

Research



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Exploring demand reduction through design, durability and 'usership' of fashion clothes

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Global planetary boundaries confer limits to production and consumption of material goods. They also confer an obligation to experiment, as individuals and collectively as society, with less-materially-intensive, but no less exuberant, ways of living. This paper takes up this mantle and explores materials demand reduction through a focus on design, fashion garments and the universal, everyday activity of wearing clothes. It takes as its starting point the design of longer-lasting products, a widely favoured strategy for increasing materials efficiency and reducing materials demand in many sectors, including fashion. Drawing on scholarship in the field of design for sustainability and ethnographic research conducted in 16 locations in nine countries about already-existing practices of intensive use and maintenance of clothing, this paper critiques the effectiveness of durability strategies to reduce the amount of materials used. It argues for an update in the familiar preference within sustainability debates for the 'techno-fix' to explore instead resourceful use of materials as emerging from human actions and relationships with material goods. It suggests that, while facilitated by design, technology and engineering, opportunities to reduce materials demand begin in individual and collective practices, which, in turn, have dynamic implications for use of materials.

This article is part of the themed issue 'Material demand reduction'.

1. Introduction

In the fashion sector, as elsewhere, the global production of raw materials is increasing. In 2013, worldwide textile

fibre production was 83.8 million tons [1, p. 50], a figure that represented an annual increase of 4.5%, building on a 5.3% increase witnessed in 2012 [1, p. 51]. The resulting textile fibre is then converted into more than 150 billion garments in a long and geographically spread manufacturing supply chain linked to a well-documented range of damaging ecological and social impacts [2]; impacts that increase in step with rising volumes.

Perhaps more obviously than for many sectors, the growing demand for material consumption in fashion is tightly bound to systems of consumerism and economic growth based on rapid product obsolescence and continually increasing throughput of resources. Described as a 'market-driven cycle of consumer desire and demand' and 'a modern mechanism for the fabrication of the self' [3, p. 2], fashion's physical products of fabric and thread are traded in pursuit of psychological needs. Joanne Finkelstein [4, p. 145] sets out this cycle's relentlessness: 'if we are relying upon the properties of procured goods for our sense of identity, then we are compelled to procure again and again'. Evidence of repeated procurement abounds: consumption of clothing has doubled within the last four decades [5, p. 78] and in 2013, the last year for which figures were available, it grew by 8.9% to a value of US\$460 billion [6]. Understood as an economic and cultural process, fashion has come to represent much of that which is destructive and morally unconscionable about modern, globalized mass production and consumption and seems to deny the possibility of a more restrained material culture. Fashion is condemned for its commerciality; for the trivial temporariness of perpetually changing styles or trends as a way to influence consumer spending; and a consumer habit of mind attuned to understanding fashion only as 'the new', to looking or watching and instant gratification through consumption. The unsustainability of the fashion sector is deeply embedded in its culture.

2. Design for sustainability

Yet, just as in other sectors, the compound, systemic nature of the challenge of reducing demand for materials in the fashion industry has not dampened efforts to foster improvements. Many of these, including strategies to promote materials efficiency, can be traced to the thinking and practice of design for sustainability. As a discipline, design for sustainability has enlarged its scope and field of action over the last two decades and aims to envision and give form to alternative ways of living [7,8]. The ability of design to influence the sustainability profile of goods and services was acknowledged by the Brundtland Report [9]. The particular focus on design in Brundtland is justified by the large relative effects of design decisions on the entire product lifecycle: it is estimated that 80% of a product's environmental and economic costs are committed by the final design stage, before production begins [10, p. 17], and, as a corollary, its potential to bring far-reaching ecological and social benefits. This anticipatory potential has led to design actions being described as 'the most proactive direct action one can take to achieve (impact) prevention' [11, p. 664] and frames design, and those who employ design thinking, as powerful agents for change in sustainability; change that has substantial reciprocal implications for the nature of design and the manufacturing industries [8,12].

