



# RE-MANTLE & MAKE

Feasibility Report for Future  
Makespaces in RdM







One of the most salient challenges facing designers today is the global impact of the linear take, make, use and dispose model of production and consumption. The dominant model in the fashion industry extracts raw materials, energy intensive processes transport and then manipulate them into products, and consumers use products in use before throwing them away when they no longer have a useful life. Within the UK alone, we dispose of approximately 10,000 garments every ten minutes. An unsustainable model for a future that has disappearing material resources, energy scarcity and a society more aware of the human impact on our environments. This study focused specifically on the practice of textile and fashion design in the UK to consider a more holistic approach for designing and manufacturing within these sectors, and explore the role maker spaces could play in a future landscape of sustainable production.



**INSTITUTE  
OF DESIGN  
INNOVATION  
THE GLASGOW  
SCHOOL OF ART**



**Future Makespaces**  
in Redistributed Manufacturing



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## EXECUTIVE SUMMARY

Re-Mantle and Make is a six-month feasibility study led by the Glasgow School of Art exploring how future make spaces can be utilised as local hubs to support innovation within Scotland's circular economy, particularly within the Scottish textile sector. This research is funded by a larger project titled 'Future Makespaces in Redistributed Manufacturing', a two-year research project funded by the Engineering and Physical Sciences Research Council (EPSRC), which is led by the Royal College of Art, London. Our study has been undertaken in partnership with Kalopsia Collective, a micro-manufacturing unit based in Edinburgh, Scotland.

The project conducted practice-led research through two Re-Make-a-Thon workshops in urban and rural contexts of Scotland, and consolidated initial findings through a final roundtable seminar for industry experts and project partners, alongside showcasing the finished artefacts within a Pop Up exhibition.

The project engaged a variety of designers and key stakeholders through the 'Re-Make-a-Thon' events to produce a small collection of open source, collar designs within a circular economy model. The participants used surplus textile materials, such as leather, lace and cashmere – all remnants sourced from Scottish textile manufacturers. These events were hosted in make

spaces, providing access to digital fabrication tools such as; laser cutters, domestic sewing and digital embroidery machines, with technical staff available throughout to provide support.

In addition to producing a unique and varied collection, the project prototyped a potential 'future make space' model for circular textile design to scope what tools, techniques, equipment and materials might be required to position a future scenario for micro-manufacturing that truly supports circular innovation.

The study gained key insights into the barriers and opportunities to implementing circular economy principals to effectively close the loop iwithin Scotland's textile sector. By engaging the interests, roles, responsibilities and knowledge of the key stakeholders through design innovation tools and challenges, this report evidences a major impetus for such models in the future, recommendations for better connecting key stakeholders, and the central role maker spaces can have in a sustainable future for design. This project would not have been possible without support from Scottish textile manufacturers, engagement with higher-education institutions, small to medium textile enterprises and policy makers to investigate the potential for sustainable, circular design futures in the textile industry.









## PROJECT DETAILS

This study aimed to investigate how we might use make spaces to cultivate circular thinking for textile designers and to provide them with resources to develop circular design knowledge and practice. Re-Mantle and Make was defined as a term and as a provocation to challenge our perceived perception of a finished artefact. Alongside, aiming to demonstrate how future maker spaces could be developed to experiment with strategies for material recovery, repair and reuse on a local scale, providing educational hubs for designers to experiment and learn. Most recently, the Ellen

MacArthur Foundation has partnered with world leading design agency IDEO (Jan, 2016) to explore how design might play a strategic role in supporting circular innovation to support systemic change. This research expands upon this work but within the context of textile design.

## PROJECT TEAM



### DR JEN BALLIE

**Primary Investigator:**  
*Research Manager,  
V&A Dundee Design Museum*

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Jen is a designer and researcher whose design journey began within the discipline of textile design but quickly became interdisciplinary drawing upon user experience, interaction and service design. Jen was awarded her PhD from the University of the Arts, London (2014). Her practice based research titled 'e-Co-Textile design' applied the concept of 'fashion activism' to explore how textile design and making, might be combined with social and digital media tools, to pilot alternative fast fashion models and promote sustainability.

Jen has designed collaborative projects and piloted them with retailers Marks and Spencer and ASOS and showcased work within the London Design Festival and Victoria and Albert Museum, London alongside consulting on projects for Zero Waste Scotland and the Edinburgh International Fashion Festival. Jen also contributes to the Global Service Design Jam's each year and has participated within Make-a-thon's at IDEO, London. In her spare time, Jen is volunteer coordinator for Fashion Revolution in Scotland, an online global movement initiated to raise awareness about ethics in the fashion industry.



### DR PAUL SMITH

**Co-Investigator:**  
*Research Fellow, The Institute of Design  
Innovation, Glasgow School of Art*

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Dr Paul Smith is a designer and Research Fellow at the Institute of Design Innovation in the Design School of the Glasgow School of Art. His current work focuses on creative engagement of citizens in the design and development of solutions to real world problems and creating a more open, innovative and locally active society. Paul holds master's degrees in Computer Aided Product Development (2006) and Additive Manufacturing (2008), and holds a PhD in Computer Aided Generative Design (2011) awarded for his work as part of the Additive Manufacturing Research Group at Lancaster University.

His research interests include: open design, citizen innovation, participatory design, the circular economy, digital fabrication technologies and new models of enterprise. He is also interested in research that explores the role of digital manufacturing technology in renewal and regeneration, especially in remote regions and on traditional making practices.



**DR LYNN-SAYERS MCHATTIE**

*Programme Director,  
The Institute of Design Innovation,  
Glasgow School of Art*

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Lynn-Sayers McHattie is a designer and researcher with over 20 years experience in the Creative Industries. She is Design Director for Post Graduate Research and the Creative Campus practice-based Cohort in the Highlands & Islands. As well as overseeing the Bag O' Clews and Innovation from Tradition programme of work, she was Co-Investigator of the AHRC funded Knowledge Exchange Hub Design in Action (DiA) in the focal area of wellbeing.



**DR MICHAEL PIERRE JOHNSON**

*Research Fellow,  
The Institute of Design Innovation,  
Glasgow School of Art*

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Michael is a post-doctoral design research fellow experienced in ethnographic research and design-led approaches to inform product, digital, service and organisational innovation. His research interests are on making the effects and viability of design innovation approaches, and the preferable changes they seek to serve, more explicit within increasingly complex collaborative contexts.



**ZOË PROSSER**

*Postgraduate Research Student,  
The Institute of Design Innovation,  
Glasgow School of Art*

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Zoë is a postgraduate research student and intern at the Institute of Design Innovation. Coming from a background in Product Design, her current research focuses upon the application of social design practices within the emerging phenomena of community landownership in Scotland. With a particular focus on community engagement, participatory design and action research, Zoë hopes to facilitate the sharing of knowledge between rural and urban landscapes.









