Kirsi Niinimäki

From Disposable to Sustainable

The Complex Interplay between Design and Consumption of Textiles and Clothing.

2011

Aalto University
School of Art and Design

Aalto University publications series
Doctoral Dissertations 84/2011

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Graphic Design: Emmi Kyytsönen

ISBN 978-952-60-4284-8 (pdf)
ISBN 978-952-60-4283-1
ISSN-L 1799-4934(pdf)
ISSN 1799-4942 (pdf)
ISSN 1799-4934

Printed in Unigrafia
Helsinki
2011

1 coat
1 scarf
1 pair of gloves
2 shirts
5 T-shirts
2 pairs of trousers
2 skirts
10 pieces of lingerie
8 pairs of socks
2 pairs of pantyhose
3 pairs of shoes
1 nightdress[1]

1 All the garments I took with me on a three-month research period in Delft, spring 2010. The idea was to test how little clothing I could manage with for three months. I also aimed for minimum laundering times by letting garments air between wearing.

Abstract

From disposable to sustainable

The Complex Interplay between Design and Consumption of Textiles and Clothing

This study approaches the complex interplay of consumption, the meaning of products, and person-product relationships in the context of textiles and clothing. By doing so, it opens novel views into our material world and contemporary consumer culture, and it especially shows how consumption patterns are linked to the current industrial system of designing and manufacturing.

The purpose of this study is to understand more deeply the balance (or unbalance) in Sustainable Consumption and Production, SCP. Drawing on literature from psycho-sociology, sociology, philosophy and economics, the study constructs alternative views to sustainable design. The study explores sustainable textile and clothing design through person-product relationships by approaching them in the light of previous theories and by applying this knowledge to empirical analysis. Three consumer questionnaires were conducted and analyzed to provide information on consumers' environmental interest and person-product relationships. This novel consumer-centered knowledge is then transferred onto the design discipline to provide knowledge on human aspects in sustainability. The dissertation is comprised of seven research articles.

This study both extends and narrows the views on sustainable design. Firstly, narrow insight, or knowledge from a more micro perspective, is provided on person-product attachments and consumer satisfaction in the field of textiles and

clothing. Deep insights into consumers' values and environmental interests and commitment are furthermore presented in articles. Secondly the study extends the approach by including the design perspective into the focus of attention, and the human aspects of consumption are especially examined as they pertain to the sustainable design field. Hence this research extends previous studies by approaching issues in sustainable design more holistically.

The study constructs a theoretical discussion on how to strengthen the person-product relationship through various design strategies or through a Product-Service System (PSS) approach by either deepening the person-product attachment or better delivering consumer satisfaction. Furthermore the study opens a conceptual discussion on new value creation, which offers opportunities to find new paths towards more sustainable design, manufacturing and consumption of textiles and clothing. Finally, by addressing radical change the study discusses the new value creation that is needed in the SCP agenda.

Designers have an important role by creating far-sighted and future-oriented sustainable design, which can change consumption behaviors towards more sustainable ones. In this way design for sustainability can be a redirective practice that aims for sustainable consumption.

Keywords: Consumption, Sustainable design, Fashion design, Textile design, Person-product attachment, Product satisfaction, Value creation

Tiivistelmä

Kertakäyttöisyydestä kestävyyteen

Tekstiilin ja vaatetuksen suunnittelun ja kulutuksen monitasoinen yhteisleikki

Tämä tutkimus lähestyy monitasoista kulutuksen, tuotteiden merkitysten ja tuotesuhteiden keskinäistä kytkentää tekstiilin ja vaatteiden kontekstissa. Tämän lähestymistavan kautta tutkimus avaa uusia näkökulmia materiaaliseen tavaramaailmaan, kulutuskulttuuriin ja osoittaa, miten nykyinen kestämätön kulutuskäyttäytyminen linkittyy teollisiin suunnittelu- ja valmistuskäytäntöihin.

Työn tavoitteena on kestävän kuluttamisen ja tuottamisen tasapainon (tai epätasapainon) syvempi ymmärrys. Tutkimus nojaa sosiopsykologian, sosiologian, filosofian ja ekonomian näkökulmiin rakentaen niiden kautta vaihtoehtoista ymmärrystä kestävään ja ympäristömyötäiseen tuotesuunnitteluun. Tutkimuksessa lähestytään tekstiili- ja vaatesuunnittelua käyttäjä-tuotesuhteen kautta soveltaen aiempia teorioita empiiriseen analyysiin. Tutkimuksen empiirinen aineisto koostuu kolmesta kuluttajakyselystä, joiden avulla tuotettiin tietoa kuluttajien ympäristöasioiden kiinnostuksesta ja kuluttajien tuotesuhteista. Tätä kuluttajakeskeistä tutkimustietoa heijastettiin suunnittelun kenttään, tavoitteena tuoda uusia näkemyksiä ympäristömyötäiseen tuotesuunnitteluun. Tutkimus rakentuu seitsemästä tutkimusartikkelista.

Tutkimus avaa sekä laajemman että kapeamman näkökulman ympäristömyötäiseen tuotesuunnitteluun. Kapean näkökulman kautta kuluttajien tuotesuhteisiin tuotetaan tietoa tuotekiintymyksistä ja tuotetyytyväisyydestä tekstiilin ja vaatteen

kontekstissa. Myös kuluttajien arvoja ja ympäristöasioiden kiinnostusta käsitellään artikkeleissa. Laajempi näkökulma syntyy, kun tätä kuluttajakeskeistä tietoa peilataan suunnitteluun. Täten tutkimus laajentaa aiempia tutkimuksia lähestymällä holistisesti ja ihmiskeskeisesti kestävää tuotesuunnittelua.

Tutkimuksessa rakennetaan teoreettinen keskustelu siitä, miten pidentää kuluttajan tuotesuhteita eri suunnittelustrategioiden avulla tai tuote-palvelusysteemin kautta. Tässä keskustelussa fokuksessa on tuotesuhteen syventäminen tai tuotetyytyväisyyden parantaminen. Lisäksi tutkimus avaa konseptuaalisen keskustelun uudesta arvonmuodostuksesta, jota tarvitaan radikaalissa muutoksessa kohti kestävää tuotesuunnittelua, tuotteiden valmistusta ja kulutusta.

Tutkimustulokset osoittavat, että suunnittelijalla on keskeinen rooli muodostettaessa uudenlaista ymmärrystä kestävästä ja ympäristömyötäisestä muotoilusta, joka on tulevaisuus-orientoitunutta ja kauaskatseista designia ja joka tavoittelee kestävää kulutuskäyttäytymistä.

Avainsanat: Kulutus, Kestävä tuotesuunnittelu, Ympäristömyötäinen tuotesuunnittelu, Vaatesuunnittelu, Tekstiilisuunnittelu, Tuotekiintymys, Tuotetyytyväisyys, Arvon muodostus

Acknowledgements

This research journey began in 2004, alongside my full-time work. It has been a long journey, and many people have positively influenced my work and made this research possible. I hereby want to thank you all!

I want to thank especially Adjunct Professor Riikka Räisänen from the University of Helsinki, whose supervision has guided me through this research. Special thanks for the helpful feedback on my academic writing. I am most grateful to Professor Turkka Keinonen for the opportunity to concentrate on research work and be one of the researchers in the Design Research unit in Aalto University School of Art and Design from November 2008 to the end of 2011. Without this period, this work would still be in process.

An important period during this study was also my research visit to TUDelft in the Netherlands in spring 2010. For this opportunity I want to thank Professor Jan Schoormans. Thank you, Jan, for all the beneficial and concise feedback. I also wish to thank Assistant Professor Ruth Mugge and Researchers Oscar Person and Natascha van der Velden. Thanks also to the Product Innovation Management, the Marketing and Consumer and the Design for Sustainability research groups in Delft Technical University.

I would also like to thank the futures researchers from TULIO Graduate School in Future Business Competencies, the doctoral program at the Turku School of Economics, 2006-2009. Furthermore I wish to thank Professor Cha from EWHA University for the possibility to finalize my manuscript in Seoul, South Korea in September 2011.

Thanks must also be extended to Professor Ilpo Koskinen, for all help and wisdom, researcher Lotta Hassi, for sharing research information, and Doctor Ossi Naukkarinen, for guidance in the equivocal world of beauty and aesthetics. I also wish to express my gratitude to the pre-examiners Professor Minna Uotila from the University of Lapland and Research Director Päivi Timonen from the National Consumer Research Centre for constructive critique during the review process.

I am also most grateful to all the researchers in the Design Department and the Design Connections Doctoral School. It was fun to be one of you. Special thanks to coordinator Maarit Mäkelä, for all encouraging words during my learning process. Thanks also to Salu, Kirsikka, Petra, JJ, Karthik, Salil, Susanne, Katja, Tuuli, Tero, Antti and all others. Thanks also to the Sustainable Design Research Group in the School of Art and Design: Tiina, Tatu, Pekka, Cindy and Alastair. And Tiina Laurila, thanks for starting me off on this research journey in 2004. Furthermore I want to thank Helsinki Metropolia University of Applied Sciences for study leave in 2009-2011. And Cindy Kohtala for improving my academic English.

For funding I want to thank the following:
Design Connections Doctoral School, Academy of Finland 2008-2011
Jenny and Antti Wihuri Foundation 2008
Aalto University School of Art and Design, Research Institute and International Affairs Center 2007, 2010, 2011
Liikesivistysrahasto, Foundation for Business Culture 2010
Creative Sustainability Master's Programme 2011

Finally, above all, I want to express my special thanks to my husband Jorma for being so patient and my dear children Jenni and Joonas, who have taught me what is truly important in life. And to my father Heikki, and all other relatives and friends who have believed in me, helped me to go forward on this bumpy road, and who have brought light and creative joy into my life in other forms than research – thank you.

Suurkiitos perheelleni, läheisilleni ja kaikille ystävilleni, jotka toivat iloa ja luovuutta elämääni tutkijakammion ulkopuolella tutkimusprosessini aikana.

List of original publications

I

Niinimäki, K. (2009). **Consumer Values and Eco-Fashion in the Future**.
In M. Koskela, & M. Vinnari, (Eds.), *Future of the Consumer Society:* Proceedings of the Conference "Future of the Consumer Society", Tampere May 28–29, 2009. Turku: Finland Futures Research Centre, School of Economics, 125–134. Available http://www.tse.fi/FI/yksikot/erillislaitokset/tutu/Documents/publications/eBook_2009-7.pdf

II

Niinimäki, K. (2010). **Eco-clothing, Consumer Identity and Ideology.**
Journal of Sustainable Development, 18 (3), 150–162.

III

Niinimäki, K. (2009). **Developing sustainable products by deepening consumers' product attachment through customizing.**
In J. Suominen, F. Piller, M. Ruohonen, M. Tseng, & S. Jacobson (Eds.), *Mass Matching – Customization, Configuration & Creativity:* Proceedings of the 5th International Conference on "Mass Customization & Personalization MCPC 2009", Helsinki Oct 4 –8, 2009. Helsinki: Aalto University School of Art and Design.

IV

Niinimäki, K. (2010). **Forming Sustainable Attachment to Clothes.**
Proceedings of the *7th International Conference on Design & Emotion,* IIT, Chicago Oct 4–7, 2010.

V

Niinimäki, K. (2012). **Sustainable Consumer Satisfaction in the Context of Clothing.**
In C. Vezzoli, C. Kohtala & A. Srinivasan (Eds.*), Product-Service System Design for Sustainability*. Sheffield: Greenleaf Publishing. In print.[2]

VI

Niinimäki, K. & Koskinen, I. (2011). **I love this dress, it makes me feel beautiful: Emotional Knowledge in Sustainable Design**.
The Design Journal, 14 (2), 165–186.[3]

VII

Niinimäki, K. & Hassi, L. (2011). **Emerging Design Strategies for Sustainable Production and Consumption of Textiles and Clothing.**
Journal of Cleaner Production, 19 (16), 1876-1883.[4]

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2 While this is a book chapter this text, unlike the others, did not undergo an independent referee procedure. Yet the editors Carlo Vezzoli and Cindy Kohtala have given valuable feedback on this text throughout the writing process.

3 The text is largely the work of the first of the authors, and Professor Ilpo Koskinen has given valuable insights and comments on the article.

4 The text is largely the work of the first of the authors, but Lotta Hassi, a Doctoral student in Aalto University School of Economics, has contributed to the sections on innovation and design strategies.

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Abbreviations

CSR	Corporate Social Responsibility
DfE	Design for Environment
DfS, D4S	Design for Sustainability
LCA	Life Cycle Analysis
MIPS	Material Input per Service Unit
PSS	Product Service System
SCP	Sustainable Consumption and Production

1. Introduction

This dissertation is a journey in the field of sustainable textile and clothing design. It is an attempt to understand the complex interplay between design, industrial systems and contemporary consumer behavior. It investigates this multilayered phenomena related to consumption, the meanings of products, and person-product relationships in the context of textiles and clothing, and by doing so, it opens novel views into our material world and contemporary consumer culture. Through this consumer-centered knowledge the study re-examines the issues of sustainable design, new design strategies and finally new value creation. By combining different views, this dissertation contributes to the design discipline by offering a novel approach to sustainable design. The aim of this work is to expand the perspectives of eco-design and sustainable design from a technological point of view to a more holistic understanding of consumption, and furthermore it aims to show how current design and manufacturing systems relate to unsustainable consumption patterns. Moreover it reveals pathways for future sustainable textile and clothing design: how design can be a proactive process aiming for sustainable consumption.

The textile and clothing industry is currently one of the largest global industries, and it causes increasing negative environmental impacts during material cultivation, manufacturing processes, many logistic phases and during use and disposal stages. In textile and clothing production manufacturing cycles are speeding up, and hence manufacturing and consumption volumes are ever-increasing while simultaneously the life span of products are shortening. The explosion of consumption in the Western world adds to the environmental load of industrial processes and increases waste streams.

At the beginning of this new century, we have more knowledge on the balance in sustainable consumption and production (SCP). Throne-Holst, Sto and Strandbakken (2007) therefore point out that in the transformation process towards sustainability there is a need to understand more deeply the consumption side. Verhulst, Boks, Stranger and Masson (2007) highlight that we have to focus more deeply on the human side, and we need to produce more knowledge on the human aspects in sustainable development. They believe that this approach is needed to create sustainable innovations and implement sustainable strategies more effectively. This could also be seen as a critique of the technological approach that has existed for the last thirty years in eco-design, an approach that has been developing technical improvements in industry. However the overall picture regarding the sustainability of industrial production is worse than ever, mainly because of increasing production and consumption volumes.

According to Manzini (1994) it is not enough to redesign existing products and make eco-efficiency improvements in manufacturing processes if aiming to reach a more sustainable future. The focus should rather be on people's consumption behavior, and a new radicalism is needed to stimulate a drastic change in consumption patterns (ibid.). Consumers themselves do not clearly see the connection between their own consumption behavior and the environmental impact of increased industrial production. Vezzoli (2007) argues that radical innovations are needed which do not only depend on technological development and innovations but also stimulate new interaction and partnerships between different stakeholders as well as new sustainable relationships between consumers and products. New types of design strategic skills must be developed and taught to designers so that they will be able to promote sustainability and work as mediators between different stakeholders in order to raise pro-environmental attitudes and economic interest (ibid.).

Several researchers (e.g. Verhulst et al. 2007; Manzini 1994) point out that human aspects play an important role in the change process towards more sustainable societies. To gain more knowledge on societies, groups and individuals we need to approach individuals, consumption, and consumer behavior through a socio-psychologically enriched understanding. Moreover this knowledge must be used in sustainable development processes. New socio-psychological insights into human attitudes and behavior are needed to re-define key factors in eco-design and to include these factors not only in design but also in sustainable business. With this approach and development it is possible to encourage new value formation for all parties, producers, retailers, consumers and societies. (Verhulst et al. 2007.)

Thomas (2008) argues that the fashion discipline is far behind architecture or industrial design, for example, in producing scientific environmental knowledge for designers' use. On the one hand she highlights that consumers in the fashion area are most aware of and active in environmental issues. On the other hand, in design practice, environmental issues are extremely important and are everyday problems with significant design implications. (ibid.)

The environmental and ethical issues in the textile and clothing industry are complex, and traditionally they have been seen through a very limited lens, by focusing on eco-materials or ethical manufacturing principles, for instance. A more holistic approach is needed in this area. Therefore it is essential to produce more knowledge not only on eco-materials, eco-efficiency in production, and ethical manufacturing, but also on the consumers' relationships with products in the context of sustainable development. Tukker et al. (2006) propose that new knowledge about consumption (a consumer's activities and choices) and its connection to environmental issues is needed. They highlight that this consumer-centered knowledge should be used in designing in order to foster more sustainable tendencies in consumption. (ibid.)

Brezet and van Hemel (1997) propose one approach to eco-design as the optimization of a product's initial lifetime, through for example a strong product-user relationship. There are three possible ways to attain this goal. Firstly the product should meet the consumer's requirements, including latent needs, over a longer period of time. Secondly the product should be so important that the consumer will take good care of it, maintaining and repairing it well, and thirdly the designer should include added value in the product that can stimulate a deeper relationship to the product, thereby postponing the product's disposal.

Value creation in the sustainable context is not well studied nor defined, yet ethics are fundamental grounds for sustainable design. According to den Ouken (23 October 2009, 17) the study of new value creation and how a designer can have an important role in constructing new value creation systems are future challenges in the design discipline. She argues that designers must be able to design and visualize value models: to link user needs, technology and business understanding in new solutions by combining product and service into a value model. It could be added that we need novel knowledge on how to add to the aforementioned the dimension of environmental value. This new sustainable value creation system could be used to evaluate design proposals and their benefits for sustainable development.

Hodges et al. (2007, 342) propose that studying products in their cultural context "– – can be used to deconstruct the point where our creation, use, and disposal of the product interface." They further argue that by understanding people, consumption and products more deeply as well as their complex meanings and interplay, this may offer a better understanding of how consumption today may affect tomorrow. They also argue that through knowledge production combined with a critical scientific approach it is possible to understand that the future is something we must work on towards ourselves: it is not preprogrammed. In the textile and clothing research area new knowledge creation in the present will have an influence on the future if we can map out the challenges, possibilities and change opportunities for a better future. (ibid.)

This study is constructed in the following way. Following the first introduction section the theoretical perspectives of the study are presented (Chapter 2). The chapter begins by presenting the framework of this study in section 2.1, and the theoretical approaches and foundations used in this study are summarized. The theoretical perspectives chapter presents themes regarding the meanings of consumption in postmodern society, the meanings of textiles and clothing in social contexts, and contemporary person-product relationships regarding attachment and satisfaction. The chapter ends with a description of value creation in a sustainable development context. The third chapter presents the research design of this study and the research process. The fourth chapter describes the research contribution by presenting the results of each article and finally summarizing the contribution to the design discipline (section 4.8). The final discussion in Chapter 5 includes the validity evaluation, the implications of the study, and future research paths. The original publications are included at the end of the work.

1.1 Change in the focus of sustainable design

By definition eco-design and design for the environment (DfE) include environmental consideration and especially life cycle thinking. The sustainable design approach adds to this the ethical and social dimensions of the product, in its manufacturing, use and disposal phases (Tischner & Charter 2001, 120). This section provides a short description of the change in focus of sustainable design by briefly reviewing the history of eco-design and sustainable design and their connections to the textile and clothing field.

1960s: Optimism and growth

The 1960s was a period of new materials and increase in industrial production. Optimism and a belief in ever-lasting economic growth were strong. New, faster textile techniques were developed, such as rotation printing; new dyes and materials were introduced such as plastic and acrylic. The growing textile industry and advance in industrial processes caused obvious and easily recognized environmental impacts: the textile plant, which is traditionally located near a river, released unpurified wastewater into the river. Some countries started to establish environmental laws concerning industrial manufacturing and waste treatment, but it was very common that the factory could acquire a permit exceptional to the law and hence continue manufacturing as before. In Finland the Water Act, which included wastewater treatment regulations, came into effect in 1961, but waste practices did not change until the 1970s. (Pulkkinen 2008; Niinimäki & Pulkkinen 2008, 213; Santti 1985, 213–214.)

1970s: Limits to growth

In the early 1970s the energy crisis shook the industrial manufacturing arena and shifted the focus of environmental worries to the sufficiency of fossil energy. The limits of nature and its resources were presented in the well-known publication by Meadows et al. (1972). The political climate changed, including the emergence of more critique of industrial production.

Papanek's book *Design for the Real World* was published in 1971. Papanek strongly criticized industrial manufacturing and the goals of industrial product design as only fulfilling people's wants instead of real needs. The 1970s was a period when industry focused on the "end-of-pipe" issues. In the textile industry this meant mainly the treatment of wastewaters, which was a significant problem in dyeing and printing processes. For example the company E. Helenius Oy in Aitoo, Finland, had an exceptional permit from the Water Court to release unpurified wastewaters into a nearby water body, Pälkänevesi, until 1977, but the company itself built a wastewater purifying plant in the mid-1970s. This plant, which was built with private money, was so special in its own time in Finland that people traveled to see it even over longer distances. (Rautio 2006, 132.)

1980s: Environmentally friendly

In the 1980s focus on the environment was guided by three factors: improved environmental legislation, public awareness of environmental issues, and manufacturers' tight competition for market share (Fuad-Luke 2002, 11). The term 'environmentally friendly' appeared in marketing language at this time. In the textile and clothing industry the main focus remained on the treatment of wastewater and using fewer chemicals in production processes.

The Green Consumer Guide was published in 1988 in Britain, indicating how consumer interest had risen. At the end of the decade the Brundtland Commission's report *Our Common Future* (WCED 1987) was published. Sustainable development was defined to mean development which meets today's needs without placing the ability of future generations to meet their needs at risk. The report highlighted that public policymakers should concentrate on the prevention of environmental problems instead of only treating the symptoms. According to Spanderberg (2001, 24) this was a paradigm change in environmental protection and how to understand eco-design.

1990s: Eco-efficiency

At the beginning of the 1990s a strong eco-trend emerged in home textiles and fashion. An important turning point in eco-fashion was the launch of new Esprit Ecollection in November 1991 (e.g. Thomas 2008). Organic materials, natural dyes and biodegradable enzyme washes were used in this collection, and fabric scraps were reused for handmade paper in India (Lewis & Gertsakis 2001, 143). This stimulated a strong eco-textiles and eco-fashion trend. For some time the "eco-look" was mainstream in fashion. Eco-materials such as hemp, linen and naturally colored cotton were introduced to consumers. Naturally colored and unbleached cotton were especially popular: some companies dyed or printed their bleached cotton products to look unbleached. Hence the phenomenon of "greenwashing" also appeared and spoiled the reputation of eco-design. This eco-trend lasted for only a few years and faded soon, mainly because of higher costs and consumers' price resistance and because these eco-aesthetics did not find lasting acceptance among consumers (Lewis & Gertsakis 2001, 131).

Globalization and deregulation began to dominate industrial development soon after the Rio Summit of 1992.[5] The European ETA[6] agreement was established in 1992. According to this agreement it was no longer compulsory to inform the origin of the product. This was a direct consequence of industrial manufacturing moving to lower cost countries. This development had begun in the area of clothing production in the 1980s, and in textile production this was a common trend in Finland in the 1990s. (Niinimäki & Kääriäinen 2008.)

As the main environmental focus in European industry was on the waste from industrial processes, natural colored or unbleached materials were considered to be better than dyed ones. There was no deeper consideration of the maintenance phase and its environmental impacts. Moreover awareness of the environmental impacts of cotton cultivation piqued the media's and consumers' interest. The use of immense amounts of pesticides and fertilizers and especially water to cultivate cotton meant that cotton gained a negative reputation and interest turned towards organic cotton (Lewis & Gertsakis 2001, 131).

As consumers' environmental worries grew, companies wanted to communicate their cleaner products through environmental labels. The Nordic eco-label, the Swan label, was established in 1989 (Nordic Ecolabelling). The EU eco-label, the Flower, was launched in 1992. The Ökö Tex standard, also launched in 1992, certifies that harmful chemicals are avoided in the end product. It informs consumers that this product is safe for the end-user. Its criteria are set according to different product groups. The tightest criteria are in children's wear. (European Commission 7.10.2010.)

In the 1990s Finnish public authorities presupposed that by increasing environmental information about product life cycles, consumers will act wisely and choose products with less environmental load (VnP 1998). It would thus be possible to decrease the environmental load of consumption and industrial production through increasing information and through consumer education. Hence the key responsibility was moved onto the shoulders of the individual consumer. Moreover it was also presupposed that this strategy will increase the number of ethical products on the market.