In the design disciplines, as elsewhere, the environmental crisis, in which the expansion of the human population coupled with greater increases in consumption cause myriad detrimental effects on species, climate, land, water and air, is understood generally as a material phenomenon. Here environmental well-being is pursued through fine-tuning material flows and consumption behaviours; often by employing economic logic, technological innovation and material prosperity. The result has been the development of a 'toolbox' of strategies to increase material efficiency and reduce environmental impact across a product's lifecycle (table 1) [13, p. 34], [14, p. 30]. Over the past two decades each of these strategies has been applied to fashion products in either commercial or conceptual contexts with varying degrees of success. These include garments which make use of lower-impact materials and processes [5,15]; modular garments [16, pp. 76–84]; more resource-efficient and transparent production chains [17,18]; home laundering practices which use less energy and water [2]; and new and

Table 1. Summary of design for sustainability strategies.

lifecycle phase	goal	strategy
materials selection	choose low-impact materials	<ul style="list-style-type: none"> — avoid materials that damage human health, ecological health or deplete resources — use minimal resources — use renewable resources — use waste by-products — use recycled or reused materials
production	optimize manufacturing	<ul style="list-style-type: none"> — minimize manufacturing waste — minimize energy in production — minimize number of production methods and operations — minimize number of components/materials
distribution	efficient distribution	<ul style="list-style-type: none"> — reduce product and packaging weight — use reusable or recyclable packaging — use an efficient transport system — use local production and assembly
use	low-impact use	<ul style="list-style-type: none"> — reduce energy inefficiencies — reduce water use inefficiencies — reduce material use inefficiencies
	optimize product lifetime	<ul style="list-style-type: none"> — build in user's desire to care for product long term — design for take-back programmes — build in durability — design for maintenance and easy repair — design for upgrades — design for second life with a different function
end of life	optimize end of life	<ul style="list-style-type: none"> — integrate methods for product collection — provide for ease of disassembly — provide for recycling or downcycling — design reuse or 'next life of product' — provide for reuse of components — provide ability to biodegrade — provide for safe disposal

more varied opportunities to donate, reuse and recycle garments at the end of a first life [19,20], among others.

Yet, in line with real and projected data sets in other sectors [21,22], evidence suggests that while efficiency gains in the fashion sector have delivered important reductions in environmental impact associated with the production and processing of clothing, increasing demand for materials is outpacing these gains, resulting in them proving insufficient to stabilize impact [5]. Put differently, things are getting worse, not better. Resource savings brought by efficiency drives in the fashion sector have, in the same period that improvements have been introduced, been outstripped by higher rates of consumption of clothes, increasing the impact of the system at large.

What is apparent is that efficiency strategies treat the *material* dimensions of the environmental crisis: substituting more promising fibres for damaging ones; using the pull of the market to create supply of alternatives; reducing waste, say, in the pattern cutting process by modifying the aesthetics of clothing to maximize tessellation of flat garment pieces in the fabric 'lay'. Yet in

their single focus on materials, efficiency treatments ignore other dimensions, remaining ‘silent about the deeper *ideational* forces at work’ [23, p. 117]. They do not question the underlying forces that ultimately shape the structures and systems that direct industrial practice, societal norms and human behaviour (including the efficiency with which people use materials). Materials demand in fashion is not solely a function of *what* people are dressing in, but also *how* they dress. It is dependent on the idea of fashion, its culture.

In the following section, through an exploration of techniques of designing for durability, I seek to explore the role of the experience and practice of wearing clothes in influencing the material efficiency of garments. I do this by drawing upon examples of extant everyday clothing practices from the *Local Wisdom* design research project [24]. I first offer an introduction to obsolescence and then review strategies to foster garment durability, including selection of robust materials and emotional engagement with garments. I then shift the focus away from products to explore instead durability as emerging from social relations and human action, and what Hansen has called ‘clothing competencies’ [25, p. 306]. I go on to suggest that fashion as a system of dress can act to promote longevity of garments—and by association reduction in demand for materials—by viewing durability as an outcome of activities linked to ideas and actions of use of clothing. Opportunities to reduce materials demand lie in the amplification of resourceful and satisfying practices of using clothing; in connecting innovative practices in wardrobes to the infrastructure and technology of reduced consumption.

3. Design for durability

Durability enjoys an easy relationship with sustainability. Resilient materials and products have potential to lengthen product lifetimes. Longer lifetimes in turn provide a wearer with more opportunities to access a product’s utility. By extending the potential for satisfaction with existing pieces, no additional ones are required. New consumption is forestalled, resources are saved, waste is reduced, needs are met. Or at least that is the theory.

