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Research Article

SUSTAINABLE FASHION: FROM CONCEPTION TO DISPOSAL

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ABSTRACT

Fashion is one of the world's most important industry, driving a significant part of the global economy. It is a part of day to day life of human being, affecting each one of us in every walk of life. Being multifunctional in nature, fashion can be classified as fast fashion, sustainable fashion, slow fashion, green fashion, ethical fashion, eco fashion, organic fashion and many more. Sustainable fashion carries a great meaning in today's context where everyone has understood and are working towards reducing pollution. Fast fashion which creates an increasing pressure on the fashion industry, to adopt means that jeopardize environment sustainable practices. Therefore there comes great responsibility to help and protect environmental impact with alternatives. There are certain misconceptions. Many people identify sustainable fashion as fashion that is simply made from sustainable materials. However the responsibility goes further than this and one needs to understand sustainable fashion in detail, spanning across the entire value chain.

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INTRODUCTION

Fashion is not just a word, it is a movement. According to oxford dictionary, one definition of fashion states, "activity that forms, moulds or shapes either material or immaterial objects". Fashion brings together creative authorship, technological production and cultural dissemination associated with dress, drawing together designer, producers, retailers and all of us who wear garments. At its creative best, fashion helps us to reflect who we are as individuals, while connecting us to wider social groups, providing a sense both of individuality and of belonging. Fashion is a connector, linking people across demographics, socio-economic groups and nationalities; and an attractor, drawing people into a movement for change. (Grose 2012) Yet fashion also has a complex relationship with larger systems; with economies, ecology and society. An approach towards sustainable fashion has become an urgent attention seeker. Sustainability offers the biggest critique the fashion sector has ever had. It challenges fashion at the level of detail also at the level of whole. It has the potential to transform the fashion sector at root, influencing everyone working within it and everyone who touches fashion and textiles on a daily basis.

Sustainable Fashion

Enhancing sustainability characteristics in fashion products, requires both broad and deep thinking while making decisions. It is equally vital that we also need to focus on the here and now and take pragmatic, practical decisions about fibre choices, supplier factories and fabric finishes. Arriving at a point where these two things happen simultaneously requires that we develop applied knowledge or practical wisdom. Aristotle described this as a "combination of moral will and moral skill" that is fusion of experience built up over time, knowledge of the systems in place and a finely tuned ability to improvise. (Grose 2012) The paper focuses on opportunities to influence the environmental and social impact of garments in their design and development across the entire product life cycle-that is, from fibre to factory and onwards to consumer, point of disposal and potential reuse.

Sustainable Fibres

Fibre crops such as cotton and hemp, and those based on cellulose from tress, such as lyocell, have the potential to strike the critical balance between the harvesting and speed of replenishment and to be renewable. In contrast for fibres based

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on minerals and oil, there is an imbalance between rate of extraction and speed of regeneration, hence they are described as non-renewable.



Fig1 Jacket in Lyocell from H&M’s Garden Collection 2010

Example: In its low-impact-focused 2010 Garden Collections, Swedish brand H&M features pieces in Tencel alongside other materials including lyocell, organic cotton, organic linen and recycled polyester. (Shen, 2014)

The use of biodegradable fibres facilitates the garments to biodegrade harmlessly at the end of their lives. It is a proactive and ecosystem inspired response to the rising levels of textile and garment wastes, overflowing landfill sites and increasingly prescriptive legislation controlling the ways in which the clothes can be discarded. (Grose 2012)

The amount of chemicals applied to the fields, most notably cotton, during cultivation should be reduced which would bring about substantial positive effects to both the lives of the workers and the level of toxicity in soil and water. US\$2 billion worth of chemicals are sprayed on the world’s cotton crop every year is considered toxic enough to be classified as hazardous by the W.H.O. Organic agriculture popularized by Katherine Hamnett is one of the route to reduce the chemical load on cotton growing. Additional routes include biological IPM (Integrated Pest Management) and GM (Genetically Modified) fiber that use biotechnology to resist pest infestations and make weed management simpler. (Fletcher, 2008)



Fig.2 Products by Bird Textiles, Australia’s first cotton neutral business

Energy use is a key issue for fibre choice in fashion. It is closely tied in with prominent global issues such as climate

change and a host of contributing factors including carbon emissions and use of petrochemicals. This has converged to drive energy saving practices in fiber production. It paves way to use alternative energy sources such as wind and solar and also bring a new focus on low-energy and in some cases low-carbon fibres.

