

Designing Garments with Evolving Aesthetics in Emergent Systems

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Abstract

This paper presents an emergent systemic context in a current research project in which the authors are engaged. The research investigates the design of service-systems that facilitate the evolution of garments through multiple-use lives made possible with the strategic integration of textile decoration, built up in complexity over time, such as digital printing, over-dyeing and embroidery. The project asks: What if a shirt were designed from the beginning as an integral part of a fashion service system? What if the design of both the product and the system enabled the object's aesthetic to evolve over time? The authors propose a system for iterative surface decoration of garments over time, as an alternative to purchasing additional garments to satisfy desire. Design for partial disassembly is a key aspect of this service-system. The authors argue that a rethinking of the current economic and business systems is required for such a service-system to flourish. Findings from the project so far are pointing to further research questions: What ramifications does an evolving aesthetic have for the role of fashion and textile designers, particularly if multiple designers drive the evolution over a period of time? What are the implications for the relationship between the designer and user in such a service-system? The authors speculate on various business models that would support these design-led approaches, including a sold product-service system, a leased product-service system, lease-to-buy, sold for DIY

customization, and informal shared use. The project speculates on factors to make such a system commercially replicable within a post-growth economic system. New language is required in such a systems redesign and the paper makes some propositions in this respect.

Keywords: lifetime, decoration, service-systems, post-growth economics, sustainability

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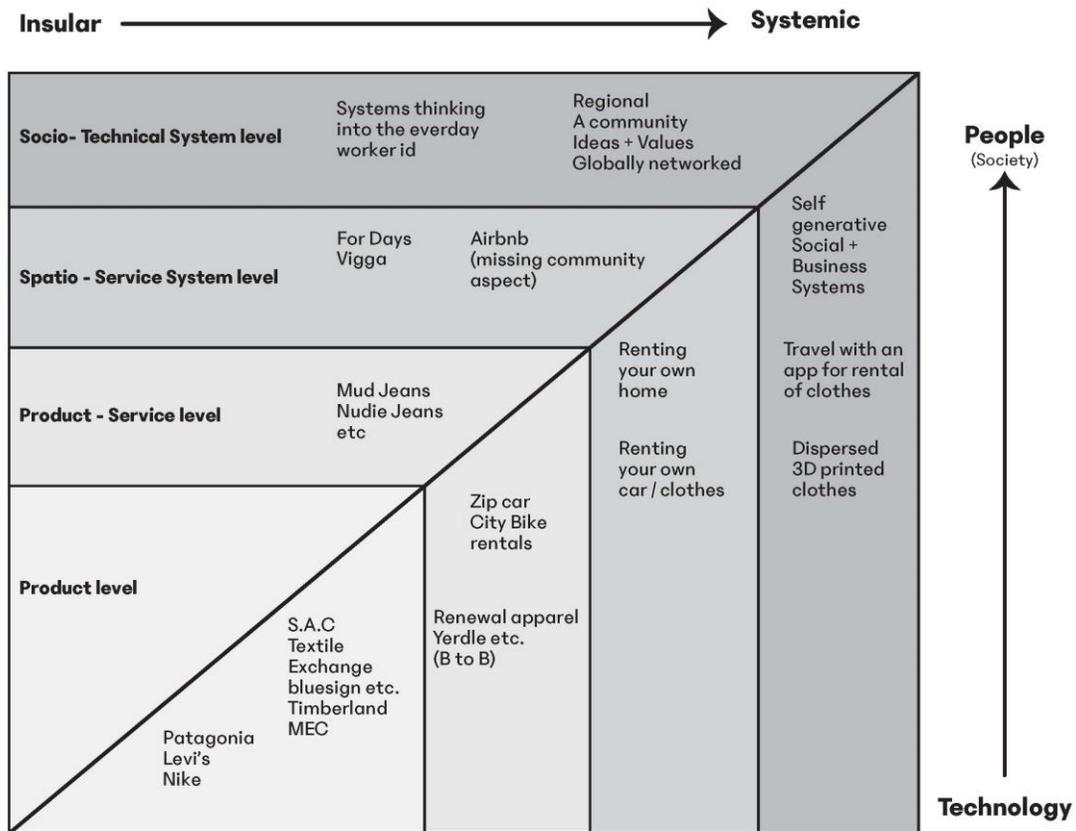
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Introduction