## PROJECT APPROACH



## PROJECT SUMMARY & RELEVANCE

Within the UK textile sector there is increasing awareness of the requirement for new textile initiatives to be linked with the concept of the circular economy (Goldsworthy and Earley, 2016), but there is a lack of innovation tools and practical knowledge and accessible evidence available to provide support. Within the UK, the RSA's Great Recovery programme has focused on the role of the design community in delivering a more circular economy. They highlight the importance of acknowledging that it is not the designer's responsibility alone to change whole supply chains. Businesses must begin to develop design briefs around new business models that take account of provenance,

longevity, impacts and end of life (RSA, 2013). Building trust and initiating partnerships with Scottish textile manufacturers were crucial. In addition to knowledge exchange events to support joined-up thinking to connect all stakeholders involved in the lifecycle of textile material journeys and new supply chain models.

This research aimed to identify what strategies and innovation tools are required to cultivate 'Circular Textile Thinking'. Here, for the purpose of this paper, the term 'designer' is applied to define fashion and or textile designers. However, it is worth acknowledging that traditional design disciplines are no longer a clear-cut categorisation of



design professionals, and that new hybrid roles are emerging, particularly within the area of maker spaces (Thomas, 2015). Within these physical hubs, technology, skills, ideology and education can come together to explore and experiment with new ideas and possible futures. The propagation of open workshops that are supporting small producers to access skills and equipment to design and make, termed the ‘maker space movement’, has been coined ‘the next industrial revolution’ by Anderson (2011). Where Designers are learning that co-creation, rather than individual authorship, is becoming a more effective way to understand and meet social needs and new tools and platforms are

becoming more effective than finished artifacts (Thackara, 2013). This is part of a shift towards transmaterialisation, where service design concepts are evolving in parallel to product design development to construct new scenarios of use, reuse, design and redesign. In a genuinely circular fashion and textile system, design and use would comprise a single whole. What actually happens in the lives of people who use garments would provide inputs for fashion and textile design and production (Fletcher, 2015). Therefore, an important part of cultivating circular textile thinking must involve fostering skills and practices that are conducive to promoting a satisfying use of garments.





## PROJECT HYPOTHESIS

One of the most salient challenges facing designers today is the global impact of the linear take, make, use and dispose model of production and consumption. The dominant model in the fashion industry extracts raw materials, energy intensive processes transport and then manipulate them into products, and consumers use products in use before throwing them away when they no longer have a useful life. Within the UK alone, we dispose of approximately 10,000 garments every ten minutes. An unsustainable model for a future that has disappearing material resources, energy scarcity and a society more aware of the human impact on our environments. This study focused specifically on the

practice of textile and fashion design in the UK to consider a more holistic approach for designing and manufacturing within these sectors, and explore the role maker spaces could play in a future landscape of sustainable production.

The designer's role will need to move beyond just consideration of functionality and aesthetic sensibility. Designers are finding new socially aligned roles, envisioning new ways to produce goods, services, and even policy (Smith & Mortati, 2016). To work this way, designers need to acquire new skills, knowledge and experience to enable them to act as social innovators and become agents of change.



## OCTOBER

### *Stage 1:*

#### **Sourcing -**

Textile waste on a local scale

Build partnerships with manufacturers (Begg and Co, MYB Lace, Scottish Leather Group, Johnsons of Elgin)

Kalopsia Collective introduction and site tour

Factory Visit - Begg and Co

## NOVEMBER

### *Stage 1:*

#### **Sourcing -**

Textile waste on a local scale

Produce Design brief and commission x3 designers to produce archetypes

Present Peer Reviewed Paper at Circular Transitions Conference, Tate Britain, London November 2016

## DECEMBER

### *Stage 1:*

#### **Sourcing -**

Textile waste on a local scale

Factory Visit MYB Textiles

## JANUARY

### *Stage 2:*

#### **Prototyping -**

Circular archetypes

### *Stage 3:*

#### **Piloting -**

Assembling a circular maker space for textiles

Re-Make-a-Thon v.1, MAK Lab, Glasgow

Re-Visit Begg and Co

## FEBRUARY

### *Stage 2:*

#### **Prototyping -**

circular archetypes

### *Stage 3:*

#### **Piloting -**

Assembling a circular maker space for textiles

Re-Make-a-Thon v.2, Altyre Creative Campus, Forres

## MARCH

### *Stage 3:*

#### **Piloting -**

Assembling a circular maker space for textiles

### *Stage 4:*

#### **Evaluation -**

Lifecycle analysis

Round Table Seminar and Pop Up Showcase, MAK Lab, Glasgow

## APRIL

### *Stage 4:*

#### **Evaluation -**

Lifecycle analysis ongoing (future research)

Present Peer Reviewed Paper at European Academy of Design Conference, Rome, April 2017

## POSITIONING RE-MANTLE AND MAKE AS A CONCEPT

Re-Mantle and Make is an exploratory model designed to pilot a new approach for trailing a circular fashion system on a local scale contextualised within Scotland's textile sector. following sections outline the timeline and include a detailed overview of the four key stages of; sourcing; prototyping; piloting and evaluation.

Our approach is to pilot a range of different approaches for repurposing textile waste within a future maker space. However, to align to the principals of the circular economy we will endeavor to preserve and enhance natural capital, optimise the use of resources and foster system effectiveness by designing out wastefulness. This will require collaboration

and a range of manufacturers have generously agreed to provide access to their textile waste. Three designers were commissioned to produce circular archetypes in response to a design brief, these archetypes provided stimuli to craft conversations within the 'Re-Make-a-thon' events and orchestrate further ideas for circular innovation. Within the final stages of the study a panel of specialists from across the supply chain reviewed the concepts and be invited to make recommendations on feasibility and the most viable concepts will be produced within the Kalopsia micro-manufacturing unit. A short film was produced to document each stage of the study and this was showcased within a Pop Up exhibition.





## **STAGE 1: SOURCING – TEXTILE WASTE ON A LOCAL SCALE**

The first stage of the study was undertaken through a consultation with key stakeholders situated within the Scottish textile sector and identified a growing awareness and responsiveness to circular innovation. This could be credited to the work undertaken by Zero Waste Scotland who provided a range of training programs and master classes (Zero Waste Scotland, 2014-16) tailored to demonstrate a wealth of different strategies such as design for modularity, collaborative consumption, zero waste design and pattern cutting and material efficiency. The Scottish Textile and Leather Association (STLA) that provides support for approximately ninety-five businesses of varying

scale were also consulted. They made recommendations of manufacturers who might be responsive in donating textile waste and participating within the study.