In the *Sustainable Production and Consumption: A Business Perspective* report by The World Business Council for Sustainable Development (WBCSD 1996, 7) it is

5 The United Nation's Conference on Environment and Development in Rio de Janeiro

6 European economic region

defined that "sustainable production and consumption involves business, government, communities and households contributing to environmental quality through the efficient production and use of natural resources, the minimization of wastes, and the optimization of products and services." The aim was to focus on eco-efficiency issues in industrial manufacturing: efficiency and less material while manufacturing more products and simultaneously resulting in less waste. The eco-efficiency approach also meant savings in material, energy and chemical costs and waste disposal costs. This approach was easily accepted among industry, including the textile industry, because it meant cost savings in production. In the WBCSD[7] report (1996) the consumer's role was also brought into the discussion. Consumer needs and their relation to consumption patterns is a problematic issue in the context of sustainable development. As business and industry focus on growth whose tendency is to promote more purchasing, it is problematic to find a sustainable balance in industry. Moreover the balance between sustainable consumption patterns and the system of production was acknowledged in the Rio +5 Conference in 1997.[8] Discussions on eco-efficiency targeting factor 4 or factor 10[9] began, and governments agreed to establish measures to include environmental costs in product pricing, e.g. through green taxation. (Tischner & Charter 2001, 124.)

A deeper understanding of environmental issues began to develop mainly as a result of novel research knowledge in the latter part of the 1990s. Life cycle assessment (LCA) was developed further as a method to be used in the design process,[10] as the focus in design moved from product design to life cycle thinking. This work on how designers can use the LCA method was especially accomplished in the Netherlands in Technical University Delft (TUDelft). (Fuad-Luke 2002, 11.) The ISO 14000 standards provide guidelines and specifications for LCA, dividing LCA into four approaches: definition of the goal and scope, life-cycle inventory analysis, life-cycle impact assessment and life-cycle interpretation (Lewis & Gertsakis 2001, 42-43).

At the end of the decade global and social issues entered into the sustainability discussion (Vezzoli 2007). As a result of globalization and open markets, industrial production moved to lower cost countries, and discussion on the use of child la-

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7 A coalition of international companies

8 The United Nations Conference on Environment and Development (UNCED), also known as the Rio Summit or Earth Summit.

9 productivity improvements

10 Originally LCA thinking developed in the USA at the end of the 1960s and early 1970s

bor and sweatshops[11] reached consumers. Consumers began boycotts against some companies, and through this activism corporate social responsibility (CSR) began to be an important issue in textile and clothing production.

Early 21st century: Redesigning and Multiple life cycle thinking

As the amount of textile waste has continued to increase at the beginning of the new millennium, the focus has moved towards recycling of textile materials. New recycling processes have been developed, such as synthetic fibers made from recycled PET plastic bottles. As garments become cheaper and are produced with lower quality, their secondhand value has also dropped, and more and more textiles and clothing end up in landfills.

The cradle-to-cradle principle was originally launched by Stahel in the 1970s (Lovins 2008, 38) and again at the beginning of the new millennium by McDonough and Braungart (2002). According to this principle a product is designed and manufactured in a manner such that multiple life cycles of the product or materials are possible. Redesign and recycling of old materials into new designed products have become popular in this era. The use of recycled instead of virgin material has been popular especially among young designers, who have established their own small fashion companies. Reuse and recycling is sometimes called an eco-efficiency approach (Fletcher 2008) even though these strategies do not face the real problem: the increase in consumption especially because of the extremely short life span of clothing. Recycling and reuse demand only a small change from consumers, and this approach allows consumers to continue with their unsustainable consumption patterns and industry to produce more and more items. The recycling approach suits current routines and how things are done today; however it is a bad fit with ideals of a sustainable society that has less consumption in total. (Fletcher 2008.) A recycling approach actually perpetuates a throwaway culture.

In the global textile and clothing business it has become challenging to identify the origin of a product. Yet this information is valuable for consumers, and more transparency is demanded especially in clothing manufacturing. The "Made by" la-

11 sweatshops = factories with poor working conditions, low wages to employees and long working hours

bel is based in the Netherlands, and its goal is transparency in clothing manufacturing. For a consumer it is possible to trace the manufacturer of a garment through a code and use of the internet. (Fletcher 2008, 68.)

Beard (2008, 452) estimates that the period 2006–2008 could be seen as a turning point when eco-fashion moved from niche to commercial reality. She indicates that large companies such as Marks & Spencer completely changed their approach towards more sustainable strategies, e.g. Fair Trade manufacturing, and this has proved to be a success. Hence consumers are much more accepting of environmentally better clothing and textiles, and manufacturers see this as a profitable opportunity. (ibid.)

The interest in environmental protection has moved to more complex issues such as minimizing logistics, the environmental load of global business systems, water use (water footprint), carbon emissions (carbon footprint), and finally the environmental load of the use phase (wet cleaning, dry cleaning, line drying, need for ironing, lower temperature during laundering, etc.). More environmental information is provided for consumers and manufacturers. Action plans for clothing are under development, including the Sustainable Clothing Action Plan, 2008, by Defra. The Nordic Fashion Association began the NICE project in 2009, which is directed at manufacturers for Clean and Ethical Fashion,[12] but it also provides new information for consumers on how to lower the environmental impact of garments by avoiding over-washing, tumble-drying and ironing. The Association also suggests good maintenance and repair of garments to prolong the use time of clothing. (Nordic Fashion Association 2009.)

Fashion companies are attempting to build a positive reputation by working together with designers in a new way. Young designers are invited to create unique fashion collections made of unsold clothing. These redesigned collections are presented at social events with the help of the media. One example of this movement is the second ReUse Republic event in Helsinki (April 8–9, 2011), where thirteen young designers sold their unique fashion.

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12 A Nordic initiative, Clean and Ethical is a joint commitment from the Nordic Fashion Industry, which aims to be in the forefront regarding social and environmental issues.

1.2 New understanding in Design for Sustainability

Better understanding of the connection between the increasing waste streams, increasing consumption and contemporary design patterns are emerging. Establishment of the connection between design and sustainable consumption is rather recent: in 2002, to be precise, during the World Summit on Sustainable Development, according to Fry (2009, 192). At the EU level a strategy for Sustainable Development was published in 2005. One aim was to establish a political agenda in Europe whose goals targeted sustainable consumption and sustainable production systems. This was followed by the Action Plan in 2008 on Sustainable Consumption and Production and Sustainable Industrial Policy, which provided a framework to strengthen SCP-related policy in the EU. (Watson et al. 2011, 5.)

To reach a more sustainable path Tischner and Charter (2001, 119) point out that a fundamental change must happen at the "front of the pipe" stage, where new ideas, concepts and design are created. In this early stage all sustainability dimensions have to be considered more deeply, already before the design is created. The idea is to create fewer products and more eco-innovations: i.e. environmentally driven new products and services and fundamentally new sustainable product innovations. Tischner and Charter also argue that the largest problems are in the ethical and social dimensions in the current industrial system, and the challenge is how to create new sustainable business models (ibid.).

Designers play a large role. Designed products have to meet both the user's need and the producers' economic expectations. It is estimated that the product design and development phase carries approximately 80% or even more of the environmental and social impacts of the product, including the manufacturing, use and disposal phases (Tischner & Charter 2001, 120). In short, the decisions made during the design process affect the environmental impact of the product during its whole life cycle. The main challenge is how to design products added with services that encourage consumers to adopt more environmentally responsible behavior.

Fletcher (2007, 121) proposes that we should concentrate on designing clothing based on values, which enable a deep sense of meaning to emerge. She highlights five ways to start a sustainable transformation process in clothing and fashion: local production, never laundered clothing, products that answer deep human needs, a multiple life-cycle approach, and design thinking that engages the consumer to take part in the design or realization process (ibid.). These strategies are still in an

early and very experimental design stage, so it is not verified whether they actually extend the garments' use time.

Walker (2009) highlights that sustainable design must pay attention to elements related to product attachment and empathy approaches, an aesthetic aging process of the product, and further accumulation of meaning over time. He also points out that currently designers lack knowledge about the end-users or consumers because the industrial mass manufacturing system has separated the designer far from the end-user. Walker (2009) further argues that in Design for Sustainability the focus should be on products' contribution to the environment, and hence appearance and style should not be the main focus in a Design for Sustainability approach. The traditional product design process aims for aesthetic experiences, aesthetic temptations, versus benefit for the environment and for sustainable consumption in the Design for Sustainability process. However, pleasant aesthetic experiences are most important to consumers and are important factors in the person-product attachment process.

Design forms an integral part of sustainable culture. This means that design should not only take into account economic values, but also cultural, social, ethical and environmental values should be included in the sustainable design process (e.g. Tischner & Charter 2001). Niemelä (2010, 60) furthermore points out that through this wide approach to sustainable design, designing could change and become a proactive and participatory process aiming for aesthetic sustainability. To this ambition it can be added that design can be a proactive process that aims for sustainable consumption.

1.3 Current textile and clothing design, manufacturing, use and disposal

As the total volume of textile consumption at the global level is estimated to be more than 30 million tons annually, the environmental impacts of this industry are remarkable (Chen & Burns 2006). Although textile and clothing consumption is estimated to comprise about 5% of the environmental impact and carbon emissions of households, textile and clothing consumption is ever increasing (e.g. Spangenberg 2001; Nurmela 2009), as mentioned, and the more recent shortening of the life spans of especially fast fashion increases the environmental burden of the industry.

Since the early 1990s industry has been interested in eco-efficiency principles in their aim to decrease their environmental load. Technological development has succeeded in lowering the environmental impact of textile manufacturing. On the other hand the increase in production volumes through extremely effective mass manufacturing systems has in total increased consumption due to lower price levels. Throne-Holst et al. (2007) define this phenomenon as the rebound effect: the benefits of the eco-efficiency approach are thus lower than expected. Hertwich (2005) sees this even as a backfire effect: efficiency and cheaper prices actually lead to increased demand from the consumer side.

Currently textiles and clothing are far cheaper compared to household incomes than a few decades ago. Textile and clothing prices have fallen, and currently the consumer possesses more and more cheap garments and low quality textiles. According to Jackson and Shaw (2009, 146), in 1950s in the United Kingdom 30% of a household's income went to clothing purchases; currently that figure is 12%, with a higher amount of consumed items. It is also estimated that even if the total amount of textile and clothing purchasing is growing, clothing will form a decreasing proportion of households' total spending, because of falling prices. Due to these low prices and households' high incomes the demand for and consumption of extremely cheap and disposable fashion with a very short life span has increased. (Jackson & Shaw 2009.)

Cheap product prices lead consumers to impulse purchases and unsustainable consumption behavior: overconsumption, very short use time of products, psychological obsolescence and premature disposal of the product. In the UK there has been a 37% increase in clothing purchasing (sales by volume) between the years 2001 and 2005, and at the same time prices have dropped by 14% (Allwood & Laursen & de Rodrigues & Bocken 2006, 11–12). As prices fall producers must maintain profitability by increasing the amount of sold units (Jackson & Shaw 2009, 146). Zara, a well-known brand in the fast fashion arena, introduces about 11 000 different design items into manufacturing annually (in five to six colors and five to seven sizes), which means 12–16 collections a year, according to Tokatli (2007). Although the company does not present sixteen collections a year, it sustains consumers' interest by introducing new garments at intervals of only a few weeks. (Tokatli 2007.)

The textile and clothing industry has moved with increasing speed and volume into low-cost Asian and Far East countries. The environmental loads of this industry have followed accordingly. According to Jackson and Shaw (2009, 145) this

global development has been the result of "capital and technology being attracted to low-cost manufacturing nations, who are eager to use their own cheap labour to attract foreign currency." They also predict that China will become the biggest exporter of clothing and textiles in coming years, manufacturing even 80% of the developed world's clothing and textiles. Many other developing nations are most interested in clothing manufacturing, as it does not require significant technological investments. The other issue that has enabled this development is the improvements in transportation systems and the cheap price of oil. (Jackson & Shaw 2009, 145–148.)

Due to economical reasons and extremely tight competition, it is not profitable for producers to manufacture durable and long-lasting products (Mont 2008). The current economic and industrial system is based on products' fast replacement. Moreover products are cheap, and repairing the product is no longer worthwhile; repairing can be even more expensive than buying a new product, especially in the clothing field. Accordingly most products are throwaway articles in Western societies. (Mont 2008.)

Even the reuse of old clothing becomes difficult because of the sheer amount of old garments. Charity shops receive more donations than they actually can pass on. Therefore, while retail markets are full of cheap garments, the secondhand markets for reused clothes are also saturated. In Finland UFF (U-landshjälp från Folk till Folk i Finland rf), a secondhand charity shop, received over eight million kilograms of old clothing in 2010, an increase of 3.5% over the previous year (UFF 2011; Keski-Uusimaa 28.1.2011). The largest collection rate compared to population was in wealthy Kauniainen (UFF 2011). Old garments are nowadays even imported from the USA to Finland to be sold again (e.g. www.rokclothing.fi).

In many Western countries, for example in Britain, clothing and textile waste is estimated to be the fastest growing waste stream. This is a direct consequence of the increase in textile and clothing consumption, which rose over 30% in the period 1995–2005 in Britain (Defra 2008). Fast fashion, marked by its low quality as well as very short product life span, is increasing its share on the market. In Britain it is estimated that currently fast fashion accounts for 20% of the market share, and it doubled its growth between the years 1999–2006 (Defra 2008). The growth tendency in fashion can also be seen in other countries. Nurmela (2009) estimated that in Finland the consumption of clothing and footwear increased by 23% between 2006 and 2010.

The increase in the purchase of short-life-span products results in a notable increase in waste. It is estimated that currently about 70% of disposed clothing and textiles end ups in landfills (Fletcher 2008, 98). Recycling often means downcycling. During the recycling process, the quality of material reduces over time, as does the value of the product and the material (McDonough & Braungart 2002). In textiles and clothing this means that the recycled material is mainly used for filling purposes.

Products are disposed of, not only because of the low quality (causing a short use time), but also because new trends and fashion make products look out of fashion. Consumers are actively seeking novelty and at the same time evaluating their appearance and the product world in a social context. The increase in waste streams can thus be understood as failed person-product relationships in the context of sustainable development (Chapman 2009, 20). According to Cooper (2005), contrary to the current system, product durability and long-term use are prerequisites for sustainable consumption.

The most influential ways to change the industrial system towards a sustainability path are governmental laws, legislation and regulations that impact producers' responsibility. Yet individual consumers' and households' consumption patterns also matter. It is not only important how much consumers buy, but also what kinds of products they buy, how they use them, how long they use them and how the products are disposed of. Consumer preferences affect household consumption patterns and households' environmental impact, but consumers have a limited affect on production processes. According to Spangenberg (2001, 33) consumers have limited possibilities to affect environmental issues, but the demand side can nonetheless have some influence. Spangenberg mentions clothing as one area where households and individuals can make a difference. Boycotting child labor in textile and clothing manufacturing has already made a difference to the ethics of industrial manufacturing inside this industry. (ibid.)

Consumption and consumerism lie at the core of Western societies. Consumption per se is an important function in people's everyday life. Current consumption patterns are strongly connected to contemporary industrial manufacturing systems, economic systems and the underlying values supporting them. However sustainable development requires a clear change in consumption patterns. Accordingly it is exceedingly important to investigate how sustainable design can encourage sustainable consumption.

2. At the crossroad of theoretical perspectives

Consumption patterns have become unsustainable, the more textile and clothing manufacturing has increased production volumes, as was described in the introduction. This chapter provides theoretical perspectives on this change process in contemporary consumer society. Theoretical perspectives open up the consumers' world regarding two main themes: the meanings of consumption and person-product relationships in contemporary consumer society. The third theoretical approach, new value creation in the context of sustainable development, introduces an ethical and conceptual discussion on the values behind the sustainable transformation process.

By approaching sustainable design from three different angles, new understanding in sustainable design can develop, design that aims to contribute to sustainable consumption. This section explains the meanings of consumption in postmodern society and the construction of identity, especially mobility in identity construction. The meanings of clothing, fashion and home textiles are presented briefly. Person-product relationships are viewed through the lens of pleasure, attachment and satisfaction. The chapter ends with a discussion on value creation, which is fundamental in the transformation towards sustainable design, manufacturing, business and consumption.

2.1 Theoretical framework

This section presents the theoretical framework for the study. The issue to be studied is complex phenomena embedded in several contexts and backgrounds (Stake

2005, 449): the complex interplay between design and consumption. This study approaches the phenomena from several directions, and each of the author's articles thereby frames the phenomena from a different perspective. Moreover, as the sustainable design discipline is young and still emerging, it borrows theories from other disciplines and so does this dissertation accordingly. In theoretical triangulation, phenomena under study are approached from multi-theoretical perspectives in order to expand these perspectives in investigation and understanding of complex phenomena (Denzin & Lincoln 2005). The phenomena under study in this dissertation, consumption and its connection to design, are therefore grounded in different theoretical perspectives.

The study explores consumption and person-product relationships mainly drawing from literature on sociology and social psychology. This theoretical foundation offers tools to understand more deeply material culture, consumption in the postmodern consumer society, and the meanings of objects, specifically, the meanings of clothing and home textiles.

When, according to Bauman (1996), consumers are constructing the mobile 'Self', thereby changing identity, change is unavoidable (this is described in more detail in section 2.2.). This need for change and novelty forms the core of consumerism. Acknowledging this significantly affects the study of the emotional and temporal dimensions of person-product relationships. On the basis of this knowledge issues related to attachment and satisfaction are then empirically studied.

The fundamental grounds of this dissertation are ethics and values. All the author's articles touch upon values on some level: the values behind consumption, the values behind person-product relationships, and the values behind designing and manufacturing. Hence value creation has been one key theoretical approach to this study. Various theoretical groundings have been used in constructing the discourse on values; they are mainly philosophical, but economic values also need to be addressed.

A framework has been established to enhance the understanding of the complex interplay between designing, manufacturing and consuming in contemporary society. This is accomplished in order to offer a more holistic approach to sustainable design. The theoretical framework (Fig. 1) offers support for the empirical investigation of the meanings of textile and clothing consumption, person-product relationships, and the conceptual discussion about values. Theoretical foundations offer grounds for a preliminary understanding of the complex phenomena under study, and they offer tools and definitions for the empirical part of the work.

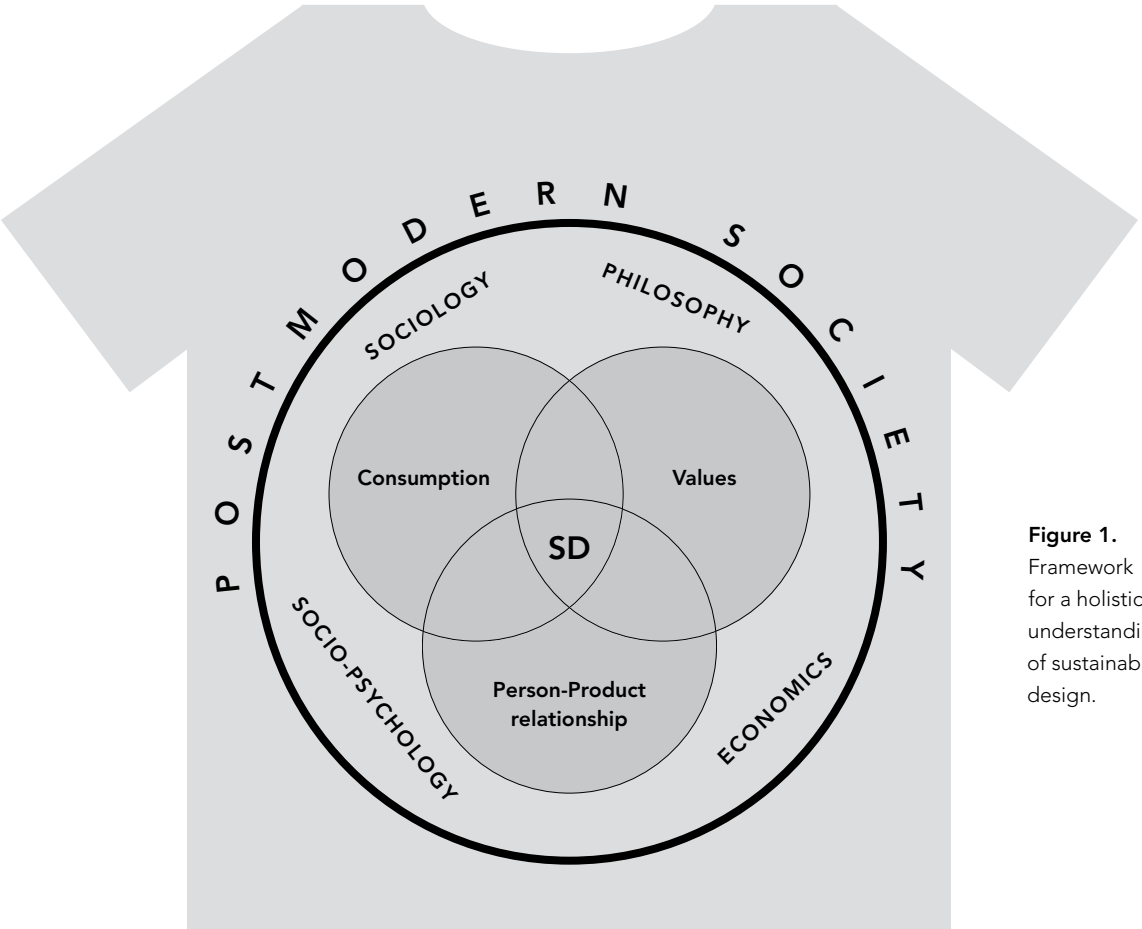


Figure 1. Framework for a holistic understanding of sustainable design.

2.2 Consumption in postmodern society

Contemporary consumer culture is said to define postmodern society. McCracken (1990) argues that the postmodern era can be differentiated by its constant change, multiple choices and individuals' freedom to create themselves. Bauman (1996) argues that the current postmodern era is seen as a period of individualism, changing values, freedom of consumer choices, and changing lifestyles. Bauman (1996) describes the present postmodern society as a 'liquid society', which is in a constant change process. Fluidity and uncertainty is constantly present, and this affects a consumer's constant self-critique. The ongoing change process and constant evaluation is also obvious in the individual's identity construction, resulting in a

"mobile" identity (Bauman 1996). This mobility in identity and constant critique in turn lead to consumer insecurity, as s/he must evaluate purchase decisions on the basis of social acceptance. Therefore the consumer has an ongoing need to renew his/her appearance according to a mobile self. 'Self' is a process linked strongly to consumption patterns. Slater (2002) argues that relations between consumption, communication and meanings have changed, which creates a new flexibility in status linked to a consumer's identity construction. Products signify status and social identity, but in the postmodern era these meanings are negotiable and flexible. Slater further suggests that the postmodern identity is actually a function of consumption. (ibid.)

This constant change in identity construction affects the aesthetic concept of clothing and its social acceptance process. According to Roach and Eicher (1973) consumers must consciously and simultaneously unconsciously check what is culturally and socially valid and how they can maintain an appealing self-type within the limits of what is culturally acceptable. The mobile self therefore needs ongoing construction and is thereby an ever-changing process. Slater (2002) argues that at the foundation of the postmodern consumer society lies the idea of freedom, and individuality is a strong image of freedom. Freedom, individuality and uniqueness are carried out through purchasing and possessing, and through these actions consumers construct their identity, social appearance and their individual lifestyle. (ibid.)

2.2.1 Lifestyle and values

Lifestyle is constructed through individual choices, and it is visible: it is expressed through appearance (e.g. clothing), actions (e.g. ethical purchasing) and products (e.g. interior decorations at home) (Gibbins & Reimar 1999, 78–79). Postmodern society offers a variety of lifestyle choices. Within certain limitations individuals can select their profession, place to live, home, family, friends and so on. However, in postmodern society, the change process is constantly ongoing, as mentioned, and there is not only one right decision to be made. To quote Gibbons and Reimar (1999, 78) "– – lifestyle is never static, it is constantly transformed." Although individualization is a strong movement in contemporary society, self-identity is always socially grounded. Accordingly people make their own individual decision and choices inside the frames of their own social and cultural context. (ibid.)

McCracken (1990) argues that consumers purchase many products because they aspire to some lifestyle, and this certain object offers a small part of that lifestyle

to the consumer. Products represent a bridge towards the desired lifestyle, and hence objects symbolize access to something meaningful. However one product as such does not represent the whole lifestyle and cannot completely fulfill the consumer's desires for that certain lifestyle; hence the consumer stays unsatisfied and the search continues. (ibid.)

