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Chapter 1: Source

Remediation: Discussing Fashion Textiles Sustainability

Remediation: (noun) acting as a remedy or solution to a problem; in this case the use of remedial methods to improve learning skills to reverse social and environmental damage.

Introduction

The general perspective of this essay is to review the idea of fashion sustainability. One definition is from the triple bottom line in business, relating to *people profit planet,* in fashion (and by association textiles) to establish if it is a utopian ideal? To begin to evaluate the answer to this question, in the first instance, it is essential to define what sustainability is or is not in this clothing context. For the purpose of this discussion, sustainability will be explained in terms of its current principles relating to the social, economic and environmental consequences of our behavior as consumers. This essay seeks to explain the significance of the fashion and textiles sector and its importance in relation to our cultural and emotional connection to clothes. This will include historical and contemporary consumption patterns (people), to assess the importance of the global industry driving macro and micro economies (profit), and to outline the physical impact this industry has, and is having, on the environment (planet). In this chapter Dr Joan Farrer, whose acclaimed doctoral thesis on these issues conducted at London's Royal College of Art in 2000, celebrates its tenth anniversary, sets out to clarify the core ideals of sustainability, in particular relation to fashion and textiles, in light of the modern zeitgeist. The objective will be to review some key solutions which may offer a remedy to the current situation to move towards the contradiction of a more sustainable fashion industry. Examples in case include recent research that profiles up-cycling and re-manufacture (Fraser, 2009), design for source local/ sell local (Finn, 2008) and her own work in smart technological solutions for producers, retailers and consumers (Farrer, 2008). A model of *remediation* is explored as a potential to provide the most up-to-date solution to what remains a critical issue for the fashion and textiles industry.

What is sustainability?

The word sustainability has a plethora of meanings to the general public and is frequently misunderstood; unfortunately it has become synonymous and interchangeable with recycling and the environment, where in fact the original rationale from the 1950's was to focus upon social change to alleviate global poverty. The misrepresentation and cherry picking of values from the sustainable agenda, particularly over the last decade, by business, marketers, politicians, and even by education, has led to the movement becoming high jacked for commercial purposes.

In many expert circles there is a struggling to find another word to replace sustainability, because its deeper meanings and associated philosophies have become worthless,

vacuous brand development and 'green-wash' tools. One of the most cohesive descriptions given more than 20 years ago by Bruntland in 1987 was that *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs,.*[i] *Which* for poor countries was perfectly commendable and appropriate however, as Wood points out in Chapter 5 of "Designers, Visionaries and other stories,"

> "Before we knew where we were, we had stretched the original idea of 'sustainable development' and were talking about 'sustainable products', 'sustainable approaches' and 'sustainable housing'...politically the idea of sustainable development created the idea that there was a common agenda or consensus." (Wood, 2007)

In fact at the latest count and rising were seventy different definitions of sustainability (Holmberg and Sandbrook, 1992: Pearce et al, 1989, cited in Boyko et al, 2005). What do seventy plus definitions of the meaning of sustainability mean for practitioners in the fashion industry now? Which one of these seventy definitions and counting, affect our philosophy upon way we think about the way we make and use clothes? One of the easiest visual descriptions of the complexity of sustainability is the milking stool model with its three legs and seat. Leg one represents people, leg two - profit, leg three - planet, which all support the seat which represents the sustainable platform. In a move towards a more sustainable fashion industry all three legs must be as good and solid as they can possibly be. Consider this example, the industry may produce an organic cotton shirt (planet) which can still be made by a child labourer (people) and flown around the globe to European markets (profit). Can we say this is a sustainable fashion product, depending on one of your seventy definitions some would?

In North America, Europe, and the UK, retailers must be 'seen to be green' due to share holder pressure, and to be 'doing the right thing' particularly in respect of customers' brand perceptions of the ethical and environmental corporate values (CSR). However the British fashion retail system is unique from the rest of the world, in its practice of being driven by a few huge industrial fashion retailers using a

> 'mono-logical' capitalist system, an overly complex and costly system of products and services, designed to relieve us of the tasks and boring repetitiveness of everyday life. (Manzini, 2005).

The mono-logical system means that the flexibility required to enable a more sustainable outcome taking business risks is difficult. British retailers also have economies of scale and can buy large volumes of clothing at ever lower prices, creating a 'churn' of affordable, well designed goods into and out of store, which can be constantly refreshed delighting the consumer who is ever willing to buy more. Cheaper goods mean more consumption, which in turn means cheaper goods, which means more consumption. The customer footfall into the UK industrial fashion retail stores is massive, as is the rapid turnover of stock and item sales. How can this giant industrial fashion system ever be sustainable? Also a lucrative byproduct of the British system, now being replicated elsewhere, is the increasing volumes of quality clothing waste leaving the UK, traded as

recycled textiles for overseas destinations. This is unregulated 'green waste' which is dumped upon other countries as any waste would be, and where the disposal of the waste at the source of consumption is not the responsibility of that country, dumping fashion clothing on more than 65 overseas countries is eroding their local fashion textiles industries and creating profit for those few agencies handling the waste, whether private commerce or registered charities.