This paper reports on preliminary findings from an on-going practice-based research project. The project investigates designing garments with evolving aesthetics in emergent, speculative systems. The aim is to use design, technology and ‘craft of use’ to both slow the flow of materials through the fashion system, and to provide new fashion experiences for wearers. At the same time this research proposes a business model to support a product-service system, focusing on button-down cotton shirts. We envision this model within a post-growth fashion economy. All of the authors worked on the post-growth-focused Local Wisdom project led by Kate Fletcher, discussed at length in *Craft of Use* (Fletcher, 2016). The economist Kate Raworth (2017) describes an economic model in which economic activity occurs between the boundaries of a social foundation (or minimum level of human wellbeing) and the planet’s ecological ceiling. To realize such a fashion economy requires radically rethinking both resource use and revenue sources in fashion. We advocate for diverse solutions of many scales, while proposing one.

In the proposed subscription model a user is provided with a white button-down cotton shirt. After a period of use the user can return the shirt for decoration choosing among various decorations and techniques. In the case of a digital print motif the shirt is partially disassembled, printed, reassembled and returned to the user. If the choice is over-dyeing and/or embroidery disassembly is not necessary. This cycle of decoration could occur several times, building up layers of decoration over time. In addition a business like this could provide complimentary services such as garment repair and alteration. Many product-service systems in fashion already exist, and this research builds on them. Figure 1 shows a range of businesses across dimensions of evolution, from product to socio-technical change, and from insular to systemic change. The system proposed in this research, initiated at the product-service level, points to socio-technical change, as it both facilitates and requires a new type of relationship between business and user.

[Figure 1: Business mapping from insular to systemic transformation, and from technological to social innovation]



Background: Cotton

In this project we focus on cotton for several reasons: Cotton is the most important natural fibre, accounting for 78% of global natural fibre market (Turley et al., 2009: 9) and about 30% of all fibre used in the global textile sector (Forum for the Future 2018a). Yet cotton is susceptible to a broad range of adverse economic, climate-related and political conditions. (Grose, 2016) The long-term static average world price for cotton fibre has caused farmers in industrialized nations to shift their acreage into higher value crops, and cotton and cotton cultivation in general to move from highly productive capital-intensive regions to less productive labour-rich regions. Cotton fibre production (and transportation) is susceptible to increasingly unpredictable precipitation patterns influenced by climate change, causing more frequent disruptions to crop yields through droughts, floods and fire. Cotton is

particularly vulnerable to government policies and direct interventions, which can cause dramatic and sudden price fluctuations (ICAC, 2013a: 2).^{1 2}

More generally, it's now accepted that as resources become increasingly scarce, a circular economy would be highly beneficial from both a materials and costs point of view (Forum for the Future 2018b). A true circular economy is a steady state, post-growth economy. We see a range of emergent business models responding to these shifting conditions, listed below and mapped out in Figure 2:

