6th Asia Pacific Roundtable for Sustainable Consumption and Production
Melbourne, 10 –12 October 2005

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Abstract

Sustainable Consumption in the consumer electronics sector: Design solutions and strategies to minimise product obsolescence

This paper considers a specific aspect of sustainable consumption: product obsolescence in the consumer electronics sector. While economic and policy aspects are critical to a coordinated approach to sustainable consumption, this research focuses upon the contribution that industrial or product design can make to the longevity of consumer electronic goods. This issue is of rising importance, both in industrializing and industrialized nations where the rate of consumption and generated volumes of e-waste have grown dramatically in recent years.

Recycling continues to be a priority in many countries that deal with e-waste. Likewise, industrial or product 'design for the environment' practices are mostly predicated upon eco-efficiency strategies to minimise environmental impacts. Such strategies often fail to address the behavioural and cultural aspects of consumption, which can result in rebounds - where material flows in the economy swell, leading to increased impacts.

It is claimed that as much as 80% of all product-related environmental impacts are determined during the product design phase. This research investigates existing examples and conditions that can contribute to product longevity and the potential for product design to tackle obsolescence in the consumer electronic goods sector. A series of product design solutions and strategies are reviewed in this paper, including: piggybacking new technology, designing-out aesthetic deterioration, modularity and design for upgradeability, product reassignment, product DNA meta-data, design quality and secondary markets.

Keywords

Sustainable consumption
Product longevity, lifespans, optimisation, durability, obsolescence
Planned obsolescence
Sustainable design, eco-design

Text notes

The terms "product design" and "industrial design" are used interchangeably.

Paper

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Landscape of Consumption

Despite the many sustainable development activities initiated by governments, industry and NGOs, environmental and social problems remain acute. Increasingly patterns of consumption are coming under scrutiny as the central driver behind many of these problems. Issues related to unsustainable consumption are now recognised as a priority. Our linear production consumption economy, inefficient and wasteful of non-renewable resources, sustains the existence of various forms of social inequality. The challenge for sustainable consumption is to decouple environmental degradation and social inequality from economic growth (HM Government, 2005, [1]). We live in a throwaway society where the average lifespan of consumer goods is reducing while the volume of waste increases. One approach in the complex landscape of consumption is to slow consumption by optimising product lifespans.

Consumer Electronics

The consumer electronics product sector clearly illustrates the magnitude of the throwaway society. Consumer electronics encompass a diverse range of electrical and electronic equipment from PCs to electric toothbrushes. Each year 2 million working PCs are dumped in the UK (Wastewatch, 2005, [2]), a pattern that is increasingly mirrored worldwide as computer networks proliferate. In the UK alone 15 million mobile phones are discarded each year while only 4% are recycled (David, 2005, [3]). Technological innovation, the proliferation of electronic communication networks and the dramatic reductions in cost drive consumption in this sector. Consumers' perceptions have shifted from seeing such products not as durables but as consumables (Cooper & Mayers, 2000, [4]).

Novelty, fashion and short-term functionality are features of the ephemeral nature of many of these products. A recently marketed children's sweet offers a good example of this trend. A motor-battery assembly in the handle spins a novelty electric lollipop until it is consumed. The functional lifespan of such a product is perhaps less than 30 minutes. The increasing integration of electronics into traditional non-electrical goods is another trend. Everything from toothbrushes and pepper mills to the car road atlas has been transformed into an electronic device. With the falling costs of many of these devices demand grows. While low costs democratise consumption by bringing many benefits to those who could not previously afford such "luxuries", the proliferation and rapid consumption of these products bring a number of significant environmental and social costs.

The DNA of consumer electronics, with its complex inventories of components, sub-assemblies and material alloys, poses a significant environmental impact far greater than many other categories of consumer goods. Throughout the entire product life cycle there are considerable impacts. Production of consumer electronics is energy and material intensive and involves many toxic substances. The consumption phase of these products brings its own set of problems, not least shortening lifespans that drive escalating consumption. When a product reaches the end of its life and enters

the waste stream, a number of new problems arise, not least the question of what potentially toxic or valuable materials may be lost in landfill or incineration. This particular problem is of increasing concern where the rate of consumption and generated volumes of e-waste have grown dramatically in recent years. When e-waste is captured before landfill it may be exported to industrializing countries for recycling, where it is often processed under appalling working conditions.