Example: Bird Textiles-Australia’s first carbon-neutral business, started out producing its fashion and homeware lines “Off the Grid” using renewable sources of energy. It has hand-printed fabric and seamstresses working on foot-powered treadle machines or those powered by electricity from photovoltaic cells and wind turbines. The result is fusion of low-and high-tech responses to energy use and carbon emissions. (Grose, 2012)

Process

Processing is an essential part of converting raw fiber to fabric to fashion garment, and a key contributor in sustainability impact. Fashion designers find the technical complexity of textile process bewildering. It often creates an “intellectual timidity” gap between the designers and experts, for the designers feel less qualified and intimidated due to lack of knowledge about technical aspects and processing of fiber and fabric. This hinders taking responsibility further marginalizing the role of designers in developing solutions. (Grose 2012)

The selected number of processing and manufacturing steps, set out best practice and exploring design opportunities to enhance the sustainability profile of garments.

Bleaching is crucial for achieving sustainability goals for it is employed in the prepare-for-dye stage of textile processing. It is critical to achieve a uniform white colour fabric that can be dyed evenly. Bleaching also has long-term durability of the garment. Alternative to chlorine is hydrogen peroxide which is readily available and feasible bleaching agent. It is active only at temperatures above 60° C. Chemical additives are required to stabilize hydrogen peroxide and optimize the bleaching process, these are highly polluting if left untreated in the discharged water. Enzymes can also be used for bleaching in tiny quantities. That is relatively easy to control by changing pH or heat or both. (Grose 2012)



Fig 3 Ardalanish Tweed jacket and De Beauvoir coat in naturally coloured wool by Eloise Grey

Colour is one of the most visually stimulating and vital aspect of fashion. Achieving colour in a fabric or garment without dyes forces deeper creative explorations. Over the long term naturally existing fiber colours contribute much more than a

lower-impact choice over dyes. Natural colour of a fiber is much an indicator of its place, reflects the weather patterns in a given year or season. With more and wide use of fibers with their natural colour, the eye becomes intimately familiar with the appreciative of the subtleties and reasons for natural colour variations.

Example: Ardalanish-textile manufacturers based in the Scottish Jighlands specializing in tweed fabrics with unique regional characters. Using mostly undyed wool, with occasional addition of madder and woad (flowering plant in the family Brassicaceae), its distinctive fabrics are created in subtly beautiful patterns and shades. Fashion designer Eloise Grey uses Ardalanish fabric in her clothing and notes that the natural colours have the broadest appeal among her clients. Grey notes that they light up people's skin tone much more than the flat neutrals provided by synthetically dyed fabrics. (Grose 2012)

Natural dyes are most often criticized by industry for their limited supply of raw material. Colour-fastness over long term, especially on cellulosic fiber, is also an expressed concern. For natural dyers using natural dyes is often not to meet self-imposed industry standards, but first and foremost to work within the limits of nature and then adopt creativity and practice accordingly. With increasing interest in sustainability, new technical innovations are now being applied. Higher yields of plants per hectare and higher yields of extract per plant begin once again to impose human-centered industrial goals on to nature. (Grose 2012)

In recent years, design-for-sustainability concepts around cutting waste have emerged from utilizing scraps in patchwork garments to recycling them into new yarns. Emergent design ideas build further on these advances by developing altogether new ways of conceiving clothing construction. Technology may provide us with new tools, but it is the creative design mind that informs and directs their effectiveness.

Examples: Sam's Forno's Low to No Waste Jacket, is designed in a way, allowing the pattern pieces to be shaped by negative space on the fabric layout. This process reduced the quantity of fabric usually required for a jacket by more than 25 per cent.