In practice, however, reducing the totalized throughput of resources by designing more durable products is not straightforward. Much of the development work of design for durability was pioneered by the group *Eternally Yours* in wide-ranging contexts from cars to philosophy [26,27]. The work also catalysed critique about the limitations of designing for durability, a critique that chiefly rests on the unpredictable ways that people’s behaviour with products and the role that structures of consumer culture play influence the success of durability strategies to shape consumption patterns. Simply put, expending resources and effort to extend the lives of products pays few dividends unless the users of those pieces take advantage of the benefits provided by their longer life and this, in turn, acts to slow consumption of new items. Durability involves people. Further, the incongruity of relying on *things* alone to influence *people’s behaviour* in turn to foster longevity of those *things* is amplified in the context of garments by the deeply social nature of fashion: what one person chooses to wear, and to wear for a long time, is also affected by the decisions and actions of others (Vignette 1).

Vignette 1: The dress from Antibes

Mother: ‘The people who lived next door gave me this dress from Antibes which they had worn there over many seasons and they said I could have it for our holiday. A great success. And, I can’t think how many more years I wore it . . .

Daughter 1: I am one of three sisters and we were very keen to wear this dress and have shared it since we were old enough to have a grown up figure . . . a period of about forty years.

Daughter 2: So this dress has been going for a long time! It’s a sundress, it’s worn really on very joyous and special occasions so, for example, we have photographs of one or other of us wearing it . . . for example, my middle sister wore it at my mother’s seventieth birthday party.

Daughter 1: There’s a certain amount of jealousy between me and my middle sister, and she’s always asking if she can ‘have a go’ with the dress for our summer holidays. We often go away



Figure 1. ‘The dress from Antibes’: shared by six family members; from the *Local Wisdom* project. Photo credit: Sean Michael. (Online version in colour.)

together in the summer and the dress always comes with us. And now, almost every holiday I’ve been on, I think, to a warm place the dress has come out and been worn.

Mother: We say, ‘Who’s got the dress this year?’, when they want it. And in the beginning I had sole possession of it.

Daughter 2: Well yeah, because we were too young to wear it.

Mother: Well, yes but it soon came the time . . .

Daughter 2: And now there’s another generation coming up [our children], who have got their eye on that dress.’

London, UK, 2010 (figure 1)

(a) Obsolescence and fashion

Since the publication of Vance Packard’s *The Waste Makers* in 1960 [28], knowledge of obsolescence has been building as a key way to influence the supply and demand of goods by influencing users’ perceptions of their products’ continued usefulness. As Burns [29, p. 43] states: ‘Planning for durability was no longer a priority. Obsolescence in its earliest form, meaning to wear out, had evolved into the newly discovered use of psychological obsolescence . . . as a means to influence consumer spending.’ This change, which coincided with the growing capacity of factory production of clothing and increasing supply of materials after the restrictions of the war years, marked a shift in the perception of clothes as a durable consumer good with an intrinsic material value, to non-durable consumer goods with novelty and brand value [30]. Indeed, particularly in the saturated fashion markets of industrialized economies where most new clothing is bought as additional or replacement purchases, a tendency towards a short ‘service life’, with little emphasis on a piece’s physical durability, is a seemingly inevitable effect of the mass consumption and production of fashion [31, p. 160]. In order for the prevailing business model’s bottom line to keep showing growth, garments have to become obsolete, at least in psychological terms. Yet irrespective of their waning psychological appeal, the vast majority of garments endure physically. When these pieces are confined to the back of the wardrobe, they do not dematerialize.

The legacy of psychological obsolescence associated with the fashion sector is found both in growing levels of discarded clothing [32] and, where they are not disposed of and additional ones bought, in the increasing numbers of rarely used garments stockpiled in homes. Statistics for the UK reveal that the volume of clothes bought each year is nearly double that which is

discarded, suggesting rising rates of ownership and storage [33, p. 100]. A small minority of this consumption of clothing can be seen as essential, to meet the basic need for protection—insulating and shielding the body—though these physical demands are met with low levels of consumption. In the economic period of ‘satiation’ currently experienced in the global North, it is using materials and marshalling resources for development of our physical life that is the chief challenge for sustainability [34, p. 28].

