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A solution to fashion textile unsustainability

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Design information communications and cognitive technologies provide opportunities for smart, intelligent and conscientious fashion to emerge and will drive the integrated product policies of the future.

It is the future. There are two different kinds of fashion outlets. In Store A, the virtual store assistant welcomes you whilst a scanning beam updates your shape and size. "Co-creation and customisation this floor," the voice chimes, "emotion and intelligent clothing first floor, track-and-trace swap shop third floor, and artisanal collections penthouse." Customers of Store A co-design clothing, innovate on style and expect eco-effectiveness. Sustainability, or 'people, profit, planet', is the bedrock of a cradle-to-cradle[1] fashion textiles system.

Store B has masses of colour and trendy merchandise, at the lowest possible prices, piled high. 'How to do it' fashion projections line the warehouse walls, and holograms march the catwalk. 'Buy one get five free' offers proliferate over in the natural fibre fabrics section. Mobile phones text what to buy, what will suit and what size from an unknown supply chain. 'Rent a look' is popular.

Today, polarisation of the fashion textile industry has already begun as smart, intelligent and conscientious fashion emerges as a backlash to the experience of choice fatigue, poor quality, dumb design and greenwash. But the process, development and manufacture of fashion textiles is complex. And the demand, both customer and industry driven, for new integrated product policies,[2] designed to minimise environmental impacts by looking at all phases of a product's life cycle, is problematic due to complexity and a lack of networking tools.

Thirty million people are employed in the clothing industry, the products of which produced a $1 trillion spend in 2006.[3] Yet in the area of sustainability, consumer ability to gather and apply the knowledge necessary to make the right choice is diminished by a monological system of production. This system, coupled with the desire of consumers to pay the least possible price for the product, has led to overconsumption and waste.[4] Fast fashion (taking designs from the catwalk to the retail shelf in as little time as possible) and quick response to the market provide grounds for competitive differentiation among retailers,

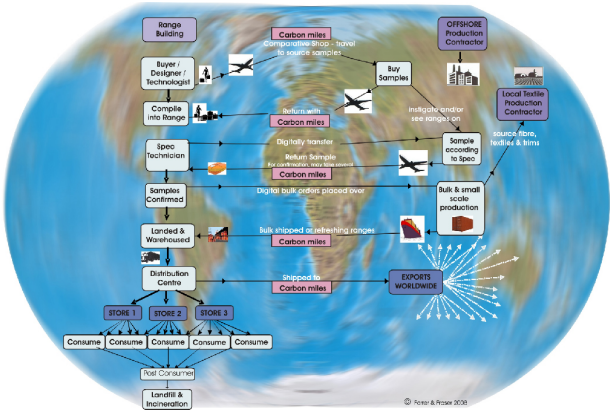

Figure 1. *Schematic illustrating the mechanisms within the global fashion textile business.*

most particularly in the speed at which retailers can react to real-time sales information to get the best-selling lines into the stores before a particular fashion style or trend moves on.[5] However, fast fashion has also resulted poor-quality garments. In exchange for low prices, customers accept inferior-quality products and expect that the clothing might not last as would more expensive items. 'Lesser quality' and 'bargain' mean shorter lifespans for clothing and a throw-away mentality, leading to a new phenomenon of disposing of garments which may only have been worn a few times even when the fabric could last for decades.

The operational mechanisms within the global fashion textile business are impressive and efficient, enabled by reliable communications and well-developed infrastructures in manufacturing countries (see Figure 1). Digital communication for design, manufacturing and warehousing, coupled with rapid developments in containerisation and air cargo, have allowed the super-efficient mass manufacturing of products to move successfully between the farm, manufacturing and retail sites throughout the industrialised world.

However, in contrast to this efficiency, consumer knowledge of clothing is limited to basic labelling information comprising brand, size, fabric type, care instructions, last country in the manufacturing process and advertising. There are significant un-

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knowns for brands, too. Where was the cotton picked? What dye processes were used? Where were the metals for the rivets and studs mined (see Figure 2)?