Eco-Efficiency and the Rebound Effect

The priority for many from governments, NGOs and industry dealing with environmental problems has been end-of-pipe strategies, in particular recycling. While recycling is widely perceived as a positive step in the right direction, it remains ineffectual in reducing environmental impacts due to inefficiency and the lack of an integrated infrastructure. The promise of closed-loop recycling has yet to be achieved. Coupled with recycling, eco-efficiency is also a widely promoted agenda. This strategy is mostly articulated through technological solutions aiming to produce more efficient and cleaner production and more material and energy-efficient products. However, the issue that has not been addressed until relatively recently, is the actual consumption phase of the entire product life-cycle. The missing part of the life-cycle equation is what happens in the middle – the actual consumption phase of how products or services are purchased, used and discarded.

Consumption cannot be adequately addressed through technocentric solutions - which are central to eco-efficiency strategies. These strategies are insensitive to the psychological and social (behavioural) factors that shape consumption patterns (Jelsma & Knot, 2002, [5]). Moreover, by ignoring behavioural aspects of consumption eco-efficiency strategies can rebound where environmental impacts unintentionally increase, not decrease (Hertwich, 2005, [6]; Kane, 2003, [7]; Park, 2004, [8]). Evidence suggests that eco-design strategies based upon eco-efficient, technocentric approaches can rebound: environmental impacts unintentionally increase, not decrease (Kane, 2003, [7]). The problem with consumption is that “demand overrides eco-efficiency” (Scherhorn, 2004, [9]).

Fragmented Debates

A survey of the literature of consumption, flowing mainly from the international debates on the environment, sustainable development and (more recently) sustainable consumption, displays “little familiarity with or deference to the depth and sophistication of the debates about consumer behaviour that exist elsewhere. Most environmentalists and advocates of sustainability have been much less interested in understanding the intricacies of consumer behaviour than have the marketing and business community” (Jackson & Michaelis, 2004, [10]). Tim Cooper (2004, [11]) adds, “a tendency among academics from environmental disciplines to take a critical approach to consumption stands in stark contrast to the positive approach of others who see consumption as a celebration of human identity and self-expression”. In the foreword to *Confronting Consumption*, Princen, Manaites and Conca (2002, [12]) present the challenge about consumption: “to confront such questions is to bite off, in one chunk, a large and vexing body of social, political, and cultural thought and controversy”. Debates on sustainable consumption have been chopped up and addressed from a variety of perspectives (Shove, 2003, [13]) with little evidence of

the “joined-up thinking” that is required to understand and respond to these issues (Evans & Cooper, 2003, [14]).

Designers are not alone in their poor understanding of consumption and consumer behaviour. As a consequence, many initiatives to tackle consumption have had limited results.

Inconspicuous Consumption and Lock-In

While much has been written about conspicuous consumption, display or status culture, consumer culture (keeping up with Jones) and the symbolic role of material consumption, little has been said about the smaller, everyday aspects of ordinary consumption (Shove, 2003, [13]). It is this ordinary “inconspicuous consumption” of everyday invisible rituals, patterns and behaviours of consumption by millions of individuals that is significant. Furthermore, individual responses to social norms and infrastructural, economic, institutional contexts shape consumption patterns. Consumption patterns are “hard-wired” into our economic systems (Robins, 1999, [15]). Inconspicuous consumption is shaped, not by display and status-seeking pathology, but by the consumption choices that we are “locked-in” to. The daily commute by car because of the lack of an attractive public transport alternative, the daily shop by car to the super centre at the edge of town because of lack of local shops, the replacement of a product due to cost of repair, all illustrate how lock-in occurs on a regular basis.

Product Obsolescence and Throwaway Society

Just over 50 years ago, while presenting to a group of advertising executives, the American industrial designer, Brook Stephens, coined a new term – “planned obsolescence”. He proposed to his audience that by deliberately “building-in” (planning) products’ obsolescence, a struggling economy could be reinvigorated by creating fresh demand for new products (Adamson, 2005, [16]; Cooper, 2005a, [17]; Burns, 2003, [18]; Myerson, 2004, [19]), instilling “in the buyer the desire to own something a little newer, a little better, a little sooner than is necessary” (Stephens cited in Myerson, 2004, [19]). To the general public “planned obsolescence” became a topic of outrage and critics lined up to attack him. Most notable of his critics at the time was Vance Packard who slammed Stevens in his best selling book *The Waste Makers* (1960, [20]). Packard popularised the concept of “planned obsolescence” as well as adding his own catch cry - the “throwaway society” (Packard, 1960, [20]).