The concept of lifestyle includes individuals' values. During the postmodern era various social movements have been emerging and there exists a search for values (Bauman 1996). Moisander and Pesonen (2002) have studied 'green consumerism' and the values and attitudes behind this movement. They explain that green consumerism represents a certain lifestyle or desire to be a certain kind of person. Green consumers actualize their values through a certain way of acting. The authors point out that green consumers are also in a process of reinventing the 'Self', evaluating their own choices and actions in the context of sustainable development. Moreover they argue that moral and aesthetic criteria in green consumerism are also undergoing a constant evaluation, which creates instability. (ibid.)

The desire to acquire social status through owning and a product's symbolic meanings are profoundly connected to an individual's own materialistic values (Wang & Wallendorf 2006). Consumers desire objects with certain characteristics, certain social status and values that they want to connect to themselves, symbolic meanings that are connected to identity construction (Wang and Wallendorf 2006). Richins and Dawson (1992) describe how through materialism individuals ascribe value and meanings to their possessions. On the basis of these values, consumers evaluate products and their symbolic values. Individuals with strong materialistic values try to gain happiness through possessions (ibid.).

2.2.2 Consumption emotions

Emotions lie at the center of human existence, and they influence most of our behavior, motivations and thought processes (Desmet 2009, 379). Emotions also play a strong role in consumption. Richins (2009) argues that textiles and garments belong to the category of self-expressive products. With these products consumption-related emotions are important for a consumer, at least immediately after the purchase event. According to Richins (2009) the purchase situation becomes a strong positive experience for a consumer, but this experience is very short term and has no connection to any experience of attachment, which is described in more detail in section 2.3.2. Richins (2009) further explains how the study of

consumption emotions might be important from an environmental point of view if aiming for sustained positive consumption emotions or when finding solutions to replace consumption with other positive emotional states in order to decrease materialistic consumption.

Consumption has many meanings for the consumer. It can involve experience, integration, or classification, or it can mean play (Solomon et al. 2002, 15-16). Consumption as an experience colors the purchase situation with emotions; consumption is an emotional goal as such. When products are used to integrate their symbolic meanings with one's own identity, consumption can be understood as integration. Classification refers to how consumers communicate symbolic meanings and status to others through objects. The element of play is important in contemporary consumer culture, and it can be seen e.g. in appearance and fashion. The consumption interplay between consumer's wants, needs, values, attitudes and experiences is emotionally meaningful for a Western consumer.

Emotional, psychological obsolescence results in premature disposal of a product. Consumer products that relate to our self construction and identity are constantly evaluated on both aesthetic and social grounds (Burns 2010), as stated earlier. Products' symbolic meanings are connected to psychological satisfaction through an emotional response; e.g. clothing and fashion enable consumers to gain social acceptance, affiliation with particular groups, as well as emotional beauty experiences. When the product no longer offers a positive emotional response, e.g. it is out of fashion, the consumer feels a sense of psychological obsolescence and can easily replace the product with a new one. Through the new purchase event the consumer can again experience excitement, enjoyment, joy and pleasure, at least for a moment.

2.2.3 Consumption behavior

Consumption can be defined to include the following aspects: identity formation, differentiation and the transmission of symbolic meanings (Solomon et al. 2002). Baudrillard (1993, 39) argues that consumption is a system where ideological values and social functions work as symbolic exchange. Consumption also functions to fulfill individuals' hedonistic pleasures (Campbell 1987), and it is an activity that produces enjoyment and pleasure (Richins 2009). In contemporary society consumers are no longer only fulfilling utilitarian needs but also wants and desires through constant consumption (Campbell 1987, 69-70).

MOTIVATIONS

Consumption motives are goal oriented, and they have direction and strength (Solomon et al. 2002, 95). Goal orientation means that there is a motivation to satisfy a certain need, e.g. consumer desires for a certain garment to reach the goal of being accepted into a certain group. In the use phase the consumer is involved in goal-directed behavior, which may result in satisfaction, frustration or some other emotion (Desmet 2009, 393), leading in turn to sustained use or product disposal.

NEEDS VS. WANTS

It is difficult to distinguish needs from wants, and both are formed by culture (Solomon et al. 2002, 96). Needs can be understood to mean biogenic needs or psychological needs. The former connects to basic needs that maintain life. The latter connects the consumer to the cultural context and e.g. social acceptance. Another possibility is to make a distinction between utilitarian or hedonic needs. Hedonic needs are subjective and based on individuals' values in a cultural context. Hedonic consumption is motivated by anticipated utility: the consumer expects to achieve certain goals through consumption and products' symbolic meanings (Solomon et al. 2002, 278). Often consumers select products that fulfill both their utilitarian and hedonic needs (Solomon et al. 2002, 96).

Wants and more so desires describe well the contemporary consumer culture and instability within it. The basis of desire encompasses emotions, pleasures, passions and bodily dimensions, and hence desire is linked to bodily aspects of motivation and simultaneously includes psychological satisfaction in the social context (Solomon et al. 2002, 102).

ATTITUDE VS. BEHAVIOR

According to Ajzen (1991, 181), the theory of planned behavior focuses on "– – the individual's intention to perform a given behaviour". Intentions capture the motivational factors that influence behavior. The stronger the intention, the more likely the behavior is to be implemented. The behavior depends on the individual's motivation (intention), but non-motivational factors, such as opportunities and resources, also have an effect on behavior (ibid., 182).

Attitudes do not always result in actions. There is a well-documented attitude-behavior gap that exists in the field of eco-design. Western consumers are environmentally aware and ethically concerned, but this attitude does not translate into consumption choices that favor ethical companies and punish unethical enterprises

(Carrigan & Attala 2001). Consumers do not want to make ethical choices if it necessitates inconvenience to them in the form of higher prices, loss of quality or discomfort in shopping (ibid.), even if they are interested in ethical consumption.

2.2.4 Meanings of clothing

Woodward (2005) argues that clothing unifies roles with regard to identity, sexuality and sociality, and hence clothing choices externalize the inner self in social contexts. Accordingly clothing is very intimate, close to our body, but also very closely connected to our external social roles and simultaneously our inner self, our identity. According to Kaiser (1990) clothing can be understood through its temporal, fashion and aesthetic aspects, i.e. its cultural context, and through connections to group affiliation, social situation, immediate body space, personal characteristics, kinetic interaction and garment/body interaction. In Entwistle's interpretation (2000), we can define clothing to mean an embodied experience that is socially constituted and situated: i.e. the dress, the body and the self in the social context are perceived simultaneously.

Levy-Bruhl (1966) explains that some objects can be defined to be the extenders of identity, since they are so fundamentally deeply associated with an individual. Clothing is one example of such a product. Appearance and clothing express the wearer's inner self, moods and identity. Furthermore clothing is connected to social class, status, gender and age. Clothing is very intimate; it exposes and hides simultaneously. McCracken (1990, 57) argues that clothing is an expressive medium and points out that clothing can be understood as a language or at least as a communication medium. Kaiser (1990, 211) defines appearance communication to mean "– – meaningful exchange of information through visual personal clues." Since appearance is constantly evaluated in social and temporal contexts, the identity construction process makes appearance and clothing changes unavoidable (Kaiser 1990, 150). As Kaiser (1995, 43) argues, "these statements of who we are or are not (or no longer are), are likely to coexist with ambiguous identity spaces that are under construction."

Temporal symbolism means that objects' symbolic meanings change over time (Miller 1992, 126). For example in fashion, time controls what the object represents, and at the same time the object stands for a certain time period. Fashion means that the product is able to signify the present (ibid.). According to Kaiser (1990) fashion is a symbolic product, and it differs from clothing. Clothing is material

production that fulfills our physical needs for protection and functionality. Fashion, in contrast, is connected to the user's emotional needs. (ibid.) Fashion connects consumers' inner individual personality to external symbols: e.g. brands, status items, uniqueness, appropriateness and beauty.

2.2.5 Meanings of home and home textiles

Home is an environment where individual signs represent the owner's character, personality, individuality, taste as well as the desired image the inhabitants want to project of themselves. Forty (1995, 119) states that the home is the field where individuals can simultaneously implement private illusions and publicly accepted tastes, values and ideas of home. The latter relates to design objects and trends as well as socially accepted roles of women and men: e.g. the housewife and her everyday practices in the home, single living, or the ideal family life (ibid.).

Gullestad (1992, 79–81) explains that 'a good home' is connected to moral values while the expression 'a nice home' relates to aesthetic aspects. However, she further points out that moral values are expressed through aesthetics, giving such examples as how the cleanliness of a home relates to decent inhabitants or how decoration expresses the inhabitants' personalities. Moreover the importance of beauty, warmth and emotional closeness are important in the home environment, and textiles are one element that can deliver these characteristics and atmosphere. (ibid.)

Crozier (1994) argues that the concept of home is a complex one. Home means sentimentality, affection and identity, and it involves deep emotional meanings (ibid.). Material products around a person express his/her identity, and the level of family interlinks with an extended self concept where home and its items are also included. Home can be defined to mean a symbolic body for the family. At home people surround themselves with personal decorations and important items, and they link their identity strongly to products that have been personified and kept for a long time. (Solomon, et al. 2002; Csikszentmihalyi & Rochenberg-Halton 1999.)

Through material possessions we communicate who we are to others symbolically: what our personality is, social standing, wealth, our values, history and relationships with others. In contemporary consumer society, home, while being the extender of self, is according to Norman (2005) a public presentation of our selves. Home is made one's own through personal objects and decoration (Soronen and Sotamaa 2005); through personalization a habitation changes into a home (Aura, Horelli & Korpela 1997). Aura et al. (1997) argue that a habitation can be

considered a matter of attachment, as it is a safe place and at the same time it consolidates one's identity. The individuality that represents a person's own identity is also important in the domestic environment. Hence home decoration, materials and color choices, and moreover home textiles, are important elements in the home environment.

2.3 Person-product relationships, where quality is placed with quantity

In this chapter person-product relationships are briefly discussed and special attention is paid to attachment and satisfaction processes, which are also at the core of the author's articles. Person-product attachments and product satisfaction in the sustainable development context are presented in more detail in articles III, IV and V.

According to Simmel (1978, originally 1900) we desire objects that are not immediately in our use and we cannot enjoy them. In other words, desire emerges from the distance created between the subject (individual) and object (product). Simmel argues that objects therefore offer resistance to our desires, and this concept is the basis for differentiation (subject–object) and objectification of the items. This objectification process in turn forms the basis for objects' exchange value: it is mediated by exchange, becoming a precondition for culture and modern society. In short, the foundation of our society according to Simmel (1978) is the processes of exchange, and this leads to a relativistic worldview. Money (exchange value) is a medium supporting these relationships between objects and subjects and between different subjects: items are evaluated according to their monetary and exchange value. This leads to a situation where reduction of quality is replaced by quantity (ibid.). This principle is strongly present in contemporary society.

According to Simmel (1978) existing as an individual in the modern world is simultaneously based on being and having. Accordingly having and possession are active processes, not a passive situation. Possession includes many symbolic relationships with the material world. We desire many objects and products because of the symbolic meaning these objects carry. We desire a certain lifestyle or the social acceptance or social status these objects offer us. Through possession and consumption we construct our identity in the social context.

Bourdieu (1977) argues that the foundation of the relationships between subjects and object exists in feelings, e.g. how we dislike or like some object. Russo

(2010) has studied the experience of love for products and how this feeling arises and changes in person-product relationships in the longer term. By love she means rewarding thoughts, thoughts of intimacy, passion and commitment (ibid.).

According to Dewey (2005) we engage with objects to create experiences. Objects and products interact with a person's needs, desires, purposes and capacities, which results in experiences. Dewey (2005) argues that a person's own narrative coherence is important when s/he is creating the meaning of this experience. Bourdieu (1977) argues that objects operate simultaneously in both the material as well the cognitive world. According to Norman (2005) there are visceral, behavioral and reflective levels operating when we are creating experience. The first, most rapid, judgment is made according to appearance at the visceral level. The second level refers to the person's behavior with the object. At this level the pleasure in use and functionality are important factors in creating a positive experience. The last level, the reflective level, is the one where a person can reflect upon his/her experience and associate feelings, emotions, self-image, personal satisfaction, memories and cognition with the experience. When stimulation comes from the highest, reflective level, emotion and thought processes, deep reasoning and interpretations are fully operating. (Norman 2005.) At this level an individual's own values are also reflected against the values behind the object or manufacturing company.

Meanings associated with objects can be cultural or subjective as well as lasting or temporary (Koskijoki 1997). In postmodern society Western consumers possess more and more items, and consumers no longer create deep and stable long-term attachments to their possessions as easily. Products are consumables that 'work' during the time consumers are building their own identity through their symbolic meanings. Chapman (2009) points out that we do not create a sustaining relationship with most products, because of our changing needs. While products stay the same, the user's needs and identity is changing over time. Chapman proposes that designers should gather more knowledge on users' emotional needs to profoundly understand individuals' change process and how to offer emotionally durable designs (ibid.).

2.3.1 Pleasures with textiles and clothing

Since consumption at present is strongly based on experiences and product design is based on the emotional experience the product can provide for a user, it is important to examine the meaning of experience and pleasures delivered by a

product. Tiger (1992, cited by Jordan 1999, 210–211) argues that objects offer us four types of pleasure: physio-pleasure, socio-pleasure, psycho-pleasure and ideo-pleasure. Physio-pleasure is the link to the body and pleasure derived from the sensory system. This includes, for example, the touch and feeling of sensual pleasure and tactile and olfactory properties in the object. Socio-pleasure emerges through the enjoyment derived from relationships with others and with society. Psycho-pleasure links the experience the object offers us with cognitive and emotional reactions such as product satisfaction. (ibid.) (See Table 1.)

Table 1. Dimensions of pleasures with clothing and textiles based on Tiger (1992), author's interpretation.

Dimensions of pleasure with clothing and textiles

Physio-pleasure	Socio-pleasure	Psycho-pleasure	Ideo-pleasure
kinetic dimension tactile dimension olfactory experiences	social situations social class, status	product satisfaction, e.g. beauty of use experience, also visual experience, aesthetics interaction between the product and user's emotions product attachment	e.g. environmental awareness: preferring ecological, ethical and sustainable design and consumption materialism: valuing possessions

Kaiser and Damhorst (1991) explain how we can approach textiles and clothing from different conceptual viewpoints. One way to understand the meanings of an object is through the relationships between the physical properties of the product and the human responses to these properties. This approach relates to the physio-pleasure approach and, at some levels, the psycho-pleasure approach. Secondly appearance is evaluated in the social context, and this explains the many levels through which people create meanings for the product to themselves, others as well as their everyday life (ibid.).

Ideo-pleasure is linked to the user's values. It relates to the aesthetics of a product and at the same time the values that a product includes. "For example a product made from bio-degradable materials might be seen as embodying the value of environmental responsibility. This, then, would be a potential source of ideo-pleasure to those who are particularly concerned about environmental issues." (Jordan 1999, 211).

A consumer's values play an important role in his/her consumption behavior and activities. Hence products are often purchased to reach the expected value-related goal (Solomon et al. 2002, 109). A materialistic value base is connected to the meaning of possessions, and materialism is a strong value base in consumerism. Richins and Rudmin (1994) have identified materialism as having a deep connection to the meanings of possessions and consumption. Furthermore they argue that materialists define themselves through possessions more than consumers with a lower materialism value base. (ibid.)

Consumers have expectations about the pleasures and goals the product will offer them, and these expectations can result in satisfaction or dissatisfaction. This will be discussed in section 2.3.3.

2.3.2 Attachments

Person-product attachment refers to the strength of emotionally engaged experiences a user has with a product (Schifferstein & Zwartkruis-Pelgrim 2008). Attachments emerge with products that are somehow special or their use means something special to the user. If this kind of product becomes lost, the user experiences emotional loss, and accordingly this kind of product is unlikely to be disposed of (Schifferstein & Zwartkruis-Pelgrim 2008; Mugge 2007). Schifferstein and Zwartkruis-Pelgrim (2008) define the following dimensions in creating person-product attachment: enjoyment; memories of persons, places, and events; support of self-identity; life vision; utility; reliability; and market value. The authors state that of these, only memories and enjoyment contribute positively to the degree of attachment (ibid.).

Goods are associated with cherished social relationships, and thus objects can be seen as inter alia markers of memory or containers of memories (Koskijoki 1997). A memory can be understood as past experience; the object is a strong reminder of this experience (Koskijoki 1997, 276). According to Csikszentmihalyi and Rochberg-Halton (1999) objects symbolize many things to the user, e.g. past

and present. The object does not only carry the memory but can also represent a promise of some experience (or emotion) to come. Moreover products can also act as a sign of the self or the family, and they carry memories and social networks, as was described in the lifestyle section. (Schifferstein & Zwartkruis-Pelgrim 2008)

As Russo (2010) suggests, users become attached to products via dimensions of e.g. love, passion and commitment. The process of forming attachments is developed temporally. Chapman (2009) states that a discursive process is important, as attachment emerges through time and stimulation. Experiences, even unconscious ones, build meaningful associations with objects, materials or experiences through time. We therefore create emotional attachment with objects at conscious and even unconscious levels. According to Schifferstein and Zwartkruis-Pelgrim (2008) deep product attachment can emerge if the product gives the feeling that the product user is loved or cared for. The authors add that if the product symbolizes a bond with friends, family or some important person, this product is important to the user because of its symbolic value.

The person-product attachments to home textiles and clothing are explained in more detail in articles III and IV.

2.3.3 Satisfaction

Meaningful attachments to products are personal and individual, connected to an individual's history, and they mainly emerge during a longer period of time. Accordingly meaningful attachments are not easy to address in the design process. Therefore, for designers aiming to extend the product life span, it is even more important to identify those elements that enable long-term use and that provide product satisfaction in the use situation.

Positive product experience is connected to the product's capacity to provide a satisfying experience through enjoyable use, psychical attributes, style and utility (Forlizzi, Disalo & Hanington 2003). Moreover operative dimensions are relevant during the use phase (Margolin 2002), and intrinsic quality attributes affect the enjoyable use of the product (Schifferstein & Zwartkruis-Pelgrim 2008). The consumer's psychological response to the product also has to be studied to understand consumer satisfaction more deeply. Jordan (1999) adds to this that even the user's ideals and values have to be studied to understand more deeply all aspects in the process of satisfaction.

Oliver (1993) suggests that consumer satisfaction is fundamental to consumer

purchasing behavior. He points out that satisfaction encourages repeated purchase decisions and routines. Hence consumer satisfaction results in continued interest and loyal consumers who routinely purchase the same products and brands that have previously provided satisfaction (ibid.). Accordingly product satisfaction can be said to add value to the product and the brand behind it.

Satisfaction is important in the sustainable development context for designers trying to extend the product life span and simultaneously slow the cycles of consumption. Consumers actively seek new products and evaluate products in the social context. As stated previously, a sense of psychological obsolescence causes consumers to dispose of the products prematurely, i.e. before they are worn out (Mont 2008). Durability and long-term use, however, are prerequisites for sustainable consumption (Cooper 2005). Cooper (ibid.) argues that consumers associate durability with high quality and not with environmental impacts, yet to change the balance in SCP it is most essential to extend the product use time.

Research done in the area of satisfaction has focused on the (dis)confirmation paradigm (e.g. Churchill & Surprenant 1982; Oliver 1980). This means that consumer satisfaction is based on the size and direction of the consumers' disconfirmation experience. Consumers have certain expectations in the pre-use phase, creating a certain frame of reference against which they judge the product. When the product performs worse than expected, the consumer is dissatisfied: a disconfirmation of his/her expectations. (ibid.) Consumers also evaluate products through a limited set of attributes. Some attributes are determinants leading to satisfaction while others are related to dissatisfaction. A good performance in those attributes that are important to the consumer is the best guarantee of stimulating product satisfaction. (Swan & Combs 1976.)

Wang and Wallendorf (2006) argue that the best way to deeply understand consumer satisfaction is to combine consumer and product factors. This entails studying not only dimensions and attributes that result in satisfaction in person-product relationships, but also includes consumer ideals and values in the product as important factors. Consumers' materialistic values strongly affect how social status in products is valued or defined. Richins and Dawson (1992) define materialism as the way individuals set a value on their possessions. Desires in consumption are strongly connected to materialistic values and especially to the desire to gain social acceptance and status in others' eyes. Individuals desire objects with certain characteristics and values that they want to connect to themselves, such as beauty, success, wealth, and taste, and these product characteristics are deeply connected

to the individual's own values. (Wang & Wallendorf 2006.)

As mentioned previously, not only utilitarian characteristics of products are significant; symbolic meanings are also most important for consumers. According to Wang and Wallendorf (2006) highly materialistic consumers seek novelty and evaluate their possessions frequently, and hence they appreciate less the satisfaction and close relationships that emerge during longer use situations. The desire to earn social status through ownership and the product's symbolic meanings is profoundly connected to the individual's own materialistic values. Consumers with less materialistic values may place less importance on the social status-related elements in products and possessions, and they may appreciate more the personal meanings that emerge over longer use. (ibid.)

The satisfaction process in clothing is discussed in more detail in article V.

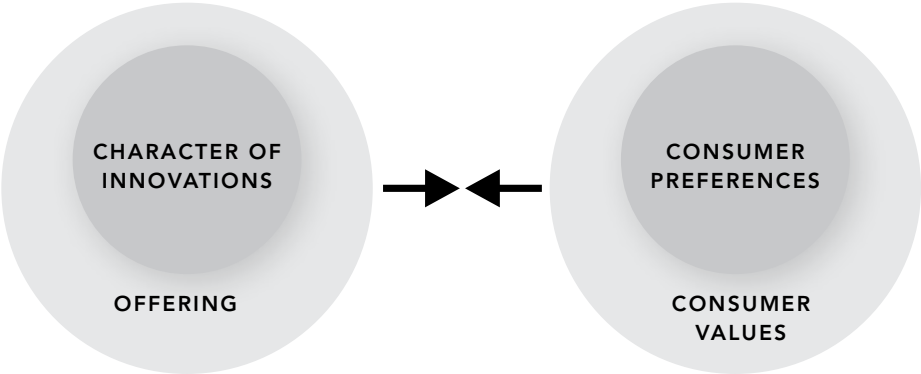
2.4 Value creation

The purpose of this section is to discuss the multiple dimensions of value, value creators and new, future-oriented value. Since ethical thinking and values form the foundation of sustainable design, even though they are not well defined or discussed, this chapter aims to present novel views on value creation. All the author's articles somehow touch on values: values behind consumption behavior, consumer values, and values behind designing or manufacturing. The last research article, VII, summarizes the discussion on new value creation in the context of sustainable development.

Values relate to beliefs about good and bad, right and wrong, and they are the basis that gives direction to our moral behavior (e.g. Gibbins and Reimar 1999). Gibbins and Reimar (1999, 100) propose that there has been a shift from stable core values to less stable ones in postmodern society. The authors argue that individuals and groups explore their own value patterns, in a way that promotes variety and personal value orientation. These authors further argue that individuals select values that best suit their understanding of themselves as well as the group to which the individual feels s/he belongs (or desires to belong to). Hence in the postmodern era individuals' values are applied or adopted in the same way as identity construction in a liquid society; values reflect the unstable 'Self'. Gibbens and Reimar (1999) also point out that values are blended with attitudes and preferences, and all these together create lifestyle.

Gibbens and Reimar (1999) explain that the value system includes first order and second order values. First order values are moral rules, but in postmodern society second order values have more flexibility than in traditional or modern society. Hence individuals have wider possibilities when choosing their own value base, which leads to instability. Moreover Gibbens and Reimar (1999, 108) argue that postmodern thinking is present oriented, and accordingly self-expression is at the core of people's goals. On the other hand they see that a post-materialistic paradigm is emerging, where future-driven thinking is the core value. The consumer in a postmodern society and even more so the post-materialistic thinker can concentrate on several aspects simultaneously: those things closest to their own body and own home, as well as at the level of the whole world. (Gibbins & Reimar 1999.) This is evident in the concerns of the Western contemporary consumer, who worries as much about the eco-materials in her/his textiles and clothing as the environmental impacts caused by clothing and textile manufacturing in Asian countries.