A process of analysing and categorizing the different mechanisms of product obsolescence has been under way for the last 50 years and can be synthesized within four modes [29]. These are: aesthetic (changing appearance renders existing products obsolete); social (shifting societal preferences leads to retirement); technological (changing technology renders still-functioning products outdated); and economic (cost structures promote disuse and replacement rather than maintenance). In the fashion sector the primary, though not exclusive, tool of obsolescence is aesthetics, supplemented by shifting social preferences and cultural conditions. Here a cycle of invention, acceptance and discard of a continually changing series of temporary modes of appearance is disseminated and replicated across social groups. The result is familiar: a procession of changing styles of fashion clothes that cascade from catwalk show to high street, to the body and then sometimes back into design concepts for a new collection. The changing styles work within longer-acting trends and index all clothes as part of the fashion system, that is, of a place and a moment in time.

4. Material and garment durability

While ideas of design for durability at a conceptual level challenge consumerist culture and contemporary fashion sector priorities, this has not stopped long-lasting and robust materials being assimilated into existing garments, often aspired to as a feature of ‘good design’. Indeed, durability of garments is pursued in many ways, often, in the first instance, through specifying long-lasting and robust materials. In the case of garments that wear out—that become threadbare and broken—and for those that are discarded because it is cheaper to buy a new item rather than mend an existing one, improving the wear characteristics of materials and construction delivers benefits. But for fashion clothes, many of which already endure physically long past their period of use, putting resources and effort into enhancing the physical durability of seams and fabrics is worth little if it is aesthetics or social preferences—or even changing waistlines—not material robustness that determines a piece’s lifespan. Making a garment last is very different from making a long-lasting garment.

5. Emotionally durable design

Given the role of human behaviour in determining a product’s obsolescence, much attention has been paid to the role of psychological connection and emotion in order to foster a product’s sustained use. In his book, *Emotionally Durable Design*, Jonathan Chapman [35] contends that products are discarded when they fail to display meaning and that by cultivating an emotional and experiential connection between person and product we can disrupt our dependency on consumption of new goods. Drawing on work involving more than 2000 users of electronic products Chapman developed a six-point experiential framework to initiate engagement with emotional durability and design, specifying points of intervention and pathways which offer starting points and lend structure to investigations [35, p. 33].

- Narrative: Users share a unique personal history with the product.
- Detachment: Users feel no emotional connection to the product, have low expectations of it and thus view it favourably because it makes few demands.
- Surface: The product ages well physically and develops a tangible character through this process.
- Attachment: Users feel a strong emotional connection to the product.

- Enchantment: Users are delighted by a product and the process of discovery of it.
- Consciousness: The product is perceived to have free will. It is temperamental and users need to acquire skills to interact with it fully.

Yet consumer studies conducted on goods with ‘meaning’ have revealed that animating the life of products does not impact consumption patterns in straightforward ways and delay disposal [36, p. 334]. Simply because users have formed a bond with a piece, it does not follow that it will be used and replacement consumption prevented: ‘In cases where such attachment was identified, new products were no less likely to be purchased; attachment merely led to accumulation and storage of seldom-used items’ [36, p. 334]. Chapman himself recognizes the limitations of designing for attachment and engagement:

Although a designer can certainly elicit within users an emotional response to a given object, the explicit nature of the response is beyond the designer’s control; the unique assemblage of past experiences that is particular to each user, their cultural background and life journey determines this. Designers cannot craft an experience but only the conditions or levers that might lead to an intended experience. What those required conditions are, however, is still unclear to design [37, p. 65].

This is corroborated by research that reveals that those products that defy obsolescence do so in informal or unintentional ways, rarely as a result of design planning [38, p. 81], and which show that consumers often behave in a way so as to reduce the lifespan of products, with an idiosyncratic approach to maintaining quality [36, p. 321]. Such insight acts to downplay the power of the traditional design process to influence the way in which a product is used and instead emphasizes on-going use and durability as contingent on user behaviour. Design is necessary but not sufficient in most efforts for change. The most influential *actant* is not a product, but the practices performed by the person using that product. Ideas about reducing demand for materials through durability require a change of approach.

