Sharing the Vision: representing the matters of concern for design-led fledgling companies in Scotland

Michael Pierre JOHNSON[a], Gregor WHITE [a], Suzanne PRIOR [a], Dayna Galloway [a]

[a] University of Abertay

Design is being performed on an ever-increasing spectrum of complex practices arising in response to emerging markets and technologies, co-design, digital interaction, service design and cultures of innovation. This emerging notion of design has led to an expansive array of collaborative and visual design methods. As such, designers now require communication and facilitation skills to demonstrate and share how such methods can shape innovation. The meaning of these design things in practice can't be taken for granted as matters of fact, which raises a key challenge for design to represent its role through the contradictory nature of matters of concern.

This paper explores an innovative, object-oriented approach within the field of design research, visually combining an actor-network theory framework with situational analysis, to report on the role of design for fledgling companies in Scotland, established and funded through the knowledge exchange hub Design in Action (DiA). Key findings and visual maps are presented from reflective discussions with actors from a selection of the businesses within DiA's portfolio. The suggestion is that any notions of strategic value, of engendering meaningful change, of sharing the vision of design, through design things, should be grounded in the reflexive interpretations of matters of concern that emerge.

Keywords: design-led innovation; actor-network mapping; visual methods; design things; co-design

Introduction

This paper explores actor-network mapping (Johnson, 2016) as an innovative method within the field of design research combining an actor-network theory framework (Callon, 1986) with situational analysis (Clarke, 2005), to report on the role of design for fledgling companies in Scotland.

The paper draws on data captured from the Design in Action (DiA) knowledge exchange hub, which is one of four UK hubs, funded by the Arts and Humanities Research Council, and draws together six universities and art and design institutions across Scotland. The key focus of DiA is investigating design as a strategy for business growth in Scotland and the chosen approach is the Chiasma method, which is a design-led, sandpit-style event for open innovation (Kearney and McHattie, 2014). Chiasma gathers collaborators from a range of business, design, and academic backgrounds to stimulate knowledge exchange and develop commercial ideas. DiA supports successful applicants in their business development through business mentoring, design support, access to expert partners and introductions to potential investors or partners. One of the conditions for funding is for a clear design partner or design work as part of business development, establishing a novel context in Scotland for design-led innovation.

Beginning with a brief review of the literature highlighting the contrasting discourses of design-led innovation, the paper explores how a clearer discourse can be formed through an *object-oriented approach*. Adopting a mapping technique based upon actor-network theory (ANT) through four case studies of DiA funded fledgling companies aims to provide a reflexive and participatory discourse for articulating the role and value of design-led innovation.

Discourse in Design-led Innovation

This paper is primarily concerned with the rising tide of design-led innovation and contributes to a growing trend in design research that seeks a clearer and more accessible discourse to consolidate such expansion (Carlgren, Elmquist and Rauth, 2013; Verganti, 2013; Kimbell, 2014; Yee, White and Lennon, 2015), both for designers and the complex and collaborative situations design engages. As Thackara explains, 'complex systems are shaped by all the people who use them, and in this new era of collaborative innovation, designers are having to evolve […] to being the facilitators of change among large groups of people' (Thackara, 2005:7). This section reviews the emergence of contemporary design discourse through User-Centred Design and Participatory Design literature, and how they purport to affect innovation, before arguing for how an object-oriented approach can account for the situational controversies design encounters.

Design-led or Co-Design

Discussion on the changing role of designers and their methods in a co-design process (Brandt, Binder and Sanders, 2012; Atkinson, 2006) seems to centre on design as a leader of innovation (Verganti, 2013) or design as the democratisation of innovation (von Hippel, 2006).

Design Thinking, which emerged from the American-led discourse of User-Centred Design, professes to take shape as a vehicle for change (Brown, 2009) that can provide human-centred innovation. There is a conscious attempt in the literature to 'distance itself from the analytical and quantitative, to the intuitive and qualitative,' while still being 'framed in business-speak' (Press, 2012). This positions designers as empathic leaders, delivering creativity within strategic decision-making and to 'bring design into the boardroom' (Brown, 2009:37). This looks to proliferate design methods and processes throughout an organisation, embedding a culture of innovation (Brown, 2009; Neumeier, 2009; Martin, 2009; Kelley, 2005 and others). A problem arises therefore in that the designer no longer embodies value, but the tools and process an organisation is told it can acquire, as though the designer and the methods were distinct from each other.

Norman and Verganti (2014) emphasise design research having potential to influence radical innovation by focusing research methodologies towards meaning-driven rather than technology-driven, incremental innovation (Norman and Verganti, 2014:16). Although the authors agree in identifying

3

meaning-change to inform design-led innovation, there is a lack of depth on such a re-positioning as the indicators for what is incremental or what is radical seem largely notional and speculative. Such discourse positions the design process as complex problem solving seemingly without disciplinary limitation and marks one of its inherent tensions. Creativity through design-led innovation is seemingly placed on a pedestal as a matter of fact, something the process inherently does, rather than understanding the situational and unpredictable collaborations developed through the innovation of practice.

