



Designing for Fast and Slow Circular Fashion Systems: Exploring Strategies for Multiple and Extended Product Cycles

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Abstract:

This paper reviews work conducted by practiced-based textile design researchers based at the University of the Arts London (UAL) who were part of the multi-disciplinary, Swedish-based Mistra Future Fashion research consortium between June 2011 – May 2015. The objective of the consortium was to research opportunities to advance a more sustainable, yet still profitable, fashion industry. The final stage of the project involved developing practice-based approaches through physical exhibition prototypes, which formed the basis of the project's online exhibition, The Textile Toolbox (Earley & Goldsworthy, 2014).

Here we discuss two of these design prototypes which both explored 'designing for cyclability' as a proactive approach to improving the retention of material value within 'circular fashion systems'. Designing in order to enable fully joined up cycles of material use is the ultimate aim for both approaches, but this 'speed' of cycle creates very different challenges on which to make informed and appropriate design choices.

The two approaches are deliberately extreme opposites, with 'short-life' closed-loop garments explored as complementary to 'long-life' user engagement strategies. Both can ultimately be argued to have an 'extending' affect on materials in the value-chain; one by keeping products in use over multiple cycles in perpetuity, the other by extending the single use cycle of a product over time. By exploring this polarisation of 'speeds and needs' we aim to gain insights into creating an effective circular materials economy, which acknowledges the complex nature of our current and emerging fashion system.

Introduction

Environmental impacts from waste in the fashion and textile industry continues to grow at an ever more rapid pace. 'Between 2.5 and 2.7 million tonnes of textiles are consumed annually in the UK. Of this, between 1.1 and 1.4 million tonnes are clothing' (WRAP, 2013).

Looking ahead to the potential of new materials and services, how can textile designers meet the challenge of fast fashion in more appropriate ways?

Recently there has been a rise of projects that encourage and support textile and fashion designers in considering their responsibilities as creators of sustainable products and systems (e.g. *Fashion Futures 2025*), but they have been struggling to find a way to both comprehend the complexity of the challenges and to know how to go about tackling them in a scaleable and economically viable way.

'Traditional UK markets for recycled textiles are declining. Market development funding, including innovation, demonstration, standards and/or capital funding for selected new markets will help to stabilise this decline and also create new markets.' (Morley *et al*, 2009)

This paper reviews the work conducted by a team of University of the Arts London (UAL) practice-based textile design researchers who were part of the multi-disciplinary, Swedish-based Mistra Future Fashion research consortium between June 2011 – May 2015.

Textile Toolbox

The objective of the consortium was to research opportunities to advance a more sustainable, yet still profitable, fashion industry. In the first half of the period the research team and external collaborators used 'The TEN' (Earley & Politowicz, 2010) to review current design decisions and best practice for fashion in Sweden and globally. The TEN are design decisions that range from the material, to shape and form, fit and finish,

processes and technology; to systems and services, consumer centred concepts; and finally design activism.

Informed by this research mapping, the team then explored new design models by testing The TEN with industry stakeholders (H&M and SME's at the Sustainable Fashion Academy); and subsequently by using their own particular practice-based approaches. The resulting models – physical exhibition prototypes – formed the basis of the project's online exhibition, The Textile Toolbox (Earley & Goldsworthy, 2014).

As the models were developed the research team found that almost all the ten models – with the exception of one, which addressed democratic design tools for the user – addressed designing for cyclability, amongst a range of other strategies. These new models included those which were at once proactive or reactive; using natural or manmade materials; suggesting closed or connected systems or loops; and also fast or slow products (Goldsworthy, 2013).

In this paper we will discuss the interplay between 'speed' and 'approach' for cyclability, using two prototypes from the project as case studies for consideration. Designing in order to enable fully joined up cycles of material use is the ultimate aim, but the 'speed' of the cycle also needs to be considered in order to make informed and appropriate design choices.