The major source of the problem in achieving a sustainable fashion industry is the consumer. The fashion customer is hungry for goods, yet needs to feel absolved from the responsibility from the constant refreshing of their wardrobe; this is also a physical problem rather than philosophical one. Low prices, good design, good quality fashion clothing items, coupled with an exciting shopping leisure experience on the cheap, mean an increase in purchases, which is difficult to reconcile with the idea of a looming environmental Armageddon. The customer can hold a large quantity of clothes in their homes stored in wardrobes, drawers, trunks, garages and lofts, but then when this storage is exhausted what can be done with these perfectly good items which are almost as good as new? The consumer's only option, apart from trading on in online auctions or selling to secondhand stores, is to give these fashion clothes as donations to Charities, either over the counter to high street shops or clothing banks, or to the increasing number of curbside collectors. The clothes are traded from the back of the charity shops and warehouses and sold by weight to their fashion textile customers primarily in the second hand clothing industry, to be dispersed across the globe.

Images of disappearing tribes on TV documentaries wearing branded t-shirts are as a direct result of this unregulated free-trade, or dumping. Second hand clothing from the UK is recognized globally as prime quality and in particular labels, such as *Marks and Spencer*, are recognized as high value to the recycler, where haggling over price rarely takes place at the country destination, due to the quality of goods in each consignment from the UK as one principal source (Abimbola, 2010). The more clothing generated and sold by Industrial Retailers, the more clothing waste is generated by the consumer and the more the UK Charities benefit by donations of these clothes, which have been given both altruistically and in desperation, in order to salve the conscience of the fashion consumer in the first place. This is a vicious circle because those purged and half empty wardrobes can now contain more new clothes! In response, UK volume high street brands such as *Top Shop*[ii], sell expensive secondhand, recycled and restyled lines alongside their main ranges and *TKMAX*[iii] offers a clothing take-back system in store, to recycle customers donated fashion items as they purchase new ones. It is appropriate that the UK is leading the research into sustainable fashion textiles with support from government funds for data capture on the industry; examples include organizations such as the University of Cambridge Centre for Manufacturing who published *Well Dressed*, (2006), because the UK is the source of this questionable business practice which other countries are following. UK Educational organizations too are supporting sustainable design networks such as *TED*[iv], *TFRG*[v], *Slow Textiles group*[vi] and degree courses such as BA Eco Design at Goldsmiths University London and MA Sustainable Fashion Design Centre for Sustainable Design London College of Fashion UAL, and the University College London UK Department of Anthropology, are all producing products, or publishing about the reasons behind and

solutions to the problem. The source of the escalating crisis of what to do with and where to dump good quality fashion clothing waste is the huge industrial fashion retail and Charity system in the UK. Significant research to resolve the problem on many levels should be funded by the fashion retailers and the Charities, in tandem who benefit from the lucrative world of free trade, where the consumer is a pawn.

It is crucial for the rest of the world to understand that these UK centric problems are not mirrored to the same extent overseas. We must be careful not to look to the UK for predictive and diagnostic data analysis, and solutions to apply them to other national systems. Each country and geographical region has its own very effective methods of dealing with the way it makes and uses clothes which the UK has moved away from. These local methods of production and disposal should be investigated and analyzed from a national perspective and not borrow rationale and solutions from the catastrophe in the UK where using methods and data may be wholly inappropriate. This is a case where the UK's northern hemisphere model of 'one size fits all' definitely does not work. Competitors in European countries such as the Netherlands and Italy, or the Antipodes for instance, operate a smaller scale boutique system in tandem with the global brands. Small retailers have the flexibility to try innovation, perhaps make locally, using ethical trade, connecting maker and consumer, or can trade online with a first sample range, then produce the numbers in the correct sizes, almost a buy before you make and produce; a customized system. Also in the case of Australia and New Zealand, where second hand clothing has value and material worth which is not throw away, fashion clothing may have been passed round many times within the family and circles of friends, before being donated to charity. In the case of New Zealand, if donations remains unsold (which is often the case due to the used state of the clothing), then will be sold to industrial scale second hand clothing outlets such as SaveMart[vii] to be retailed before being dumped on Papua New-guinnie. (Fraser 2009)

Today our libraries have volumes of literature describing the concepts of sustainability, rafts of business case studies, reports and illustrations, charts, mind maps, graphs and data, which help us to grapple with the complexity of the movement. But who reads these scholarly tomes? Not many Fashion designers do, which is a problem when it is they who are often charged with being at the heart of the consumer desire for fashion clothing, leading to over-production of items which date, and are inadvertently responsible for the creation of fashion clothing waste. *Fashioning an Ethical Industry*[viii] has been a key driver in the UK with regard to up skilling the staff and student body on some of ethical and empathetic issues, which has led to an interest in alternative production and consumption of clothing. The assumption is that this will lead to a more sustainable fashion industry and consumer.