Participatory Design, by contrast, developed mainly in Northern Europe in the 1970s through methods of integrating new technologies and systems within organisations. Simonsen and Hertzum (2012) tell how 'Participatory Design started from the simple standpoint that those affected by a design should have a say in the design process' (Simonsen and Hertzum, 2012:103). So the process of constructing the problem with participants is as important as the production of an artefact (Bredies, Chow and Joost, 2010:164). Such 'democratisation' of the design process has only recently been folded into the wider discourse of design-led innovation as its principles sat in contrast to the 'existing power structures' of most organisations, 'the expert mind-set', and seems antithetical to the consumerism that has shaped organisational culture (Sanders and Stappers, 2008). Bjögvinsson, Ehn and Hillgren (2012) refer to this process of creating democratic conditions for Participatory Design as the 'staging' and 'infrastructuring' of *design Things* (Bjögvinsson, Ehn and Hillgren, 2012:103). They recognise parallels in the appealing rhetoric of Design Thinking with many of the concepts explored in Participatory Design, but distinguish their approach to innovation through engagement with the socio-material, as opposed to fluid notions of design intuition.

Making Design Explicit

Bredies, Chow and Joost (2010) highlight the differing approaches for involving interpretations of use within each design process. In mediating the creative process 'designers often impose their methods for expression' on the participants (Bredies, Chow and Joost, 2010: 168). It is seen as a continuing issue how designers interpret other people's professional practice when representing them through design. Sanders and Stappers (2008) identify the rising challenge for design's relevance as a profession by emphasising the wider skills future designers will need to adopt (Sanders and Stappers, 2008:15). There is a sense of a gamble for designers in the

increasingly complex skillset they will be expected to develop, without some way to make design's contribution more explicit across the disciplinary boundaries they encounter.

It is for this reason this paper has positioned itself as a response to Latour's call for design to develop ways of representing 'the controversial and contradictory nature of matters of concern' (Latour, 2008:9). Latour argues that through our will to modernise technologically, scientifically and economically, 'we rendered more and more explicit the fragility of the life support systems that make our 'spheres of existence' possible' (Latour, 2007); what Sloterdijk (2004) called, explicitation. In other words, what earlier was taken for granted has now become explicit matters of concern. It is from this concept of explicitation that design is positioned as a 'precautionary Prometheus', asking how design can find a more considered approach to be 'carefully radical, or radically careful' (Latour, 2008:5).

This paper proposes an object-oriented approach towards reporting on the role of design in complex collaborations. The notion of an object-oriented approach is derived from Science and Technology Studies (STS) research exploring object-oriented ontologies (OOO) (Morton, 2011), which seeks to understand the complex connections and networks that emerge between objects, or as Latour termed them, non-human actants (Latour, 2005). Actor-network theory (ANT) emerged from STS as an approach to observing and describing the associations between human and non-human actants that produce the effects of agency we observe around us (Latour, 2005). All effects of agency are phenomena often assumed as facts – such as a newspaper, an industrial sector, or perhaps the discipline of Design Management – and all can be thought of as actor-networks arising from the work of people and things that become visible or perceptual when performed.

Methodology

The methodology for this paper is adapted from the lead author's PhD thesis, which was developed and funded as part of research for the knowledge exchange hub, Design in Action (DiA). Four DiA-funded fledgling businesses are presented in this paper as brief case studies using actor-network mapping (Johnson, 2016), derived from actor-network theory (ANT), to capture each business's development, and situational analysis (Clarke, 2005) to interpret the matters of concern in each case. Together, these methods follow the essential separation understood between action (representation) and reflection (interpretation), as proposed by Schön's *reflection-in-action* (1983), and constitute the object-oriented approach to representing design-led innovation explored in this paper.

Actor-Network Mapping

ANT is foregrounded as the core method of representation as it situates the design things within the organisational work being performed. An ANT approach uses ethnographic methods such as observation and interviews with the actors within the network (Mewburn, 2010) to tell 'stories of how things, objects, actors, come to be how they are [...] through a process of interaction with other actors.' How interaction 'changes actors' and 'translates actors' (Kraal, 2007:6). The main tenet in ANT is 'that actors themselves make everything, including their own frames, their own theories, their own contexts, their own metaphysics, even their own ontologies' (Latour, 2005: 150). Callon (1986) provides a four step research frame for assembling actor-networks: *interessement*, *enrollment*, *point of passage* and *trial of strength*. Akrich (1992) neatly outlines how these steps go toward assembling the actor-network necessary.

For the purposes of this paper, actor-network mapping focuses on points of passage as the 'one or more actors [...] who assigns roles [...] or acts as spokesperson for the other actors in the network.' The mapping structure (please see fig. 1) is based upon a timeline represented by a bold black horizontal line along the base of each map, and concentric, evenly distributed, semi-circular blue lines broken down into three sections: historical, live and potential. These sections frame the activity surrounding each business, while the concentric lines provide degrees of separation by which to order the identified actors and actants to be mapped, from those internal or external to the actor-network.
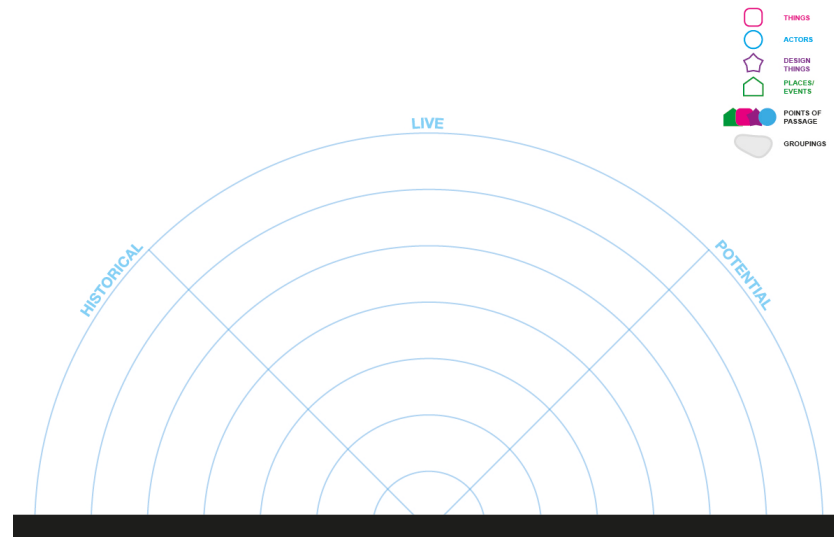
6

Figure 1   Actor-network Mapping Structure. Source: Johnson, 2016.