Product obsolescence is still a poorly understood phenomenon; much of what is known has been based upon anecdotal evidence and speculation. It was not until the 1990s that baseline studies started to offer empirical evidence on product lifespans and consumer attitudes to obsolescence (Cooper, 1994, [21]; Cooper & Mayers, 2000, [4]; Heiskanen, 1996, [22]; Gilbert, et al, 1992, [23]). Recent literature on product lifespans is positioning itself within the emerging and complex debates of sustainable consumption. Coupled with this, emerging legislation, such as the recently introduced European Union Waste Electrical and Electronic Equipment Directive [EU WEEE] (Envirowise, 2003, [24]), offers further focus on product lifespans of electrical and electronic goods (Cooper & Mayers, 2000, [4]). An aspect of recent literature on this topic focuses directly on the role and contribution that

product design can offer to the field (Van Hinte, 1997, [25]; Van Nes, 2003, [26]; Park, 2003, [27]; Chalkley, et al, 2001, [28]).

Typologies of Product Obsolescence

Packard was the first to make the distinction between the various types of product obsolescence. He described them in terms of function obsolescence, obsolescence of quality and desirability - what he also later called “psychological obsolescence”.

A body of literature emanating from the field of consumer research into product disposal, referred to as disposition studies, dates from the late 1970s. These early investigations, mainly of small household electronic products, devised taxonomies of disposal options (Jacoby, et al, 1977, [29]). The taxonomies of dispositional behaviours described in this literature are: keeping, throwing away, selling/swapping, giving away and donating.

Product obsolescence can be said to be either absolute or relative (Cooper, 2004, [11]). Absolute (functional) obsolescence is determined through a range of functional reasons, while relative (intangible) obsolescence is determined through a complex range of psychological and social aspects of consumer behaviour. The increasing disposal rate of still functioning consumer products, in particular personal computers, is just one example that confirms that factors are at work other than functional obsolescence (Van Hinte, 1997, [25]). From a review of sociological literature Cooper (2004, [11]) sums up the issue of product obsolescence as a question of considering psychological (mind), economic (money) and technological (matter) factors.

The Role of Product Design

It is claimed that 60%-80% of life-cycle impacts from products are determined at the design stage (Lewis & Gertsakis, 2001, [30]; USNRC, 1991, [31]). If this is indeed the case, then product design and development teams have a tremendous responsibility to address issues such as the consumption and lifespan of consumer products.

Sustainable consumption is a new challenge for most designers. The predominant response by designers to related environmental issues is through eco-design practices. These practices are often based on eco-efficiency strategies, such as minimising materials and energy inputs. Efficiency is nothing new to many designers; for many years design engineers have used methods such as value analysis as a means of maximising the efficiency of a design. The pre-modernist production ideologies of Fordism and Taylorism are studies of efficiency in the workplace - synchronising time, labour and inventory in a form of applied militarism (Fry, 1999, [32]) - that underpins the evolution of the product design profession. For the modernists the mantra “less is more” suggests a desire for efficiency, simplicity and honesty in design. In post-WW2 Britain, material and energy shortages, coupled with high demand for household goods, led to the emergence of a design for austerity movement. Material efficiency is an important feature found in many manufactured products from this period, such as the utility furniture of Ernest Race (Dormer, 1993, [33]). It could be concluded that eco-design (design for the environment) is another chapter in the history of an efficiency agenda.

The criticism is that eco-design practices, predicated upon efficiency agendas, are narrowly defined in terms of technological parameters that disregard psychological and social contexts of consumption. Eco-design rhetoric mostly revolves around the design of the actual product, through analysis and discussion of material choice, production technologies and material and energy-efficiency. The contexts of product use (consumption) are largely ignored.

The opportunity for design to play a more powerful and transformational role lies in influencing consumption choices and lifestyle aspirations (Richardson, et al, (2005), [34]). Product design should by definition be well placed to respond to the psychological and social aspects of consumption. It has long held the principle of addressing users' needs through mediating between the user and technology. Design for product life offers new opportunities for product designers because it is much more than resolving a range of technological factors such as functional durability by designing products that do not prematurely break down. Simply extending a product's life may not necessarily be the best solution. By understanding behavioural factors, the social and psychological aspects of consumption, by knowing the what, how and why we consume, designers have a greater opportunity to contribute to progressing sustainable consumption through product lifespan optimisation strategies.