Sustainability in Fashion Textiles

Fashion and textiles are integral to our culture and to our economies, indeed Schneider and Weiner in the book Cloth and the Human Experience assert that,

> 'Throughout history, cloth has furthered the organization of social and political life'. (Schneider &Weiner 1989)

Phrases in the English language which have come from this ancient industry, where cloth remnants have been found from 36000 BP (before present) and fashion textiles meanings are subliminally embedded into our culture. Phrases like 'after a fashion' meaning to follow a style or behavior, 'fabric of society', 'folded into', 'text' from textile, 'tailor made', customized, a' thread' of conversation, the list of 'material' is substantial. Historical records show the economic significance of the clothing and textiles trade. Even the trade in second hand clothing is centuries old and in Italy in 1400, Tuscan Pawn Brokers kept detailed accounts to show that 40% of trade was in clothing and apparel. So too, documents from the late 1500's in the UK prove second hand textiles and clothing to be a significant physical feature of economic development where during the 1500s and 1600s the banking sector was in its infancy in Europe. At this time, small coins were a rarity, and as garments and textiles were an investment and the items often carried great value; they were used as barter, where they were seen as part of a trading system to replace cash. This was a textile society where fabric was an alternative currency, particularly for the working poor, however both the wealthy and poor in society used textiles and clothing to replace hard cash. The late 1500s saw the development of 'small thrift' economics, cottage industries and the emergence of the solo female trader who began to benefit from the transformation of a society of relative scarcity which gave way to one of plenty in commodity terms. The 1600s and 1700s saw a wide array of general goods for sale and barter with an increase in the volumes of clothing and textiles because of the importation of cheaper cotton from India, led to a greater volume of cheaper clothing and household textiles to trade and an increase in dealers. The growing abundance of goods enjoyed by the working classes ensured increased material flows which meant that the trading of old goods, clothing and textiles for new items gathered momentum, expanding commercial activity and developing significant microenterprises. Textiles knowledge at the time was striking, as was the scale of trade in these businesses. This is explained by Lemire in her paper entitled: 'The second-hand Textile Trade in Europe &the Atlantic World: Practice and Enterprise, c. 1600-1850"

> '...the technologies of textile use and reuse were foundational aspects of European society and economy for generations. Skills in reuse were practiced in many areas of society from households through to retail marketplace, with intersecting networks of use and exchange. The trade offered marginal commercial opportunities for poor women and minorities, while being a staple of various retail and merchant sectors (regional, national and international)'. (Lemire, 2010).

During the 1800's with the development of industrially produced textiles made from of cotton, wool, and flax the price, and standing of textiles in society began to decline, which is a trend which has continued until the present day, where fashion clothing in the UK is a disposable commodity. Then, common people, were swapping clothing for goods such as china, which resulted in the increase of quantities of used apparel being shipped overseas to places such as Poland and The Netherlands. However the upper classes had been moving away from this trade in second hand textiles, which had a decreasing value and were pawning jewelry and fine goods to raise money instead. Consequently, the second hand textiles and clothing trade became synonymous with the working classes on the one hand, making decency, style and comfort possible to a certain extent, for the poor where quality goods in particular tailored clothing were sort after second hand market,

but created a distinction between the classes of those who wore new and those who wore second hand. Fine sewing was the domain of the tailor and seamstresses, who repaired and altered items, (including those involved in refurbishing hosiery) in order to adapt clothing successfully for those who could pay. Such transferrable skills with regard to making, altering and repairing clothing were passed down through generations, although this began to change with the introduction of mechanization, development of industrially manufactured clothing, the introduction of the domestic sewing machine and the emergence of the mail order, ready to wear industry, during the early 19th century.