6. Social relations and interactions

Here I am indebted to the work of anthropologist Karen Tranberg Hansen [25], who, in her research exploring second-hand dress in Zambia, is confronted with a similar requirement to shift understanding. For Hansen, the problem is that material culture, with its emphasis on socially constructed things or commodities, falls short in explaining the fashion practices awash with social exchanges and relationships that she observed in Lusaka. In her analysis, she overcomes this by ‘shifting the focus from things to social relations and interactions. With this shift, the point of departure is not the things themselves but rather the strategies within which they are embedded’ [25, p. 301]. She takes Jonathan Friedman’s suggestion to approach objects and relations from a different perspective, turning around Arjun Appadurai’s now foundational idea of material culture that things have social lives [39], arguing that her evidence from the streets of Lusaka reveals instead that ‘things do not have social lives. Rather social lives have things’ [40, p. 301]. In so doing, her point of departure becomes people.

For material demand reduction, such a shift changes the focus of investigation of durability from the object (with or without its qualities of enchantment and attachment) to the behaviours, habits and material expression of the person using it. Innovation around demand for materials is rooted in the practices that go on in our society (Vignette 2), drawing those working towards reducing demand for materials into an engagement and understanding with the real world and attention to others [41]. Here the actions taken in the course of maintaining and living with clothes through time is an essential, if unstructured part of the sustainability activity [42]. In these actions, the physical durability of the garment *per se* appears less critical to the piece’s longevity than a user’s habit of mind fostering long-term use. It seems that durability in fashion is mainly a product of nurture not nature. Its potential, present within most pieces, is uncovered as garments are used (Vignette 3).



Figure 2. ‘Three stage jacket’: transformed repeatedly in the course of a long life; from the *Local Wisdom* project. Photo credit: Fiona Bailey. (Online version in colour.)

Vignette 2: Three stage jacket

I call this my three stage jacket. It began about forty years ago as a very slim waistcoat that was given to me. I knitted a panel and put it into the back just to be able to fasten it together at the front, you see. And then about fifteen years ago I added sleeves and a collar and some trimmings. And then, only about five years ago, I became a bit too big to button it up so I added latches across to the front so that I can fasten it.

Bollington, UK, 2009 (figure 2)

Vignette 3: Multiple functions take time

This is a top made out of two shirts, two men’s shirts. I have cut it up and made it into a new ladies’ top, so half of it is silk and half of it is polyester. You can totally unbutton the two halves from each other. It means that you can wash [the two halves] separately, but it actually means that one side crinkles much more than the other, so I only have to iron half (laughs). It had to be made from two shirts that had the same collar width . . . I discovered after I made the other ones what the criteria is for the next pieces that go together. Which is complicated (laughs). You [can wear it without the second half], you can actually unbutton it off and put that over your head and wear it as a halter-top.

But I’ve also found that when I’ve had multifunctional pieces I don’t really find the second function until I’ve owned it for a number of years. It is not something that I necessarily interchange, weekly. It might be I wear it one way for a year or two and then I discover how the other way now works. That sort of helps the longevity of a piece that might not be immediately apparent.

Melbourne, Australia, 2013 (figure 3)

7. Usership

Tacit knowledge and empirical evidence both suggest that durability is an outcome and not an aim of using products. This point is underscored by durability’s nonlinear relationship with user satisfaction: while lack of durability of products is a source of dissatisfaction to consumers, neither is perpetual durability valued [43]. Instead, such evidence suggests that reduced demand for materials through product life extension becomes a nested system within a bigger system of skills, competences, garment-related doings and beings. Here the durability of a garment’s material form—its fabric, construction and design—is a consequence of an individual’s skill and



Figure 3. ‘Multiple functions take time’: appreciating a garment can be a slow process; from the *Local Wisdom* project. Image credit: Paul Allister. (Online version in colour.)

competence, engaging in freely chosen practices and a strong force in influencing a garment’s eventual length of life.

