and secondary school curriculums in design, which participants felt required an overhaul. This could involve re-training design teachers to link early years problem-solving to design. At HEI level, more cross-fertilisation between design and other disciplines was proposed particularly as part of multi-disciplinary real world challenges. Specifically to Wales it was proposed that design apprenticeships could be an alternative to a degree.

RESEARCH
According to 40% of respondents, Wales does not perform as well as the rest of the UK in terms of knowledge exchange between academia and industry in design. Alternatively, 54% of respondents agreed that Scotland performs as well as the rest of the UK in terms of
knowledge exchange between academia and industry in design. In Wales, the main academia-industry collaboration programme is *Academia4Business* and in Scotland it is *Interface*. While both of these initiatives are successful, workshop participants felt that more design-related activities could be conducted and a proposal included promoting design more explicitly within these initiatives. In Scotland, the AHRC funded project *Design in Action* has been effective in creating an active dialogue between academia and industry. In Wales, the ASTUTE project (Advanced Sustainable Manufacturing Technologies) is a partnership across nine Welsh universities, led by Swansea University, to embed advanced technologies, including design, into Welsh manufacturing. The £27 million project is part-funded by the European Regional Development Fund operating from 2010 to 2014. While world class research is being generated through these projects, participants questioned whether the insight generated through academia is accessible to companies. Therefore, universities should perhaps be more proactive in embedding research more broadly within industry.

**POLICY**

Design already features as part of innovation policy in Wales but not in Scotland. In addition, 56% of respondents were aware of the Welsh Government policy ‘Innovation Wales’ and 50% were aware that design is included in the policy. Nevertheless, 43% asserted that the Welsh Government does not have a strategy to increase demand for design. While the policy represents a vision for design in Wales, the policy has yet to be linked to an action plan. Nevertheless, the authors have proposed a series of actions that could form part of such a strategy. These proposals have been presented to the Welsh Government and plans have been made to further examine the feasibility of the proposals to appoint a design manager within the Welsh Government innovation team, train Welsh Government officials in design thinking and appoint a design representative to Welsh Government industry sector panels. These actions form part of a drive to raise awareness of design more generally within the Welsh Government. The Welsh Government already co-fines the INTERREG IVB project SPIDER (Supporting Public Sector Innovation using Design in European Regions). SPIDER is implementing two service design pilots with Cardiff Council one focused on getting young people back into employment and the other on independent living for dementia patients. As part of the project, 100 civil servants attended service design training in 2015.

In Scotland, 32% of participants stated that the Scottish Government does not have strategy to increase demand for design compared with 11% who believe that it does. In addition, 51% of participants felt that the Scottish Government does not have an appreciation of the broader capabilities of design. Although design does not formally feature within Scottish policy, the Lighthouse and Scottish Enterprise are collaborating to advocate design as a strategic tool for innovation. Workshop participants proposed to develop a stakeholder-led manifesto for design in Scotland that could feed into a distinct design strategy separate from the innovation policy. Workshop participants felt that design could be a driving force for innovation in the public sector in Scotland. They supported the action of piloting design methods within five local authorities to create case studies of design impact. This approach should be combined with a more general design awareness and training exercise among Scottish Enterprise and Scottish Government officials. For example, policy-makers from Wales and Scotland could participate in a study visit to the Cabinet Office Policy Lab and
Government Digital Service. In Scotland, the Creativity Team already uses design methods to enhance inclusive policy-making and in Wales, Nesta is establishing a Public Service Innovation Lab to use design methods to tackle policy and public service issues.

**FUNDING**
The message from workshop participants and survey respondents in Wales and Scotland was the funding landscape for design is complicated. In Scotland, 60% of respondents were not aware of public funding to support the use of design versus 11% who stated that they were aware. In line with this, 72% had not accessed design-related funding. Funding mechanisms can act as a means to promote design to companies. For example, the proposal in Wales to set up a Design and Development Grant to encourage start-ups to invest in design is currently under consideration and Scottish Enterprise are also considering a grant to enable SMEs to invest in design. In Scotland, a number of financing mechanisms exist such as the Prototype Funds issued through the Design in Action initiative, Starter for 6, innovation vouchers through Interface and more general financing from Scottish Enterprise. At the Glasgow workshop, it was also proposed to implement Design Vouchers in Scotland that came into operation in May 2015. It was proposed that both Scottish Enterprise and the Welsh Government could conduct a customer journey mapping of their innovation and design financing mechanisms in order to make the process more user-friendly.

**CONCLUSION**
All parts of the UK have initiatives to support design but often they operate outside the mainstream innovation ecosystem. To implement effective policies and programmes for design, policy-makers require insight into the design landscape, the active players and the operating conditions of the ‘Design Innovation Ecosystem’. By mapping the Design Innovation Ecosystems in Wales and Scotland, the results demonstrate that the model and approach is useful in framing discussions among stakeholders and providing tangible policy proposals. By being directly involved in the process, the framework enabled policy-makers to take a more holistic view of the interaction within the innovation environment and develop more targeted policies. Not only was the Design Innovation Ecosystem framework a useful tool for conceptualising the environment in which design operates, but policy-makers also found the methodology engaging. The Head of the Innovation Team in the Welsh Government found that the process “…enabled us to identify ways in which design can play a more effective role…” Similarly, the Innovation and Enterprise Lead at Scottish Enterprise found the approach “…a really useful way of gaining insight from different stakeholders…”

While co-design methods are familiar to design researchers, methods that visualise complex systems and facilitate constructive dialogue between diverse stakeholders is not common among government officials. The feedback from policy-makers was that both the framework and the method were beneficial in constructing a shared understanding of user needs and policy constraints. This approach resulted in new ideas for and from policy-makers. For example, some of the proposals included additional design training for Welsh Government and Scottish Innovation Specialists, a new design and development grant for start-ups in both Wales and Scotland and integrating design as an eligible cost within existing innovation support programmes. Unique proposals to Wales included appointing design
representatives to Welsh Government industry committees and recruiting a design manager. Scotland-specific proposals included integrating design into the Smart Exporter programme and promoting design to the public sector through the Scottish Leaders Forum. This would suggest that while there may be significant synergies between regional Design Innovation Ecosystems in the UK, or indeed in other EU countries, there are also unique operating conditions. Therefore, this framework and method could be replicated to support evidence-based policy-making elsewhere. The framework and method have already been used in Thailand to generate input for a National Design Policy. Neoclassical policy-making is still very much data-driven, further research should be conducted to assess whether an empirical, co-design or mixed approach is more effective for user-centred policy-making. There is also an opportunity to further analyse the relationships between the components to identify leverage points and enhance design-led innovation performance. To begin to address these issues, we intend to conduct further research with industry partners, academic colleagues and government policy-makers around the world.

REFERENCES


BIOGRAPHIES
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