Designing to enable material flows within current (fast) industry systems is here explored through ASAP (Goldsworthy & Politowicz, 2014). Paper-like clothing that has been designed not to be washed, and instead composted or recycled after a short user life. Designing to enable extended product life through consumer engagement is here explored through Fast Refashion – a polyester shirt overprinted by the user at home (Earley, 2013).

Both of these approaches, although seemingly opposed in approach, can ultimately be argued to have an 'extending' affect on materials in the value-chain. One by keeping products in use over multiple cycles in perpetuity, the

other by extending the single use cycle of a product over time.

'...value creation potential stems from keeping products, components, and materials in use longer within the circular economy. This can be done by either going through more consecutive cycles or by spending more time within a cycle. This prolongation of usage will substitute virgin material inflows to counter the dissipation of material out of the economy (which, assuming constant demand and given the second law of thermodynamics, i.e., 'matter is decaying towards entropy', will eventually happen).' (Ellen MacArthur Foundation, 2013)

This paper proposes that there is a very different set of material and design approaches needed for short-life (fast fashion) products, designed for efficient recovery of material resources when compared to long-life (suitable for extended life services) garments, which needs to be designed for durability.

This deliberate polarisation of the range of clothing available through design conforms to the 'Well Curve' has two spikes and is a reverse of the 'Bell Curve' theory in which society's benefits gravitate to the centre. Taking what is the 'best' in the system and applying the idea to the extreme could match behaviour and become a sustainable solution.

There is very little practice-based research in the fashion field that refers to these opposing product speeds or rhythms. 5Ways (Earley & Fletcher, 2003) tested design approaches based on needs, with the 'Updatable T-Shirt' experiencing an extended life through a series of interventions by the consumer.

'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)

In 2007 Fletcher and Tham considered the idea of garment 'archetypes' and scenarios in 'Lifetimes'; yet little practice-based work since has expanded upon this notions.

Short-Life Fashion

Designing for Material Recovery

This concept is based around the idea of designing for multiple-short cycles that can be recollected and transformed for future use as new materials. Biodegradability, mono-materiality and low-energy production are key attributes.

'... the fastest flowing products... need to be fed into a recovery stream as soon as they have finished being used. [But] our lack of understanding in the design industry around effective material recoverability can create more waste through misinformation, which can contaminate valuable recovered materials... The design brief must be strongly influenced by the end of life of the product.' (RSA, 2013)

This approach may radically reduce impacts associated with laundry and material production. Enlightened design needs to be applied to the fast fashion reality: the social, ecological and economic impacts. Connecting existing (albeit unrelated) industries – such as fibre, fashion and waste recovery, is a logical way to process raw material and recover existing material.

In order for this project to achieve maximum impact, new and agile production technologies need to be explored and the system for recollection and recycling also need to be designed as part of the vision.

This concept is an extreme opposite, but complementary to 'heritage quality' and 'long-life' strategies, and suggests that new products should be 'proactively' designed with the conscious goal of enabling material value retained through future material cycles. To do this a designer must first identify a specific end of life route for which to design towards.

(A.S.A.P.) Fashion Forward Paper Clothing

This approach responds to the prevailing 'disposable' culture in fashion and asks if it could be transformed by the development of inexpensive, bio-based 'recoverable' garments

with sustainable production and disposal credentials. It also aims to eliminate the 'consumer washing' phase and therefore remove this part of the large carbon footprint. By connecting compelling strategies for economic growth with sustainable, fast track business models, raw materials are developed to offer alternative, renewable qualities as a complement to the resilience and durability of an existing, classic, wardrobe.



Figure 1: ASAP's paper-fabric garment project (2013-14)

For this exhibit, UAL researchers Politowicz and Goldsworthy collaborated with materials scientist Granberg (Innventia), industry consultant MacLennan (East Central Studios) and fashion designer David Telfer, to produce a collection of material samples and a jacket, made from a wearable, non-woven cellulose based material (fig.1).