The actors and actants within each actor-network were designated into four categories represented as varying shaped nodes. Actors, a blue circle representing any human individuals, discernable groups or organisations. Things, a rounded pink square representing any non-human artefact, document, tool, entity or recognised group thereof. Design Things, a five-pointed purple star representing any non-human artefact, tool, visual representation or recognised output from design work. Places/Events, a house-shaped, green pentagon representing any recognised space, building, event, meeting or site where work had taken place.

Points of passage were distinguished by filling actants with the associated colour. As Callon's ANT research frame associates points of passage with inscribing roles, any actant inscribing a role to another actant is identified as a point of passage. The case studies presented are built around these identified points of passage, as they were deemed to best and most concisely describe key developments for each business. The physical mapping tool was composed of A3 fabric sheets, onto which card disks of the actants could be attached, similar to Velcro (see fig. 2).

7
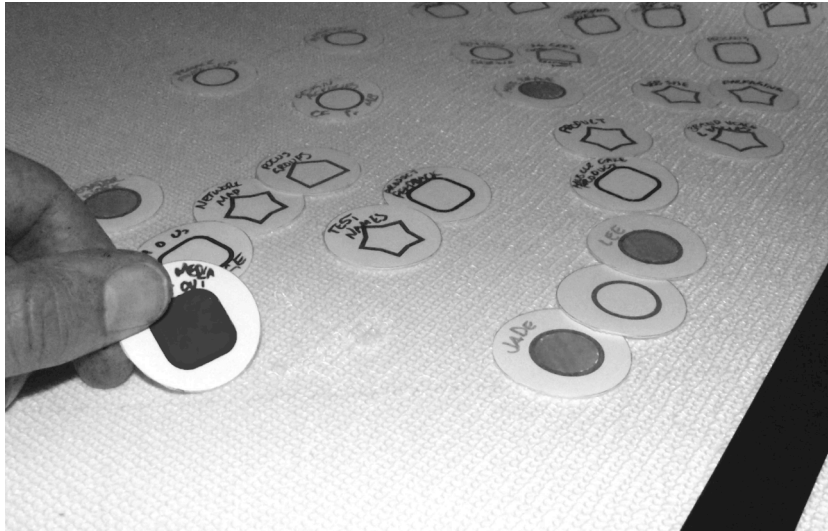
Figure 2   'Physical Actor-Network Mapping. Source: Johnson, 2016.

Situational Analysis

Clarke (2005) presents situational analysis as methods of mapping to support grounded theory analysis, the initial form being situational maps, which this paper has chosen to adapt through actor-network mapping. Situational maps 'lay out the major human, non-human, discursive, and other elements in the research situation of inquiry and provoke analysis of relations among them' (Clarke, 2005:xxii). In Clarke's method of situational mapping, the questions are: 'Who and what are in this situation? Who and what matters in this situation? What elements "make a difference" in this situation?' (Clarke, 2005:86). Of particular note is the contemplation of what elements facilitate or hinder access within the situation and representing these on the map (Clarke, 2005:87). These are questions of interpretation calling on the researcher's (or participant's) experience observing (or participating) in the situation under inquiry. These are recognised as important lines of inquiry towards identifying matters of concern, so were included within a process of relational analysis. To perform relational analysis, Clarke suggests the analyst 'literally centre on one element and draw lines between it and others and specify the nature of the relationship by describing the nature of that line' (Clarke, 2005:102). This is performed systematically, one selected element at a time.

For each case study, selected actants would undergo relational analysis drawn on sheets of translucent white fabric placed over each actor-network map, with the map visible underneath (see fig. 3). Firstly, the selected actant(s) is circled in pen, then every other actant that the informant felt mattered in relation to this actant was also circled. Lines of relation were drawn from the selected actant to each additionally circled actant. Finally, on each relation small circles were drawn to annotate the participant's interpretations of that relation. This would all be supported by asking questions on each relation, with the discussion audio-recorded ready for further analysis by the author following the interview.
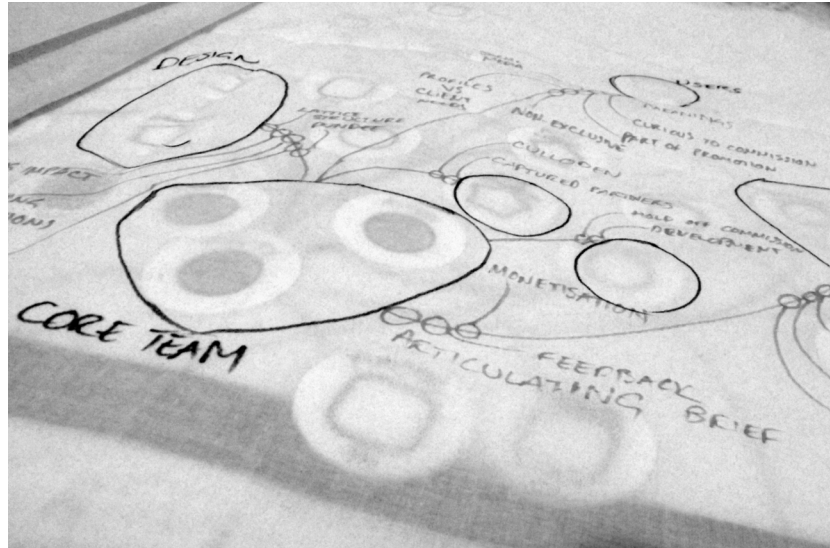
Figure 3   'Relational Analysis on Fabric Overlays'. Source: Johnson, 2016.