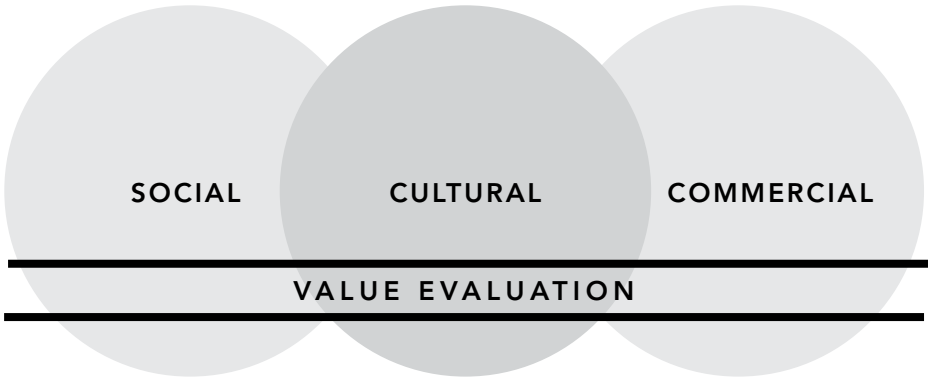
Figure 2. Values connect consumer preferences and the character of innovations (based on Jacobs 2007)



Jacobs (2007, 88) argues that consumer preferences and the characteristics of innovation are connected by values. He suggests that preferences belong to the demand side and are based on consumer values. New innovations, on the other hand, must meet consumers' preferences (i.e. values) in order to succeed (ibid.) (Fig. 2). A successful product must therefore connect with the personal values of the consumer. People want to purchase products that offer enriching experiences based on their personal values. This approach to value creation is partly subjective, but

value creation can also be approached through external ways: through social and cultural systems, global or local systems and so on. One approach to value creation is via the symbolic meanings of objects and products as they are evaluated in their social contexts. Accordingly value creation has a connection to existing social and cultural systems. Shove et al. (2007, 126) argue that value is "– – relative, contextual, situationally specific and therefore inherently unpredictable". The authors (ibid.) also emphasize that product value is evaluated in social, cultural and commercial contexts (Fig. 3).

Figure 3. A product's value evaluation contexts (based on Shove et al. 2007)



Bilton and Cumming (2010, 65–85) present ways to approach the value chain through strategic innovations, and they suggest that there are six degrees to improving the value chain. The first is value innovation (extending the chain) where the aim is to extend the value chain through new value innovation, i.e. creating something new to generate a new type of demand. It is also possible to add some new dimension, a new value into an existing valuable thing. The second approach is cost innovation (shortening the chain). This does not mean only lower prices, but it can also mean understanding deeper consumer considerations, what aspects are valuable to the consumer, and how much s/he is ready to pay for those elements. The third approach includes volume innovation (widening the chain), which in the field of textiles and clothing means mass-manufacturing in lower cost countries and sub-contracting manufacturing. Fourthly, market innovation (broadcasting

or recasting the chain) entails several different approaches and creative marketing systems, e.g. who pays and how the product is delivered. New customer insight can be used to enhance understanding of the meaning of the products and how consumers use the product. This approach actually includes the customer inside the value creation system. The fifth approach is boundary innovation (scattering or sharing the chain), which means innovations that might combine existing elements into services, e.g. networking production systems. Bilton and Cumming (2010) give an example from the clothing area, where a company offers the customer the role of co-designer, e.g. in customization. The customer here is also inside the value chain while actively adding value to the product through his/her own interventions. The authors argue that this active role in fact affects brand loyalty. The sixth approach, learning innovation (adapting the chain), also needs the active role of the customers as they interact with the product and the producer learns from that interaction. This learning can happen in the pre-market stage, after market stage or after market failure. (Bilton and Cumming 2010, 65–85.)

In summary, improving the value chain, according to Bilton and Cumming (2010), can be approached through the following strategies:

value innovation
cost innovation
volume innovation
market innovation
boundary innovation
learning innovation.

Brands have psychological power, and a well-known brand name has high market value. Jackson and Shaw (2009, 133) point out that too many discounted items on sale call into question the 'normal price' and consumers feel cheated. This phenomenon has led to a situation where especially fashion companies try to avoid discounting items too often or in too large quantities, and they rather destroy the extra production than sell it at a reduced price in order to safeguard their brand value and future value. Companies try to protect this psychological brand value also through limited edition styles of marketing where garments are made only in limited numbers, a strategy that also increases demand. (ibid.)

2.4.1 Value creators

DESIGNERS AND VALUE

Traditionally design's role can be seen as adding value; the quality of everyday life of consumers can be improved through design. This is a very optimistic statement, as the current Western design and industrial manufacturing system causes many environmental problems that do not improve people's quality of life. Adding value through design could mean, firstly, an increase in sales and profitability, secondly lower manufacturing costs, thirdly less complaints from the customer side and finally deeper customer satisfaction and more loyal customers (Jacobs 2007, 102).

Value opportunities in design are those elements that differentiate the product in competition. When a consumer's needs, wants and desires strongly affect the purchasing decision, there is an opportunity to use these consumer-centered elements to create a difference in design. The constant evaluation and change process in the postmodern consumer society is also transferred to the cultural meanings of products. McCracken (1990) argues that designers study this change process and gather these meanings into new products. Designers and producers use consumers' need for novelty and constant change when creating new temptations for consumers.

Designers can add sustainable value to a product. In this process the aim is to decrease the environmental load of fiber cultivation, manufacturing, logistics, the use phase and the product disposal stage. While the design process has a strong impact on the use phase of the product (the environmental load of the product's maintenance, the use time of the product, and the product's disposal), it is essential to evaluate all design details according to sustainability principles before manufacturing begins. Creating services to extend the product's enjoyable use time adds value to the product and its use. Through product-service system (PSS) thinking it is possible to extend the enjoyable use time of the product and accordingly add sustainable value by extending the product's life span.

Shove et al. (2007, 122) suggest that it would be useful for designers to consider whose values are considered in the design process or the final product and on what basis. They (ibid.) also demand a more normative basis of design and deeper understanding of how current design practices affect unsustainable consumption patterns. Products actually configure consumers' needs and use patterns, and hence design can be said to be "practice-oriented", which leads to certain everyday social practices and consumption habits (Shove et al. 2007, 134–136). This conclusion makes designers responsible also for the unsustainable consumption behavior of

consumers. Through this thinking it is possible during the design process to evaluate how each design decision may affect the consumer's consumption patterns, for example, how the material choice of the garment will affect the total environmental load of the use phase (such as polyester's likely laundry frequency).

Fry (2009, 192) suggests that designers can even destroy the value of the product by creating ever-changing trends and fashion that quickly outdate the products and render them valueless. Even though the product may offer positive experiences to the user (e.g. the pleasure of use), at the same time the product may destroy something valuable, such as a craft skill or local knowledge (Fry 2009, 12). This situation is easily identified in the current global industrial system, where the manufacturing location is far from the end markets and local manufacturing skills have diminished or disappeared.

Papanek (1995, 70) argues that "ethics are the philosophical basis for making choices about morals and values – –. To think dispassionately about what we design and why, and what the eventual consequences of our design intervention may be, is the basis of ethical thinking." When design is connected to a deep sense of environmental responsibility, new forms, aesthetics and style will be developed, resulting in design outcomes that fulfill people's real needs and not only short-term wants and that are timeless and age gracefully (ibid., 48, 235).

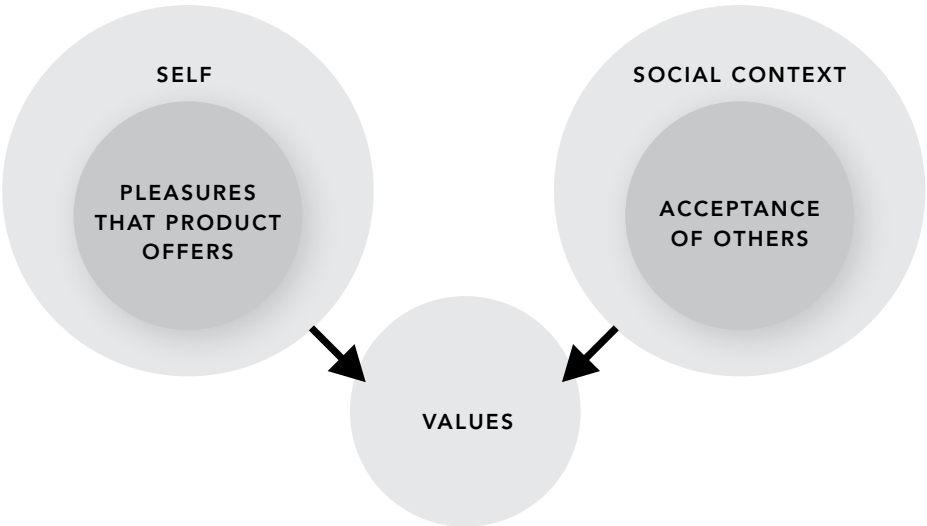
CONSUMERS AND VALUE

Price as exchange value is a simple way for consumers to evaluate a product. Although currently price is not connected to the quality of the product as obviously as previously, consumers still expect higher prices to mean higher quality. Producers play with cost and quality issues in order to arrive at the desirable end price of the product, one hopefully cheaper than competing companies' prices, and this has created a situation where quality can only be average or lower (Jackson & Shaw 2009). Jackson and Shaw (2009, 125) claim that consumers are no longer seeking the best quality; they are quite happy with lower prices if the product performs at the minimum level and manufacturing standard. However the authors (ibid.) also point out that price is forgotten shortly after purchase, while the quality of the product is something consumers remember long after. This value resulting from the experienced quality of the product is reflected as trust in the producer's brand name.

Michaelis (2001, 273) argues that it is essential to recognize which values consumers actualize in their consumption behavior and purchase decision and how

these everyday routines are connected to fundamental human needs and values. Consumption decisions are based on an individual's own personal morals and ethics (Michaelis 2001, 276). Holbrook (1999) divides values into extrinsic versus intrinsic values from the consumer point of view (cited by Jacobs 2007, 109). Extrinsic values are related to the utilitarian aspect of objects while intrinsic value is linked to consumption itself, the experience of pleasure during consumption. Moreover he divides values into the dimension of self-oriented versus other-oriented values. Self-oriented values refer to the pleasures the object provides to the user, and other-oriented values mean the acceptance of others that the user will gain through this object. This social acceptance is important e.g. in the context of clothing. (Fig. 4)

Figure 4. Value dimensions (based on Holbrook 1993)



HIERARCHICAL VALUE CREATORS

Peattie (2010, 252) argues that "– – developing an economy in which marketing can promote more sustainable consumption patterns will require a very different relationship between companies and customers." In a sustainable economy producers and customers begin to be partners "in the co-production and maintenance of value within a production and consumption system, which – – is materially ef-

ficient and largely a closed loop[13]." (ibid.) Not only designers, manufacturers and consumers themselves create value in a product or its use. The value creation system includes hierarchical and external value creators, which can influence value creation through their power of expertise, pre-selection or because of public authority procedures.

Experts and media

In a value creation system the media has an important role (Jacobs 2007, 118–119). Women's magazines and advertisements emphasizing new trends in fashion have a strong impact on the clothing and brand valuation process among some consumers. Pop stars become role models, idols whose appearance followers try to imitate. Product placement in movies generates a positive image of the product and further desires among consumers. The media can be seen as an expert who leads or co-determines consumers' evaluation or draws consumers' attention to certain attributes in their valuation process. In this case we can talk about expert influence when the consumer himself/herself makes the final purchase decision: the moment at which the valuation process has resulted in monetary exchange value. Opinion leaders can try to influence people; at the same time consumers select their own opinion leaders themselves. (ibid.)

Pre-selectors

Buyers in the retail industry have the power to select those products that will be available for consumers. Through this selection process buyers influence consumption patterns (Michaelis 2001, 276). Some researchers argue (e.g. Joergens 2006) that consumers do not actually have a real opportunity to choose environmentally or ethically better textiles and clothing, because almost all textiles are produced in cheap Asian countries in an unsustainable way. As long as prices are not comparable in ethical clothing, and the design and appearance of eco-clothing are considered unfashionable, eco-clothing is not a real option for consumers (ibid.).

Public policymakers

Public authorities contribute to value creation via regulations, legislation and taxes. Public policy is always based on certain values, which very often are not well communicated to consumers. Green taxation is a good example of how environmental-

13 closed ecological system

ist values can be implemented. Increasing green taxation and other public authorities' controlling measures is the best way to make an essential change in the current economic system. However this kind of public policy procedure is complicated to implement in a global and open economy. Paehike (2000) describes how shifting taxes from income tax and property ownership to energy, material use, land use and waste disposal would make an effective difference in environmental issues. He argues that this would help integrate environmental and economic values. Accordingly companies that lead in green development could make breakthroughs in profitability and moreover improve environmental protection. (ibid.)

Munasinghe (2010) proposes that producers study the entire value chain, from raw materials and product manufacturing stages to product use and further product disposal, to redefine the product value in a completely new way, on economic, social and environmental grounds. It is possible to drive this change in the value chain process through public authority procedures and legislation (e.g. green taxation), which would also enable change in the pricing system.

2.4.2 Adherent beauty, green aesthetics

As Walker (2009) argues, we have to evaluate the product as a whole and go beyond appearance, considering the production, materials, use and after-use, as well as the product's meanings and contribution to sustainable development. Berleant and Carlson (2007, 207) claim that the strict meaning of beauty and aesthetic judgment implies "– – a thorough background check and consider[ation of the object's] projected consequences." This type of new value evaluation in the context of sustainable design necessitates more environmental information on the products as well as new aesthetic concepts.

Moore (2008, 239) argues that "[i]t is a sign of maturity in general – moral, political, and social no less than aesthetics – that feelings and thought stratify." He also suggests that responsibility helps us to develop a mature appreciation for our normative response in aesthetics. Moore describes the order of responses to natural beauty. The first response is an immediate pleased reaction, where the sensory element is dominant. The second-order response is reflective awareness, which needs a cognitive reaction and series of reframing and reflective inquiries. At the third level the pleasure felt moves into commitment (evidentiary consideration), and the fourth level entails an analogical extension, according to Moore. He suggests that at this fourth level aesthetic values can connect with other values. (ibid.)

Sircello (1975, 79) writes about the goodness that beautiful objects may possess. Goodness means that something is beneficial to or for something. Accordingly, we can interpret that green aesthetics is something that is good and beneficial for the environment and sustainable development. Sircello also states based on Immanuel Kant that beauty can be free or dependent, adherent, and he points out that up until the time of writing (the 1970s) philosophers had not been interested in adherent beauty. Environmental problems have changed this situation, and the discipline of environmental aesthetics has been developing since the 1970s. The concept of green aesthetics has thereby emerged on this basis.

In environmental aesthetics, the visual and other sensory systems are not the only dimensions and actors in the aesthetic experience. In environmental aesthetics a deep dive into ecological values has to be made. Berleant suggest (2002, 16) that "aesthetic value may provide a foundation of intrinsic value for the ethical values in the environment." He also argues that aesthetic values are one dimension that ought to be safeguarded and appreciated in environmental ethics. The relationship between ethics and aesthetics in environmental aesthetics as well as in green aesthetics is fundamental. Environmental values penetrate the aesthetic evaluation when an observer is making an environmental aesthetic judgment. The object under evaluation also includes moral values, where the observer reflects upon the aesthetic evaluation against ecological values. Kotkavirta (2003, 97) argues that "– – the aesthetic and the ethical are different but connected with each other." He also maintains that all that is aesthetically valued is not at the same time ethically appreciated. And the reverse is true: all that is ethically interesting does not necessarily embody aesthetic attributes. There is therefore not only the aesthetic aspect but also a moral-aesthetic argumentation in green aesthetics, which merges moral values and aesthetic sensitivity.

Jordan (1999) believes that personal ideologies, such as environmental concerns, affect the aesthetic appreciation of products. As the saying goes, beauty is in the eye of the beholder, but the eye notices what it has been taught to behold. Saito (2007) asks if it is possible to redirect aesthetic preferences towards better environmental solutions; that is, through education aesthetic taste can be directed to appreciate environmental values. The 'thick meaning' in aesthetic evaluation can include a deeper evaluation entailing quality as well as morality (Hosper 1946). Hence 'thick' aesthetics include life values supporting sustainable development. Saito argues that "– – a new aesthetic sensibility should be cultivated to educate us about the consequences of our aesthetic preferences" (2007, 78). Brady (2002)

argues that when feeding new knowledge into an aesthetic experience, it is possible to rethink and re-evaluate aesthetic qualities. "Knowledge supports in some significant way the aesthetic qualities we discover and engage with" (Brady 2002, 120). Walker (2009) argues that knowledge about an artifact affects the way observers and users see, experience and respond to the object. On this basis green aesthetics can be considered a normative way to evaluate design objects by combining aesthetic values with environmental values, and the aim, while doing so, is to promote sustainable futures (Saito 2007, 80).

In green aesthetics regarding artifacts environmental information is needed to transform a negative aesthetic response into a positive response (Saito 2007, 82). Nonetheless the need for a visually beautiful appearance is the most important factor in the field of clothing and textiles. Eco-clothes have to fulfill the customer's concept of beauty in order to be considered attractive. Hence eco-clothing has to be attractive, a good fit, and visually pleasant also when it is designed and manufactured according to sustainable principles. In sustainable development the best way to promote sustainable futures is to consume less. Hence the best way to encourage sustainable development involves recycling more, using clothes until they are completely worn out, and avoiding excessive water washing and ironing. This kind of sustainable scenario for clothes that are old, torn and patched up, dirty and wrinkled, would in practice correspond to environmental values but most certainly do not fulfill our need for beauty or social norms in appropriateness. Hence green and at the same time anti-aesthetic, ugly fashion is not possible. Saito argues (2007, 85) that " – – green aesthetics regarding artifacts has an additional mission: to render initially attractive objects not so aesthetically positive if they are environmentally harmful."

Dewey (2005) states that we can explore changes in our valuing observation when a beautiful, aesthetic object is exposed to be something other than what we believed it to be. Accordingly it is possible to evaluate for example fast fashion with a large environmental load to be unaesthetic. In the area of sustainable design designers as well as consumers have a duty to concentrate on educating their aesthetic preferences towards adherent beauty that promotes environmentalist values.

2.4.3 Use value

Use value can be approached by addressing the "price over time" connection. A high price should connect to the product's longevity. The use phase of the product

may incur costs (e.g. the frequent chemical cleaning of garments or frequent laundering) and high environmental impact, or environmental costs. Moreover a very short product life span might cause dissatisfaction among consumers and high environmental impact. Consumers evaluate the life span of a product and the time s/he is going to use the product against her/his individual value base. According to this evaluation a suitable balance between price and life span should be sought, and this evaluation results in the product's use value.

If manufacturers change their focus from exchange value to use value, they could improve the product's intrinsic quality and hence offer a longer satisfying use experience for the users, thereby extending the utilization of the product (Mont 2008). Park and Tahara (2008) also argue that product value has to be defined in the actual use phase. Accordingly the life span of the product has to be connected more profoundly to the product's value. Furthermore recognizing the value of use and offering value-adding services change traditional business thinking. On this basis manufacturers could create a new service-oriented economy, a functional economy, where utilization, function and services are at the center, rather than traditional industrial manufacturing (Mont 2008). As Mont (2008) explains, a product-service system is a model that satisfies consumers' needs in a more sustainable way than traditional business models; accordingly the PSS approach can create emotional value through deeper use satisfaction.

If there is a stronger focus on the use value of products, changing from an industrial system to a functional system creates novel opportunities to develop solutions that provide, according to Mont (2008), a certain quality of life for consumers through a new kind of value creation. Na, Wu and Xing (2009) propose this to mean lifestyle value, centering on the consumer's satisfaction on the level of psychological wants and emotional desires. This new focus in value creation aims not only at satisfactory utilization and an enjoyable use experience with the product, but also the goal is to embed environmental values in the product (ibid.).

2.4.4 Emotional value

Walker and Chaplin (1997) identify the following values in artifacts: monetary or exchange value, use value (practical functions), artistic value (aesthetic quality), and personal or sentimental value (emotional). The authors claim that it is extremely difficult to sustain the value of a product in a temporary context (ibid.). As time passes and the product ages, its use value and monetary value in most cases fade.

Some products' aesthetic value may last if the product is not too fashionable and it ages in an aesthetically pleasing way. Moreover personal memories can increase the emotional value of the product.

In the "experience society" emotions play an important role in seeking value opportunities in new products: new products should offer emotional experiences to the user. When the objective is to extend a product's life span, a positive emotional response in person-product relationships is most significant. The user's positive emotions towards a product offer possibilities to create commitment and bonding to this product, which will be cherished and taken good care of. Accordingly emotions play an important role, not only in consumption but also in the commitment process.

An increased sense of responsibility towards some products is connected to product attachment. Consumers value a product if they can experience enjoyment with it, the product offers interpersonal ties, it becomes linked to the construction of their identity, or it is connected to some special person or memory. These kinds of positive and emotional connections between an object and the user embed deep emotional value into this product or its use, resulting in attachment. (e.g. Koskinen & Battarbee 2003; Mugge 2007.)

Psychological value is not easy to measure in financial terms (Jackson and Shaw 2009, 133). Psychological value refers to the brand value for the consumer: e.g. the status consumers acquire by wearing some brand in social situations (ibid.). Alternatively psychological value can refer to the satisfaction a consumer experiences with a product, e.g. through the quality experienced during use.

2.4.5 Environmental value

Paehike (2000) has listed the core values in environmentalism: firstly, the protection of biodiversity and ecological systems; secondly, consideration of negative impacts on human health; and finally the sustainable use of resources. Moreover he argues that these values are not sufficient, and we must challenge our whole way of living: how we organize our societies and how we live our lives, including new challenges in purchasing patterns and disposal behavior. (ibid.)

Leiserowitz, Kates and Parris (2006) argue that the most important value in sustainable development is environmental protection. This is a very broad concept and includes many different values and approaches. Moreover in sustainable development there are three key 'stakeholders': people, the economy and society, whose

sustainable development also needs to be taken care of in the quest to achieve a sustainable balance in the system. In this process values such as equality, freedom, and democracy are most important. According to Leiserowitz et al. (2006) people's behavior, actions and decisions are based on underlying values and attitudes (conscious or unconscious), which may promote environmentalism.

Jordan (1999, 211) argues that one pleasure artifacts can provide is ideo-pleasure, which is linked to the user's values such as environmental awareness and appreciation of aesthetics. He gives an example of a product made of biodegradable material, which can be seen to embody the value of environmental responsibility. This aspect is obviously important to only those consumers who respect environmental values. Ideo-pleasure is related to the earlier discussed adherent beauty and the way we value aesthetic aspects and environmental values in products. The social and environmental impacts of products can be evaluated to add consumer value to the product. In other words, if consumers prefer a product that benefits the environment, this characteristic adds value to the product from the consumer's viewpoint. The environmental aspect can differentiate the product from competing ones, and this can be understood as a value opportunity.

2.4.6 Future-oriented value

In the quest for radical system-wide changes in existing value systems, Möller (2006) proposes a new approach, future-oriented value. He suggests that the traditional way to approach the creation of new value activities needs to change (ibid.). The new green economy needs a new kind of value base in designing, manufacturing, business, and consumption. The transition towards sustainability needs a focus change from quantity of goods to the quality of human knowledge, creativity and self-realization as measures of development, and furthermore quality of life, human solidarity and ecological sensibility should guide the transition process.

Walker (2007a, 70) argues that in the context of sustainable development it is possible to add ideological value to objects. This means that through environmental values we can assess products in a completely new way. Through this lens it is possible to value e.g. redesigned objects according to their environmental value. Accordingly eco-materials, leftover materials, recycled products and parts, and a 'classical' appearance can be evaluated with the goal of increasing the environmental and sustainable value of the product. Moreover renting, leasing and other actions aiming to dematerialize consumption can be seen as sustainable value actions.

This approach comes close to the earlier described adherent beauty concept, and all these elements can be seen to add future-oriented and sustainable value to the product or its use. Rethinking material culture and how we as designers create material culture and its meanings for consumers offer opportunities to effect positive change. Current patterns of designing stimulate consumerism and disposable products (Walker 2007b, 51). As Walker (2007b, 51) highlights, "it is only by attempting to make our material culture meaningful that we can hope to contribute to a sustainable future."