The Scottish Leather Group provided leather waste generated during their manufacturing processes, MYB Textiles provided offcuts of traditional Scottish lace and Begg and Company and Johnston's of Elgin are provided remnants of traditional Scottish cashmere.



## STAGE 2: PROTOTYPING – CIRCULAR ARCHETYPES

Prior to introducing the design brief for prototyping it was important to acknowledge that context is everything. Earley and Goldsworthy (2015) highlight that we need to be very clear about which segment of the fashion industry we are designing for and also which specific garment archetype. They continue by stating that while strategies may be more relevant for the mass market and high street fashion (short-life), others will be focused on more niche, SME brands and even reach beyond industry to the user (long-life) (Earley and Goldsworthy, *ibid*). The Re-Mantle and Make model aims to prototype a long-life, circular archetype that has the potential to be transformed within a make space to enable the archetype

to evolve through different design loops. The market place may be positioned somewhere in between the high street and luxury retail.

A design brief was written (see below) which provides an overview of a circular fashion archetype. Three textile designers have been commissioned to conduct research and development to produce a concept, demonstrated through a prototype and presented as an open source package for others to replicate or modify. The maker space facilities were available to support sampling and production and at least one of the materials need to be included.

## THE DESIGN BRIEF: CIRCULAR COLLAR

'Fashion clothes capture a moment in time and are as quickly forgotten. But what if that moment was not one but many moments... a process of transformation?' (Earley & Fletcher, 2003).

### ***Design Challenge:***

To prototype a circular design concept for a collar that can be worn with existing garments. This project aims to shift our perception of fashion archetypes and the collar needs to be open source, the original conception of a collar can be hacked or modified to produce a hybrid concept. This must apply a modular design approach and consider how to sustain a long-life. The collar will be initially produced within a maker space and this can be used to provide a range of different services to support transformation through workshops or a menu of tailored options.

### ***Facilities:***

3-D Printer, Digital Textile Printer, Digital Embroidery Machine, hand stitching and embroidery, screen printing.

### ***Materials:***

Leather, lace and cashmere.

### ***Inspiration:***

The following open source fashion archetypes are available to reference; the Uniform Project (ref), Smock Shop (ref), SHOW studios Design Download project (2009 - ongoing) provides downloadable fashion garment

patterns from previous catwalk collectives from several high profile fashion designers (McQueen, Galliano, Pugh, Yamamoto, Watanabe, Price and Margiela, 2009). Each of these projects utilise social media to adopt an open source approach for distributing patterns and downloadable templates.

### ***Three textile designers have been commissioned:***

Shirley McLauchlan; Heather Martin; and Christie Alexander.

They were invited to design a circular collar with reference to the design brief, documenting the process for others to replicate or reference. They have also been encouraged to challenge themselves as designers to re-think new ways of designing, with value associated to consumer use, attachment and stronger 'user-product' and 'user-manufacturer' relationships. The emphasis on product care and maintenance will become more important, and the cultivation of a more considerate approach to consumption in which the user is provided with an opportunity to learn new skills, knowledge, and are motivated to extend the life or use of their clothing. This research endeavours to learn more about the drivers for cultivating resourcefulness and cherishability within fashion and textiles, but experimentation was required to identify creative methods through which they may be implemented.







**STAGE 3: PILOTING -  
ASSEMBLING A  
CIRCULAR MAKER  
SPACE FOR TEXTILES**

Stage 3: Piloting – assembling a circular maker space for textiles  
This research piloted the concept of Re-Mantle and Make within a Re-Make-a-Thon, an interactive event orchestrated to invite a selected group of stakeholders to work collectively to address a design challenge or problem over an intensive period of time. Within this instance, the event was one full day and replicated in both a rural and urban context. While we focus on the role of the textile designer within this study, it is worth acknowledging that the design events supported collaboration and input from additional stakeholders across the supply chain from the manufacturers providing the textile waste, to other local businesses, design students,

policy makers and citizens.

The commissioned designers were invited to share their prototypes and to demonstrate their making processes and reflect on their personal journeys. Within these events, we explored additional design ideas for circular collars through ideation and prototyping activities. An experience prototype of a future maker space will also be curated to enable participants to experience the model in situ and to provide them with an opportunity to offer feedback and make recommendations. The project partner Kalopsia played a pivotal role in servicing the production of emerging design concepts.





## STAGE 4: EVALUATION - LIFECYCLE ANALYSIS

The final stages of the research focused on evaluating the prototypes and introducing lifecycle thinking as a visual framework for design ideation to encourage a deeper understanding of the key issues and barriers to closing the loop on textiles. By mapping the varied routes around and through the lifecycle, we can design new briefs for the designer working towards a more connected material economy.

Although in general terms consumer products have come to be considered disposable, it is argued that through 'good' design there is an opportunity to establish an emotional bond or attachment between the user and

the product but this will require associated practices of care in order to help sustain and extend product lifetimes (Chapman, 2005; Walker, 2006; Schifferstein & Zwartkruis-Pelgrim, 2008).