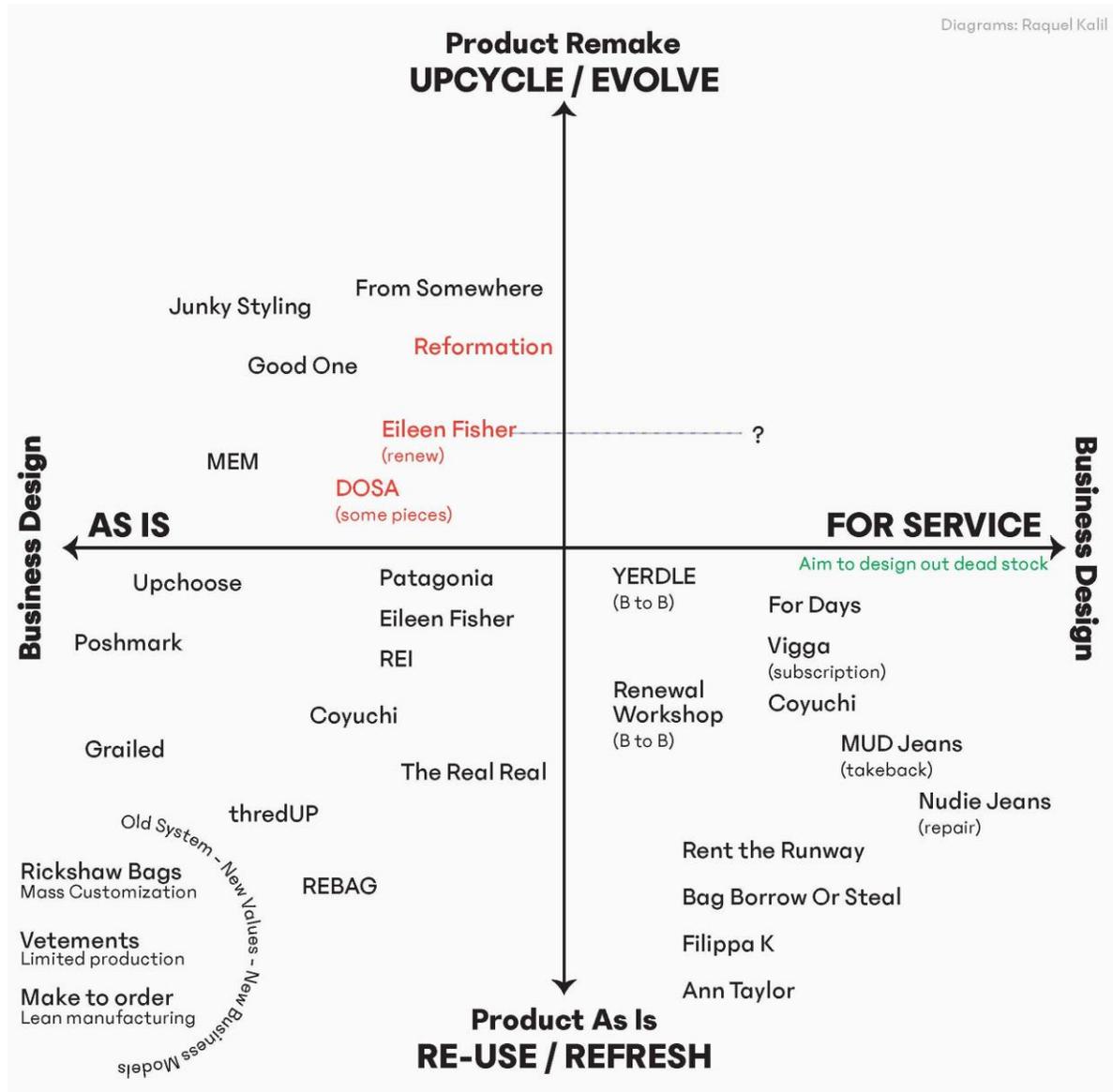
1. Brand re-sale of existing products (Eileen Fisher, Patagonia, REI)
2. Subscription models (Vigga, For Days, Style Theory)
3. Clothing repair services (Patagonia, The North Face)
4. Lending/leasing (Filippa K, Ann Taylor)
5. Rent to buy (or not) options (Mud Jeans, Rent the Runway)
6. Streamlined/systematized repurposing (Eileen Fisher Renew)

Our research is most closely related to points 2 and 6. Other researchers like Early and Goldsworthy (2015) note there is an “opportunity to connect retailers and designers with consumers and with garments designed for new business models”. They also note that one of the most common reasons for disposal is boredom and that this could be addressed by "raising the customer's satisfaction with the product". Olivetti & Cullen (2018: 1397) list lifetime extension as one of five key strategies in the transition to sustainable material systems, a strategy we also focus on in this research. We expand this territory by specifically focusing on the front end of the product cycle rather than the end of use or repurposing of materials. We explore design for multiple lives and extended use, supported by a service business aiming to enhance customer satisfaction. We explore this idea through the strategic integration of garment construction and textile decoration designed to build in complexity over time. We have begun with digital printing, with plans to explore over-dyeing and embroidery. These strategies aim to meet user desires for changing looks without wasting cotton material.

¹ The Chinese National reserve, for example, holds cotton stocks as large as 10 million tons (ICAC, 2013a: 2) and periodically drops these into the global market to drive the commodity price down and incentivize Chinese farmers to grow food crops.

² At time of writing, the trade war between US and China threatens to impact US cotton fiber imports to China and cotton apparel and textiles exports from China to US (Cotton Inc. 2018).