The future-oriented value approach requires an extension of the time horizon in our evaluation process (Paehike 2000). Focusing on the future in sustainable development renders the evaluation criteria, for example in products or consumption patterns, as quite different. A future-oriented approach guides designers and manufacturers towards far-sighted products, which means designers also have to take into account the environmental load of the product, its manufacturing and use, during the whole life cycle of the product. This approach therefore adds environmental value to the product. Fry (2009, 211) argues that design shapes the future alongside technology and science. According to Fry "– – every design decision is future decisive" (ibid, 211). Every designed object transforms us: our knowledge, habits and practices as well as our emotions and well-being (ibid.). Understood in this way sustainable design is a redirective practice (ibid, 53), which aims for sustainable practices in consumption (Fig. 5). Paehike (2000) proposes that in the

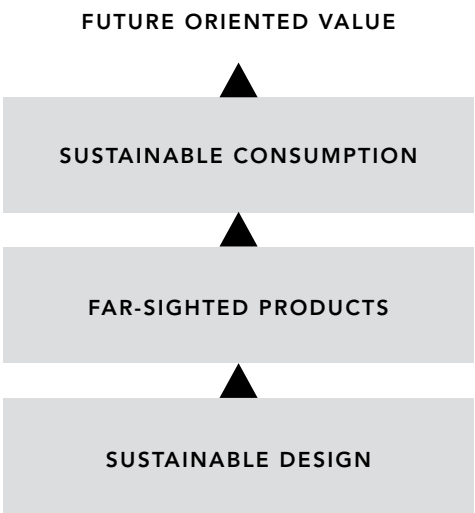


Figure 5. Future-oriented Sustainable Design.

transformation of industrial societies environmental values could be taken more seriously, and this new focus in values could lead to better public policy that supports a sustainable transformation process. Therefore a fundamental discussion on values is the basis of the transformation process in building sustainable societies.

2.4.7 New value evaluation

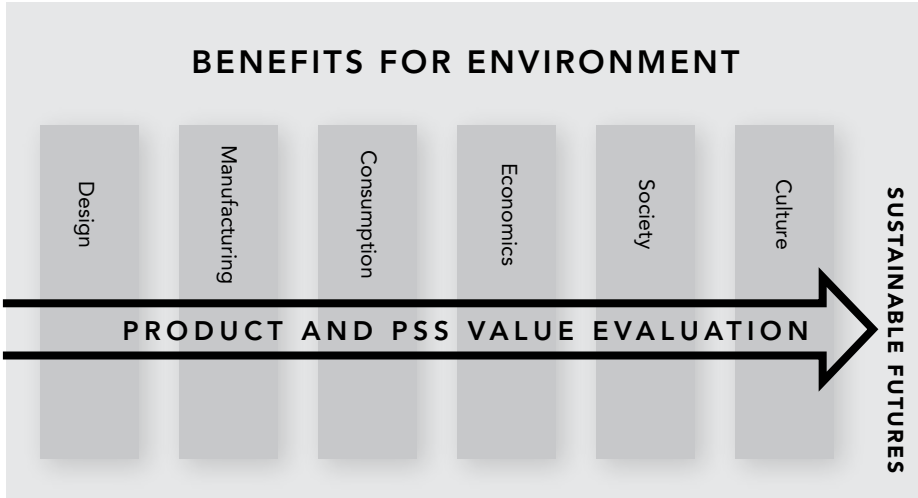
Values are relativistic, meaning that an 'objective' or 'true value' does not exist. Traditionally evaluation of value has been directed to where the value is seen to reside. Value can exist simultaneously in the object itself or within people. Intrinsic values are object-based characteristics which are valued, as opposed to extrinsic value, which may relate to the use situation and its social meanings. (Frondizi 1971.) Subject-based values include use value and utilitarian value (Woodall 2003). As Smith (1987, cited by Woodall 2003) argues context defines how value is evaluated, and therefore the environmental, social and cultural context mediates this value evaluation. Moreover the value evaluation process is influenced by an individual consumer's own values as well as utilitarian and economic aspects.

In the context of sustainable development, the concept of future-oriented value needs to be newly defined in the process of value creation, necessitating expanding the definitions of value creation in different disciplines that were presented earlier. Locking this study to one theoretical aspect alone would not create new knowledge on value creation in the context of future-oriented sustainable design, even if the threat exists that value definition would become obscured in this expanded knowledge. A new, expanded understanding of value creation can be seen as the base for new knowledge on how value in sustainable design can be understood. Through this understanding sustainable design includes values that are technical and design-solution-oriented; in addition they are relativistic and exist in the person-product relationship. Future-oriented sustainable value is created in the design and production phases, value that leads to sustainable consumption. Production and design systems are based on existing values in our society; it is in the purchase and use phases where sustainable value is relevant. Consumers' behavior during these phases is grounded in their own ethical, environmental and sustainable value-base.

To conclude this theoretical section, the value evaluation contexts by Shove et al. (2007) presented earlier (in section 2.4) have been expanded to better correspond with this new understanding of future-oriented value. Figure 6 presents a proc-

ess for future-oriented value evaluation, which includes a conjoint appreciation of environment, society, economy, and people and which adds to the aforementioned philosophical and ethical perspectives. This new understanding of value opens novel views on how product design can contribute to sustainable futures.

Figure 6. New product and PSS value evaluation, which recognizes future-oriented sustainable value.



3. Objectives and scope of the study

This doctoral thesis studies the meanings of consumption in postmodern society and person-product relationships in the context of sustainable textile and clothing design. Specifically, the person-product relationships in the context of sustainable development are examined with the goal of expanding perspectives on eco-design and sustainable design from a merely technological point of view to a more holistic understanding of consumption and consumers' behavior. A conceptual attempt is then made to integrate this novel knowledge of person-product relationships into the design field and further in new value creation. This study therefore aims to provide insights from the consumers' point of view that could be used in the design process and in the discussion on the transformation process in SCP balance. In other words this study reflects novel consumer-centered empirical knowledge onto the design field in the aim to find new ways to implement sustainable design that better promote sustainable consumption, and it opens up the discussion on new value creation in the context of sustainable change.

The following questions are addressed in this thesis. First, as the main interest has been in person-product relationships, one key question asks what attachment and satisfaction attributes enable the long-term use of products. Secondly, particular attention is paid to the relevance of the findings to design: how to use these findings in the design field in order to extend the life span of the product. Thirdly, the thesis widens the final discussion by exploring what form of new value creation can enable change towards sustainability.

The research questions in the articles are the following:

- Publication I
  What are consumers' attitudes to environmental issues in the textile and clothing field?

- Publication II
  What is the meaning of consumption in postmodern society?
  How does a consumer's ideological commitment affect the meaning of clothing?

- Publication III
  What are the important elements related to attachment to home textiles?
  How can meaningful uniqueness be provided through design?

- Publication IV
  What attributes enable person-product attachment to emerge in the field of clothing, and what is the attachment process?

- Publication V
  What attributes and processes result in long-term use and satisfaction in the clothing area? How can sustainable consumer satisfaction be provided through a PSS approach?

- Publication VI
  How can empathic design improve sustainable design in the aim to prolong products' life spans?

- Publication VII
  How can new balance in SCP be achieved in the area of textiles and clothing?
  What form can new value creation take in the context of radical change and sustainable development?

3.1 Research design

This section presents the research design used in this study. It begins by presenting the research strategy and methods, the empirical data collected, and the analysis methods. The chapter ends with a description of the research process, as well as the articles' positions and their connections to each other.

3.1.1 Research strategy

In this dissertation the complex phenomena under study, consumption and its connection to design, are theoretically grounded in different theories, and hence the articles frame the phenomena from different perspectives respectively. The study comprises theoretical perspectives in a strategy of triangulation. Triangulation can also be termed a mixed method approach, which offers alternative ways to enter the complex problem being studied (Teddlie & Tashakkori 2009). A mixed method approach can be directed at "- - exploring the attributes of a phenomena or the possible relationships between variables", and therefore it can be defined to be descriptive research (ibid, 23).

From the beginning of this research journey the whole research setting was not fixed. The researcher has taken the role of 'detective', following hints and tracks to solve the problems one by one (Alasuutari 1989). New information has thus led to new tracks and even new paths. The different approaches and views have been used to understand the complex phenomena of consumption and its connection to current design systems. The researcher has taken an active role in following the tracks, in order to make progress, to change the direction at times (ibid.).

The research journey begins with the aim to understand the consumer and consumption in the textile and clothing field. To this purpose the first data were collected. An internet questionnaire was selected in order to reach many respondents and for the researcher to take an objective position. Another possibility would have been to collect the data using deep interviews. This first round also explores consumers' attitudes and future wishes concerning environmental and ethical issues in the textile and clothing field. This first dive into the consumers' world produced preliminary knowledge on the complex phenomena of consumption.

The first questionnaire included also two open questions, one addressing the consumers' attachments to home textiles and the other to clothing. The respondents' answers provide rich narratives, which opened another type of view on con-

sumption to the researcher. This illuminated the way to the issue of meaningful person-product relationships. After analyzing these responses and writing two papers about them (Publications III and IV), the researcher still wondered how to use this knowledge in the design field. Meaningful person-product attachments are very personal and often connected to an individual's own experiences, memories and history; these aspects are not easy to embed in design. One piece of the puzzle was still missing.

To acquire knowledge about the long-term use of textiles and clothing two new data sets were collected. In these questionnaires stories about the long-term and short-term use of textiles and clothing were also gathered. This information pointed towards the attributes that enable consumers to feel satisfaction, and one paper was thereby written about sustainable consumer satisfaction (Publication V).

A wide approach using differing theoretical perspectives on the research area enables a deeper understanding of complex phenomena such as consumption and its connection to the meanings of things as well as how consumption patterns correlate to current industrial systems. This breadth as such provides rich content on the case being studied, and it enables new perspectives and novel research knowledge to emerge. This research aims for descriptions and understanding of consumption in a social world and consumers' person-product relationships. The complex phenomena under study needs mixed methods to succeed (Denzin and Lincoln 2005).

Throughout this study the empirical findings are intertwined with theory: conclusions are drawn using both empirical and theoretical viewpoints in turn (Anttila 2006, 282). Empirical data have formed the basis for a description of reality, and they have worked as a catalyst in the process of constructing a theoretical discussion (Anttila 2006, 285). In the study a quantitative, descriptive and interpretative research approach has been used (Alkula, Pöntinen & Ylöstalo 2002, 188), and this strategy can also be described as mixed methods research (Workman & Freeburg 2009, 43) or methodological triangulation (e.g. Hirsjärvi, Remes & Sajavaara 2009, 228), as suggested above. Workman and Freeburg (2009, 44) conclude that using a mixed methods research strategy in the study of clothing and sociology advances the discipline. Empirical findings from consumer insights have formed the basis for a theoretical discussion on design strategies in the context of sustainable development. To construct these discussions, an interpretative approach has been used. In doing so several design strategies that enable long-term use of textiles and clothing have been identified. Moreover consumers' interest in these design

strategies has been evaluated.

The study involves both intrinsic and instrumental interest. Intrinsic interest helps the researcher to acquire deep insight into a well-framed area, and the knowledge produced in this process forms the basis for further theoretical discussion towards instrumental interest (Stake 2005, 445). In the study the intrinsic interest has been in person-product relationships, attachment and satisfaction attributes that enable long-term use of products. The instrumental interest has been in the question of how to use this consumer knowledge in sustainable design strategies. Moreover each of the author's publications discusses values, and in the final paper new value creation in the context of sustainable development is discussed. Therefore new value creation in the context of sustainable development can be defined as the other instrumental interest of this study.

3.1.2 Methods of data collection

This study uses empirical data gathered in three consumer questionnaires. All these surveys were online questionnaires conducted using the Webropol program. In research based on a survey technique the aim is to describe the opinions, attitudes and insights of a large group of respondents; the goal is therefore to place the respondents in the same comparable and measurable situation through offering understandable and fixed questions. (Tuomi & Sarajärvi 2009).

Questionnaire A was conducted in April 2009. The link to the questionnaire was disseminated among design students at Helsinki Metropolia University of Applied Sciences and the University of Lapland. Furthermore the link was available to staff at the University of Art and Design Helsinki and on the following websites: Fashion Finland, Eettinen Kuluttaja (Ethical Consumer), Vihreät Vaatteet (Green Clothes), and Kierrätystehdas (Recycling Factory). A total of 246 respondents participated in this questionnaire. The vast majority, 91.8 %, of the respondents were women and 8.2% were men. The majority of respondents were fairly young: 38.4 % being 18 to 25 years old, and 41.6% between 26 to 35 years old. It can be concluded that the young female standpoint dominates the responses in this data. However this is quite understandable when asking consumers' opinions in textiles and clothing, an area that interests women more than men. Young women are also the largest consumer group in the area of fashion.

The content of questionnaire A mapped out consumers' attitudes and wishes concerning ethical consumption, ethicality, safety and environmental issues in

the textile and clothing field, environmental information on textiles and clothing, readiness to pay more for ethical products, and wishes regarding future products. Furthermore the questionnaire included a section where consumers expressed readiness to change their own consumption behavior. Respondents also had the opportunity to describe the elements behind products they felt attached to in open questions. (Appendix 1)

Structural and open questions were used to gather knowledge from the consumer perspective in the context of sustainable textile and clothing design. The questionnaire was tested in a small pilot before implementation. The first part of Questionnaire A mapped respondents' demographic and background factors and the second part the attitudes toward ethical consumption. These questions worked as a basis for different types of distributions, dividing the respondents according to gender or age. Furthermore the respondents could be divided into qualitative categories according to their ethical interest (Tuomi & Sarajärvi 2009, 75).

The third section of Questionnaire A mapped out consumers' opinions on current sustainable textile and clothing offerings. It also indicated attributes that affect the purchase decision in the field of sustainable textiles and clothing as well as barriers to ethical consumption (in all eight questions). These attitudes were scored by using a five-point Likert scale. One multiple choice question (question 15) addressed the best information sources for a product's ethicality, and the consumer's own eco-actions during the stage of textile and clothing maintenance were mapped in three questions (questions 20-22).

The fourth section in Questionnaire A studied the respondents' attitudes and wishes about future sustainable and ethical production and design. These attitudes were addressed in 20 questions (16 questions as five-point Likert scales and four questions as multiple choice). The aim of this section was to identify those opportunities that could be used in sustainable design.

The fifth section mapped out the meaning of textiles and clothing through three structured questions based on Kaiser (1990), constructed as Likert scale, and two open questions. The attachment to textiles and clothing was explored through one structured question and two open questions. The goal of this section was to find attachment attributes in person-product relationships.

The five-point Likert scale included a "do not know" option in the middle, allowing those respondents without a clear opinion to also complete the questionnaire. The smallest number in the scale (or the square on the left) indicated a "Totally disagree" response and the largest number (or the square on the right)

"Totally agree". In a Likert scale all answers are equally relevant. The Likert scale was used in statement-type questions. Multiple choice questions were used in those areas where the aim was to find dimensions or attributes affecting the phenomena under study, e.g. consumers' purchase decisions. Open questions were used to allow respondents to answer in their own words and to gather more open and deeper descriptions, e.g. regarding the dimensions of person-product attachments and product satisfaction. Open questions produce wide and rich data, which needs time-consuming content analysis to yield findings. (Tuomi & Sarajärvi 2009; Hirsjärvi et al. 2009; Teddlie & Tashakkori 2009.)

The second data collection was conducted in March 2010. This questionnaire B was based on a 'snowball sampling' method with 204 respondents. The link to the questionnaire was randomly sent to about 30 people who were then asked to further disseminate the link to their acquaintances. The aim was to reach different consumers from the first questionnaire. As there was a preconception that the first data mainly concerned young, ethically interested female respondents, the second survey also targeted male respondents and respondents without ethical interest. In this second data set most of the respondents belonged to the age group under 35 years old (29.4% were 18–25 years old and 48.5% were 26–35 years old), and 70.4 % of the respondents were women.

Questionnaire C, in March 2010, was a random sample (simple random sample) sent to 500 respondents selected to represent the Finnish population: female and male respondents, different age groups between 18 to 64 years old, and geographically from all of Finland (VTJ poiminta, Väestörekisterikeskus, i.e. a selection from the population register system, Population Register Centre). This simple random sample is based on the statistical probability that each inhabitant can be equally selected to be a respondent (Jackson & Shaw 2009, 38). For this questionnaire 137 answers were returned, a reply rate of 27%. Despite the low reply rate for questionnaire C, the respondents represented rather equally male (42.9%) and female (57.1%). Furthermore the respondents represented rather equally different age categories: 17.8% were 18–25 years old, 21.5% 26–35 years old, 20.7% 36–45 years old, 25.2% 46–55 years old, and 14.8% 56–64 years old. However this questionnaire did not reach all male respondents. In addition there was not equal representation from respondents from the southern part of Finland.

Table 2 presents the respondents of questionnaires A, B and C and Finnish population statistics (Suomen virallinen tilasto (SVT): Väestön koulutusrakenne; Suomen virallinen tilasto (SVT): Väestörakenne).

Table 2. Data A, B and C.

		QA [%]	QB [%]	QC [%]	FINNISH POPULATION
GENDER	FEMALE	91.8	70.4	57.1	50.9
	MALE	8.2	29.6	42.9	49.1
AGE	18–24	38.4	29.4	17.8	12.3*
	25–34	41.6	48.5	21.5	12.7
	35–44	7.8	13.2	20.7	12.3
	45–54	10.2	7.4	25.2	14
	55–64	2	1.5	14.8	14.6
EDUCATION	Elementary school	1.6	0.5	10.4	33.8
	Secondary school graduate	31.1	23.3	19.3	
	Vocational school	11.4	4.5	32.6	38.9
	Bachelor's degree	26.4	16.8	17	27.3
	Master's degree or Doctoral degree	30.5	54.9	20.7	
OCCUPATIONAL STATUS	Students	40.4			
	Civil servants	29			
	Working class	6.5			
	Unemployed	4.5			
	Entrepreneur	1.6			
	Managerial position	1.6			
	Agriculture	0.4			
	Student, teacher or professional in textiles	11.4			
	Student, teacher or professional in other design area	4.5			
PROVINCE OF RESIDENCE	South Finland	72.1		38.8	50
	West Finland	11.1		36.6	25.3
	East Finland	4.9		12.6	12.1
	North Finland	11.9		12	12
INTEREST IN ETHICAL CONSUMPTION AND PRODUCT'S ENVIRONMENTAL IMPACTS	Totally disagree	4.1	2	1.5	
	Somewhat disagree	3.2	2.9	9.6	
	Can't say	1.2	2	8.1	
	Somewhat agree	28.3	36.3	55.1	
	Totally agree	62.7	56.9	25.7	
OWN ACTIVITY IN ETHICAL CONSUMPTION BEHAVIOR	Totally disagree	2.4	2.9	4.4	
	Somewhat disagree	14.7	12.3	16.2	
	Can't say	4.9	3.4	7.4	
	Somewhat agree	57.1	62.7	66.2	
	Totally agree	20.8	18.6	5.9	

*This rate is the Finnish population between 15–24 years old

Questionnaires B and C had the same content, and they included structured and open questions about environmental issues in the textile and clothing industry (Appendices 2 and 3). In addition they mapped consumers' interests and worries in this field. The questionnaires included questions about consumers' textile and clothing purchasing, satisfaction and dissatisfaction elements in textiles and clothing, consumers' interest in different design strategies, and the duration of product use and what affects how long textiles and clothing are used.

The first part of Questionnaires B and C mapped respondents' background factors (in B four questions and in C five questions) and the second part the attitudes toward ethical consumption (three questions). In addition Questionnaire C addressed the barriers to ethical consumption through two questions (one structured question based on a Likert scale and one open question). The third part of these questionnaires concentrated on the purchasing decision (three multiple choice questions) and satisfaction and dissatisfaction issues in clothing purchasing (two multiple choice questions). Furthermore one multiple choice question addressed consumers' concerns about the environmental impacts of textiles and clothing.

The next part of the questionnaires examined the use phase of textiles and clothing through two structured questions (multiple choice) and two open questions. The aim of this part was to investigate the temporal dimensions of the use of textiles and clothing and to identify attributes that affect the use time of textiles and clothing. The fifth part of the questionnaires mapped out new production, design and service opportunities in the field of sustainable textiles and clothing and consumers' readiness to accept these strategies (on a five-point Likert scale). One question (five-point Likert scale) addressed consumers' own readiness to change their behavior towards more ethical consumption patterns. Seven multiple choice questions investigated the attributes that affect the long-term use of textiles and clothing. Questionnaire B was tested in a small pilot enquiry before the questionnaires were implemented.

The data has been used in the author's articles as illustrated in Table 3.

Table 3. Data used in articles.

Publication	QA	QB	QC
I	x		
II	x		
III*	x		
IV	x		
V		x	
VI	x	x	
VII		x	x

*In addition to the questionnaire the data included interviews with two specialists.

3.1.3 Methods for analysis

Computer-assisted methods of lower-level statistical analyses (Denzin & Lincoln 2005) have been used to produce knowledge on consumers' attitudes, wishes, values and person-product relationships. Triangulation, using data collected with different methods and analyzing them from different perspectives, gives a rich picture of the focus area. Quantitative methods alone result in a rather limited viewpoint of an issue, but the aim of this study is to produce a rich description of the phenomena (Alasuutari 1989, 59). Accordingly both quantitative and qualitative methods have been used to generate richer and deeper knowledge. Generally when combining quantitative and qualitative methods, firstly quantitative data, which is collected e.g. with questionnaires, is analyzed to construct the frame or the foundation of the study. Secondly the research is deepened through qualitative methods. (Eskola & Suoranta 2008, 73)

When analyzing the responses to the questionnaire, in some papers a division has been made according to the main effects: gender, age or respondents' environmental interest and readiness to actualize their environmental values during textile and clothing purchasing. Respondents' environmental attitudes have been compared regarding issues such as identity construction, the meanings of clothing and textiles, the meanings of uniqueness, and consumers' interest in various design strategies. Similarly a division has been made according to respondents' age or gender, and these different subgroups have then been examined through cross tabulation (e.g. Alkula et. al 2002, 189). This knowledge from analyses has been used to construct the theoretical discussion and provide answers to each research question.

Respondents' open answers were analyzed using content analysis, where the aim was to understand the inherent categories and construct themes (Silverman 1999) in product satisfaction (article V) and product attachment (articles III and IV). In the analysis of respondents' open answers, firstly the answers were coded to find incidences, and the groups and further themes were then constructed on the basis of the coding (Tuomi & Sarajärvi 2009, 93).

Open questions were used to allow respondents to answer in their own words. For example the respondents were asked in an open question about the oldest clothes they possessed and the reasons why they have kept them. Incidences could be calculated through analysis, first by simply reading through answers several times and then by coding key words in each answer. Themes and categories for product attachment could be then constructed. In this case the product attachment categories were as follows (the highest incidence being number one):

1. connection to memories which are linked to some person or family
2. quality
3. style
4. beauty
5. durable materials and product's pleasant aging process
6. emotional values
7. individual and small-scale manufacturing process
8. color
9. good maintenance, reparability, modification possibility.

Based on this categorization the analysis was directed to identifying those attributes that are relevant for a designer in the context of sustainable design. Furthermore interpretations were drawn regarding which design strategies best correspond to these attachment attributes.

The novel consumer-centered knowledge on person-product attachments and satisfaction attributes was then transferred to the design field to produce a theoretical discussion about designers' field of work, empathic design, design strategies and new value creation in the context of sustainable development. The empirical data have thereby had the role of being a catalyst in the process of constructing a theoretical discussion (Anttila 2006) and the grounds for theoretical interpretations (Eskola & Suoranta 2008, 145).

3.2 Research process

This section describes the flow of logic constructed by the author's articles. Firstly, as the background for the study the meanings of consumption in postmodern society are described. The research process begins with the intention to understand more deeply consumers and consumption. Hence the two first papers take a rather wide approach to consumers' attitudes, values, environmental worries and future wishes. These two papers open up the views on the consumers' world and consumption, but they do not indicate any obvious ways this knowledge can be used in the design field. Nonetheless these two papers, and as mentioned the first data set, revealed that the most significant problems lie in the clothing field and especially the attitude-behavior gap that is most obvious in the fashion field. Consequently most of the author's papers cover the field of fashion and clothing.

The research focus then narrows to study attachment attributes and the satisfac-

tion process from the consumer viewpoint and by using empirical data. Specifically, person-product relationships in the context of sustainable development are examined, with special interest in person-product attachment, the attachment process (i.e. how people form attachments to products), and product satisfaction issues. This new focus on person-product attachments was an attempt to understand more deeply what kinds of textiles and clothing are meaningful to consumers and what items are kept for a long time. However this information was not sufficient because meaningful textiles and clothing are often kept for memory reasons only, and this information does not help sustainable designers in their design process. Subsequently the research focus turned towards the long-term use of clothing and attributes that enable long-term use. This consumer knowledge was then viewed through the lens of the design field in order to map out opportunities to extend the product life span. Finally the last paper concludes with a wide and conceptual discussion about new value creation in the context of sustainable change. (Fig. 7)

Publication I is the initial article in this study, and it maps out consumers' interest in and wishes regarding eco-fashion. It serves as an introduction to the viewpoint of consumers. Publication I is the basis for Publication II. At some levels they do overlap, but both articles contribute their own, discrete, information: environmental information in Publication I and information on the meaning of clothing and its connection to consumers' ideology in Publication II. Publication II contributes to an understanding of fashion consumption and consumers' purchase decisions when constructing their sense of self using external symbols, such as appearance, clothing and fashion items. The article clarifies the reasons for contradictions in consumption in the clothing field and the ethical attitude-behavior gap in contemporary society.