Case Studies

The four case studies were selected according to their coverage of the economic sectors pursued by DiA (wellbeing, food, sport, ICT and rural), their depth of engagement with DiA, design and its researchers, as well as how they represent situational complexities encountered across all the funded projects. Each case describes the slight variations in data collection and mapping undertaken. The actor-network maps and situational analysis for each case study are digitally redrawn to allow for clearer presentation.

9

Case Study: Know Sugar

Know Sugar represents the most design-led and innovative service business concept to be funded by DiA and comes from the first wellbeing-focused Chiasma. The core team constitutes a Service Designer, Design Thinker, Textile Designer and an Innovation Consultant. As one of the first funded businesses, it had the lead author assigned as PhD researcher to follow their development through semi-structured interviews and observation, which, on occasion, included actual participation in activities as a recognised design contributor to proceedings. The business concept itself concerns a shopping experience based on various products and services that facilitate and engage consumers to reduce their sugar intake.

Know Sugar: Points of Passage

A first major point of passage came following the exploratory research, where desktop research, expert interviews and initial concepts were explored and shared between the team members at an all day team session. The session ended with an improvised service blueprint, translating the team's research discussion and concepts into a proposed customer experience for behaviour change, which then informed a report to release further funding from DiA.

A second major point of passage came in the combined authority of a developing service blueprint for Know Sugar, and the lead entity (KS1) and her colleague (KS2). As Service Designers working in the same agency, they set up a digital project space on Basecamp for documents and visuals, which included iterations of the service blueprint as reference. Aspects of concept development occurred across the team, but only those that related to the service blueprint seemed to progress the concept.

A third major point of passage came in delivering a full prototype of the pop-up shop experience in a Dundee shopping centre. Additional designers, associated with the lead entity, were assigned to develop and produce prototypes ready for user experience testing. These were arranged as stations for visitors to experience in a scripted sequence, with volunteers assigned at each station to engage visitors with each concept and collect data. The purpose of the prototype was to develop evidence for the business concept to then take to potential partners/investors.

Figure 4   'Know Sugar Actor-Network Map: Feb 2013 - Aug 2014' Source: Johnson, 2016

Know Sugar: Matters of Concern

The key reflections for Know Sugar revolved around the complexity of their service blueprint and how it drove the approach pursued by the lead entity. From their exploratory research, the lead entity acknowledged controversial feedback to their concept, ultimately being recommended not to focus on sugar. However, when engaging a range of end users with the business concept focused on sugar, they expressed how 'It blew us away in terms of the level of people saying 'we need this, we want this, we would use this'.' This contradiction in response came to define the challenge for Know Sugar as they worked towards developing a prototype shop experience based around the level of interest they were having with end users:

We developed quite an in depth blueprint of what the prototype needs to be, […] not just a shop but a range of tools, with a Know Sugar scale being the core proposition with which to identify yourself […] then giving them like health advice information, exercise information – so that being maybe our IP – to then inform also a digital, not just channel in order to

11

like market it, but in order to use the service as much as you could to do it in a physical location as well. (Know Sugar, lead entity)

This acceptance of complexity and purpose was expressed as the business developments most interesting and innovative aspect, as well as its greatest challenge. It needed a model that was tangible and solid, but the catalyst has been the conversations about sugar, revealing the potential they sought. This challenge of matching the more solid business model with the responsive level of conversation around sugar fell onto the final delivered prototype, which did well to evidence the level of engagement with the conversation around sugar they were curating, but with regards to bringing in the right partners:

There's still a requirement to evidence a need and relevance for the idea. The idea needs to grow up by reflecting on how it's going to fit into the world [...] the idea needs to pick up the crest of a wave in people's changing attitudes and awareness with sugar, diabetes and obesity [...] or else get lost in a gradual, yet disingenuous shift in language and rhetoric by the food industries. (Know Sugar, partner)
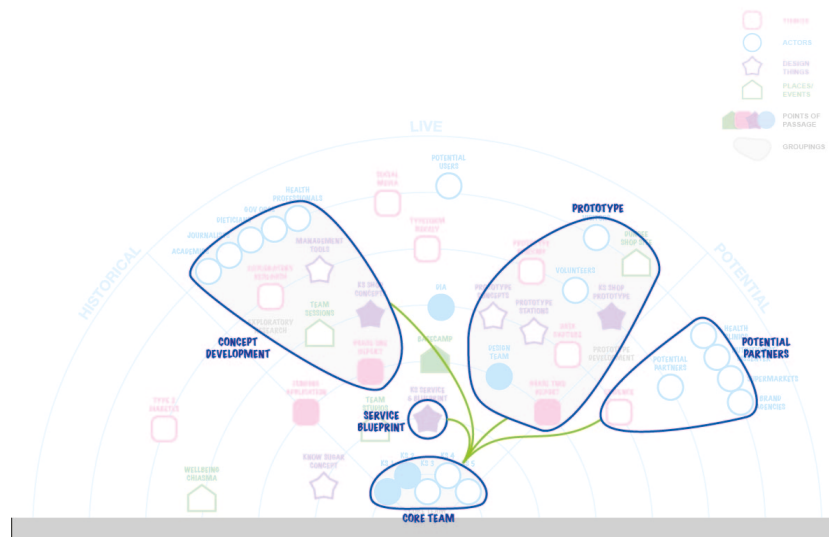

Figure 5   'Know Sugar Relational Analysis Overlay' Source: Johnson, 2016.