Design Strategies

In the preface of the landmark book *Design for the Real World* (1971, [35]), Victor Papanek stated "there are few professions more harmful than industrial design, but only a very few of them". He argued that designers were preoccupied with fashions and fads, focusing far too much on aesthetics and styling. Designers need to consider the environmental, social and ethical impacts of their work, which could, in some way, be achieved through considering functional, utility, reparability, affordability and needs.

However, the literature design for product life is relatively recent. Cooper (1994, [21]), Heiskanen (1996, [22]) and Burns (2003, [18]) discuss ways that product design can contribute to product life. Heiskanen (1996, [22]) describes a range of product design approaches: the use of durable materials and constructions, modularity, interchangeability of parts, multifunctionality, repairability, ease-of use, instruction manuals, aesthetic characteristics, operating and maintenance costs, automatic fault detection and built-in safety features. Such strategies regularly feature in the Eco-design, Design for the Environment (DfE) and sustainable product design literature that emerged during the 1990s (Lewis & Gertsakis, 2001, [30]; Tischner, 2000, [36]; Mackenzie, 1991, [37]).

The influential Dutch book *Eternally Yours: visions on product endurance* (Van Hinte, 1997, [25]) combined theory alongside design research and product design examples, illustrating how product obsolescence could be challenged. Practical examples offered capture many of the approaches mentioned above. One emphasis of the book concerns perceptions of product quality, ageing and wear. Design examples explore qualities commonly associated with the desirable aesthetic wear of leather and wood, as found in antique furniture, or that of a well used tool. Notions of newness and the vulnerability of perfection are challenged. The book successfully

negotiates, through poetic and creative devices, the complex interface between the product (design) and the consumer (psychological and socio-cultural influences).

At the other end of the design spectrum (product engineering), Chalkey, et al, (2003, [38]) propose a method to calculate the environmentally optimum lifespan of electrical household products using energy consumption data. For example, their devised mathematical model demonstrates that the optimum lifespan of a dishwasher in 2003 was 8.1 years. After this point, it was determined to be environmentally beneficial to replace the dishwasher with a more technologically advanced, eco-efficient model.

In the commercial arena the German firm, Manufactum (2005, [39]), has advanced an understanding of product lifespans through its marketing strategy. The company claims that:

> "…somewhere in the region of 1,500 quality items have been selected for inclusion (in the catalogue), some of which are true classics which have stood the test of time. They are made from materials of the highest quality, they function well and will outlive any trend or fashion".

The commercial success of Manufactum, based upon the marketing of functional and fashion durability, demonstrates that slow design strategies and slow consumption, are not anti-commercial or anti-economic growth.

A tangential design strategy that has implications for product lifespans and holds much potential is product service systems (PSS). PSS strategies displace physical ownership of products by offering service solutions to customers. Such strategies may include product-leasing or sharing arrangements that encourage businesses and manufacturers to supply products that are capable of long life service (Van Hinte, 1997, [25]; Stahel, 2001, [40]; Manzini & Francois, 2003, [41]).

In her PhD thesis, Nicole Van Nes (2003, [26]) offers design examples, both conceptual and real, of products for extended lifespans. She emphasizes that "replacement decisions can be influenced through product design". If a product is dynamic and flexible in its design then it has a better chance to resist the complex dynamics of motivations to replace it with a newer product. Design strategies include:

- *modularisation* - a strategy where sub-assemblies, when they become technologically obsolete, can be easily updated by the user. Van Nes discusses the concept of fast and slow technology. Modular design strategies offer a way to even out discordances between fast and slow technology. For instance, a hard disk in a computer is fast technology where technical innovation is rapid, whereas a power supply in a computer is slow. Technical innovation is either slow or an upgrade is of little consumer benefit.
- *emotional attachment* - to a product can be triggered in many ways. Van Nes suggests that products that include some playful interaction (novelty) can engender an emotional attachment. Playful interactions, such as a mileage recorder in an iron – how ironing miles have been achieved – build a relationship between user and product. The product becomes personalised and is a carrier of memories.

- *fashion upgradeability* - through replacement parts such as fascia panels and covers. The appearance of a product can be updated to contend with issues of fashion obsolescence as well as offer a personalised look.

Design for Product Lifespans

In addition to the range of strategies and theories outlined above, a number of other design related strategies offer potential to optimise product lifespans. Many of these proposed strategies pick-up or overlap with existing knowledge on product lifespans and attempt to address the importance of the psychological and social aspects of consumption. A few possible strategies described below include piggybacking new technology, designing-out aesthetic deterioration, product reassignment, embedded intelligence, scripting, design quality and secondary markets.