Nevertheless, the second hand clothing market continued to flourish and was supported by the culture of home sewing in the UK, due to the cost of new items. There were periods of renewed interest in the field of remake in the 1900's particularly during and after World War One and World War Two where new clothing and materials were scarce. Towards the end of the century, from the 1990's there has been a gathering momentum for remake and upcycle, with individual designers in that decade, leading the way under the genre of deconstruction. One such master of changing the way we think and use clothes is Margiela, whose contemporary use of raw materials are sourced from second hand or army surplus commodity clothing, which have some of the lowest exchange values in the second hand clothing system. However, Margiela, moved the notion of second hand away from its associations with the poor and working classes repositioning the garments at the top of a hierarchy of prestige. He converted textiles and clothing waste into something of desire with a high commercial value and a new understanding of material worth. He is the antithesis of the 19th century second hand clothing worker or rag picker who was discussed by Quennell in 1964, and by Benjamin in 1997, who were:

> 'deemed to be the lowest and weakest of citizen who were scavengers, rag pickers and peddlars [sic]' (Quinnell 1964).

In her acclaimed essay 'The golden Dustman: A critical evaluation of the work of Martin Margiela and a review of *Martin Margiela Exhibition (9/4/1615)* Evans also draws together numerous historical references affirming the low status of the second hand clothing market, its workers and consumers in the past and she argues in the light of Margiela's artistic genius, for a change of status of the industry, referencing previous scholarly texts written on the subject.

> 'Benjamin goes on to comment on the analogy that Baudelaire made between the rag picker and the poet-for which latter term we could as well substitute 'artist'. Or, as I [Evans] would argue in this context, 'fashion designer. Not, of course that Margiela's status as a fashion designer is low: on the contrary. But his interest in scavenging and revitalizing moribund material is that not dissimilar to that of Baudelaire's poet/rag picker.'(Evans 1998)

The 1990's period saw the remake, deconstruction and upcycling of clothing, either in its most beautiful form from avant-garde designers such as Galliano, Chalayan or from a

mid range quality from Ann-Sophie Bach and Jessica Ogden to the often rough but acceptable work of students and 'cool' home sewers.

A global Industry driving macro and micro economies (profit).

The world textile and clothing trade (according to the world trade organization) reached US$ 530 billion in 2006. Today fashion/textiles continue to drive economies throughout the world on micro and macro scales from a multitude of developing world craft producers to industrial fashion manufacturers and retailers. In Europe, the textiles and clothing industry turned over 211 billion Euros in 2007, produced by approximately 145000 enterprises employing more than 2.5 million people, the small to medium enterprises (SME's) employed an average of 1-9 people each. (EU 27 Textile/clothing Industry 2007 Source: Euratex).The value of the global industry is estimated to reach US $ 1,781.7 billion by the end of 2010 and in excess of 30 million people work in the industry in China alone. The European Union continues to dominate global markets and represents the worlds second largest exporter of textile products after China (observatoryNANO 2009). The Industry has focused on 'start of pipe' streamlining, design and branding and optimizing supply chain management, aiming to supply consumers with high added value low price products at very short notice. Based on current production, consumption and disposal business practices the diagram shown in Fig.1., illustrates the complexity of existing fashion supply chains. The difficulty that the fashion industry faces, in order to supply a future sustainable and ethical customer, is how to alter their philosophy and multiple business models whilst remaining profitable? This diagram shows the typical process for development and manufacture of a fashion textile product, commencing with fiber processing, through textile manufacture, garment assembly, distribution, sales and eventual disposal. Most processes could be local but are usually global. This flow chart also points out the various chemical inputs required throughout the manufacture process which are usually not associated with the finished product. Through introducing 'use' and 'disposal' as the follow up phase to 'distribution and 'sales', detergents can be viewed as chemical input, further adding to the complexity of the issues faced by the fashion industry (Farrer & Fraser 2010).

Figure I. Image removed

Figure I. Fashion and Textile Typical Supply Chain designed by Farrer & Fraser (2009)

The physical environmental impact of the Fashion Textiles Industry (Planet)

As an industry, textiles and clothing was the core driver of the Industrial Revolution in Great Britain; the developmental effects of which cascaded through Europe, the Commonwealth countries and North America over a 200 year period from the late 1700's. Now the industry is again at the fore front of a revolution, on the one hand in technical terms with the development of smart polymers[ix] and nanotechnology to produce functional wellbeing performance fashion textiles products with minimum waste, which is recyclable. But perhaps more importantly, this time round, fashion, like the organic

food industry, is having a humanizing effect communicating the complex technical issues central to a sustainable philosophy involving production, consumption and waste. Through the emotive medium of clothing, which any one of any age and culture can relate to, fashion is visualizing and sustainable philosophies communicating positive and negative issues around the way we make and use clothes.