Publication III concentrates on the home textile area, and it is an initial article in the field of person-product attachments. Furthermore it provides knowledge about the meaning of uniqueness in contemporary society. Uniqueness is approached through the use of digital textile technology together with a design service. Publication IV deepens the knowledge on person-product attachments through studying how people form attachments to clothing. In this paper the attachment process is also discussed in more detail.

Publication V adds satisfaction as another important dimension of person-product relationships. It opens up the discussion on products' planned obsolescence in the current industrial system by focusing on consumer experience in the context of clothing. This text identifies the attributes that determine long-term

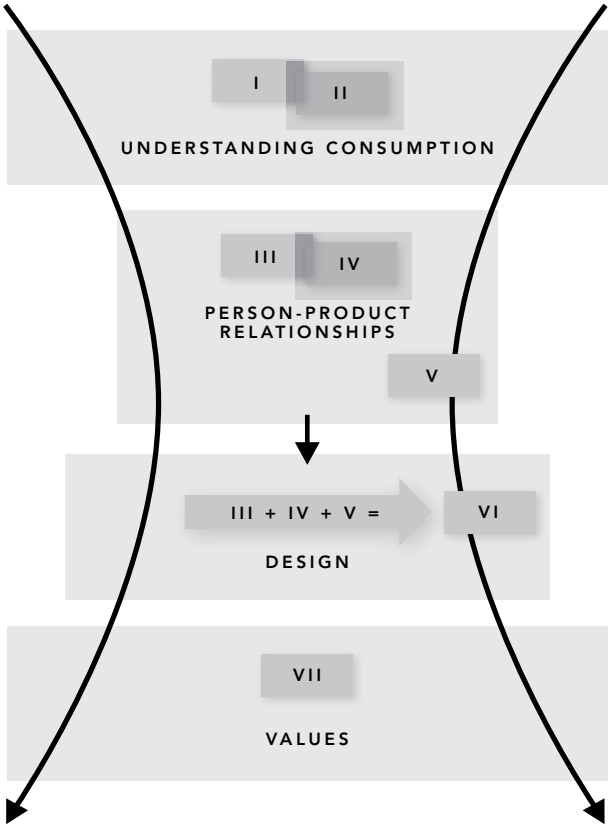


Figure 7. Research process.

use of clothing, and it shows why product satisfaction and an increase in products' intrinsic quality are important when aiming to extend the product's lifetime. Publication VI combines the results of publications III–V, on person-product attachments and satisfaction, and reflects upon this knowledge in the design field. This article could be characterized as the main article of this work, as it studies how an empathic design approach could improve a sustainable design process. The article discusses the emotional approach in design and its possibilities and limitations to offer consumers meaningful experiences in a temporal context.

Publication VII opens up the discussion on opportunities for radical change in the textile and clothing industry. Change is needed to reach a systemic sustainable transformation, not only in production but also in consumption. The article presents ways to rethink and redesign business in the textile and clothing field by offering an overview on various design strategies that exist today in niche markets. Furthermore the study compares certain design strategies to consumers' interest and evaluates them inside a framework of radical change through new value creation.

4. Main findings of the study

This chapter presents the main findings of the articles.

4.1 Consumer attitudes towards environmental issues in the textile and clothing field

PUBLICATION I

Designers and producers lack knowledge on consumers' interest in and attitudes towards eco-issues in the textiles and clothing field. Better insight into consumers' desires and values could offer new sustainable design opportunities in this field. Most consumers are interested in environmental issues. Yet their choices are somewhat irrational and not always well connected to their values. A consumer fulfills deep inner motivations and unconscious needs by consuming. We must challenge the consumer to actualize his/her own ethical values in purchasing and consumption behavior.

The following is a quote from the questionnaire:

We should return, in our consuming behavior, back to the time, to the stage, where we bought a little, but expensive and good. Now cheap products block the way to realizing this ideal.

To change consumption habits towards more sustainable ones, the consumer would like help from producers and public authorities, e.g. in the form of more environmental information and green taxation. The majority of consumers feel that

their values are based on ethicality, but authorities have given too much power and, at the same time, too much responsibility to individual consumers. Moreover consumers wish that the whole responsibility for environmental issues would be shifted to producers. In the study consumers were asked about their wishes regarding products' environmental optimization. A total of 73.4% of respondents agreed that it would be good if products were automatically optimized according to environmental impacts and thus no extra environmental labeling would be needed.

The following is a quote from the questionnaire:

Producers have to carry the responsibility. In shops there should only be ecological and ethical clothes and other products. It is incomprehensible that now the responsibility has been pushed to consumers and while maximizing profits we have ended up in a situation where consumers have to separately demand ethicality and 'ecological-ness'. Enterprises should somehow be forced to follow ethical and ecological principles with the help of legal institutions and laws, and these have to be tight enough.

Only a small proportion of respondents wanted to state ethical or environmental values through their clothing, which means that the eco-aspect should not result in eco-aesthetics that differentiate eco-garments: consumers do not want eco-clothing to differ in design or appearance. Most respondents (70%) want eco-clothes to look exactly the same as ordinary clothes. It may be more advisable to develop the eco-aspects in materials, production and the textile maintenance phase than in new design concepts.

How much more you would be ready to pay	Respondents [%]
not at all	3.7
1-4% more	12.6
5-9% more	19.9
10-14% more	29.7
15-19% more	14.2
20-24% more	10.6
more than 25%	9.3

Table 4. Consumers' readiness to pay more for sustainable textiles and clothing.

Many consumers are ready to pay more for ethical and sustainable textiles and clothing (see Table 4), and furthermore they are ready to change their own textile maintenance habits (65.7%) and use textiles and garments longer to decrease their own environmental impact (94.6%).

4.2 Meanings of consumption in postmodern society

PUBLICATION II

This article opens up the discussion on the meanings of consumption and clothing in contemporary consumer culture. It is grounded on Bauman's (1996) theory of the postmodern liquid society and the constant change process in individuals' identity building process. A constant process of self-critique and evaluating one's self (appearance, clothing etc.) in a social context means that identity becomes mobile. (ibid.) The meanings of clothing and fashion in the social context are discussed based on socio-psychology (e.g. Kaiser 1995).

An eco-trend is emerging strongly in the field of textiles and especially in fashion. There is however an attitude-behavior gap in the eco-fashion field, meaning that consumers are interested in ethical fashion but its market share has increased only slightly. The present trends in eco-fashion and ethical clothing appeal only to a limited number of consumers and their aesthetic preferences. Moreover the ever-increasing amount of cheap and fashionable 'fast' fashion items tempt consumers into unsustainable consumption behavior, and it is most difficult to resist this temptation. Clothing and fashion has to interconnect strongly to a person's own self-image and identity, and eco-clothing is no exception to this. The eco-aspect can only add value to a product that is otherwise attractive, and thus the eco-aspects offer the final reason to buy the garment.

Consumers can be selectively ethical in the clothing market. Accordingly it is most important for designers and manufacturers to identify which ethical factors are important to each customer group. Furthermore they should know how consumers' ethical and environmental interest affects the purchase decision and the meaning of clothing. This paper illustrates how a consumer's ideological commitment affects the meaning of clothing and consumption decisions.

Table 5. Consumers' interest in ethical consumption.

Attitude, Ethical interest, Purchasing behavior	never [%]	seldom [%]	can't say [%]	often [%]	always [%]
Ethical interest in general	4.1	3.7	1.2	28.3	62.7
Everyday ethical consumption behavior	2.4	14.7	4.9	57.1	20.8
Ethical interest in textiles and clothing	1.6	24.4	8.1	49.2	16.7
Real ethical purchasing decision in textiles and clothing	2.4	28.9	12.6	47.2	8.9
Division made according to real ethical purchasing decision in textiles and clothing	Not interested	Do what I can		Conscientious consumer	Ethical hardliners

Respondents with high ethical commitment, or ethical hardliners, say that they always take sustainable issues into account when purchasing textiles and garments; ethical, safety (freedom from toxic chemicals) and environmental issues always affect their garment and textile purchasing decisions (Table 5). However this ethical hardliners group forms a minority: 8.9%. The findings of this article show that an ethical commitment and ethical values are a strong driver of the consumption of eco-clothes, eco-materials, recycled clothing, and ethically made garments. Furthermore, environmental interest and ethical commitment form an individual's value base, which strongly affects the meaning of clothing. A strong ethical and environmental commitment become a prioritized value in purchasing decisions for "Ethical hardliners", and this base is even more important in clothing than one's own identity or aesthetic values. On the other hand for all consumers quality and aesthetics are highly important when purchasing clothes and fashion, even eco-ones.

4.3 Home textiles and uniqueness

PUBLICATION III

This paper discusses the meanings of home textiles in the postmodern era as well as the meanings of uniqueness in the home environment. According to this paper home textiles have the following meanings for their owners (in the order of importance): practicality, beauty, creativity, own identity, protection, own ideology, safety and direction in one's life. The respondents' answers concerning person-product attachments to home textiles convey that functionality, aesthetics, quality, memories, family ties, uniqueness, and self-made aspects create attachments to home textiles. The study also shows (through content analyses of respondents' open answers) the many levels through which consumers construct attachment with home textiles. These meaningful emotional attachment attributes in home textiles include some connection to family, family history or own childhood; achievement and effort; or some special memory.

Uniqueness is an important aspect in a postmodern consumer society where everything is so easily manufactured, repeated and reproduced. Uniqueness in a product is transferred to its owner, and the goal is to strive towards individuality. The consumers' continuous construction of self and their own identity leads to a demand for individuality, customization and desire for deep emotional experiences with products. According to this study the respondents with a stronger ethical and environmental commitment have a greater respect for the aspects of uniqueness, modifying possibilities and a designed-for-me approach than other consumer groups.

This article discusses the possibilities to add meaningful uniqueness to home textiles through digital technology. It argues that if a designer can link the new product deeply with a consumer's emotions, identity construction, aesthetic needs (that is, values and lifestyle) and personal memories, the design process can result in deep product satisfaction and product attachment. This can be made possible through a design service and new technologies. Digital textile technology offers opportunities for unique design processes. Through this kind of design process it is possible to place the consumer's attachments, emotions and meaningful visual elements at the center of the design process. An individual and unique design process can thereby result in product attachment. Accordingly it is possible to extend the product life span through this deeper person-product attachment, and thereby promote sustainability.

4.4 Person-product attachments

PUBLICATION IV

This paper contributes to a deeper understanding of person-product attachments in the field of clothing. The creation of meaning is one of the most important issues a designer must consider in the context of sustainable design. Accordingly the meanings behind person-product attachments provide the most important insight for a designer. Through studying the consumer's product attachments, the designer has the opportunity to create reflective dimensions in the product in order to promote discursive engagement and emotionally durable design.

Aesthetic aspects are fundamentally important to consumers when they describe their attachments to clothing. Beauty in clothing can be approached through social, cultural and temporal contexts and in a multi-sensorial way. Other important aspects in this regard include positive experiences, memories, family ties, expressions of self, promises of future experiences, and emotions. In the study findings, design attributes that are connected to attachment are: high quality, color or print, classical design, functional style and multi-functionality. Furthermore some materials' ageing process is considered to be aesthetic, and this aspect enables a long lifetime for garments. These materials include high quality wool and leather.

In the paper a table is presented listing all dimensions in attachments to clothing (Table 6). In summary these include the following themes: design/style, materials, functionality, personal values, emotional values and present and future experiences.

Moreover in this paper the person-product attachment process is described more detail and it is connected to earlier theories and empirical evidence. Norman's (2005) theory of person-product experiences through three levels has especially been a solid basis upon which to understand the attachment process: namely, visceral, behavioral and reflective levels. The reflective level is fundamental when a person is creating discursive engagement with an object (Chapman 2009). A sustained and reflective response, in the form of an emotional experience (Forlizzi et al. 2003), is also a basis for long-term and sustained person-product attachment.

Attachment process:

1. visceral = direct effect (perception)
2. behavioral = pleasure + use
3. reflective = emotions + self-image + satisfaction + memories + cognition

Table 6. Attributes that create sustainable attachments to clothes

Attributes that create sustainable attachments to clothes	
design/style	classical, timeless design, not overly loud visual messages strong design, represents some unique period of design style the experience of beauty in multi-sensorial ways
quality	high quality in design, materials and manufacturing durability
material	ageing well, aesthetically and gracefully (e.g. wool, leather)
functionality	multifunctionality fit reparability
personal values	uniqueness tailor-made self-made self-designed made for me expression of one's own ideology
emotional values	memories (history/past, places, people, moments, childhood) family ties positive associations (e.g. safe and soft tactile feeling) expression of self
present/future experiences	promise of experiences (e.g. modification possibility, party clothes, opportunities for narratives to emerge) family ties and continuity aspect suitability for gift-giving satisfying experiences

4.5 Sustainable consumer satisfaction

PUBLICATION V

This paper opens the discussion on planned obsolescence in a throwaway society and connects this discussion with current textile and clothing manufacturing systems and short life spans of garments. It also discusses psychological obsolescence in our current consumer society.

The paper contributes to the sustainable design area by providing a deep explanation of the satisfaction process in the clothing field by identifying the attributes that enable long-term use of clothing. In the study both approaches to satisfaction are adopted: firstly a narrow approach is used to provide deep insights into consumer satisfaction in the context of clothing (based on empirical data) and secondly a wider approach is used to include design strategies and services in the discussion on how to provide sustained consumer satisfaction.

A study is presented that defines attributes for product satisfaction and determinants for dissatisfaction based on empirical data, from the consumer perspective. In the satisfaction process consumers create a frame of reference against which they make their own evaluation of satisfaction. The evaluation frame of reference is connected to the use of the product, and hence it differs according to product type. The use situation and the symbolic meanings of the product define the attributes around expectations. The attributes that enable longevity in clothing are: quality (durable materials, durability in use, durability in laundering and high manufacturing quality), functionality (easy maintenance, suitability in use and satisfying use experience), and aesthetic attributes (beauty, style, color, fit and tactility, and comfortable materials). Fulfilling instrumental performance expectations in clothing (i.e. the quality experienced in the use phase) alone does not result in satisfaction. Expectations in expressive performance (aesthetic dimensions) also must be met in order to develop a sense of deep satisfaction. Expressive dimensions in clothing connect to a person's psychological response to the product (the emotional experience).

Moreover a consumer's personal factors, e.g. environmental concerns and individual values, influence the evaluation frame of reference and what satisfaction attributes are important to the consumer. For those consumers who have a keen interest in the environment, the following values are important in clothing choices: local or ethical production, eco-materials and long life span of garments. These elements also connect to the consumer's satisfaction with clothing. For environmentally interested consumers, sustainability attributes and values are included in their individual frame of reference regarding product expectations, against which they make product judgments. Consumers' expectations regarding a garment's environmental values also have to be met if deep product satisfaction is the goal.

Satisfaction attributes:

- quality
- functionality
- aesthetics

- emotional response
- ideological response

This paper also shows that it is possible to slow consumption and increase the longevity of products by design strategies related to intrinsic product durability, good product maintenance and deep product satisfaction. The paper demonstrates why consumers' experience of product satisfaction and an increase in the product's intrinsic quality are most important when aiming to lengthen the product lifetime. In addition this paper illustrates that through services there is an opportunity to extend the enjoyable use of the product or connect the product deeper to the consumer's identity construction; through this deeper satisfaction can be delivered to the consumer. The PSS approach presented in this paper argues that PSS thinking can postpone the psychological obsolescence of garments.

4.6 Empathic and sustainable design

PUBLICATION VI

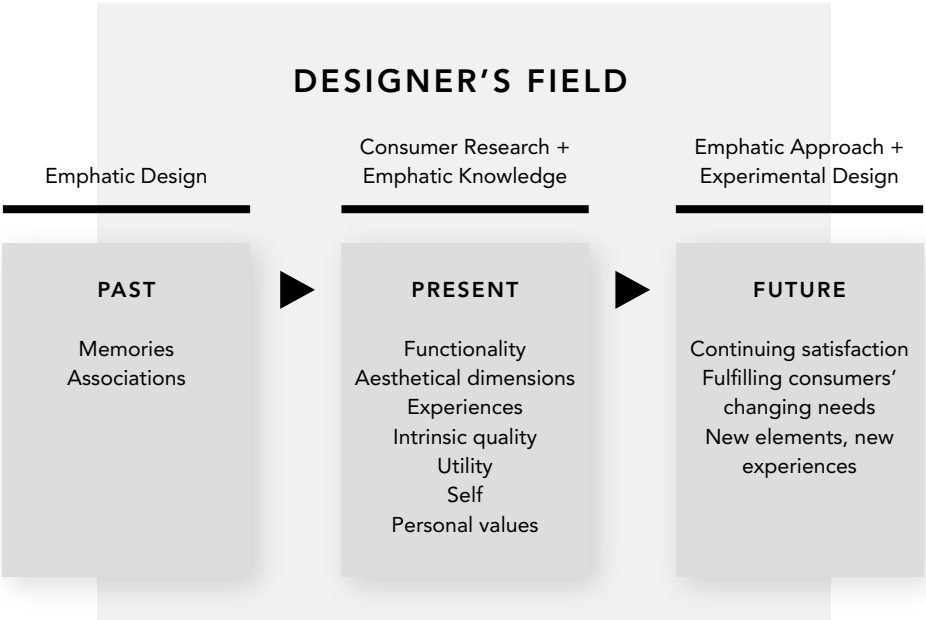
This paper argues that an empathic approach in design can be of primary importance in promoting sustainable product relationships by strengthening current methods of understanding consumers' needs, values and emotions. As a result it explains how an empathic design approach could improve a sustainable design process.

This paper sums up research done in the areas of attachment to, long-term use of and satisfaction with textiles and clothing. The challenge in sustainable development is to extend products' life spans. This paper focuses on this problem by studying how to offer continuing satisfaction with the product or how to offer meaningful experiences through which person-product attachment might emerge. Through an empathic approach a designer can understand consumers' needs, values and long-term product relationships, and moreover empathic knowledge enables the designer to provide deep product satisfaction and opportunities for future product attachments to emerge.

In this article a framework is constructed that integrates temporal, meaningful attributes of long-term person-product relationships and the designer's work field. Attributes in person-product attachments related to the past are based on individuals' very personal experiences. Present and future dimensions are therefore easier

to include in the design process. The paper explains how a designer can work with these dimensions to facilitate long-term use of the product. The designer can use the customer's personal history, individual meaningful memories and associations, as a starting point in the design process to create unique and meaningful design. In this process the designer needs an empathic approach combined with design service thinking.

Figure 8. Framework for sustainable product relationships, empathic knowledge and the field of design



Designers can work with the present emotional experience levels in product satisfaction through empathic design combined with consumer-centered research knowledge (Fig. 8). In the present time, the designer can provide good product performance in those attributes that are important to consumers and that are also determinants for the product's longevity and product satisfaction. The designer can also create opportunities for product attachments to emerge in the future by providing continuing satisfaction in the use experience through e.g. high intrinsic product quality and satisfying aesthetic experiences. In addition creating services that enable new experiences to come better ensures prolonged use. To be able to

work with these future-oriented aspects, the designer needs an empathic approach combined with experimental design. Considering future experience and especially the service approach may be even more important in design work than designing and manufacturing original products when the goal is long-term person-product relationships and consumers' sustained positive product experiences. This future-oriented level of thinking offers possibilities to drive sustainable consumption with fewer but longer lasting and at the same time emotionally meaningful products.

4.7 Emerging design strategies and new value creation

PUBLICATION VII

This paper presents design and manufacturing strategies for the textile and clothing industry that could reduce the environmental impact of textile and clothing production and consumption. These strategies question the current industrial system in the context of sustainable development. The design strategies focus on offering better consumer satisfaction and hence may initiate discussion on how to start a systemic change in this industry. Since the short life span of textiles and especially clothing is one of the main environmental problems in the current industrial system, this paper presents design strategies that focus on extending product life span. The paper also presents consumers' environmental worries in the field of textiles and clothing as well as consumers' interest in different design strategies (Table 7).

Secondly the paper discusses how to develop new value in the product or its use in the sustainable development context. It highlights that instead of focusing on exchange value only, the product value should be defined during the use context. The use value should thus be connected to consumer satisfaction and product life span. Furthermore an important value in products for the consumer is emotional value, as well as environmental and ethical value for some consumers. Cultural and social value, sustainable development value and finally future-oriented value are also described. Rethinking and re-evaluating the fundamentals in value creation offer opportunities to develop new sustainable value both in production and in consumption, and through this knowledge it is possible to redesign business models (Table 8).

Table 7. Evaluation of the design strategies

Design strategy	Decreasing environmental impact of production	Decreasing consumption	Consumer interest
Multiple life cycles	+	-	+
Slow fashion	+	+	+
Customization	+/-	+/-	+
Halfway products	+	+	+
Modular structure	+	+	+
Co-creation	+	+	+
Local production	+	+/-	+/-
Design services, unique design	+	+	+
Services for longer or intensive utilization	+	+	-

Table 8. Main value creation through particular design strategies

	Use Value	Emotional Value	Cultural Value	Social Value	Added Value through Services
Slow fashion	x		x		
Long life guarantee	x	x			
Customization		x			
Halfway products		x			
Modular structure	x	x			
Co-creation		x		x	
Local production			x	x	
Open-source design		x			x
Design services, unique design		x			x
Services for longer or intensive utilization	x			x	x

In value creation in the context of sustainable development, the idea of future-oriented value needs to be newly defined. Accordingly previously accepted definitions of value in different disciplines must be combined and expanded to create new knowledge on sustainable value which is future oriented. Future-oriented sustainable value is created in the design and production phases where the aim of this value creation is sustainable consumption. Therefore sustainable design includes values that are embedded through technical and design solutions as well as those that are relativistic and exist in the relationship between the person and the product. In addition the purchase and use phases allow expression of sustainable future-oriented values.

In the framework of sustainable development, redefining and rewriting the values in the context of radical change needs the interaction and co-operation of different stakeholders, producers, manufacturer, consumers as well as politicians. Co-evolution of new, radical and systematic sustainable value creation is needed based on sustainable technologies, business and consumption in order to contribute to building a more sustainable society. Radical change and innovations require completely new approaches that attempt to understand the new realities for which new concepts, strategies, products, services and systems will be created.

The discussion on changes, options, possibilities, and future visions is never value free. Neither are our purchase and consumption choices ever value free. Governmental decisions and regulations as well as economic and technological systems also entail values. Values are always present in cultural and social systems, in theoretical discussion, in practical everyday actions and in design thinking. Co-evolution means co-creating the value system together with different stakeholders of whom the important one is the consumer. S/he must become engaged into this new value co-evolution and made responsible for implementing environmentalist interest and thinking into action.

4.8 Results summary

This dissertation has investigated the complex interplay between design and consumption in the context of textiles and clothing. This study has explored sustainable design through person-product relationships by approaching them in the light of previous theories and different angles and by applying this knowledge to empirical analysis. This novel consumer-centered knowledge is then transferred upon

the design discipline to bring knowledge on the consumer into sustainable design.

Several design strategies were presented and evaluated in the author's articles that could drive more sustainable production and consumption patterns. Some of these strategies such as multiple life cycles are easier for consumers to accept, as they do not need significant changes in their own consumption habits. Other strategies take into account the current consumption patterns and offer environmentally better products, but consumers are not ready to accept these products, such as easily recycled garments that do not need any laundering during their short use time. Strategies for intensive utilization, e.g. renting, are problematic in this product group, because of the intimate nature of textiles and clothing. It is also possible to take into account the values and environmental worries of different consumer groups and produce products and services accordingly. The quality and lifetime of the product are the most difficult to evaluate at the stage of purchasing. The estimated life span of the product could be informed so that the consumer could better evaluate the connection between price, quality, aesthetics and utility of the product when purchasing. On the basis of this information the consumer could therefore evaluate the product's environmental benefits according to its estimated use time and compare the product's values against their own value base.

Services that aim for product life extension offer new design possibilities as well as business opportunities, e.g. unique design services, exchange stocks and upgrading services. These kinds of services offer extended use satisfaction for consumers. It is possible that in the future a sustainable designer's work field will be more often in the service design sector than in traditional product design as long as society aims to decrease waste streams by extending the use time of products.