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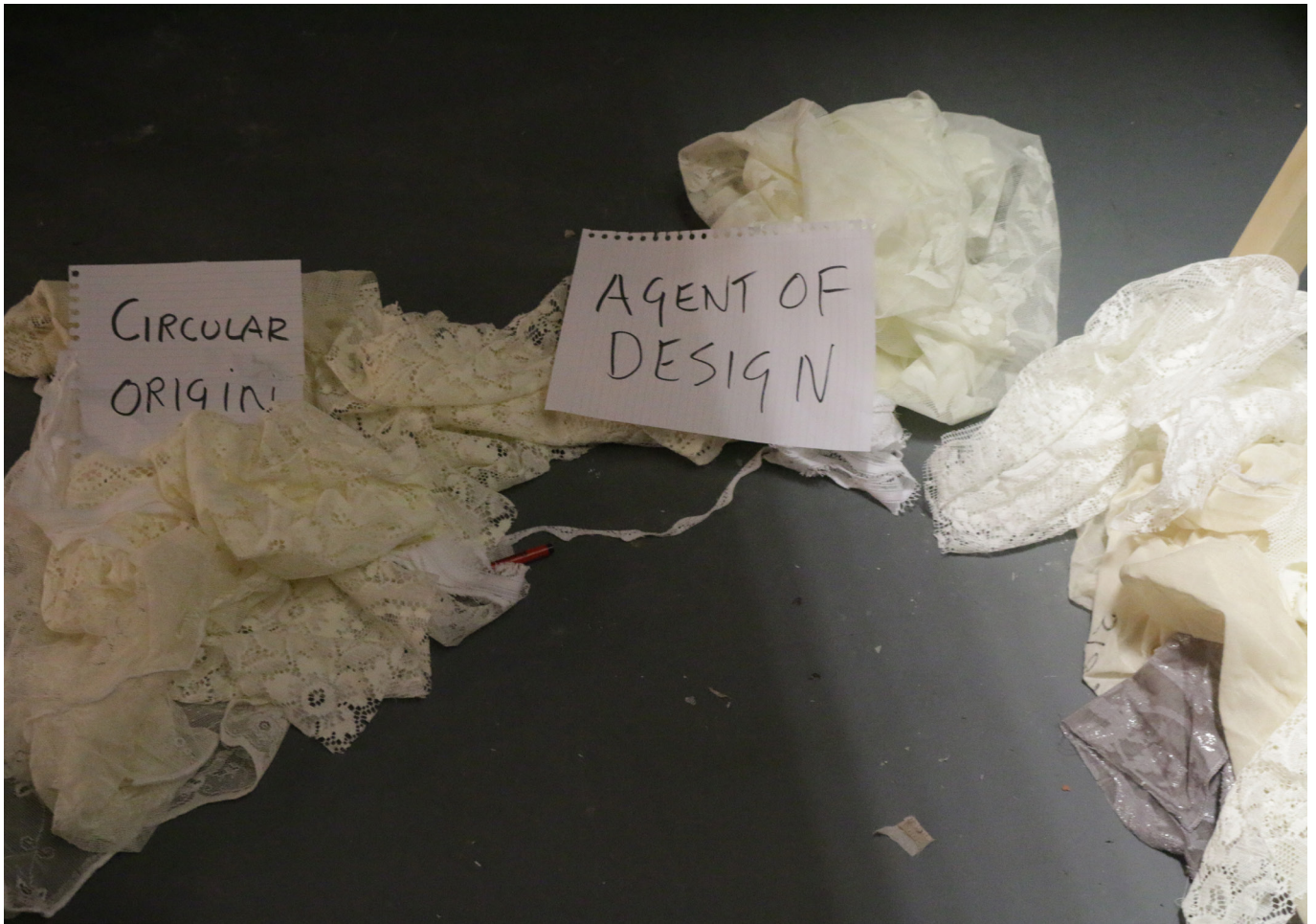
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## ACTIVITIES / METHODOLOGY





## METHODOLOGICAL MODEL

To address our research questions and objectives, we developed a circular model to pilot new approaches for circular design on a local scale, contextualised within Scotland's textile sector (see fig.). Our method was to conduct live experiments that explored a range of approaches for repurposing textile waste within both an urban maker space and a temporary rural maker space. To align to the principals of the circular economy, we endeavoured to preserve and enhance natural capital, optimise the use of resources and foster system effectiveness by designing out wastefulness. This required collaboration

with a range of manufacturers who agreed to provide access to their textile waste, policy representation to contribute to the debate around intervention, designers to add their insight into designing for the circular economy, and academics to contribute to the debate around knowledge production and dissemination.





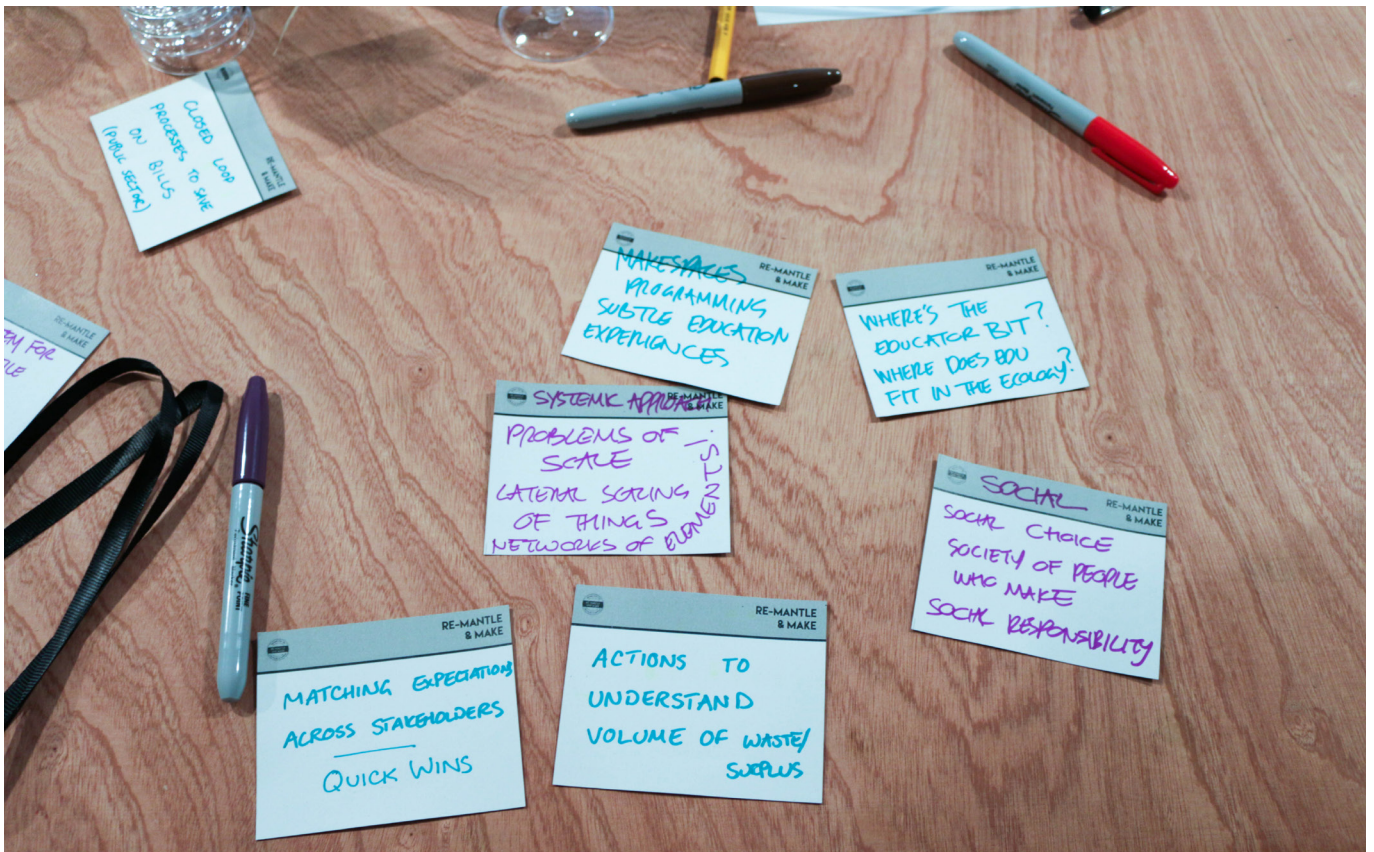
## ARCHETYPES & PROTOTYPES

Three designers were commissioned to produce what we called circular archetypes, which would act as definitive prototypes in response to a design challenge. The archetypes were presented, and the techniques used to produce them demonstrated, within two 'Re-Make-a-Thon' design workshops to inspire further ideas for circular concepts. Participants from the workshops and a panel of specialist stakeholders from across the production ecology for textiles reviewed the concepts at a Roundtable and Showcase at the end of the project.