For the individual in Europe and the northern hemisphere, until recent times, the environmental crisis had been imperceptible. The sun rises and sets, the birds sing, children are born, and life continues as it did yesterday and yet crisis there is, inextricably linked to commerce and commodity production of fibers. This is seen many times in the case of cotton production, which is harmful to ecosystems, such as the 1990's Aral Sea desertification, water and soil contamination in Russia, and post 2000 in the Mackenzie River delta, in Queensland Australia. Free trade and the generation of money-capitalism have become destructive to the ecosphere which has exquisite limits, unlike the generation of capital (profit) which is limitless, and the resulting globalization and neoliberalism of fashion brands, heightening the exploitation of nature (planet) as well as labor (people) in recent years. No one can deny fashion clothing 's seductiveness, through the fact that its industries produce a feeling of luxury and wealth, a feel-good factor which is affordable, easily reinvigorated and deeply cool.

Current estimates are that the global production of fiber is 60 million tones, of which about half is natural in origin and the other half artificial (Slater 2003). Natural textiles fibers can be obtained from the seed head, stem and leaf of a plant. The cotton plant needs 150 days of sunlight to grow good quality fiber (obtained from seed hairs) and plenty of fresh water, which means it can be grown naturally in a narrow geographical belt within 35degrees latitude of the equator, with Egyptian cotton, deemed to be the best and Russian and Indian cotton inferior. This issue over cotton quality has lead attempts to improve the crop by adding fertilizers, insecticides and herbicides which have had cumulative polluting effects on the air, soil and water table in the growing regions. Another cost to the environment comes with improving irrigation, which often leads to soil nutrient leaching, soil erosion and drought. Linen, flax, Jute and hemp can grow without much interference as long as water is available for growth and retting, a process where the stems must be soaked to remove the pithy outer covering, to leave the long core fibers for processing. Since the Middle Ages these 'bast' fibers were harvested by hand and the stalks left in pools or ditches of water over a 6 week period. Now mechanical and chemical retting takes place in tanks, where the pith can be quickly removed, with increased and constant temperatures of 75 degrees and the addition of oxalic acid, and detergents to speed up the process.

Silk fiber is, grown by silk worms, creating a fine silk filament around themselves to become a cocoon. The filament is then unwrapped and reeled ready for processing. Wild silk cocoons produce a thread and fabric known as 'Tussah' which are gathered by hand from mixed leaf forests, the labor intensive production of this crop is often a main source of income for forest tribal people in India, although the quality of the product can be compromised. However farmed or cultivated silk, where the worms are fed high quality, cultivated Mulberry leaves, has a consistent quality. Economics not philosophy has been

the key, to which of these textile processes is employed, the former can be said to be more sustainable, than the latter which has environmentally and socially damaging consequences

Animal fibers such as wool have desirable properties too. Originally these animals gave milk and meat as an extra commodity, they could be farmed in marginal landscapes which were unproductive, and where the animals could survive relatively independently whilst fertilizing the land. Now due to selective breeding, very good wool fiber producing animals do not give good quality meat although research is underway at AG research in New Zealand to produce high quality wool and meat animals. These sheep are highly bred, need supervision at lambing time and must be sheared or they will overheat and die, particularly in southern hemisphere climates, such as Australia and South America where large scale, commercial, good quality wool fiber farming is taking place. Another issue with wool is in the use of antibiotics and insecticidal dips administered to the animals to prevent infection and remove pests from the animal's coat which have severe animal and farmer welfare issues.

The other group of fibers in the global supply chain is the artificial fibers. These can be grouped into 3 types, true synthetic polymers, regenerated materials and modified natural fibers. Main production techniques are solvent spinning, wet spinning and melt spinning. Oil is the primary source of polymer preparation, oil extraction is environmentally expensive, processing the oil into polymer solids which requires great heat, uses large amounts of energy, and produces waste in the form of gas, liquid or solid by-products. However the end result polymer is clean and easy to handle and is recyclable. Solvent spinning gives off harmful vapors, which is difficult to neutralize. In wet spinning a process most used in regenerated fiber production, a chemical reaction is engineered to create a viscous liquid from a solid starting material, these chemicals may include acids, alkalis, reducing or oxidizing agents and bleaches which if not properly contained may be a threat to the environment. Melt spinning is extremely temperature sensitive, uses vast amounts of energy and creates waste in the processing of the fibers due to them being poor thermal conductors and the residue waste is difficult to dispose of. However, the new direction of polymers is in the area of biodegradability, where alternative sources, other than oil are used as the starting point for polymerization, such as polylactic acid from plant material which including vegetable waste such as corn husks. These new fiber developments can be blended with natural cellulosic's, thermo plastics and polyester to produce co-polymers which can be designed to have certain performance characteristics including compost ability.