12

Case Study: UAN Wool

UAN Wool represents a business idea brought from outside the Chiasma process, yet from a lead entity who had experienced the first rural-focused Chiasma. While it was assigned a PhD researcher to follow its progress, this paper draws from data gathered from a reflective interview, mediated through visual mapping, towards the latter stages of the business's ongoing development. The business concept itself concerns using blends of Scottish sheep's wool as anti-allergy bedding.

UAN Wool: Points of Passage

A first major point of passage came with a successful funding application from the sole leading entity of the business (UAN 1). The concept and name of UAN Wool proposed in the application was conceived separately from the Rural Chiasma, although the lead did participate, and her application included a call for design support, under the advice of the DiA business manager.

A second major point of passage came with the design work, focus groups and business model development. The assigned DiA PhD researcher became the main design support, bringing in a textile designer (also studying service design), a graphics designer and later a digital designer to deliver materials for feedback within focus groups. This also resulted in the textile/service designer instilling a circular business model, with zero waste, as well as prototyping wool blends for the different qualities for bedding.

A third major point of passage came with the research into wool treatments conducted with Heriot Watts University, in order to qualify for UK Allergy Certification. This was conducted in parallel with the selection of wool blends deemed suitable for the initial product launch. This research also sought to evidence the ideal properties of wool for bedding.

Figure 6   *'UAN Wool Actor-Network Map: Feb 2013 - Feb 2014' Source: Johnson, 2016.*

UAN Wool: Matters of Concern

The lead entity's reflections during relational mapping initially focused on the work being done towards patenting her product and gaining UK Allergy certification (see fig. 7). However, from these reflections key matters of concern for design emerged that she felt were important to support her strategy to market. The key design-led process came from herself and a Textile Designer exploring varieties of wool blends for bedding. They expected to find evidence on the material and health benefits of Scottish wool already available, but this was not the case. The knowledge of what made a good wool blend came more through making and testing, revealing a product development model more comparable to food and drink:

> *As long as you know your properties of the wool, you can choose different blends. […] It's exactly like how whisky manufacturers do it. […] We worked out seven different blends and you can physically work it out there and then. […] It's not so much science, but experience of working with the material.* (UAN Wool, lead entity)

14

The emerging value and knowledge gained through working with the material became a key part of the business values, along with her motivating interest, which came to inform her preferred strategy to market in order to retain these values.

> *I want to take it as far as I can take it. […] I'd rather try the local test farm shops […] to demonstrate evidence of demand. The health side of the wool benefits, and the effects on sleep, are very important to the value of the product. The story at the moment is about a natural, Scottish based product, with enhancements added later.* (UAN Wool, lead entity)

This developing story is one she feels should target a premium market and so the website, packaging, communication and process of gathering feedback became paramount in the next stages of development. Through discussion during the relational analysis, she came to identify a design-led, cost-effective process to gather, communicate and evidence the story she feels will make the business, not just successful, but valuable.
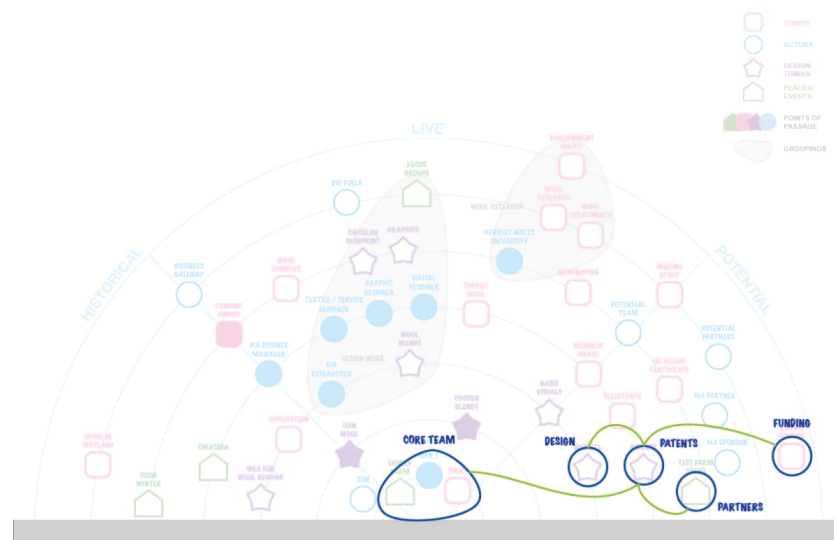

Figure 7   'UAN Wool Relational Analysis Overlay' Source: Johnson, 2016.

Case Study: ScrAPPbook

ScrAPPbook represents a non-profit, digital business concept funded by DiA and comes from the first ICT-focused Chiasma. This will also draw from data gathered from a reflective interview, mediated through visual mapping, towards the latter stages of the business's ongoing development. The business concept itself concerns bringing a digital platform to local communities for members and visitors to share their experiences, with potential for local partners to curate challenges.