Through the collaboration between designers and scientists, a new material was developed which responded to the multiple requirements set by the designers of softness and drape, coupled with strength and stretch. To achieve this the material scientists focused on a blend of wood fibres and PLA fibres, which can be produced using current mass production and recycling systems from the paper industry. By varying the fibre composition and weight, different tactile and functional qualities could be achieved.

A further stage of processing was developed in the finishing of the materials which was used to impart qualities not possible through fibre composition and construction alone. One of the most successful finishes applied was that of micro-pleating, a method for creating mechanical stretch in an otherwise non-stretch substrate. This imparted textile-like qualities

into an otherwise paper-like material thus improving its suitability for garment use.

Laser finishing (Goldsworthy, 2012) was another successful finishing technique applied as a way to create different properties and surface qualities including glossing, laminating and print-effects and which could be used to transform the material post-production according to the particular requirements of each design (fig.2). It was also used as a way to weld the seams on the final garment, thus negating the need for stitching which reduces the strength of nonwoven materials due to its 'perforating' effect.

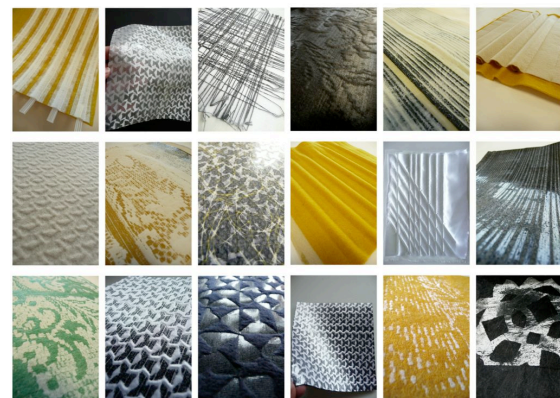


Figure 2: 'Laser finished' monomaterial samples (2008-11)

During the initial stages of the material development user testing was carried out at Innventia, Sweden, in order to assess the viability of the materials in terms of consumer acceptance. These user-based perception studies were carried out by Innventia and showed that the paper materials developed stood up well against more traditional fabric qualities in terms of handle and tactility.

The effects of this kind of short-life, closed-loop technical approach are limited to suitability for certain garment archetypes within the current market, but the researchers are interested to continue development in conjunction with industry input to test the viability of the approach further with appropriate market segments.

Could this concept, coupled with the following long-life approach, work together in order to provide extended material value solutions for a large part of our current fashion landscape?

Long-Life Fashion

Designing to Prolong Material Use

This concept is based around the idea of designing for extended use single-cycles whereby existing products can be kept in service over a longer-life. Durability, adaptability and personal connection are key attributes.

This approach may radically reduce impacts associated with material production and manufacture. Enlightened design needs to be applied to increasing demand for more durable fashion garments. Here the opportunities lie in connecting retailers and designers with consumers, and with garments designed for new business models - where clothes are recirculated to users as many times as possible to ensure that the greatest possible value is gained from a given garment over its lifetime.

This concept suits the new and emerging business models around: services for extended life of garments (e.g. Barbour); collaborative consumption; own brand resale (e.g. Filippa K); luxury second hand; leasing and many other models. By designing with these specific scenarios in mind, products can be designed for longevity and transformation; by both the designer and the user.

(Fast ReFashion) Designing Fashion Services



Figure 3: 'Updateable T-Shirt', 5Ways (2003)

The idea that consumers can be more creatively engaged in the transformation process of a product in a single cycle was tested as part of 5Ways (fig.3) where the researchers asked six graduates to transform an organic cotton t-shirt using a brief that arrived by post each month. The skilled textile graduates completing the tasks reported feeling 'anxious' about making the changes; which raised the question of what additional support *untrained* consumers might need.