Fiber production sourced for fashion of any type is likely to harm the planet in the long run. The cost of fertilizers, insecticides, chemicals for processing, costs of handling and transportation are seldom if ever recognized or factored into the garment's true cost. Following fiber manufacture, fabrics are made in the traditional ways, using spun thread in crocheting, felting, knitting, lace making or weaving, tatting, non woven development, fiber-to-fabric, film fibrillation, laminating, needle punching, bonding, tufting, stitch-knitting and braiding. These fabrics are often chemically washed and finished including being coated, softened, colored or surface decorated (cut, printed or embroidered) before

making into garments. The vast array of seductive and constantly changing fabrics sourced in the market for retail designers and buyers ensures consumer desire. Fashion clothing remains one of the easiest and most conspicuous ways to display wealth and the desire to buy and refresh one's wardrobe is constantly reinforced as is the act of disposal, in a kind of lip-service to planetary well being, to 'recycle' the articles via alternative outlets, such as second hand clothing stores and charities, ensures that the gift of a garment through altruism creates a gap in the wardrobe to be filled.

Pressures on the fashion industry and consumer are mounting, going directly against ecological welfare of the planet. As Slater explains in his book entitled Environmental Impact of Textiles: production, processes and protection,

> 'the fashion industry (and those connected to it) has a vested interest in ensuring a regular turnover of garments. It is inevitable that a large reduction in sales would lead to a major loss in employment, because it is not only the textile and clothing manufacturers who would be out of work, but also the designers, alteration staff, marketing specialists, transportation personnel, retailers, magazine editors or artists and anyone else with ancillary interest in the fashion world. The cumulative psychological effect on Society of the need of all these people to be kept in employment is difficult to resist, meaning that the relentless drive to be up-to-date will continue for as long as we (or our planetary home) are prepared to tolerate it.' (Slater, 2003)

The Case Studies

The Case Studies illustrate examples of remedial action where the objective is to review key solutions which may suggest a remedy to the current un sustainable situation in the fashion clothing industry.
Case Study 1: Source, Upcycling and remanufacture for waste materials recovery.
Case Study 2: Source local and Sell local.
Case Study 3: Communication of the Sustainable Agenda and its issues through Fashion Clothing

Case Study 1 - Kim Fraser: "ReDress - ReFashion as a solution for clothing (un) sustainability."

Murray in the book Zero Waste- explains what Upcycling textiles from fashion textiles waste should be about:

> 'not merely conserving the resources that went into the production of particular materials, but adding to the value embodied in them by the application of knowledge in the course of their recirculation' (Murray, 2002).

The Fashion Industry epitomises unsustainability with its fast changing trends, high minimums and planned obsolescence, contributing millions of tons of clothing to landfill, incineration and third world dumping. One solution is to Refashion a process which intercepts discarded clothing, (post-consumer textile waste: PCTW), reclaims, re-cuts and

refashions, returning the item to the clothing stream, effectively creating a new loop, postponing its grave ending, thus reducing both textile waste and the demand on raw materials required in the manufacture of new textiles.

The research of designer and maker Kim Fraser's was to promote debate and alter perceptions of second-hand materials and ReFashion[x] concepts. Her thesis took the standpoint that discarded clothing is an untapped commodity, a rich fiber/textile resource to be conserved and transformed into contemporary fashion. However while the word, ReFashion, has filtered into fashion product terminology and many fashion labels are reusing and recycling second hand and vintage fabrics, it remains a 'one-off' principle. The 'multiple production of one-offs' which arises from the haphazard and diverse nature of the starting point materials (Dunn, 2008), is an approach to manufacture which is suitable for low unit quantities and niche market, but is unlikely to be attractive to large fashion businesses. Through reflection on the deconstruction/reconstruction process of developing prototypes, issues involved in the current practices of 'Materials Recovery' in the secondary textile industry were identified. As the work developed the investigation sought to determine whether the current ReFashion process could be suitably scaled up for larger fashion businesses. Typically large fashion businesses operate in an 'Economy of scale'[xi] that is, large companies lower the average cost per unit through increased production. The subsequent advantage being that buying bulk is cheaper on a per-unit basis, allowing a producer's average cost per unit to fall as scale is increased. The implication if ReFashion was to begin to address effective manufacture and parallel this bulk model was an obvious need to source a bulk supply of input stock.

Fraser's studio investigation targeted specific PCTW and established several processes unique to ReFashion. During the first scoping phase of the ReFashion experimentation, numerous discarded items were transformed. One of the early experiments, which transformed a men's trouser into a contemporary fashion dress, highlighted the potential for targeting men's dress trousers: quality of cloth within a semi-standard size and shape; similar construction and tailored details; apparent availability of large quantities. The strategy to limit input stock to men's trouser permitted a way of filtering the complex issues created by worn garments, providing opportunities for in-depth examination and interpretation. Throughout the research, focus was placed on process rather than artifact, processes used in the development of prototypes were analyzed and tacit understandings scrutinized. The emphasis was on repeatability, identifying and recording the appropriate manufacturing knowledge, techniques and processes that would be required to repeat the 'product'. In this manner issues relating to patterning for repeatability were highlighted (disassembly, usable piece size, nature of the second-hand garment, complexity and jigsaw fit, expertise of the cutter, initial selection and stock recording).