ScrAPPbook: Points of Passage

A first major point of passage, following a successful application for initial funding, came with the enrolment of the core team. The original team from the ICT Chiasma had to be reshuffled due to other commitments and illness, leaving the lead entity to change one member into a conceptual mentor, and replace the other member with a business mentor from the wider network of DiA Chiasma members.

A second major point of passage came simultaneously with the core team being consolidated when they developed the ScrAPPbook branding and logo together. This was used to deliver a follow up presentation and business model to release further funding from DiA.

A third major point of passage came with delivering a prototype website in Badenoch, developed with a local web designer, engaging with a secondary school and local community members. Tasks were given to school pupils through workshops where they digitally captured places they had emotional responses to in their school and their grandparents stories of the local area, uploading them on the website.

Figure 8   'ScrAPPbook Actor-Network Map: Feb 2014 - Jan 2016' Source: Johnson, 2016.

ScrAPPbook: Matters of Concern

The lead entity expressed difficulty with the pressure of monetisation for the concept as her experience of delivering projects previously came from third party funding. The driving motivation for the concept came from providing a digital resource for communities that told stories, experiences and built a local identity, sustained by enrolling like-minded people. The initial process of branding and conceptualising the business idea was acknowledged as key to communicating it thereafter.

> *I've always been someone who sneered at branding […] it was money well spent. That nice piece of design, right at the outset, was really worth it… Helped us think what it was we were doing. I had found it difficult to describe the project before.* (ScrAPPbook, lead entity)

This stronger conceptualization gave the lead entity the confidence to focus her strategic development on potential partners who would be 'altruistic and would want this to benefit communities if we could'. This

17

confidence was reflected through the impact of the roleplay demonstration with, not just a selected potential design partner, but with a potential client in Culloden. Being a concept based on performative elements, such as storytelling, the business model and any contact with potential partners equally needed to replicate this storytelling element. When exploring the relational mapping across all the connections, a strategic design-influenced process began to be emerge around the business model:

> *Capturing case studies is really important. It will be crucial for engaging clients thereafter. [...] We haven't profiled our users, but we have profiled our clients. Once we secure a client, at that time we would do a little bit more about how the user group is structured. An inner circle who get it and want to use it. [...] There is a structure to it, but every place is going to be different. We know not everyone will take to it as easily as others.* (ScrAPPbook, lead entity)

Figure 9   'ScrAPPbook Relational Analysis Overlay' Source: Johnson, 2016

Case Study: Muscle Cake

Muscle Cake represents the last business concept funded by DiA and comes from the last food-focused Chiasma, but also incorporates elements of sport. This also draws from data gathered from a reflective interview, mediated through visual mapping, but also includes observation from the lead author's participation in activities as a recognised design contributor to proceedings. The business concept itself is a high-protein, baked cake delivered direct to the customer via a subscription service model.

Muscle Cake: Points of Passage

A first major point of passage came with the successful funding application, as not only was the concept and team articulated, but the team members (all young entrepreneurs) committed themselves full-time to the business development. This established a strict six-month timeline to launch and a heightened strategic approach.

The second major point of passage came with the first stage of development, recruiting a network of ambassadors for their business through social media. This network represented their beachhead market of aspiring athletes, gym owners and weight lifters, who would be engaged about feedback for test names and the basic concept through focus groups and surveys.

The third major point of passage came with the simultaneous development of the Muscle Cake food product itself, with food science academics, and initial branding with a design agency for the packaging and website. These would be tested in a second stage of focus groups, led by DiA with support from this paper's lead author. The participants selected offered feedback on each element of the business, including tasting sessions, to inform a final stage of development before launch.

Figure 10 'Muscle Cake Actor-Network Map: Nov 2015 - Mar 2016' Source: Johnson, 2016.

Muscle Cake: Matters of Concern

The emergent matters of concern for Muscle Cake are identified here in relation to their timeline towards launch and how engagement with potential customers came to inform design concerns. The identification and selection of their Ambassadors was emphasised as a crucial element of their business model and ongoing development, with a long list of mutual benefits drawn up to engrain the role:

Ambassadors contribute to social media presence, feature on the website, can gain apparel, as well as allowances for the product, by helping to roll out the product on the ground. They are the calorie counters keeping track of what they're eating. If they eat it, others will eat it. They love being called ambassadors. (Muscle Cake, partner)

This process of high-engagement with expert users supported their developing brand identity, which was keen to be inclusive of women and needed to be valuable beyond the product itself towards a more mature, empowering relationship with fitness.

> *It's not a shake or bar, like men associate. A brownie is not so clinically driven. […] The diet industry is changing from short term diets to long term balanced diets, empowering women with a healthy lifestyle. Cheating is part of the lifestyle. We're passionate about becoming leaders in the state of mind market […] it's less about calories but about an education and balanced diet.* (Muscle Cake, partner)

When first iterations of the product concept were tested with a wider market of end users, the role of design in co-developing the product, packaging, communication and values became more explicit. From the focus groups, the product came out strongly in taste and representing treats for the strength and fitness market. Key concerns emerged around the website moving away from clinical gym associations, packaging providing clever, subtle functionality over big branding, and added value coming from connecting to a like-minded community.

Figure 11 'Muscle Cake Relational Analysis Overlay' Source: Johnson, 2016

Discussion

This methodological paper explored actor-network mapping as an approach to represent and interpret the role of design in the development of select fledgling businesses within the DiA portfolio. The aim of this approach was to make design-led innovation more explicit within the complex situations it increasingly engages, by articulating the mapped design things, in association with wider actants, as *matters of concern*. This discussion section reviews whether actor-network mapping achieved this and what this reveals about design-led innovation in relation to wider literature.