This dissertation aimed to unfold, at several levels, the complex interplay of design and consumption in contemporary consumer society. The work both extends and narrows the views on sustainable design. By providing novel insight from person-product attachments and consumer satisfaction in the field of textiles and clothing, the study offers a narrow lens on the consumers' world. Moreover deep insights into consumers' values and environmental interest and commitment are presented. This knowledge on consumers' attitudes and values is reflected in the meanings of products in social contexts. At the same time the study extends the approach by including the design perspective in the focus. By adding consumer aspects to sustainable design the study unfolds several new layers in the SCP approach. Moreover the correlation between current industrial design and manufacturing systems and consumption patterns were investigated. Hence this research

extends previous studies by approaching the issues of sustainable design and consumption in the context of textiles and clothing more holistically.

The study opens up the conceptual discussion about new value creation, which offers opportunities to find new paths towards more sustainable design, manufacturing and consumption of textiles and clothing. Finally in the spirit of the radical change needed, the study discusses new value creation in the SCP agenda.

Sustainable design can affect sustainable consumption behavior and moreover, sustainable design can be seen to add value to the product if consumers are ready to pay for this attribute and value. Therefore not only consumer preferences but also values are important to recognize and study. As Spangenberg (2001) argues, designers can have an important role in sustainable development by shaping sustainable products and their use in a more easily acceptable form to consumers. Designers also have an important role in creating far-sighted and future-oriented sustainable design, which can change consumption behavior towards more sustainable behavior patterns. In this way design for sustainability can be a redirective practice. Accordingly sustainable design must include those ethics and values that promote sustainable consumption.

5. Discussion

5.1 Validity

By approaching textile and clothing design on the basis of consumer insights this study has contributed to the field of sustainable design. A deeper understanding of textile and clothing consumption was offered through a holistic approach to the meanings of consumption and products in our society. Meanings behind consumption and person-product relationships offer ways to open new understanding on how design, manufacturing and consumption are connected to each other and how they together can boost sustainable development.

By combining different theoretical perspectives the study has aimed to produce new views on the consumers' world and the complex interplay of designing, industrial manufacturing and consumption. The study of consumer behavior is an applied social science (Solomon et al. 2002, 24), and person-product relationships are studied on the grounds of socio-psychology. Sustainable design research is an applied science field that is still emerging, borrowing and combining theories from different disciplines. Hence the triangulation method is appropriate in sustainable design studies. A theoretical framework for addressing new perspectives in sustainable textile and clothing design was constructed. The theoretical framework focuses on a holistic understanding of sustainable design through investigating consumption, person-product relationships and value creation. The theoretical framework in this study is wide because of the research process: interpretations have matured step by step during different article writing processes and because different articles use different theoretical approaches. Hence the use of concepts

and definitions inside the theoretical framework has been applied.

Some limitations concerning this study are noted here. Firstly none of the questionnaires themselves are extensive enough to represent the whole Finnish population. Accordingly none of them can be defined to be a traditional consumer survey. However this was not the aim of this study. The empirical data has been used to describe the phenomena and to function as a catalyst in the process of constructing a theoretical discussion and interpretations. To that purpose the empirical data, even when limited, have worked well.

Secondly the limitation in this study is that the results may not be repeatable as such in other cultural contexts, because the data provides only the viewpoint of Finnish consumers. Nevertheless the development of textile and clothing consumption and design and production patterns inside this industry in Finland are largely similar to those in other Western countries. At any rate, it is proposed that the results and conclusions in this study can be seen as precedent, not generalized results. As Denzin and Lincoln (2005, 381) argue knowledge is always local and situated in local cultures. The findings can, however, reveal some layers of the Western reality regarding sustainable issues in the context of textiles and garments. These consumer insights offer new ways to understand more deeply consumption patterns and the balance, or unbalance, in SCP.

There is always contradiction in how people answer questionnaires and how they behave in everyday life (Silverman 1999, 150). There are also limitations when collecting and analyzing data and how well this knowledge then represents the people's everyday reality. When using triangulation, methods drawn from different theories, the 'objective' truth is difficult to reach (Silverman 1999, 155). Nevertheless the author has gained some understanding of clothing and textile consumption and its connection to industrial design systems. The question of why we consume the way we do (instead how we consume) has remained the focus, and through this focus several layers of consumption have been revealed and opportunities for sustainable design aiming towards sustainable consumption have been identified.

It is also acknowledged that building research upon different articles does not allow for the monitoring of one phenomenon in depth. This kind of wide research approach to one phenomenon on the other hand can provide different dimensions to the research focus, and hence it can open novel views to the research area of sustainable design and consumption.

In evaluating the researcher's position in this current study, some noteworthy comments could be made. The researcher has had free hands to choose her own

focus, research question and the process to follow. The researcher's own interest and value base has guided selections at the beginning of this journey, mainly when choosing the subject and approach. From the point of collecting the first data onwards, the empirical findings have indicated the directions towards which to continue. It has been most valuable to take a deep dive into the empirical data in order to try to understand more deeply the meanings behind consumption and the connection between consumption patterns and the current design system. Piece by piece the work has been constructed. As Eskola and Suoranta (2008, 21, based on Alasuutari 1990) state, the researcher is like the weaver of a net, who patches the torn net (positivism) into a whole piece again. In the same way, by solving problems piece by piece and now at the end seeing the picture from a distance, the individual problem-solving, each article, has built a whole picture providing novel knowledge to sustainable design research.

5.2 Implications of the study

As stated at the beginning of this work, textile and clothing design is lacking research knowledge on eco-design and sustainable design issues, knowledge that can be implemented in the design discipline and practical design cases. This study offers more knowledge to this design field.

It can be proposed that the overall theoretical contribution of this study is that it unifies various themes from consumption, person-product relationships and values, with sustainable design. As Hodges et al. (2007, 342) propose, by investigating products in their social and cultural context we can identify how design, use, and disposal interface. Furthermore through deeper understanding of the meanings and *complex interplay between products and consumption* it is possible to show how consumption affects tomorrow. Socio-psychological factors do play an important role in investigating consumption (ibid.). In this research socio-psychological approaches are seen as useful for the empirical part of the study.

The study has shown how to approach *person-product relationships through the lens of attachment and satisfaction.* These dimensions have not been well defined or studied previously in the context of textiles and clothing design. Designers and manufacturers need this kind of insight when they wish to deepen and extend person-product relationships as well as to develop business towards sustainable practices. This path also needs a new value creation system, discussion upon which

was opened at the end of this study.

This study has offered novel knowledge on textile and clothing design and consumption from the viewpoint of consumers. In doing so the research has strengthened the human aspects in eco-design and sustainable design. This novel consumer-centered approach can also be used in other product groups when studying the meanings of products from the consumers' viewpoint and in the social context. This approach offers opportunities to understand more deeply consumption and its connection to design, manufacturing and economic systems. With regard to the conceptual and theoretical discussion it may be argued that *a holistic view on sustainable design* is needed to understand more deeply the socio-psychological and *value aspects* in consumption and to construct *the connection between industrial systems and current consumption patterns*. Moreover deeper understanding of people's everyday consumption routines and patterns as well as the meanings of consumption in the postmodern consumer society offers ways to see *change opportunities.* Through this research knowledge it is possible to understand the unbalance in SCP and map future opportunities for sustainable change.

Traditionally the consumer has been a value user (user of the product), but as new design strategies offer the consumer an increasingly active role, the consumer begins to be a value creator. Consumers can act as co-creators in value creation systems, for example through new design strategies. The consumers' role is also important if the manufacturers wish to gain more insight and use it in product development processes. Moreover consumers can have an important role in acceptance of new, radical sustainable products, services and systems, and therefore customers are co-creators in sustainable transformation process.

In the end we cannot dictate consumer behavior. We can nevertheless create designs and products that lead consumers into more sustainable consumption patterns, e.g. extending how long they use a product. This approach needs research knowledge about person-product relationships, attachment and satisfaction attributes. Moreover the meaning of consumption and products in their social context is fundamentally important in trying to understand consumption patterns and consumer behavior. This study established a link between current unsustainable textile and clothing consumption patterns and the industrial design–manufacturing–business system.

The research described in this thesis contributes to the design discipline by offering design researchers and designers insights from consumer knowledge in person-product relationships in our contemporary society. The findings that are pre-

sented suggest that, in order to foster long-term product relationships, one must consider including those attributes in design that enable attachment or satisfaction to emerge. This needs holistic understanding of the consumers and a more empathic approach to design. How to extend products' life span can be seen as a fundamental question in sustainable development in the Western world. New design strategies have to be developed and tested in longitudinal studies to determine the best, most effective, ones that can truly extend product life span. In the future experimental design cases can be implemented on the basis of this research knowledge.

The knowledge produced in this study can also be used to educate more empathic designers. Designers in the textile and clothing field do not necessarily use knowledge from consumers. Even the user-centered approach has not yet reached the textile and clothing design field. To change these circumstances this study offers examples of how to use consumer insights in sustainable design processes that aim for sustainable consumption.

5.3 Paths for further studies

This study provides several opportunities for further research work. One possibility to continue this study is to develop a consumer-based eco-efficiency methodology. Since the general eco-efficiency approach (as begun in the early 1990s) has not succeeded to balance industrial systems and their connection to consumption volumes towards smaller environmental impact, Park and Tahara (2008) propose that producer-based eco-efficiency needs to be combined with consumer-based eco-efficiency. This means that not only the environmental impact of the product and its use is counted, but also that quality and satisfaction is evaluated from the consumer point of view. In this study the satisfaction process was described and attributes leading to consumer satisfaction were defined in the field of textiles and clothing. The study identified an approach to consumer satisfaction that can be used to develop methods to study experienced quality and satisfaction issues. This consumer-centered eco-efficiency should use both quantitative and qualitative methods. As previously mentioned this could be one future research area, where multidisciplinary research work is needed to develop a robust methodology.

Secondly this study presented several design strategies that may lead to deeper person-product relationships or extended enjoyable use time of the product. This

research knowledge could be used to develop experimental design approaches that aim to extend the product life span. This also needs a longitudinal study to scientifically research the relevance of each experimental design strategy and its connection to the product life span.

Some future research paths could be:

- consumer-based eco-efficiency methodology
- experimental and exploratory design in the context of sustainable development
- design semantics in the context of sustainability
- new value creation in a sustainable society
- design for sustainable consumption
- emotionally durable design.

In the articles several design strategies were presented that enable person-product attachment to emerge or provide deeper satisfaction. Therefore this study could be continued into the area of product semantics. On this path the objective could be to identify what kind of semantic qualities encourage a sustainable usage of products or product-service systems. In this case the research question could be thus: how to advance attitudes of responsibility and good care through design and, moreover, how to promote long-term use of products and substitution of products by services.

6. Conclusions

The study offered ways to approach sustainable design from the consumers' viewpoint. Consumers' environmental worries and wishes for the future were presented, and these desires, attitudes and values were viewed through the perspective of the design field and design potential. Several design strategies were presented and evaluated in the context of sustainable development. This study added novel knowledge to an existing knowledge base on sustainable textile and clothing design. It offered broad generalizations and theoretical discussions that unfold the phenomena surrounding textile and clothing consumption. The study transferred this consumer-centered knowledge in the context of design by constructing a theoretical perspective on future sustainable textile and clothing design and new value creation.

The empirical data have been collected on home textiles and clothing, which showed consumers' worries, wishes and interests in the area of sustainable textile and clothing design. The attributes contributing to person-product attachments to home textiles and clothing have been identified, and the determinants for long-term use of textiles and clothing satisfaction were defined. In this dissertation person-product relationships are examined in the context of sustainable design. By identifying attachment attributes in home textiles and clothing and further explaining processes facilitating sustainable product satisfaction, this study offered consumer-centered knowledge to the design discipline.

The purpose of this study was firstly to establish the link between unsustainable consumption behavior and current design systems, and secondly to offer future design opportunities to strengthen person-product relationships in the interests

of sustainable development and SCP. In this way the study offered several future paths to redirect textile and clothing design towards a design for sustainability strategy. Designers interested in the design for sustainability approach can create far-sighted and future-oriented design objects or PSS, which can change design and manufacturing systems as well as consumers' consumption behavior towards more sustainable patterns. At the very least design can propose sustainable consumption behavior to consumers. Moreover the focus change from tangible products to service thinking allows customer needs to be met in a more sustainable way. Through this knowledge the link between design for sustainability and sustainable consumption was constructed.

We cannot predict the future, but we can contemplate our options and implement those that work towards a better future. To facilitate more radical change towards a sustainable society the discussion and evaluation of values should be at the core, and the goal should be to strive for a deeper sustainable future orientation. There are always many futures available, and our choices in everyday life lead us to one or another of these futures. Local and global and individual and communal thinking will blend, and we make choices at individual, social and political levels while creating futures: hopefully more sustainable ones.

At the end of my own research journey I am pleased to note other new openings in the sustainable textile and clothing research area. Markkula's (2011) dissertation "Consumers as Ecological Citizens in Clothing Markets" widens the understanding of the consumers' role and limited power in clothing markets.

Finally, I would like to return to my own empirical experimentation: how few garments I could manage with for three months during my research visit abroad (the list of garments presented at the beginning of this work). The answer: surprisingly well. I did not even use all the clothing I had with me. After two months I briefly visited Finland and exchanged the spring coat for a summer one. I did launder my clothing much less than at home; I let them air between use times. There was one temptation I could not resist: new summer shoes, which I bought when the sun begin to shine so warmly. When I returned home, I wondered why I have four wardrobes full of garments, of which I use approximately 5% frequently, 5% seasonally, and the rest are simply waiting for better times to come.

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Appendices

Ekotekstiilejä ja kompostoitavaa muotia

Mitä onkaan tulevaisuuden ekomuoti ja miten pestään tulevaisuuden kodintekstiilit? Vastaa ja vaikuta!

Taustatiedot

1) Sukupuoli

○ nainen ○ mies

2) Ikä vuosina

○ 18-25 ○ 26-35 ○ 36-45 ○ 46-55 ○ 56-65
○ yli 65

3) Koulutus

○ kansa- tai peruskoulu ○ ammattikoulu/tekninen koulu/kauppakoulu ○ ylioppilas ○ opistoasteen tutkinto ○ ammattikorkeakoulu
○ akateeminen loppututkinto

4) Ammatti/asema

○ johtava asema ○ toimi- tai virkahenkilö ○ itsenäinen yrittäjä ○ työväestö ○ maatalousväestö
○ opiskelija ○ eläkeläinen ○ työtön ○ Olen tekstiili- tai vaatetusalan opiskelija, opettaja tai ammatilainen ○ Olen muotoilualan opiskelija, opettaja tai ammattilainen

5) Perhetyyppi

○ yhden hengen kotitalous ○ lapseton avo- tai aviopari ○ avo- tai aviopari, jolla lapsia ○ yksinhuoltaja, jolla lapsia ○ muu

6) Asuinlääni

○ Etelä-Suomen lääni ○ Länsi-Suomen lääni ○ Itä-Suomen lääni ○ Oulun lääni ○ Lapin lääni

Kuluttajan asenteet eettisyyteen

7) Olen kiinnostunut eettisestä kuluttamisesta ja tuotteiden ympäristövaikutuksista.

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

8) Toimin kuluttajana eettisesti (ostan vähemmän/vain tarpeeseen, ostan ekomerkittyjä tuotteita, luomuruokaa, suosin lähialuetuotantoa....)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

9) Ostaessani kodintekstiilejä tai vaatteita, mietin tuotteen eettisyyttä, tuoteturvallisuutta ja ympäristöhaittoja

○ en koskaan ○ harvoin ○ en osaa sanoa ○ usein ○ aina

Kuluttajien näkemys nykyisestä tuotetarjonnasta tekstiili- ja vaatetussektorilla

10) Tekstiilituotteen eettisyys, turvallisuus ja ympäristöhaitat vaikuttavat ostopäätökseeni

○ ei koskaan ○ harvoin ○ en osaa sanoa ○ usein ○ aina

11) Eettisiä tekstiili- tai vaatevaihtoehtoja ei ole tarpeeksi markkinoilla

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

12) Tiedonhankinta tuotteen ekologisuudesta tai eettisyydestä on vaikeaa ja tuoteinformaatiota tarvitaan lisää

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

13) Eettinen kuluttaminen on liian kallista

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

14) Eettiset tuoteselosteet ja ekomerkit ovat luotettavia

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

15) Arvioi kuluttajan kannalta parhaimmat tietolähteet tekstiili- ja vaatetuotteen eettisyydestä ja ympäristövaikutuksista.

Asteikko 1=heikko, 2=tyydyttävä, 3=hyvä, 4=erinomainen

	1	2	3	4
Tuotteen valmistajat	○	○	○	○
Tuotteen maahantuojat	○	○	○	○
Kauppa	○	○	○	○
Standardoiduit ympäristömerkit	○	○	○	○
Viranomaistahot	○	○	○	○
Tiedotusvälineet	○	○	○	○
Kansalaisjärjestöt	○	○	○	○
Kuluttajajärjestöt	○	○	○	○

16) Arvioi nykyisten eettisten, ympäristömerkittyjen ja ekovaatteiden ja -tekstiilien ominaisuuksia. Tarjolla olevat ekotuotteet ovat mielestäni...

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa mieltä, 5=täysin samaa mieltä

	1	2	3	4	5
laadukkaita	○	○	○	○	○
kiinnostavia	○	○	○	○	○
kauniita	○	○	○	○	○
trendikkäitä ja muodikkaita	○	○	○	○	○
klassisia, ja siten pitkäikäisiä	○	○	○	○	○
erikoisia	○	○	○	○	○
epäkäytännöllisiä (esim. pesuominaisuudet)	○	○	○	○	○
vanhanaikaisia	○	○	○	○	○
epäesteettisiä	○	○	○	○	○
tylsiä	○	○	○	○	○
huonolaatuisia	○	○	○	○	○

17) Paljonko enemmän olisit valmis maksamaan ympäristön kannalta paremmasta ja eettisesti tuotetusta tuotteesta

○ en lainkaan
○ 1-4%
○ 5-9%
○ 10-14%
○ 15-19%
○ 20-24%
○ enemmän kuin 25%

18) Mitkä seuraavista seikoista vaikuttavat eniten omiin vaatehankintoihisi.

Asteikko: 1=ei koskaan, 2=harvoin, 3=en osaa sanoa, 4=useasti, 5=aina

	1	2	3	4	5
todellinen tarve	○	○	○	○	○
halu uudistua	○	○	○	○	○
muodin seuraaminen	○	○	○	○	○
mainokset	○	○	○	○	○
lehdistö/TV	○	○	○	○	○
brändi, yritys	○	○	○	○	○
tuotteen suunnittelija	○	○	○	○	○
kotimaisuus	○	○	○	○	○
lähialuetuotanto	○	○	○	○	○
ekomateriaali	○	○	○	○	○
helppohoitoisuus	○	○	○	○	○
vesipestävyys	○	○	○	○	○
hinta	○	○	○	○	○
laatu	○	○	○	○	○
tuotteen sopivuus	○	○	○	○	○
väri	○	○	○	○	○
design	○	○	○	○	○
tuotteen pitkäikäisyys	○	○	○	○	○
tuotteen korjattavuus	○	○	○	○	○
tuotteen monikäyttöisyys	○	○	○	○	○
tuotteen sopivuus olemassaoleviin vaatteisiisi	○	○	○	○	○
tuotteen käytöstäpoisto	○	○	○	○	○

19) Mitkä seuraavista seikoista vaikuttavat eniten kodintekstiilivalintoihisi

Asteikko: 1=ei koskaan, 2=harvoin, 3=en osaa sanoa, 4=useasti, 5=aina

	1	2	3	4	5
todellinen tarve	○	○	○	○	○
halu uudistua	○	○	○	○	○
muodin seuraaminen	○	○	○	○	○
mainokset	○	○	○	○	○
lehdistö/TV	○	○	○	○	○
brändi, yritys	○	○	○	○	○
tuotteen suunnittelija	○	○	○	○	○
kotimaisuus	○	○	○	○	○
lähialuetuotanto	○	○	○	○	○
ekomateriaali	○	○	○	○	○
helppohoitoisuus	○	○	○	○	○
vesipestävyys	○	○	○	○	○
hinta	○	○	○	○	○
laatu	○	○	○	○	○
tuotteen sopivuus	○	○	○	○	○
väri	○	○	○	○	○
design	○	○	○	○	○
tuotteen pitkäikäisyys	○	○	○	○	○
tuotteen korjattavuus	○	○	○	○	○
tuotteen monikäyttöisyys	○	○	○	○	○
tuotteen sopivuus olemassaolevaan sisustukseeni	○	○	○	○	○
tuotteen käytöstäpoisto	○	○	○	○	○

20) Tarkistan aina tekstiilin hoito-ohjeet ennen ostoa ja suosin vesipestäviä tuotteita

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

21) Suosin ekomateriaalista tehtyjä ja ympäristömerkittyjä tuotteita tehdessäni tekstiilin ostopäätöstä

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

22) Kuivaan pyykin narulla kuivausrummun sijaan ympäristösyistä

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

Tulevaisuudessa

23) Ympäristöä rasittavaa halpatuotantoa tulisi mielestäni verottaa (ympäristömaksut, ympäristöverot)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

24) Tulevaisuudessa haluaisin löytää seuraavaa tuoteinformaatiota tekstiileistä ja vaatteista

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa mieltä, 5=täysin samaa mieltä

	1	2	3	4	5
Pohjoismainen ympäristömerkki, "Joutsenmerkki"	○	○	○	○	○
Euroopan ympäristömerkki, "Kukkamerkki"	○	○	○	○	○
Reilun kaupan merkki	○	○	○	○	○
Merkintä eettisestä tuotannosta	○	○	○	○	○
Merkintä tuotannon aikaisesta ympäristökuormituksesta	○	○	○	○	○
Tuotteen hiilijalanjälki(hiilidioksipäästöt tuotannon aikana, esim. 1 T-paita 5kg))	○	○	○	○	○
Tuotteen vesijalanjälki(tuotannon aikainen kokonaisvedenkulutus,esim 1 T-paita=35l)	○	○	○	○	○
Käytön aikaiset ympäristövaikutukset (pesu, huolto, energiakulutus, vesimäärä ym.)	○	○	○	○	○
Koko tuotteen elinkaaren aikaiset ympäristövaikutukset (LCA=tuotanto+käyttö+poisto)	○	○	○	○	○
ISO-14000-standardit Kansainvälinen standardisarja, jonka tarkoituksena on minimoida yrityksen ympäristölle haitalliset vaikutukset.	○	○	○	○	○
Ohjeistus käytöstäpoistosta	○	○	○	○	○
tuotteen valmistumaa, -maat	○	○	○	○	○

25) Toivoisin, että tuote olisi automaattisesti ympäristövaikutuksiltaan mahdollisimman optimoitu ja näin erillisiä merkintöjä tuotteessa ei tarvittaisi

☐ täysin eri mieltä ☐ jokseenkin eri mieltä ☐ en osaa sanoa ☐ jokseenkin samaa mieltä ☐ täysin samaa mieltä

26) Mistä mieluiten haluat ostaa ekologisen ja eettisen vaatteen

○ tavaratalosta ○ erikoismyymälästä ○ internetistä ○ erikoistapahtumasta, esim. messut ○ suoraan tekijältä

○ kirpputorilta ○ muu, mikä _____

27) Mistä mieluiten haluat ostaa ekologisen ja eettisen kodintekstiilin

○ tavaratalosta ○ erikoismyymälästä ○ internetistä ○ erikoistapahtumasta, esim. messut ○ suoraan tekijältä

○ kirpputorilta ○ muu, mikä _____

28) Tulevaisuudessa ekotekstiilit ja ekomuoti voi mielestäni olla

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa mieltä, 5=täysin samaa mieltä