Piggybacking

Piggybacking is a strategy that enables renewed functionality of a technologically obsolete product. This is achieved through the integration or add-on of a secondary devise or component. Not to be confused with upgrading strategies, piggybacking requires a device that fits adjacent to, upon, or within the existing product architecture. Piggybacking is an attractive strategy for consumer electronic products that are particularly prone to technological obsolescence as it offers a means to balance out fast and slow technology within a product (Van Nes, 2003, [26]).

The current migration from analogue to digital TV broadcasting in the UK offers an example of the piggybacking approach. By March 2005, 62% of UK homes were receiving digital TV (OFCOM, 2005, [42]). Despite concerns that existing TV equipment would become obsolete as the new digital services were rolled out, digital receiver “set-top boxes”, piggybacking onto the “old” analogue equipment, extend functional life into the digital age.

Allied with digital TV the rapid rollout of DAB (Digital Audio Broadcasting) also presents an opportunity for new product innovation through piggybacking. During the first quarter of 2005, 1.5m DAB digital radio sets were sold (OFCOM, 2005, [42]). The functionality of the millions of analogue radios found in our homes and cars could be extended through the piggyback approach. Similarly, the functionality of the millions of dormant SLR film cameras could be extended through piggybacking a digital “film” module (Siliconfilm, 2005, [43]).

Designing-out Aesthetic Deterioration

When a product looks worn out, shabby or has suffered some form of aesthetic deterioration it is likely to be discarded and replaced. Many consumer electronics are prone to this form of deterioration. Replacement of one item can trigger a renewed round of acquisition as the replaced item makes other owned (older) items look shabby. This phenomenon is referred to as the “Diderot effect” (Shove, 2003, [13]).

Polished or very fine surface textures as seen on many consumer electronic products such as laptops, computers, mobile phones and digital cameras, increase aesthetic degradation. Often their plastic mouldings are finished using a plating process or

vapour metal deposition process that allow for mirror finishing in metallic appearance. The problem with these finishes is that, despite their improved surface hardness, they are prone to scratching and surface marking. Marks and scratches are a form of "memory" that documents a product's history. The patina of age tells us something of a product's life. We are familiar with feature on antique furniture, but are less tolerant of the patina of age on electronic products, probably with good reason as such markings are often an indication of abusive use or misadventure.

However, aesthetic deterioration is not always undesirable on consumer electronics. Nicks, scratches and dings in some instances can also be desirable. So-called "pro-consumer" equipment often carries this cache by linking the aspirations of the consumer to professional usage of the product. The logic carries that professional equipment is manufactured to a higher specification than consumer products in order to take the knocks and abuse of daily professional work, and that by owning such robust equipment you attain through display an association with professionalism. Many Apple iPod owners carry their (old) first generation iPods, complete with scuffs and scratches, with pride as a display, as a fashion leader through association, as early adopters of new technology - an anti-fashion statement, turned fashion statement.

Product Reassignment

Obsolete products in some instances can be transformed from their original function and purpose into something entirely new. Product reassignment offers the potential for extending product lifespans through the exploration of new uses for obsolete products. With 15 million mobile phone handsets discarded annually in the UK, Nokia have been experimenting with turning obsolete mobile phone handsets into alarm clocks, handheld games and TV remote controls (David, 2005, [3]). The technology they have developed reassigns the obsolete handset to an entirely new function. Many other examples of product reassignment exist. In developing countries it is not unusual to see examples of obsolete products being put to new uses through sheer necessity (Pentagram, 2003, [44]). The Japanese phenomenon of Chindogu, a word coined for the "art of (un)useless ideas", is often achieved through the appropriation of existing products. These ideas are logic-defying, bizarre gadgets, but none the less thought-provoking and amusing in their ingenuity (Kawakami, 2004, [45]; Ichiki & Umehara, 2005, [46]).

Talking Rubbish: Product DNA

In *When Things Start to Think*, Neil Gershenfeld (1999, [47]) argues that information technology (IT) is at an awkward developmental stage and points to a future in which the digital world merges with the physical world. The proliferation of IT and digital network technology and infrastructure are driving the meshing of the digital with the physical world. Not only will computers continue to talk to each other, but also products, from toasters to washing machines, will join in the conversation. In many product sectors there has been a marked shift in the software/hardware ratio in products. Many products are now "programmed" through software rather than "hard-wired".