Representing Matters of Concern

The extent of challenges and matters of concern expressed through interviews and actor-network mapping sessions emphasised a need for design things to be pushed, refined and differentiated as methods of representation and interpretation in business development. The question of whether actor-network mapping supported ways of navigating each case situation is under-substantiated, but it is argued it raised the question as part of future strategic development along both *progressive* and *lateral* dimensions. The progressive dimension is related to perceived improvement, growth or effects of agency, highlighted by the presentation of *points of passage*. The lateral dimension is related to outward looking moments of reflection, exploration and learning through engagement with the wider actants.

Laterally, Know Sugar engaged a wide network of crucial actants, deconstructing the issues of sugar intake very effectively, however consideration and enrolment of the progressive stakeholders for business development were ultimately lacking. UAN Wool followed a strong balance in product development through testing multiple Scottish wool blends to learn of the properties material effects, while also pursuing multiple lines of inquiry on the product's wider benefits against sleep deprivation, allergies and zero waste production; all while identifying the actors that could officially certify such values. ScrAPPbook demonstrated a high lateral sense of exploring the conceptual potential of providing such a digital platform for communities, but has taken a long time to learn of the demands, interests and commercial sustainability of client buy-in, to a point of focusing any roll-out strategy around identifying and capturing their needs. Muscle Cake set out to immediately establish a strong lateral support of ambassadors to

22

validate each stage of development as effectively as possible. While the quality of the product was important, it was seen as secondary to capturing and articulating a leading brand for empowering healthy lifestyles.

Across the cases, having a visual reference of key actants, people and things, arranged to express a design situation certainly allowed a breadth of reflection and analysis that the design participants hadn't pursued before. The strongest evidence for the approach came in its overall form, from attempting to represent the situation collectively, so that participants accepted it as a reference to examine, to relating concerns around key actants to the wider issues that emerged, so that situation-sensitive strategies could emerge. The importance of the approach is that it was *object-oriented*, that having the reference to actants, and points of passage, led to conversations about what they were doing, how they were doing it and how it could be done better. It is these discussions that are argued to have most informed an *explicit* discourse. Design things became matters of concern through these discussions. Not always explicit concerns in discourse, but there was *explicitation* of the situation through analysis, and this is the methodological contribution that this paper claims to make. When the space was created for such a line of discussion, the resultant discourse is proposed to reveal design as a *performative* act.

Design as a Performative Act

Actor-network mapping attempts to visually situate the design artefacts within the wider actor-network and, therefore, act as a reference mediating dialogue around the object of design between designers and participants. Binder et al. (2011) hold that for design things to have value and significance, they have to become part of the living experience of human beings in the way these afford, invite, and oblige interactions. This process is seen to have a 'performative potential' that is sought to maximise the final thing to be delivered (Binder et al. 2011, 128). So for them, the context of the design dialogue with participants is just as important as the design things themselves, but it is their setting, the way design things and the design situation are co-constructed, that distinguishes such an approach. This is a major part of where actor-network mapping seeks to contribute methodologically.

Each design situation, whether it includes progressive points of passage or lateral reflection and engagement, is a process of trying to fine-tune these contradictory dimensions as matters of concern. To propose that design is acting along these two dimensions is not, or should not be, to

predetermine the effects design will have, but to set the parameters by which design could be judged. It is the *while also* that determines how careful, how strong, how attentive to matters of concern, how reflexive the act of design and the culminating design thing can be evaluated to be. It is this fine-tuning of the design act that points towards articulations of design knowledge, or more precisely, the distribution of a *performative knowledge* through objects, people, systems and the environment. Once it is distributed, it needs to be gathered and performed again to matter, to affect change. This doesn't need to be done fully anew, as there are various people, things and design things that are in place to perform it again.

In *The Semantic Turn* (2006), Krippendorff presents a comprehensive interpretation of constructivism for design and proposes a set of methods for design analysis and projection. Krippendorff's basic assumption is that people, in perceiving artefacts, construct and coordinate meanings by assuming a mutual understanding, so designers should employ this 'second-order understanding' if the artefacts are to be useful, usable and understandable. Bredies, Chow and Joost (2010) suggest that the less familiar a new artefact is, the more its meaning has to be coordinated anew, the more uncertain second-order understanding becomes. For them, it means that the more a design artefact deviates from the norm, understanding it (in terms of use) becomes increasingly similar to designing (Bredies, Chow and Joost, 2010:159).

In design-led innovation, the success of a new design thing (business or concept) cannot necessarily be deduced from existing meanings, as it requires a re-coordination of those meanings. It must be *performed* within a new context, and this is what an object-oriented discourse is argued to provide.

Conclusion

Across design-led innovation, the designer is often entering into a situation for which they have little direct expertise or experience (new technology, established organisations, socio-cultural issues); yet, are often able to engage with the contextual design problem with a variety of actors, collaborators and participants, through various methods using and producing design things. This highlights the opportunity space this paper has labelled as methodologically establishing an *object-oriented approach* to providing a more explicit design discourse*.*

This paper has presented the method of actor-network mapping, and situational analysis, as such an approach towards making design-led innovation more explicit within discourse. The limitations of this research are manifold. Design in Action cannot represent the wide variation of design-led innovation as a whole, but does represent a novel example of design-led innovation through its method of business creation through Chiasma. The variable accessibility and unpredictability of data collection for the case studies, while circumstantially dependent, leaves the selection open to scrutiny, however the method of actor-network mapping is argued to provide detailed references for analysis. These are also unsubstantiated cases in that none represent fully established businesses at the end of data collection, but in ongoing development.