At this event the participants, artefacts and broader stakeholders were brought together to critique the findings and the propositions that emerged from the experiments, pull out the key challenges and opportunities, and set an agenda for next steps.







## DATA GATHERING

Data gathering to address our research question used a mix of desk research in the form of reports, articles, books and publications, semi structured interviews with stakeholders, site visits, and researcher observation from the workshops, such as note taking, participatory design tools and audio transcripts.





## PRESENTATION OF OUTPUTS









## THE RE-MAKE-A-THONS

To explore the possibilities for a circular economy in textiles we hosted two design Re-Make-A-Thon workshops. These were one-day, rapid, hands-on design events where we conceived and prototyped new garment designs using surplus materials from local suppliers that challenged our conception of current models of production. The first workshop was held at an independent urban maker space and the second workshop was held at a temporary maker space inside a HE institution in a rural location.

Both events set about exploring the challenges and opportunities for establishing a circular economy in the Scottish textile

sector. The participants were set the challenging brief of using only surplus materials from local textile manufacturers in Scotland, and transforming them into a prototype circular collar that can be worn with existing garments. The collar needed to be open source, where the original conception can be hacked or modified to produce a hybrid concept.



## RE-MAKE-A-THON 1: GLASGOW

Glasgow and the surrounding region have a rich industry and history of textiles and fashion. The textile industry has seen some decline over recent years, but there is a small resurgence and desire to innovate Scottish textiles. The diversity of activity in the region poses unique opportunities for industries such as increasing numbers of maker spaces, collectives and modes of production, but also a competitive market containing responses to the challenges faced. We wanted to embrace this rich, urban context in our research and base part of our study among such inspiring enterprise.

As it was the first Re-Make-A-Thon, this event focussed more on exploring the possibilities with the surplus material and

the making facilities provided by the maker space. With the exception of some thread and buttons, all the material we used for the Re-Make-A-Thon was surplus textiles sourced from Scottish textile manufacturers, including luxuriant cashmere selvages from Begg and Company, leather off-cuts from The Scottish Leather Group, and varieties of lace from MYB Textiles. Participants also made full use of the technical capability of MakLab, such as 3-D printing, digital textile printing, digital embroidery and laser cutting, alongside more traditional sewing and embroidery equipment. There were sixteen participants in total, including a range of fashion and textile designers, product designers, academics and students.





## COLLABORATORS

The day began with a brief overview of the Re-Mantle approach, an introduction to the circular economy and the current challenges to feasibly make circular ways of working a reality. In order to provide inspiration, Christie Alexander and Shirley McLauchlan were commissioned before the event to explore and work with the materials and demonstrate ideas and techniques they were able to perform. The exquisite examples they provided drew intense conversation and reflection on the qualities of the materials at hand, the initial frustration of working with surplus materials, as well as the enjoyment is discovering how to bring such materials to life.

We also invited researchers and practitioners to present short lightning talks delivered by Myra Ostacchini, sharing work and experience engaging consumer use, and Kalopsia's Adam and Nina, sharing experience and insights on being a micro-manufacturer.



## RE-MAKE-A-THON 2: FORRES

The second Re-Make-A-Thon was hosted in a temporary 'pop up' maker space in the Glasgow School of Art's Highland and Islands Creative Campus on the Altyre Estate, just outside of Forres. The Highlands and Islands region of Scotland has a rich history of textiles production, from Harris Tweed to Shetland wool, large producers of raw material, and a patchwork of small creative enterprises turning local materials into consumer products. The textile sector has faced many challenges over recent years due to globalisation and mass production, but Scotland is special in the sense that it has successfully sustained the sector over 200 years by investing in new technology and skills development, alongside research and development into new fibres, production and finishing processes, which has allowed diversification into other sectors. Despite the geography of the region posing significant

challenges for the sector in terms of supply, skills and resources, there is a rich patchwork of small industries with the scope to experiment, presenting opportunities to craft innovative responses to the challenges faced.

We were joined by some of the participants from the first Re-Make-A-Thon, with the welcome addition of craft makers, researchers and design students from the region, to total fourteen participants. To build on our findings from the first Re-Make-A-Thon, this event put even more focus on the systemic challenges for the circular economy. So, to supplement the original brief, we challenged participants to not only think of some great ideas for open source designs, but to consider the whole lifecycle of their concepts. Using our circular economy lifecycle tool to guide them and build systems level thinking into their designs.



## COLLABORATORS

To add some inspiration to the event we invited researchers and practitioners to present short lightning talks to frame the circular economy with some practical challenges and opportunities learned from existing work. The talks included former RCA graduate Thomas Leech who presented his Shoey Shoe project, exemplifying the system level thinking required for circular approaches. There were also talks from GSA post-graduate Heather Martin on the challenges of circular thinking and embedding circular thinking in design, and an insightful presentation from project partners Adam and Nina of Kalopsia Collective on viable approaches for working at small-scale using sustainable materials.









## **WHAT WE MADE: VISUAL SECTION OF PROTOTYPES**



## GLASGOW

Using the full diversity of materials and flexible making facilities, unique designs quickly came to life with lots of great collaboration and sharing of skills. It was truly a collective effort. Among the unique, yet remarkably simple, collars presented were two inspired by Eric Cantona's arrogant 'popped' collar, plaited and braided selvedge, pungent interlocking laser cut leather panels, customisable layers of ruffles and folds, decorative shoulder pads and all manner of ways to revive seemingly lifeless materials.

Included in the showcase of prototypes at the end of the day were hooded collars fashioned by simple folds and darts, cashmere fabric designs made adaptable in it's processes of production, patchwork pattern garments and even utilising smaller off-cuts as padding for modular garments.





## FORRES

Using mainly hand tools, with some designers utilising the laser cutter to produce leather buttons, designs quickly came to life. During the workshop the participants worked individually and in collaboration to develop ideas and explore the systemic issues of adopting circular economy principles into their thinking. For each new concept participants used the circular lifecycle tool to scrutinise the broader implications of their design from material origin to end of first life and onto the next.

Included in the range of prototypes at the end of the day were hooded collars fashioned by simple folds and darts, cashmere fabric designs made adaptable in it's processes of production, patchwork pattern garments and even utilising smaller off-cuts as padding for modular garments. Profiles of garments can be seen at the end of this report.