[Figure 2: Fashion business mapped on product and service innovation]



Designing for flattening

To print a pre-existing white shirt after its initial use phase requires unpicking it in order to flatten it for digital printing. However, initial stages of this research revealed that full disassembly was unnecessary. Only partial disassembly to enable the garment to lie flat for printing was needed (Riisberg and Grose 2017). At our current stage of research, we propose that certain predetermined seams are stitched with Wear2 thread developed by C-Tech Innovation. This thread can be dissolved through exposure to microwave radiation and is used for temporary seaming at points requiring to be

flattened (pleated areas on cuffs and yoke, for example; curved seams such as armholes), while permanent seams are stitched with conventional thread. This partial disassembly to enable flattening needs to be designed into the construction of the garment from the outset. Designing for flattening can be challenging, as the relationship between the two-dimensional flat pattern, the garment and the body underneath it defines the ultimate silhouette and fit. Considering how to most efficiently return the three-dimensional garment to a temporary two-dimensional phase increases the complexity of the design process.

Digital pattern cutting combined with three-dimensional simulation is helpful to include flattening and subsequent decoration. Scaled-down analogue mock-ups of the shirts help to bridge intended with actual outcomes rapidly; we used paper mock-ups extensively early in the project to explore form and cut, as well as possibilities for decoration. Extensive design exploration is necessary to arrive at the most efficient option; the aim is to design the shirt so that it can be flattened with the least unpicking (by dissolving) and re-stitching. In future research we will employ CLO software that allows speedy simulation of garment shapes in both two and three dimensions as well as testing various decoration techniques, fabrics and drape.

Curricular connections

As part of this research Rissanen had students work in teams of two or three for eight weeks on a zero waste button-down shirt that was digitally printed. However, enabling students to think in long timespans is challenging. The experience of the students in their own lives and the traditional fashion design curriculum have not yet shifted to familiarize students with the potential for several aesthetic incarnations of a single garment. Further, students struggle to imagine phases of the garment's use-life that they will personally likely not be a part of or connected to. Showing historical examples may help; Palmer (2001: 151-4) demonstrates clients of Christian Dior having garments remade over time to accommodate changing tastes and bodies. While remaking garments is not new, it is often new to most of the current generation of students. The addition of various technologies to support such practices in this proposition is also new, but there is an interest and thirst in students to adopt new technologies, and leveraging this interest may flatten the perceptual hurdle of garment transformation.

In addition, research by Rissanen (2011: 132) has demonstrated that collars and cuffs are the first to wear on a shirt. Replacement pieces in these areas, combined with a surface treatment service could potentially lengthen the useful life of a garment. This implies a sustained active engagement between

the business and the customer, and/or additional service industries (for example, a dressmaker/tailor as part of a dry cleaner). It also implies new home storage systems, where the user would keep loose collars and cuffs for an extended period. Rethinking business models to include a fully integrated set of services and home/retail store storage around the garment is intriguing and warrants further research. We see the user becoming educated as they interact with the new clothing system and the clothing system co-evolving with and through use, rather than educating consumers in a traditional and hierarchical fashion directed by the brand or industry.

This way of thinking has been tested in different ways by each of the colleges the authors teach at. As a larger school, Parsons has implemented a Systems and Society pathway in the BFA Fashion Design program to provide a productive space for students to consider and explore these issues. Design School Kolding has run projects for some time that extend over multiple semesters and years to cover systems thinking, wardrobe studies, user engagement, materiality and design-led sustainability responses. California College of the Arts has required studio classes on fashion and sustainability where ideas from seminar classes are tested in practice, and students are engaged in projects on wardrobe studies and dressing systems. These new directions are in part facilitated by the smaller scale of the latter colleges. In all cases, we see that to introduce a systems perspective into a fashion and textile design course does not necessarily require changes in infrastructure; the main investment is in pedagogy and the re-orientation of faculty to follow and meet students in the co-creation of systems thinking in fashion and textile design.

Implications

During this on-going research we have identified areas for further inquiry. As Fletcher (2017: 9) notes, a wardrobe is “a philosophy of being”. This raises questions for our research about the social lives of the shirts and services we propose. What assumptions are we making about users in this research? What do we need to discover about and learn from users? Are there strategies that may increase the likelihood of a user bringing back a shirt for decoration? What are the implications and opportunities for business? One possibility to probe this further would be testing the shirts with actual users as well as a brand partner, working with their customers over a period of years, to determine if and when the wearer would return a shirt for decoration and remaking, and what that means for business operations. This could also expand to investigating what factors the designer and pattern cutter need to consider when designing with soluble thread and for future flattening as well as planning for decoration evolving over time. Service design also needs further investigation. For example, would the microwave

be an external provider or managed internally? What scale of operation would make it feasible internally? These questions and others will guide us, as this research progresses.

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