Future research would seek to perform and develop similar methods of actor-network mapping with cases studies in various stages of new business development, establishment and change. Fledgling businesses are a very particular context, though of paramount concern for DiA, so such a method of data capture is intended to be applied across further contexts of design-led innovation to validate the method in practice and extract design theory.

25

References

Acklin, C., Cruickshank, L., and Evans, M. (2013) Challenges of introducing new design and design management knowledge into the innovation activities of SMEs with little or no prior design activities. *European Academy of Design – Crafting the Future*, Gothenburg, April 2013, http://eprints.lancs.ac.uk/71802/

Akrich, M. (1992) Beyond social construction of technology: the shaping of people and things in the innovation process. *New technology at the outset* (pp. 173-190). Campus/Westview.

Atkinson, P. (2006) Do it yourself: democracy and design. *Journal of Design History*, 19(1), 1-10.

Beacham, C., & Shambaugh, N. (2011) Contemporary uses of design thinking across society, work, and the individual. *Design Principles & Practices*, *5*(5).

Binder, T., De Michelis, G., Ehn, P., Jacucci, G., Linde, P. and Wagner, I., (2011) *Design Things*, MIT Press.

Bjögvinsson, E., Ehn, P. & Hillgren, P. (2012) Design Things and Design Thinking: Contemporary Participatory Design Challenges. *Design Issues 28*(3) 101-116.

Brandt, E., Binder, T., & Sanders, E. B. N. (2012) Ways to engage telling, making and enacting. *Routledge international handbook of participatory design. Routledge, New York*, 145-181.

Bredies, K., Chow, R. & Joost, G. (2010) Addressing Use as Design: A Comparison of Constructivist Design Approaches. *Design Journal 13*(2), 157-180.

Brown, T. (2009) Change by Design: how design thinking transforms organizations and inspires innovation, New York: Harper Collins.

Callon, M. (1986) Some Elements of Sociology of Translation: Domestication of the Scallops and the Fishermen of the Saint Brieuc Bay. *Power, Action, and Belief: A new sociology of Knowledge?*

Carlgren, L., Elmquist, M., & Rauth, I. (2013) Perceptions of the value of Design Thinking in innovation in large firms. *EAD Conference 2013, Göteborg*.

Clarke, A. (2005) *Situational Analysis: Grounded theory after the postmodern turn*, California: Sage Publicationst.

Johnson, M. P. (2016) *Mapping Design Things: making design explicit in the discourse of change*, PhD Thesis, Glasgow Schoo of Art

Kearney, G., and McHattie, L. (2014) Supporting the open innovation process in small and medium enterprises. *International Journal of Entrepreneurship and Small Business*, *23.4*, pp 552–557.

Kelley, T. (2006) *Ten Faces of Innovation,* London: Profile Books Ltd.

Kimbell, L. (2014) *The Service Innovation Handbook*, Amsterdam, BIS Publishers.

Krippendorff, K. (2006) *The Semantic Turn: A New Foundation for Design.* Boca Raton, FL: Taylor and Francis.

Kraal, B. J. (2007) Actor-network inspired design research: Methodology and reflections. *Proceedings Internationl Association of Societies for Design Research*, Hong Kong.

Latour, B. (2005) *Reassembling the Social: an introduction to actor-network theory,* Oxford: Oxford University Press.

Latour, B. (2007) To modernize or to ecologise? That is the question. *The Politics of Interventions*, *249*.

Latour, B. (2008) A cautious prometheus? A few steps toward a philosophy of design (with special attention to Peter Sloterdijk). *Proceedings of the 2008 annual international conference of the Design History Society* (pp. 2-10).

Martin, R. (2009) *The Design of Business: why design thinking is the next competitive advantage*, Boston: Harvard Business School Publishing.

Mewburn, I. (2011) Lost in translation: Reconsidering reflective practice and design studio pedagogy. *Arts and Humanities in Higher Education 11* (2012) 363-379.

Neumeier, M. (2009) *The Designful Company: how to build a culture of nonstop innovation*, Berkeley: New Riders

Norman, D.A., and Verganti, R. (2014) Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change. *Design Issues*, *30.1*, pp 78–96.

Sanders, E. B.-N & Stappers, P. (2008) Co-creation and the New Landscapes of Design. *CoDesign; International Journal of CoCreation in Design and the Arts*, 4(1), 5-18.

Schön, D. A. (1983) *The Reflective Practitioner: how professionals think in action,* Basic Books Publishing.

Simonsen, J. & Hertzum, M. (2012) Sustained Participatory Design: extending the iterative approach. *Design Issues, 28*(3), 10-21.

27

Thackara, J. (2005) *In the Bubble: Designing in a complex world*, MIT Press, Cambridge.

Verganti, R. (2013) *Design-Driven Innovation: changing the rules of competition by radically innovating what things mean*, Boston: Harvard Business Press.

Von Hippel, E. (2006) *Democratising innovation*. Cambridge, MA: MIT Press.

Yee, J.S.R. (2010) Methodological Innovation in Practice-Based Design Doctorates. *Journal of Research Practice*, 6.2 ,pp 1–23.

Yee, J., White, H. & L, Lennon (2015) Valuing Design in Public and Third Sector Organisations. *11th IEAD Conference 'The Value of Design Research'*, Paris, April 22-24, 2015.