## DESIGN COMMISSIONS

A selection of the prototype collars from the Re-Make-a-Thons were developed as demonstrator open source garments for exhibition by our project partners, micro-manufacturers Kalopsia, for the Roundtable and Showcase. Our commissioned designers, Shirley McLauchlan, Christie Alexander, Myra Ostacchini and Heather Martin, also developed their prototypes for exhibition to a highly finished standard. These were delivered above and beyond the commissioned scope our initial arrangement in large part due to each designer

wishing to build and refine on ideas stimulated during the Re-Make-a-Thons. These are presented here with notes from each designer.



## SHIRLEY MCLAUCHLAN

### Commissioned Artist

[www.shirleymclauchlan.co.uk](http://www.shirleymclauchlan.co.uk)

Shirley Mclauchlan studied Textiles at The Glasgow School of Art and St Martins London. She was a partner in the successful print studio Kim Clark Design in London designing collections and selling prints internationally for over twelve years.

On return to Scotland in 1997 she set up her own practice designing 'Modern Family Heirlooms' working with a range of clients from Nicole Kidman to David Walliams.

Her design philosophy is embedded in sustainability. She strives to work as a commercial, sustainable designer making pieces that are valued and 'tell a story.'

### **Collar Kit:**

Hand stitched collar made from surplus linen. The collar has been made into a kit that will be further developed as a commercial kit aimed at anyone who wants to learn or simply enjoy stitch. The collar kit will encourage individuals to personalise their collar by following the simple instructions or they can adapt the stitches and make the collar even more personal.



## MYRA OSTACCHINI

### Commissioned Artist

[www.myraostacchini.com](http://www.myraostacchini.com)

I have been a designer (fashion) for 20 years and as a mature student I have studied fine art for the past 6 years at Glasgow School of Art, receiving my BA Honors in Sculpture and Environmental (2010-2014) and my Masters in the Drawing Pathway (2015-2016).

My socially engaged practice and public artwork education has developed innovative hybrid and experimental forms of approaching design innovation. Drawing blindfolded has heightened my sensory acuity and allows me to sense an object rather than my representational response.

### **Five Ways:**

The collar exists as a scarf, transforming by an addition of another section of fabric into a cape. Five ways will be the addition of a sleeve and also another smaller panel, which would create a waist section or a cuff. Paper buttons allowed the realization of functional points of attachment between modular pieces and will explore possibilities of findings as the garment develops. The design extends to five transformations.



## CHRISTIE ALEXANDER

### Commissioned Artist

[c.alexander@gsa.ac.uk](mailto:c.alexander@gsa.ac.uk)

Christie Alexander is the knit technician at the Glasgow School of Art. She instructs and provides technical support in the following areas; hand knitting, domestic machine knitting, knit specific software design, industrial machine knitting, fashioning for knitwear, calculating knitwear patterns, linking and finishing knitwear.

She has experience teaching various knit courses in Iceland, Singapore and UK. Personal projects include consulting and knitting for films, television productions, adverts, fashion designers and architects.



## HEATHER MARTIN

### Commissioned Artist

[www.monoonommonoonom.com](http://www.monoonommonoonom.com)

Heather Martin is a practicing designer, creative entrepreneur and an educator who disrupts the conventions of design to shift beyond the boundaries of fashion, art, craft, business and design activism. Critical making, propositional thinking and a constant questioning of the framework all propel the work that Heather undertakes in the studio, in business and in the classroom. Heather relocated to the UK from the west coast of Canada to begin postgraduate study with the Glasgow School of Art where she recently completed a Masters of Research in Design Innovation.

### ***The Squished Line Circular Collar and The Squished Line Kite Wrap:***

The Squished Line Series builds upon the principles of the 1 + 1 Propositional Pattern Cutting System that Heather developed within her postgraduate research and uses the selvedge edges of Scottish wool mill waste material to build two collar styles; The Squished Line Circular Collar and the Squished Line Kite Wrap. Both styles can be worn in numerous ways and can also be made and unmade to reform a multiplicity of design options.





# **ROUNDTABLE & SHOWCASE**

The project returned to the MAKLab makerspace in Glasgow to set up a final Showcase exhibition and host a Roundtable discussion with our project stakeholders. The Showcase told the story of the project, exhibiting the raw surplus materials that started it all, through to the hands on experiments and the ideas from both Re-Make-A-Thons, and finally the finished open source garments produced by Kalopsia. As well as the tangible textile outputs of the projects we wanted to bring the ideas and themes that had emerged through the workshops, and the research that has run through the project, to the surface. Before, during and after the workshops we maintained close contact with

participants to question their understanding of the circular economy, their experiences of the project, and their reflections on the role maker spaces have played. From these responses and our own reflections, we displayed key insights on large black boards in between the textiles to provoke conversation about the study.

After allowing the guest stakeholders to walk around the showcase, we all sat down for an intensive 90 minute discussion, facilitated by prompt cards with questions drawn from our insights, but very much driven by the different perspectives and experiences around the table. We used the Circular



Canvas tool we developed to guide our conversation through the stages of the circular approach. This drew out valuable discussions around the origin and provenance of materials, the roles for producers, designers and consumers, and the tensions that exist between stakeholders in the whole system. In addition to the broad discussion about system level issues to implementing circular economy in textiles, the conversation turned to the role of technology, policy and institutions in furthering a more sustainable material future. Towards the end, the discussion was rounded off by directly questioning our guests on what they thought the role for maker spaces could be.

Overall, the debate and conversation at our Roundtable reaffirmed some of our earlier insights about challenges and opportunities for the circular economy, while uncovering some new issues and tensions with implementing a closed loop textiles industry. These are presented in following section to set the agenda for future research and direction for the next phase of developing on this study.











Across all the data sets of audio transcripts, workshop materials, interviews and email responses, we performed thematic analysis at two stages. The first stage of analysis followed the two Re-Make-a-Thon workshops in order to inform the Round Table and Showcase. The second stage of analysis followed the Round Table discussion and follow up interviews with participants. From the first round of thematic analysis, we translated our initial findings into bespoke insights from each Re-Make-a-Thon.

These were shared in summary format through two printed booklets representing each event at the final Showcase. These insights were also collated into 'insight boards' as part of the showcase display, and a series questions, shared through prompt cards as part of facilitating the round table discussion via our circular canvas tool.





## PRESENTATION OF INITIAL FINDINGS

Presentation of Initial Findings  
Our initial findings, following both stages of thematic analysis, are presented here as four cores themes, supported by quotes and key sub-themes.





## BRINGING SURPLUS TO LIFE

Bringing Surplus Materials to Life  
In both Re-Make-a-Thons, the quality of the materials gathered were a real source of inspiration for designers and makers. The commissioned designers discussed their experience working with the surplus materials during the first Re-Make-a-Thon in Glasgow, sharing their initial frustrations in a material they weren't initially knowledgeable of, however exploring the properties of the surplus materials were seen to begin leading the designers' process. Working with surplus is currently an informal process, as there is no consistency with supply, and designers need to know the material they are working with.