If a product can be programmed, the opportunity exists for it to be reprogrammed, to take advantage of new operating conditions or technological innovation opportunities and thus to extend its functional life. Product “hardware” functionality can be extended through changing only the software. We are familiar with this concept for computers, but what about other products? Miele, a manufacturer of dishwashers, has an upgradeable operating system in dishwashers allowing for improvements in washing cycles, new washing chemicals, and better power management. Sewing machines could be upgraded to take account of new fabric, threads and stitches. In cars, engine management software could be digitally upgraded to take advantage of new fuels and pollution controls (Ryan, 2004, [48]).

Secondly, embedded intelligence offers opportunities for the optimisation of product lifespans. Digital information could be embedded within the product to inform on material content, producer/batch details to aid supply chain declarations, refurbishment, recycling or remanufacturing end-of-life strategies (Ryan, 2004, [48]). RFID (Radio Frequency Identification), a widely used technology in manufacturing and distribution supply chains, could be used to access the embedded information within a product at various points throughout its entire life cycle. When a consumer electronic product is cast-off as a hand-me-down or traded in a secondary market, the new owner may be presented with a number of problems. What is its condition, how does it work, how can it be upgraded/repaired and so on? Embedded intelligence could provide “onboard” user manuals, spare parts and supplier information that could be accessed through an RFID reader or a data port connected to a PC. In addition, the product may be able to provide the new owner with a log of its conditions such as hours of use, fault detection and energy consumed.

Scripting

A strategy that specifically weaves together product design with consumer behaviour is the concept of product scripting. The notion of a product “script” is that it can guide user behaviour to interact with a product in a prescribed (scripted) manner - such as energy-saving behaviour. This may seem obvious as designers often seek to make their designs both accessible and intuitive to use. However, scripting goes further as it attempts to modify or guide user behaviour through the product architecture, so that the user behaves as scripted (Jelsma, 1999, [49]). An important aspect of scripting is an alignment of script with user logic. If a user’s logic runs counter to the product script it will override the script and negate any environmental benefits conceived within the script. Scripting offers much potential as a product lifespan strategy due to its close association with consumer behaviour.

Design Quality

"*There is hardly anything in the world that some man cannot make a little worse and sell a little cheaper." John Ruskin*

Design quality transcends popular notions of material, prestige and price as a mark of quality. Equally, it is not about what is and what is not “good design” (as has often been declared by style leaders and media commentators). Rather, “design quality” is a totality of all those tangible and intangible aspects of a design that touch on emotional, cultural and functional needs, while acknowledging the bigger picture of

contributing towards a sustainable consumption. In practical terms, the quality of design brief, the relationship between designer, producer, distributor and customer are important ingredients, needed to establish the framework for design quality to be achieved. Design quality in a product will stand the test of time, it may be a modest, low cost artefact that offers faithful, reliable service earning the respect from its user, or it may be a more significant investment that engenders a lasting emotional durability with its user. The German firm, Manufactum (2005, [39]), markets a range of products that attempts to capture elements of design quality.

Secondary Markets

Market mechanisms, as well as being a central driver for product obsolescence, can also be a means to extend product life. Although not strictly a design strategy the role of secondary markets can play a significant role in extending product life. Secondary markets such as auctions, classified advertisements and car boot sales offer a range of both formal and informal opportunities for extending product life. The role of secondary markets offers a powerful economic mechanism for potential new owners to search and trade for obsolete and unwanted products. As the volume of goods circulates, design for long life becomes an increasingly important issue.

Conclusion

This paper attempts to outline some of the existing, as well as some of the potential strategies that could be gateways for design to move from narrowly defined eco-design practices towards more transformative practices that influence sustainable consumption choices and lifestyle aspirations. To consider issues of product lifespans and the interrelated debates on sustainable consumption requires a co-ordinated, multidisciplinary approach. Past approaches of picking off little chunks of consumption for analysis and action from within specialist disciplines has proven to be ineffectual in addressing these issues. Blanket calls to reduce consumption by “doing without”, by consuming less, will not be politically, economically or socially acceptable. Consuming differently will have to be a core objective of any solution. Designers have a key role in transforming and influencing consumption choices and lifestyle aspirations (Richardson, et al, 2005, [34]). Optimising product lifespans is just one practical approach towards this aim. Through better understanding of the psychological and social aspects of consumer behaviour, designers have a greater opportunity to contribute sustainable solutions.

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