Fig 4 Sam's Forno's Low to No Waste Jacket and its pattern layout

Australian fashion design house Materialbyproduct works with a novel system of cutting, making and joining cloth that uses both the positive and negative spaces of a pattern to create a garment, potentially described as, 'cutting with both sides of the scissors'. The company has developed a unique layout programme that uses grading and sizing lines as integral parts of the garment's shape and surface pattern. (Grose 2012)

Distribution

The size and global reach of the fashion industry, requires numerous means of transport in various parts of the world arranged into a complex network to move product inventory from fiber through processing to final garments and to retail. It reveals an astonishing mass of intersecting transportation lines, each generating a calculable number of carbon emissions which includes various means of transportation switching from air and truck, to rail and sea transportation as the preferred mode of transport. Thinking critically about distribution systems, inventory management and transport, as a whole, can lead to innovative carbon reduction strategies.



Fig.5 Clothing Company Nau

Example: Clothing Company Nau, developed small retail stores and stocked them with sample garments primarily for the customer to see styling options and assess fit. The company provided 10 per cent discounts to consumers who ordered products online for door-to-door home shipment. The company's own research indicated that, the delivery option encountered to reduce carbon emissions and also simplified inventory management. (Grose 2012)

Consumer Care

Designing to reduce the impact of the laundering or consumer-care phase of the life cycle has the potential to bring great benefits with some clothes. The realization that most impacts associated with a garment occur in the laundry suggests that one of the most influential sustainability strategies would be to change how people wear, wash and dry clothes. Even a small change here could have a big effect and might include changing garment labels to encourage lower-temperature cleaning, specifying particular colours that tend to be laundered less

frequently and on cooler temperatures and designing with quick drying fabrics.

Recently a number of brands and retailers have started using care labels to advise consumers to use lower washing temperatures. A new generation of washing detergents has now made it possible for effective cleaning of clothes even at low temperatures. Enhanced washing machine functionalities could also help to reduce the energy intensity of washing in other ways as many current machines do not have the capability to reduce temperatures below 30°C. (Grose, 2012)

Example: Marks and Spencer uses the slogan 'Think Climate, wash at 30°C' in its labels in an attempt to influence the environmental impact of consumer behavior.

Disposal

Disposal-into first a rubbish bin and then a landfill site-is the end point for many clothes. It is not just physical garments that are deposited in landfill, design and business opportunities also end up buried beyond reach in the ground.

Designing clothes with future lives requires a radical renovation of the way we currently deal with waste. It is an attempt to redefine our notions of value and to make the best use of the resources inherent in garments either as items of clothing, as fabric or as fibre, before finally throwing them away. This has given rise to clusters of activity in fashion such as recycling, reconditioning of worn or dated clothes, remaking of items from old garment pieces and recycling of raw materials.



Fig 6 Bodice dress made from post consumer waste by Goodone

Examples: Designer Karina Michel has been working to utilize waste generated by garment production at Pratibha Syntex, a knitted apparel manufacturer in India. Michel uses a reverse appliqué technique, sandwiching several knit fabrics together with machine and hand-stitching. The transformation of factory waste into exquisitely crafted garments exemplifies the power of design to innovate around issues of sustainability.

The signature garment of UK-based reconditioned fashion brand Goodone is made from a patchwork of pattern pieces. Goodone's pieces are made from 'the best rag possible', carefully sourced and handpicked from textile recyclers trading in post-consumer waste. (Grose, 2012)

CONCLUSION

The challenges posed by sustainability for fashion are profound, for at their core they aim to foster activity that creates social and environmental richness and value in the long term, a goal that is qualitatively different from that of the fashion industry today. Sustainable fashion design will be impact-rather than trend-led. As new ideas arise, it will facilitate to restore environment and society. With the mass acceptance and knowledge of sustainable fashion and its processes, it will have a pluralistic aesthetic. This will also further facilitate in emerging of different businesses with sustainability as its prime focus. Adopting sustainable practices at each stage of creating a product will induce a positive social, cultural and environmental value. Thus with the advent of sustainable practices, the fashion sector can create a sustainable future.

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