***"There is an issue of quality of material. That's what we found that using second life material, there's no point, its not going to have a second life. We send the fabric back, getting the products and the waste."***



The Re-Make-a-Thons also brought about processes to explore of how to 'upcycle' or enhance the surplus materials for designer use. This varied from punching holes into leather cuts for easier sewing, unravelling lace into raw strands and lasercutting new patterns. In later developments of the prototypes, it became clear that processes of digitising analogue garment patterns for open source distribution were limited by the scale of maker space machinery, often resulting in smaller interlocking pieces.

***“Starting a movement that’s accessible for everyone, something that’s really special as part of this project. The idea that really beautiful things can be made from surplus materials is really the point of this project.”***

# CHALLENGING INDIVIDUAL & COLLECTIVE MINDSETS

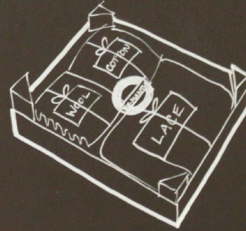
Unfamiliarity with the materials & a constrained brief forced new ways of thinking.



A zero waste context also informed considered design outputs intended to inspire others.



Coming together enhanced skillsharing and a faster process of prototyping.







## CHALLENGING INDIVIDUAL & COLLECTIVE MINDSETS

Wide unfamiliarity with the materials, and the constrained designed brief of an open source pattern collar, forced new ways of thinking and working for participants. coming together in such circumstances enhanced skill sharing and a faster process of prototyping the zero waste context also informed considered design outputs that weren't just designerly outputs, but intended to inspire others tension in responsibilities from consumer to industry, makerspaces traversing audiences to change habits and mindsets around consumerism.

*"As a designer, I think it's process. As an artist, it's process. As a marketing strategy, it's probably mindsets,*

*how do you re-package it in the minds of the consumer?"*

*"People don't want to be lectured to. How do we engage broader communities of people in this? Whether it's looking at geography or early years."*

*"You've got to make it easy for people as well."*

*"They're cheaper because they are undercutting the cost it takes to make these things. That's the mindset shift with that, it's getting away from the idea that these prices are acceptable, when in fact what you are doing is undercutting your own market. Again, it's dangerous and can't continue."*



## SPACE TO MAKE TOGETHER

Capacity to experiment with new techniques, technology and people focus for regular engagement and community building, including public facing activity an agent to broker between stakeholders mutual relations between the different stakeholders and makerspaces diversity of makerspaces, their flexibility allows the space to do the R&D (i.e. shoe leather cuts soles) in collaboration.

*“In order to find new ways of using these new materials, there needs to be a space and time for experimentation and playing. In order to do this you need to get access to materials, but when approaching manufacturers they need you to take 5 tonnes, when I’m looking for 2 bags. Give me stuff, I’ll play with ideas, then we’ll come back with ways to deal with 5 tonnes.”*



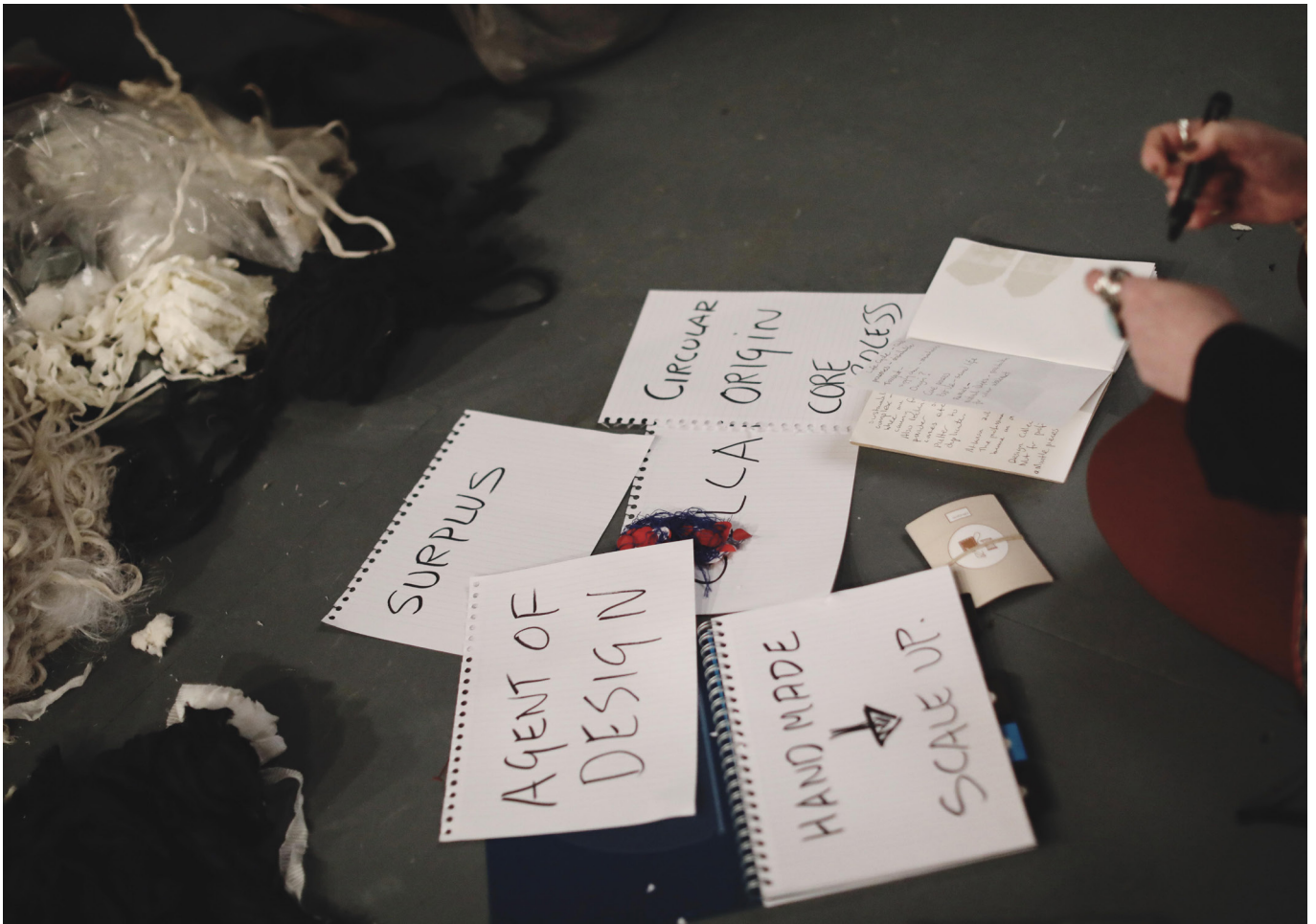


*“How much we are selling stuff vs what they cost to be made. This is a conversation we have at Makerspaces all the time to educate the client in what they are requesting.”*