Walter Stahel describes this expanded view of durability as ‘usership’ [31, p. 175], that is something which emanates from performance rather than products. Evoking ideas of *usership* as distinct to *ownership* moves the debate around demand reduction away from a materials- and product-centric focus and back to a debate of wider society. This is not an insubstantial task, for the widely held view of fashion users as consumptive individuals, ‘locked in’ to fashion conventions, habits, social norms and industry structures, and where many of the practices of satisfying use are little valued and driven underground. Not only are such practices personal, variable and slow to enact; they also fall outside the narrow spectrum of fashion activity that is valued by consumer society. In this space, a different role for design practices for durability—and material demand reduction more broadly—emerges.

Wardrobes have been described as representing ‘a “philosophy of having” . . . both literally and figuratively’ [30], yet in the case of usership, a different representation emerges, the wardrobe as a philosophy of being. Here the aim is to foster and amplify the skills, habits of mind and abilities of users to create and engage with fashion from within a context of satisfaction and resourcefulness. This fashion-ability, ‘craft of use’ [42], is a set of skills, ideas and identifiable practices which are conducive to promoting the satisfying use of garments and to the creation of fluid appearance in dress appropriate to both time and place that is expressed in a fashion ‘moment’. Here fashion provision and expression are contingent on clothes worn in ways that



Figure 4. ‘Bike–rain–felt’: garment changing with daily life processes; from the *Local Wisdom* project. Photo credit: Ellinor Stigle. (Online version in colour.)

require (user’s) skill and confidence (Vignette 4). Such skills are dependent on appreciation of material qualities, the art and practice of noticing, access to appropriate tools, adroit movement of fingers, eyes, hands and the telling and hearing of stories about use to foster social narratives around these skills (Vignette 5). Further, it seems that these activities may contribute to feelings of well-being as they help satisfy inherent psychological needs for competence, relatedness and autonomy [44].

Vignette 4: Bike–rain–felt

This used to be a really big sweater that my mum gave me when I was a teenager and a while back my husband borrowed it – well we used to wear it together, because it was so big, it used to fit us both. And there was one time he was biking in the rain in Berlin and he got so warm and so soaked that it felted and became really, really small. On his body! . . . [He was cycling] for probably about a half hour. But it was a warm summer rain. And because of the heat and the moisture it just shrank . . .

New York, USA, 2013 (figure 4)

Vignette 5: Staple, rubber band, paper clip

The jean shorts are originally a pair of my dad’s jeans from about twenty years ago or so and then I turned them into shorts and since then they’ve been kind of ripping themselves. I go dancing in them or adventures or get up to mischief or what not. So every time I go out I have to spend five-ten minutes re-stapling, [closing holes with] rubber bands, paperclips and things.



Figure 5. ‘Staple, rubber band, paper clip’: simple tools to maintain a garment in on-going use; part of the *Local Wisdom* project. Image credit: Jeremy Calhoun. (Online version in colour.)

This side’s kind of a mess, big knots and things. So every time it’s a new pair of shorts almost when I leave the house. They rip on their own and then I kind of react to whatever’s happened to them when I get home. Or I’ll even bring a hand full of paperclips when I go out just in case I need to make some repairs on the go. ‘Cause you can’t show off too much skin . . .

Vancouver, Canada, 2013 (figure 5)

8. Conclusion

As in other product and materials sectors, strategies that attempt to foster durability in fashion are limited by the behaviour and consumption practices of users. Despite this, most activities that promote durability start from materials and products, not users. The ability of a traditional design process to reach into the life world of the user and influence behaviour appears to be weak, and, in the context of fashion clothes, weakened further by fashion’s social nature, which sees it influenced by human exchanges and actions and not just material objects.

In this paper, I have articulated a new point of departure for exploring durability, and, by extension, material demand reduction, in the case of fashion clothes, supported by evidence from ethnographic research into satisfying practices of garment use. It reveals that long-life garments exist, but that their extended lives are determined more by an ideology of use than by a garment’s physical robustness or the strength of the user–object relationship. In short, durability is

performance-based rather than product-based, though played out in material form. This suggests that, in order to promote greater resourcefulness and longevity of products in fashion, it is clothing competency and the 'craft of use' that deserve attention. Such processes recognize the social and experiential dimensions to fashion, which, facilitated by a garment's materials, design and construction, shape fashion culture and sustainability futures.

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