Fast ReFashion (FrF) approach is to transform the industry through designing services, rather than the creation and sale of new products (fig.4). This outcome of Earley's Top 100 work (2014) facilitates users to create a monomaterial refashioned garment for themselves, using readily available tools like irons, paper and dry foods.



Figure 4: Black Hack (2012 – 2014) & Fractal Shirt (2013)

The FrF model references the speed of high street trends, but draws users away from the shops and back to their wardrobes for the garment that will begin the material, and perhaps the personal, transformation. The service offers consumers support through events, demonstration films and downloadable instruction kits.

'Previous studies have shown that the most common reasons for premature disposal of clothing are fit, fashion change, boredom, and damaged/worn out goods, all of which could be addressed through innovative PSS (Product System Service) models designed to reduce material throughput by eliminating the need for disposal while raising the customer's satisfaction with the product.' (Niinimäki, 2013; 105)

The approach has been tested with stakeholders throughout phase 1 of the Mistra project: at the Black Hack 10 researchers were invited to design and execute an overprint for a polyester garment using the heat press; in the next iteration Black Hack Chat (EAD10 conference, Gothenburg, 2013) domestic irons were used by conference participants working on tabletops covered with bed sheets.

Although technically simple, the workshops revealed that without aesthetic guidance from the resources provided, the results were often too naïve to enable users to feel that they had added value and created something wearable. The users enjoyed the company and discourse with other users and the support and guidance provided by the ‘experts’ (Earley & Ballie, in von Busch *et al*, 2014).

The effects of this kind of extended life approach would always be limited in terms of volume, but the researchers are keen to understand if this kind of hands-on experience would lead the consumer into behaviour change around fashion consumption. Textile Toolbox is currently enabling the FrF model to be explored further by providing downloadable resource sheets, PDFs that give the user information to create their own FrF garments and events. Feedback from this interaction will be used to refine this approach in phase 2 of the Mistra research.

Conclusion

Working with multiple partners and collaborators, we are planning to develop these two speeds further during the next phase of the Mistra Research project (2015 – 2019); and to produce a revised set of design guidelines that help designers work towards a circular fashion system and the consumers who may populate it.

Context is everything. We need to be very clear which segment of the fashion industry we are designing for and also which specific garment archetype. Whilst some 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) (fig.5).

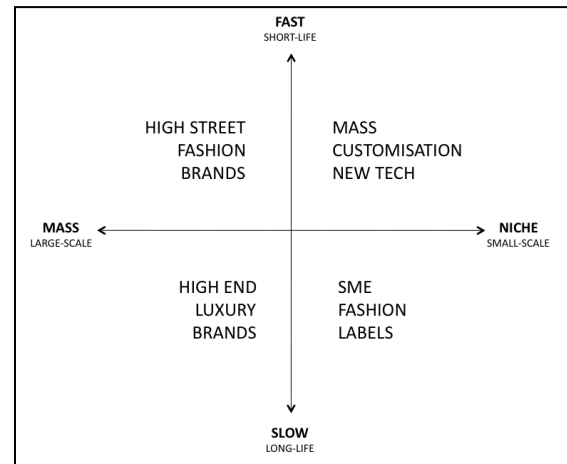


Figure 5: Fast versus slow; mass versus niche – the landscape of potential for extending the life of fashion products (Goldsworthy, 2014)

However, there is also the possibility that luxury brands may find long life ‘service strategies’ open up new markets; shifting users away from buying items from the brand for the signature that has transitory trend value but more permanent material implications.

Likewise, in many ways the short life products could be found to have new meaning implications for the way in which we view long life. In short, by keeping paper (-like) products in a wide range of perpetual single cycles we are in fact achieving long life with these products.

Both the short and long life approaches come with a variety of potential social benefits. The context for each prototype will be developed further during the next phase of the Mistra project (2015 - 2019). These design approaches will work in tandem with materials research and measurement tools (LCA and user-perception studies) to gain a new discourse and level of understanding around our fashion material ‘speeds and needs.’

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