*“Big ideas come from a lot of small ideas come together before looking at how it can be scaled up and industrialised. There is a knowledge issue, access to materials, as well as access to the space to come up with those ideas by gaining access to those materials and equipment to actually just think about what could be on a small scale.”*

*“People think that it is such a big issue, that they don’t know where to start and so don’t start at all. What I would like to see happen is more investment in spaces where surplus is brought together with designers, retailers and layers in one place to think, how can I play with this?”*





## INSTILLING CIRCULARITY

Throughout the project, there was clear concern to embed a circular ethos into the final designs, as well as ensure quality where possible. The framing of the circular model and the design brief is reflected to have enabled a common purpose to be found across the stakeholders engaged. Following attendance at our Re-Make-a-Thon workshops, there have been stories of continuing engagement with circular design from our participants, from continuing to develop their prototypes, to instigating projects and training of their own.

There was potential insight that the circular economy is as much a knowledge economy as a product economy, to interest other industries as stakeholders. A product economy focuses on new processes and products as a means of progressing efficiency or effective outputs towards circularity. A knowledge economy denotes the experience and know-how of how to value such models and communicate across ecological stakeholders, highlighting the importance of open source designs, process-sharing and even collaboration events, as trialled in this study.



*"I'm up against the boardroom, the design team and the technologists. I'm up against fashion, where one year it's polyester, which puts up their carbon, another year it's cotton, which puts up their water usage."*

Conflict between knowledge production and new technology in instilling a circular economy.

*"I think it's more, from a policy level, about producer responsibility. We don't have the return schemes to have the re-processing."*

*"What if we were guerrilla returners? Whenever a product breaks down, we just go back*

*to the shops and say 'take that back!' You've sold me this, but you now expect me to look after this for the rest of its life. Is it about consumers being taxed. Who's going to take responsibility without more legislation and taxing."*

*"Fi Scott has been doing all the profiles of factories in Scotland. If you could add, 'and this is our surplus stream', that is a real bonus to this process as well. You need a large symbiotic company dealing with waste streams."*



## DISCUSSION

*What do you consider the implications of the new knowledge your project has generated are on the core research questions of the Future Makespaces in Redistributed Manufacturing project?*

### ***Q1 What roles will makespaces play in the future of Redistributed Manufacturing?***

This feasibility study aimed to embed a thinking through making approach to truly work through scenarios to explore how a makespace might support Redistributed Manufacturing in the Scottish textile sector.

The insights captured demonstrate that there is the need for an intermediary to act as a conduit between larger manufacturers and makespaces, someone who can take responsibility for textile surplus and redistribute it as a material. The process of collecting, grading, sorting and archiving and storing varied amounts of materials, in a range of colours,

weights and quantities materials requires a systems thinking to codify a procurement process. The larger factories use a CRM system to track and trace material from origin and every stage of production is digitally recorded. However, the offcuts or remnants are undocumented and further research is required to calculate quantity and cost.

Currently, these factories are selling offcuts to China for other areas of production or disposing of this surplus material. The Scottish Leather Group have invested into a zero waste policy. Each of these factories have a sustainability manager and have an appetite to develop innovative new solutions, systems and strategies to address these issues.





***Q2 What value can be created with makespaces involved in Redistributed Manufacturing and who will benefit?***

This study provided a different lens through which to view micro-manufacturing from a textile sector perspective. The materials were sourced as bi-products from large scale industrial textile manufacturing facilities which service a global fashion industry. The technical infrastructure required to support micro manufacturing required much less machinery. The technical facilities used were domestic sewing machines, digital embroidery machines, a heat press and a selection of different industrial sewing machines (for sewing and overlocking).

While costly, they are significant differences in size, cost and space requirements. The majority of the design concepts could have been produced using a domestic sewing machine, iron and hand sewing and embroidery.

Therefore, the emphasis on our conceptual future make space could not be centered around technical facilities, rather a more human capitol embodied within the individuals operating makespaces.



**SECTOR WIDE BENEFITS  
OF CONDUCTING THIS  
RESEARCH**

This research was presented at the European Mistra Future Fashion conference titled ‘Circular Transitions’, hosted at Tate Britain, London, November 2016. A further paper was presented at the European Academy of Design (EAD) Design for Next Conference, Rome, 2017.

The work has been introduced to IDEO’s Circular Economy Programme Director and further conversations will explore how this might support a case study for their circular design guide.



## LOOKING AHEAD

Future directions for further research: potential scenarios for expansion of your current work.

***Open Source Knowledge Bank to Support Re-Manufacturing:***  
within the Re-Make-a-Thon's technical knowledge emerged from the design participant's and make spaces provide a forum to support collective research and development (R&D).

***Open Source Re-Mantle and Make Pack:***  
a seed fund could be implemented to allow design students to host their own Re-Make-a-Thon, all of the project assets could be digitised to produce an open source work package.

***Life Cycle Analysis:***  
further work is required to undertake an audit of the collected textile surplus and to evaluate the archetypes.





## HUNCHES

These are things this work has highlighted that you think are patterns or associations or just really relevant to the overall research question, but that you cannot prove. FMs\_RdM will not include that directly in the report to the research councils but your informed hunches may inform some of the cross cutting research.

Textiles Industry has greater diversity of stakeholder interest and engagement, which can support stronger innovation and its transfer across sectors.

This project explored a future scenario that aims to reduce the rapid replacement of products by providing access to a local supply chain where the consumer can connect with different designers and select from a menu of manufacturing options within an ecosystem of make spaces. The live experiments within this project demystified the design process through practical case studies that evidence and demonstrate the role of re-design through a closed loop framework. The final artefacts require further assessment to measure the impact of material recovery



and to identify the economic and redesign value of circular innovation. The findings require further testing and validation through peer review from industry professionals, policy and the public sector and business support agencies.

This differs from the current paradigm of our material world, where products become obsolete within short time scales. This emerging supply chain will provide information about the circular economy to connect all agents and actors within the supply chain and provide

further information about where materials come from, how they can be used and demonstrate what and how they can be 're-mantled and made' to become. This will also position value on consumer use, attachment and work towards initiating stronger 'user-product' and 'user-manufacturer' relationships. Therefore, the everyday citizen will also have a role within this process and be provided with an opportunity to share their feedback.

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**INSTITUTE  
OF DESIGN  
INNOVATION  
THE GLASGOW  
SCHOOL OF ART**



 **Future Makespaces**  
in Redistributed Manufacturing