Fraser's practice based research highlighted the new skill set required, revealing potentially achievable methods to manage the processes that were determined unique to ReFashion. Through comparative analysis, the identified processes were measured against standard garment assembly procedures within current manufacturing systems to determine the required modifications. Potential adaptations of a manufacture process for

ReFashion have been identified and documented, with the T-series (Fig II) providing evidence of the possibility of ReFashioning a standardized fashion 'product'.

Fig II. Image removed

Fig II. Band, B. (2010) ReDress –'T series' dresses on rack designed by Kim fraser. Digital photograph.

Case Study 2 - Angie Finn: Full Circle: A collection of Prototypes.

The research of designer and maker Angie Finn engages with another one of the key issues facing the fashion textiles industry in terms of future sustainability: that of the well being of fashion industry workers in Australia and New Zealand (people). Her honors dissertation (completed in New Zealand in 2008), and subsequent publication and conference presentations, examine the contribution that design can make to sustainable manufacturing; particularly design for local production and consumption. An important aspect in this discussion of source, the work suggests that the *made in China syndrome* (as she refers to the current state of over-consumerism in Australia and New Zealand) could be bought to a close through design to minimize waste and maximize opportunity for 'people': in this case both garment workers and the SMEs that employ them. Her work is interesting in that it focuses on a *local approach* that could be put into practice by a framework of SMEs that already exist. In addition the design process is highly transferrable and could be put into practice almost anywhere with minimal set up costs and a design ethos that progresses at the same pace as the skills of workers. This collection is a physical and conceptual embodiment of a *source local/sell local* approach.

In a different approach to the previous case study, where reuse/recycle/reclaim methods were applied to the problems of fashion textiles waste and explored through ReFashion processes, Finn's ideas engage with stopping these problems at the source. She argues, with Farrer (Farrer and Finn, 2010, Farrer and Finn, 2009) that this is not an unrealistic ideal and is in fact possible through the development of a sustainable industry, in the truest sense of *people, profit and planet*, through adoption of a design process model that stops the waste at the source, by making better use of the raw materials and labor involved in making fashion garments. Finn identifies that much discussion surrounding fashion textiles sustainability is focused on environmental sustainability, raising the issues and problems but failing to offer what she refers to as real world solutions for small business.

Finn examines one possible solution in her honors dissertation entitled "Fashion Manufacturing in New Zealand: can design contribute to a more sustainable industry" (Finn, 2008). Her final collection entitled "Full Circle: A collection of prototypes" showcases a range of highly desirable and commercial products that could be manufactured by SMEs in New Zealand (or indeed in Australia or the United Kingdom) in smaller quantities for a realistic market price. Fig IV shows one sample from the collection. The inspiration behind the collection was to design a series of prototypes that minimized fabric usage, could be constructed using a straight sewing machine, cut

without a pattern and fit without the requirement of a pattern grading process. The aim of this research was to demonstrate that design could be used as a practical process to recreate jobs and re-energise the career of making. As she explains:

> "It has been, and continues to be, of real concern to me that perhaps Australia sold out far more than we realized for the price of cheap T-Shirts and jeans. I worked in the industry in Australia in the late 1980s, before the import tariffs were lifted, with a couple of hundred factory workers who were getting on with their lives, paying their mortgages, catching up for a few drinks on Friday after work, bringing up young families. I was very young myself but remember thinking...this [lifting the tariffs] is a *really stupid idea*, and so it was. It seemed that the industry died overnight, trying to compete on price. The great thing about the fashion industry is that it can change, reshape itself and regrow. This is our strength; we can work with what we have rather than what we have not" (Finn, 2007).

A key factor in Finn's interest in sustainability is to improve the well being of individuals, particularly through a reconnection between the user of a product and the maker. Although the focus of this research appears to centre on people and profit, as the next case study will show, this kind of source local/sell local approach also has great benefits in terms of environmental sustainability.