The concept of best-practice product management from cradle to cradle has started to embed and is now better understood. However, there are few reliable tools to measure the outcome of new practices, and results can be subjective. Pervasive adaptive computing could underpin a new approach to sustainability that supports a methodology in the sector which is "integrative, action-oriented, goes beyond technical fixes, incorporates recognition of the social construction of sustainable development and engages local communities in new ways."[6]

New fashion and sport brands incorporate health, social, environmental, economic and technological information in their clothing and accessories,[7,8] combining design information communications and cognitive technologies as requisite for a brand's unique selling point and its commitment to corporate social responsibility.[9] Opportunities for transparency, behaviour change and sustainability are emerging, adding value to products that incorporate smart textiles into everyday clothing. Improved track-and-trace technology[10] will reveal the global and local supply, consumption and disposal chain for the consumer, applying the benefits of smarter technology to aid materials and nutrient recovery. The market will support those who 'want to know' and those who 'don't want to know', and the business will supply accordingly. Ubiquitous computing and digital systems will pass information to the retailer and consumer through the supply chain and back,[11] a practice that will be seen as a business imperative. Affective computing will be used to inform the fashion textile consumer, the designer and the business in an environmental, social and economically positive way. Farmers, manufacturers, retailers and disposal agencies will be able to address the emerging social, environmental, personal and technological concerns of all users. Interdisciplinary and applied research collaboration will be the new thinking in fashion textiles sustainability, supplying brands that cater to innovative consumers with up-to-date research on global supply chain issues, best practice and developing consumer preferences. Smart textile technology will create stronger emotional connections between consumers, makers and products which will become more human-centric, providing psychological benefits to the wearer.[12]

Digitally enhanced clothing which takes advantage of mobile wireless networks and customisation will be the new paradigm for design. Design aesthetics will be dynamically personalised and will encourage new ways of creative thinking and personal interaction through clothing. Wide-scale design of infrastructure for computation, communication and collaboration will

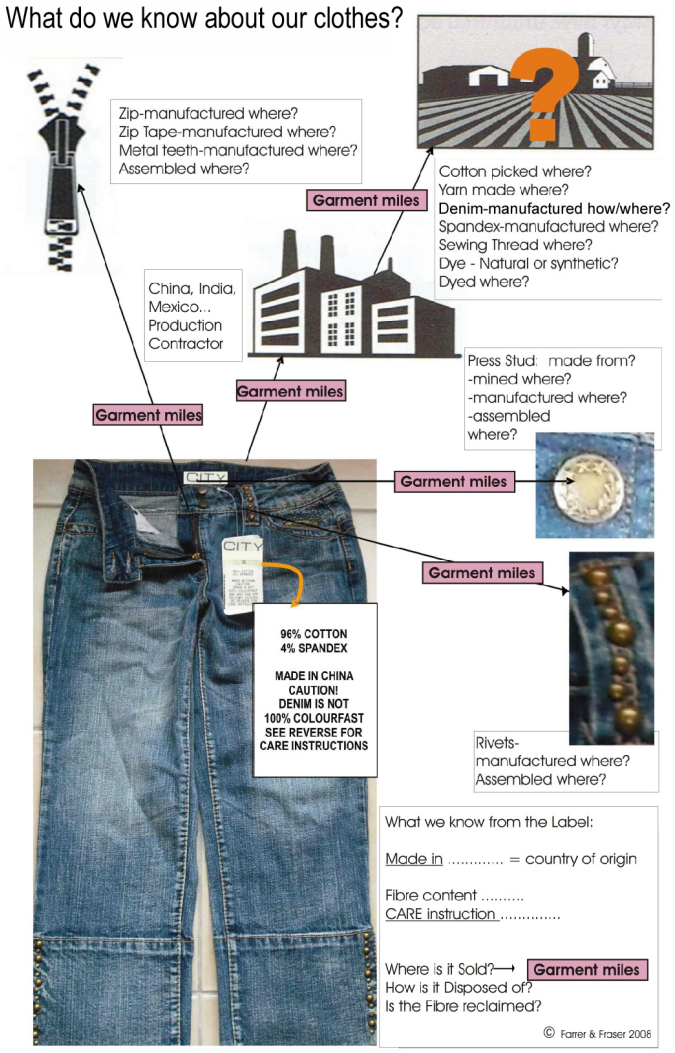

Figure 2. *Illustration of knowledge that may be made available to consumers and retailers.*

contribute to 'design for appropriation' in the urban landscape. Ultimately, the demise of the 'unknowns' and of the built-in obsolescence of fashion, the inclusion of garment miles and carbon footprint information in labelling, and a demand for high-specification up-cycled products under sustainable production will take place. Pervasive adaptive computing could be the key to creating a sustainable global fashion and textiles industry, and to a future not unlike that of the scenarios outlined at the beginning of this article.

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