Fig111: Image removed

Fig111: Finn, A. (2008).Hooded Jacket and dress designed by Angie Finn. Collection: Full Circle

Case Study 3 - Joan Farrer: Conscience Clothing. Communicating through Fashion Clothing to inform the Sustainable Consumer

The research of Joan Farrer is to understand the complexities of the sustainable agenda in terms of industrial fashion and textiles design, manufacture and disposal and then to communicate these issues to all consumers within this chain leading towards knowledge building and behavioural change. Manzini (2005) talks about enabling and disabling solutions (related to design, production and sustainability) and his argument is that human ability to gather, learn from, and utilize knowledge to apply to situations, including design and production and consumption, is now diminished because of advances in mechanization. This has become a disabling phenomena, accelerating the loss of essential skills and knowledge transfer such as how to design, how to consume, how to make and re use clothes, how to dress, what to wear, and most importantly what to accept from a consumer point of view (Farrer, J. & Fraser, K. 2008). Sourcing and manufacturing garments off shore for cheap sales in the home market, appears to be a sensible and inexpensive process, but if the social, economic and environmental cost is not effectively incorporated into the retail price of the garment or its effects not communicated properly to the consumer, we are supporting the concept of 'out of sight; out of mind' in terms of wellbeing for workers, environmental pollution and natural resource exploitation. This suggests a greater need than ever before for transparency and communication in the supply and disposal chain of fashion garments, to inform

consumers and to enable the right purchasing choices to be made. Fashion consumer awareness campaigns such as the second collection of "Conscience Clothing" (Farrer, J. 2008), targets a new breed of sustainable consumer. In this work, five students were chosen at random, and photographed in their everyday clothes. A note was made of the point of origin or 'made in' label, sewn into their clothing and printed on their footwear. A calculation was made of each garment's mileage from the garment manufacturing labeled point of origin, to New Zealand which, and the milage was included on the poster. Using the Quantas air miles carbon convertor, estimates were made of the model's garment miles totalling an astonishing 1.069112, and a carbon emission estimate, of 50.98 tonnes. A series of life size images were digitally printed on fabric banners and exhibited in Auckland. From the five student models, the poster 'Sally' illustrates local clothing sourced from Australia and New Zealand which is calculated as travelling, 3,296 miles, compared with 'Sanjiv', who illustrates the consequences of clothing sourced from parts of Asia with a total of 43,765 miles. This highlights the potential benefits, in carbon terms alone, of close to market design and manufacturing, but poetically illustrates and communicates complex information, in a simple way for consumers to make educated choices to support behavioural change.

Fig 1V Image removed

Fig 1V. Parr, H. (2008) Conscience Clothing Shoot, showing Garment Miles to New Zealand and related Carbon Footprint. Life size posters designed by Joan Farrer. Digital photographs.

Conclusion

The multiple sources of fashion textiles production coupled with the enormous number of definitions of sustainability mean that there are too many variables in creating a sustainable fashion and textiles sector in mass market terms. It is a Utopian ideal. For instance, a limitation to the wider adoption of sustainable philosophies in the sector is related to the cost of more sustainably produced products from accredited supply chains with an integrated product policy. There are concerns from industrial manufacturers that there may be low compatibility of new 'sustainable' production processes with current production processes and critically insufficient production capacity of the new production methods which are successful, as experienced in the organic food industry, where supply and demand has been an issue along with fraudulent claims of product authenticity.

More sustainably produced commercial fashion clothes which factor in the 'true cost' of these products from an environmental and social perspective are a higher cost than traditionally manufactured and priced lines, not only in the area of equipment, but in hiring expertise in sustainable practices, use of more expensive less damaging raw materials and considered disposal or upcycling of fashion clothing waste. The industry is dominated by SME's, the fragmentation of which complicates the implementation of new developments, theories and processes. Most companies are not informed about what is

being done or discussed in literature on sustainability or aware of research centre R+D in addition they have limited resources to invest in new technical developments and business processes unless forced to by legislation. The fashion textiles sector is mainly cost driven where this increase towards a more sustainably sourced product will be realized in the final product cost to the consumer which is unfeasible at the moment to the general consumer due to cost**.**

However a polarization is taking place in the fashion textiles industry (Farrer & Fraser 2009) which has meant that there is a division appearing where there is an opportunity for an alternative sector from co creators of generation C (Pearce & Young 2007) to emerge, where a political message is being delivered to makers and users developing new kinds of business models for distribution and sales. As outlined and discussed here, methods of production and consumption from the raft of sustainable definitions, such as make local /sell local (Finn, 2008) and deconstruct/reconstruct (Frazer, 2009) are slowly being understood. Small scale business in this arena is producing fashion clothing design which is artisanal and underpinned with craft skills, where the handmade and its 'one off' idiosyncrasies are celebrated. These garments are becoming 'sustainable fashion badges' worn by an educated, consumer who wears the small run commercial or handmade garment as a political flag in order to rail against the unsustainable industrial fashion clothing system in the developed world.

(Words = 7,650)

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