	1	2	3	4	5
ryppyisen näköinen (säästetään silitysenergia tai materiaali ei kestä silitystä)	○	○	○	○	○
alemmassa lämpötilassa pestävä (esim. 30C)	○	○	○	○	○
harvemmin pestävä (käsityksemme puhtaudesta voisi hieman joustaa)	○	○	○	○	○
työläämpää huoltoa vaativa (esim. käsinpesu viileässä vedessä, jota vaativat esim. uusiutuvat kasvivärit)	○	○	○	○	○
koostunut irrotettavista osista (moduulirakenne), jolloin vain pahimmin likaantuvat osat voi irrottaa pesua varten	○	○	○	○	○
kuvioinniltaan likatahroja peittävä, jotta pesuvälejä voidaan harventaa	○	○	○	○	○
väritykseltään likatahroja peittävä, jotta pesuvälejä voidaan harventaa	○	○	○	○	○
hengittävä ja siten hikoilua estävä, jotta pesuvälejä voidaan harventaa	○	○	○	○	○
itsestään puhdistuva (esim. nanoteknologialla käsitelty)	○	○	○	○	○
suppean väriskaalan omaava (kompostoinnin kannalta turvallisia värejä käytössä vain 10-15)	○	○	○	○	○
mahdollisimman pitkäikäistä, laadukasta	○	○	○	○	○
kestää vain todellisen käytön verran esim. muodikkaat tuotteet vain ½ vuotta	○	○	○	○	○
kierrätysmateriaalista valmistettu (kenties hieman heikkolaatuisempi kuin aivan neitseellisestä raaka-aineesta tehty)	○	○	○	○	○
kierrätettävä	○	○	○	○	○
kompostoitava	○	○	○	○	○
ulkonäöllään ja designillaan ekoarvoja julistava (ecodesignin tunnistettavuus)	○	○	○	○	○
tunnistettava "vihreäksi" esim. jollain merkillä sisäsaumassa tai vihreällä saumauksella	○	○	○	○	○
standardoidulla ympäristömerkillä tunnistettava	○	○	○	○	○
ulkonäöltään ja estetiikaltaan samanlainen kuin muutkin tekstiilit (ei erotu joukosta)	○	○	○	○	○
jotenkin yksilöllinen	○	○	○	○	○
käsityötuote	○	○	○	○	○
tuunattavissa oleva, tee-se-itse periaatteella yksilöitävissä	○	○	○	○	○
vain itselle suunniteltu, jolloin tuotteeseen kiintyy pidemmäksi aikaa	○	○	○	○	○
laadukas	○	○	○	○	○
kalliimpi kuin tänään	○	○	○	○	○
turvallinen (myrkytön tuotanto ja tuote)	○	○	○	○	○
ohuempi (vähemmästä materiaalimäärästä valmistettu)	○	○	○	○	○
korjattavissa oleva	○	○	○	○	○

29) Olen valmis pidentämään tekstiilituoteen pesuväliä ympäristösyistä

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

30) Voisin ostaa lyhytkäisen tekstiilin (esim. huippumuodikkaan vaatteen) joka on tarkoitettu kestämään lyhyen aikaa, mutta sen voi kompostoida käytön jälkeen

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

31) Olen valmis laskemaan tekstiilituotteiden pesulämpötilaa ympäristösyistä (esim. pesu 30C)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

32) Olen valmis ostamaan laadukkaita, pitkäikäisiä, korjattavia, hinnakkaampia tekstiilituotteita ja käyttämään niitä pitkään ja täten vähentämään kokonaiskulutustani

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

33) Tekstiilit ja vaatteet pitää suunnitella kiertoon kelpaaviksi ja kierrätyspisteitä pitää olla tarjolla

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

34) Jotta viitsisin viedä vanhat tekstiilit kierrätykseen, tulee kekstiilimateriaalin kierrätyspisteen sijaita kodistani

○ 1-4km ○ 5-9km ○ 10-14km ○ 15-18km ○ enemmän kuin 20km päässä

○ ostoskeskuksen yhteydessä ○ Työmatkani varrella ○ muu, mikä _____

35) Olen valmis ostamaan kierrätysmateriaalista tehdyn tekstiilituotteen, vaikka sen laatu olisi heikompi kuin aivan uusista materiaaleista tehdyn tuotteen (esim. kierrätyspuuvilla)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

36) Tulevaisuudessa tekstiilien ja vaatteiden valmistuksen tulee olla ympäristövaikutuksiltaan minimoitua

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

37) Tulevaisuudessa vaatteiden ja tekstiilin huollon ja käytöstäpoiston tulee olla ympäristövaikutuksiltaan minimoitua

○ täysin eri mieltä ○ jokseenkin samaa mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

38) Tulevaisuuden ekomuodin tulee olla yksilöllistä

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

39) Tulevaisuuden ekomuodin tulee olla massatuotantoa ja kaikille samaa tyylilajia tarjoavaa

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

40) Tulevaisuudessa ekomuodin tulee olla paikallisesti tuotettua (lähialuetuotantoa)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

41) Tulevaisuudessa kuluttajilla täytyy olla mahdollisuus löytää informaatiota tekstiilituotannon eettisyydestä, tuotantopaikoista ja tekijöistä (made by jäljitys tavaroihin)

○ täysin eri mieltä ○ jokseenkin eri mieltä ○ en osaa sanoa ○ jokseenkin samaa mieltä ○ täysin samaa mieltä

42) Jotta ihmisten kulutuskäyttäytyminen muuttuisi ympäristön kannalta kestävämmäksi, mitä täytyy tapahtua?

○ tiedotusta tuotannon ympäristövaikutuksista lisätään

○ kulutusverot , ympäristöverot, muut valtiovallan ohjaustoimet lisääntyvät

○ kulutuksesta syyllistetään esim. tiedotusvälineissä

○ ympäristökatastrofit lisääntyvät

○ muu, mikä

Tekstiileiden ja vaatteiden merkitys

43) Vaate merkitsee minulle

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa meitlä, 5=täysin samaa mieltä

	1	2	3	4	5
suojaa	○	○	○	○	○
turvaa	○	○	○	○	○
omaa identiteettiäni	○	○	○	○	○
käytännöllisyyttä	○	○	○	○	○
sosiaaliluokkaan kuulumista	○	○	○	○	○
ammattiryhmään kuulumista	○	○	○	○	○
omaa ideologiaani(esim. vihreät arvot)	○	○	○	○	○
kontrollia	○	○	○	○	○
asiallisuutta	○	○	○	○	○
ajankohtaisuutta(muotia)	○	○	○	○	○
turhamaisuutta	○	○	○	○	○
suuntaa elämässä (identiteetin kehitys tai muokkaaminen)	○	○	○	○	○
kauneutta	○	○	○	○	○
luovuutta	○	○	○	○	○

44) Muuta, mitä

45) Kodintekstiili merkitsee minulle

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa mieltä, 5=täysin samaa mieltä

	1	2	3	4	5
suojaa	○	○	○	○	○
turvaa	○	○	○	○	○
omaa identiteettiäni	○	○	○	○	○
käytännöllisyyttä	○	○	○	○	○
sosiaaliluokkaan kuulumista	○	○	○	○	○
ammattiryhmään kuulumista	○	○	○	○	○
omaa ideologiaani(esim. vihreät arvot)	○	○	○	○	○
kontrollia	○	○	○	○	○
asiallisuutta	○	○	○	○	○
ajankohtaisuutta(muotia)	○	○	○	○	○
turhamaisuutta	○	○	○	○	○
suuntaa elämässä (identiteetin kehitys tai muokkaaminen)	○	○	○	○	○
kauneutta	○	○	○	○	○
luovuutta	○	○	○	○	○

46) Muuta, mitä

47) Pitkäikäisimmät tekstiilituotteeni: Kiinnyn tuotteeseeni, koska tuote on

Asteikko: 1=täysin eri mieltä, 2=jokseenkin eri mieltä, 3=en osaa sanoa, 4=jokseenkin samaa mieltä, 5=täysin samaa mieltä

	1	2	3	4	5
kaunis	○	○	○	○	○
toimiva	○	○	○	○	○
laadukas	○	○	○	○	○
arvokas	○	○	○	○	○
tunnetun suunnittelijan	○	○	○	○	○
lahjaksi saatu	○	○	○	○	○
itse tehty	○	○	○	○	○
itselle suunniteltu, uniikki	○	○	○	○	○
käsityötuote	○	○	○	○	○
peritty	○	○	○	○	○
vanha	○	○	○	○	○
muistoja herättävä	○	○	○	○	○

48) Kerro pitkäikäisimmän vaatteesi tarina. Miksi se on säilynyt niin pitkään?

49) Kerro pitkäikäisimmän kodintekstiilisi tarina. Miksi se on säilynyt niin pitkään?

Lähetä

Kiitos vastauksistasi!
Jos haluat osallistua ekotuotepaketin arvontaa, laita yhteystietosi sähköpostilla
kirsi.niinimaki@taik.fi

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Tulevaisuuden tekstiilit ja vaatteet Textiles and Clothes of the Future

Aalto-yliopisto

Tulevaisuuden tekstiilit ja vaatteet Textiles and Clothes of the Future [Score: 0]

1) Sukupuoli/gender [Score: 0]

○ nainen/female [Score: 0] ○ mies/male [Score: 0]

2) Ikä vuosina/age [Score: 0]

○ 18-25 [Score: 0] ○ 26-35 [Score: 0] ○ 36-45 [Score: 0] ○ 46-55 [Score: 0] ○ 56-64 [Score: 0]

3) Koulutus/education [Score: 0]

○ kansa- tai peruskoulu / elementary school [Score: 0]

○ 2. asteen tutkinto esim. ammattikoulu / vocational school [Score: 0]

○ ylioppilas/vocational school [Score: 0]

○ ammattikorkeakoulu / Barchelor level degree [Score: 0]

○ Akateeminen loppututkinto / Master level degree [Score: 0]

○ Tohtoritutkinto / Doctoral degree [Score: 0]

4) Mihin tuloluokkaan kuulut / Which income bracket you belong to [Score: 0]

☐ ei tuloja / no income [Score: 0]

☐ alle 2000 € kuukaudessa / less than 2000 € a month [Score: 0]

☐ 2000 - 2999 € kuukausi/ a month [Score: 0]

☐ 3000 - 4999 € kuukausi/ a month [Score: 0]

☐ yli 5000 € kuukaudessa / more than 5000 € [Score: 0]

Kuluttajien asenteet ympäristöasioihin ja eettisyyteen / Consumer interest in environmental issues and ethical consumption [Score: 0]

5) Olen kiinnostunut yleisesti eettisestä kuluttamisesta ja tuotteiden ympäristövaikutuksista / I am interested in ethical consumption and the environmental impact of products [Score: 0]

täysin eri mieltä/ totally disagree

6) Toimin kuluttajana eettisesti (ostan vähemmän/vain tarpeeseen, ostan ekomerkittyjä tuotteita, luomuruokaa, lähialuetuotantoa ym.) / As a consumer I act ethically (buying less/only for real need, I favor eco-labelled products and local production) [Score: 0]

täysin eri mieltä/ totally disagree

7) Tekstiilituotteen ja -tuotannon eettisyys, turvallisuus ja ympäristöhaitat vaikuttavat ostopäätökseeni / Ethicality, safety (free of toxic chemicals) and the environmental impact of textile products and production affect my purchasing decision [Score: 0]

täysin eri mieltä/ totally disagree

Ostotarve/ The need for purchasing [Score: 0]

8) Mieti viimeisimpiä vaatehankintojasi ja kerro, mihin tarpeeseen ostit vaatteesi (esim. viimeiset 3 ostosta). Voit valita useamman vaihtoehdon / Think about your 3 last clothing purchases and tell, what need you were addressing with your purchasing [Score: 0]

☐ todellinen tarve uudelle vaatteelle/real need for a new clothe [Score: 0]

☐ halu uudistua/need to renew appearance [Score: 0]

☐ muodin seuraaminen /following fashion [Score: 0]

☐ impulssiostos/impulse shopping [Score: 0]

☐ vakaa harkinta/deep consideration [Score: 0]

☐ kauneuden kaipuu/yearning for beauty [Score: 0]

☐ sosiaalinen paine tietynlaiseen ulkonäköön/social pressure for certain kind of appearance [Score: 0]

☐ tarve vaikuttaa muihin/need to affect on others [Score: 0]

☐ tarve kuulua johonkin ryhmään/need to belong to some group [Score: 0]

☐ tarve osoittaa omaa ideologiaa/need to show own ideology [Score: 0]

Ostopäätös/ Purchasing decision [Score: 0]

9) Mieti viimeisimpiä vaatehankintojasi ja arvioi 5 eniten ostopäätökseesi vaikuttanutta tekijää Think about your resent clothing purchases and name 5 of the most important factors [Score: 0]

- ☐ hinta/prize [Score: 0]
- ☐ tyyli/style [Score: 0]
- ☐ yritys/brand [Score: 0]
- ☐ laatu/quality [Score: 0]
- ☐ kotimaisuus/made in Finland [Score: 0]
- ☐ väri/colors [Score: 0]
- ☐ materiaali/material [Score: 0]
- ☐ ekologisuus, eettisyys/ekological, ethicality [Score: 0]
- ☐ vesipestävyys/suitability for water washing [Score: 0]
- ☐ tuotteen pitkä käyttöikä/long lifespan of the product [Score: 0]
- ☐ tuotteen sopivuus muihin vaatteisiisi/suitability for existing wardrobe [Score: 0]
- ☐ tuoteen sopivuus yllesi/fit [Score: 0]
- ☐ muu, mikä /something else? what? [Score: 0] _____

10) Mietitkö missään seuraavissa vaiheissa vaatteen ympäristövaikutuksia/ Did you consider the environmental impact of the textiles in any of the next stages [Score: 0]

- ☐ Kun ostotarve herää / When the awareness of a need arises [Score: 0]
- ☐ Kun tutustut eri vaihtoehtoihin / When searching alternative options [Score: 0]
- ☐ Kun sovitat vaatetta / When fitting the cloth [Score: 0]
- ☐ Varsinaisessa ostopäätöstilanteessa/ In the real purchasing situation [Score: 0]
- ☐ Maksuvaiheessa / When paying [Score: 0]
- ☐ Käyttövaiheessa / When using the cloth [Score: 0]
- ☐ Poistovaiheessa / When disposing the cloth [Score: 0]

11) Merkitse, mihin asioihin olit tyytyväinen viimeisessä vaateostoksessasi/ Mark, which things you were satisfied with in your latest clothing purchase [Score: 0]

- ☐ odotukset tuotteesta/product expectations [Score: 0]
- ☐ ostokokemus/shopping experience [Score: 0]
- ☐ tuotetieto/product information [Score: 0]
- ☐ laatu/quality [Score: 0]
- ☐ väri/color [Score: 0]
- ☐ materiaali/material [Score: 0]
- ☐ hoito-ominaisuudet/maintenance quality [Score: 0]
- ☐ käyttö-ikä/life span [Score: 0]
- ☐ käyttökokemus/ use experience [Score: 0]
- ☐ tuntu/feel and touch against your skin [Score: 0]
- ☐ istuvuus/fit [Score: 0]
- ☐ kauneuskokemus/ beauty experience [Score: 0]
- ☐ muiden palaute/ feedback form others [Score: 0]
- ☐ muu, mikä? /something else, what? [Score: 0] _____

12) Merkitse, mihin asoihin et ollut tyytyväinen viimeisimmässä vaateostoksissasi/Mark, which things you were not satisfied with in your latest clothing purchases [Score: 0]

- ☐ odotukset tuotteesta/product expectations [Score: 0]
- ☐ ostokokemus/shopping experience [Score: 0]
- ☐ tuotetieto/product information [Score: 0]
- ☐ laatu/quality [Score: 0]
- ☐ väri/color [Score: 0]
- ☐ materiaali/material [Score: 0]
- ☐ hoito-ominaisuudet/maintenance quality [Score: 0]
- ☐ käyttö-ikä/life span [Score: 0]
- ☐ käyttökokemus/use experience [Score: 0]
- ☐ tuntu/feel and touch against your skin [Score: 0]
- ☐ istuvuus/fit [Score: 0]
- ☐ kauneuskokemus/ beauty experience [Score: 0]
- ☐ muiden palaute / feedback from others [Score: 0]
- ☐ muu, mikä? / something else, what? [Score: 0] _____

Tekstiilien ympäristövaikutukset/ The environmental impact of the textiles [Score: 0]

13) Mikä tekstiilituotannon vaihe huolestuttaa sinua ympäristön kannalta / What phase of the product life cycle worries you while thinking about the environmental impact of textiles [Score: 0]

- ☐ Kuidun tuotanto (esim. puuvillan kasvatus)/ The cultivation of fiber(e.g. cotton cultivation) [Score: 0]
- ☐ Kuidun prosessointivaihe/ Fiber processing [Score: 0]
- ☐ Tuotteen valmistusprosessi/ Product processing [Score: 0]
- ☐ Kuljetusvaiheet/ Transportations [Score: 0]
- ☐ Tuotteen käyttövaihe (vedenkulutus, energia)/ Use phase (the use of water and energy) [Score: 0]
- ☐ Tuotteen lyhyt elinikä/ Short life time of the product [Score: 0]
- ☐ Tuotteen poistuminen käytöstä/ The disposal of the product [Score: 0]
- ☐ Tuotteen valmistumaa / Location of manufacturing [Score: 0]
- ☐ muu, mikä? / something else, what? [Score: 0]

Tuotteen käyttö/ The use phase [Score: 0]

14) Arvioi pitkäikäisimpien/eniten käytettyjen vaatteidesi elinikä /Estimate the lifespan of your oldest/most used clothes [Score: 0]

- ○ 1kk-2kk (1 month-2 months) [Score: 0]
- ○ 3kk-6kk [Score: 0]
- ○ 7kk-1vuosi (7 months-1 year) [Score: 0]
- ○ 1-2 vuotta (1-2 years) [Score: 0]
- ○ 2-3 vuotta [Score: 0]
- ○ 3-4 vuotta [Score: 0]
- ○ 4-5 vuotta [Score: 0]
- ○ yli 5 vuotta (more than 5 years) [Score: 0]

15) Kerro lyhyesti, mikä tekstiilituote kestää sinulla pitkään ja miksi / Tell briefly what textile product you use for a long time and why so [Score: 0]

16) Arvioi lyhytikäisimpien vaatteidesi todellinen käyttöikä / Estimate the lifespan of the product which you have used the shortest time [Score: 0]

- ☐ vähemmän kuin 1kk / less than 1 month [Score: 0]
- ☐ 1-2kk / 1-2 months [Score: 0]
- ☐ 3-6kk [Score: 0]
- ☐ 7kk-1vuosi (7 months-1 year) [Score: 0]
- ☐ 1-2 vuotta (1-2 years) [Score: 0]
- ☐ 2-3 vuotta [Score: 0]
- ☐ 3-4 vuotta [Score: 0]
- ☐ 4-5 vuotta [Score: 0]
- ☐ yli 5 vuotta (more than 5 years) [Score: 0]

17) Kerro lyhyesti, mikä tekstiilituote kestää sinulla lyhyen aikaa ja miksi / Tell briefly what textile product you use for a short time and why so [Score: 0]

Uudet tuotanto- ja palvelutavat / New production and service systems [Score: 0]

18) Vastaa allaoleviin väittämiin / Answer to the statements below [Score: 0]

1=täysin eri mieltä (totally disagree), 2=jokseenkin samaa mieltä (somewhat disagree), 3=en osaa sanoa (can't say), 4=jokseenkin samaa mieltä(sometwhat agree), 5= täysin samaa mieltä(totally agree)

	1 [Score: 0]	2 [Score: 0]	3 [Score: 0]	4 [Score: 0]	5 [Score: 0]
Tuotteen kotimaisuus on minulle tärkeä ostokriteeri / It is important to me that the cloth is made in Finland [Score: 0]	☐	☐	☐	☐	☐
Vaatteen tulee olla tehty lähialueella/ The clothes has to be made in neighbouring area [Score: 0]	☐	☐	☐	☐	☐
Vaatetuotannon tulee olla vähän ympäristöä rasittavaa/Clothing production has to have small environmental impact [Score: 0]	☐	☐	☐	☐	☐
Haluan tietää ostamani vaatteen tuotantotavoista ja ympäristövaikutuksista/I want to know the manufacturing processes and environmental impact of the cloth I am buying [Score: 0]	☐	☐	☐	☐	☐
Olen huolestunut vaatetuotannon eettisyydestä/ I am worried about the ethical issues in clothing production [Score: 0]	☐	☐	☐	☐	☐
Voin vuokrata vaatteen lyhyeen käyttöön/ I can rent a clothe to a short time use [Score: 0]	☐	☐	☐	☐	☐
Voisin vuokrata vaatteen pitkäkestoiseen käyttöön (esim. 1 vuosi)/ I can rent clothe for a long time use (e.g. 1 year) [Score: 0]	☐	☐	☐	☐	☐
Vaate tulee suunnitella optimin käyttöiän mukaan ja käyttöikä tulee ilmoittaa vaatteessa (esim vaate on suunniteltu käytettäväksi 6kk tai 3 vuotta)/ Clothes has to design for optimal use time and this has to inform (cloth has designed to be in use e.g. 6 months or 3 years) [Score: 0]	☐	☐	☐	☐	☐
Voisin ostaa lyhytikäisen vaatteen,jota ei tarvitse lainkaan pestä lyhyen käyttöiän aikana/ I could buy a short lifetime clothe, which do not need any washing during the short lifespan [Score: 0]	☐	☐	☐	☐	☐
Vaatteille voisi kehittää palautus/vaihtopalveluja valmistajan toimesta/ There could exists change and return services for clothes (manufactures activies) [Score: 0]	☐	☐	☐	☐	☐
Vaatteet voisivat olla päivitettäviä (esim. osia voisi vaihtaa tai kokonaisuutta täydentää uusilla osilla)/Clothes could be upgradeable (You can buy or change new parts to add in your outfit) [Score: 0]	☐	☐	☐	☐	☐
Voisin käyttää vaatteen korjaus-, muutos- tai uudistamispalveluja/ I could use repair-, modification services [Score: 0]	☐	☐	☐	☐	☐
Olen kiinnostunut vaatteen yksilöllisestä suunnittelupalveluista/ I am interested about the customization possibilities with clothes [Score: 0]	☐	☐	☐	☐	☐
Minua kiinnostaa modulaarirakenteiset vaatteet, joita voisi korjata tai jopa valmistaa itse/ I am interested about clothing with modular structures, because I could repair or even made the cloth by myself [Score: 0]	☐	☐	☐	☐	☐
Olen kiinnostunut vaikuttamaan suunnitteluprosessiin itse (esim. netin välityksellä/ I am interested to take part into the design process (for example through internet) [Score: 0]	☐	☐	☐	☐	☐
Olen kiinnostunut vaikuttamaan valmistusprosessiin itse (esim. netin välityksellä/ I am interested to effect on the manufacturing process (for example through internet) [Score: 0]	☐	☐	☐	☐	☐
Vaatteiden tulee olla kierrätykseen kelpaavia (kuidun kierrätys uudeksi vaatemateriaaliksi)/ Clothes has to be suitable for recycling (recycling the fiber into a new textile material) [Score: 0]	☐	☐	☐	☐	☐

19) Olen valmis ostamaan laadukkaan, pitkäikäisen,korjattavan ja hinnakkaan vaatteen ja ja käyttämään sitä pitkän aikaa vähentääkseni omaa ympäristökuormitustani/ I am ready to buy a long life time repairable cloth to minimize my own environmental impact [Score: 0]

- ○ täysin eri mieltä/totally disagree [Score: 0]
- ○ jokseenkin eri mieltä/somewhat disagree [Score: 0]
- ○ en osaa sanoa/can't say [Score: 0]
- ○ jokseenkin samaa mieltä/somewhat agree [Score: 0]
- ○ täysin samaa mieltä/totally agree [Score: 0]

Tuotekiintymys/product attachment [Score: 0]

20) Kiinnyn pitkään käytössä kestäviin tekstiileihin ja vaatteisiin, koska.../ I become attached to textiles and clothes and use them long, because... [Score: 0]

- ☐ ne ovat kauniita /they are beautiful [Score: 0]
- ☐ ne ovat laadukkaita/they have a high quality [Score: 0]
- ☐ väri miellyttää minua/ I like the color [Score: 0]
- ☐ tyyli miellyttää minua / I like the style [Score: 0]
- ☐ kuvio miellyttää minua/ I like the print [Score: 0]
- ☐ materiaali miellyttää minua / I like the material [Score: 0]
- ☐ ne ovat helppohoitoisia/ they are easy to maintenance [Score: 0]
- ☐ ne ovat muodikkaita/they are fashionable [Score: 0]
- ☐ ne ovat nimekkään brändin tai suunnittelijan/they are made or designed by famous brand or designer [Score: 0]
- ☐ ne ovat kalliita/ they are expensive [Score: 0]
- ☐ ne ovat istuvia tai käyttöönsopivia/ they fit perfectly or they are suitable for use situation [Score: 0]

21) Pitkään käytössä olevat vaatteeni ovat väriltään /The clothes I have used for a long time are [Score: 0]

- ☐ mustia /black [Score: 0]
- ☐ valkoisia/white [Score: 0]
- ☐ harmaita/grey [Score: 0]
- ☐ sinisiä/blue [Score: 0]
- ☐ punaisia/red [Score: 0]
- ☐ keltaisia/yellow [Score: 0]
- ☐ vihreitä/greev [Score: 0]
- ☐ oransseja/orange [Score: 0]
- ☐ violetteja/violet [Score: 0]
- ☐ ruskeita/brown [Score: 0]
- ☐ kirkkaita perusvärejä/ basic bright colors [Score: 0]
- ☐ taitettuja tummia värejä/dark, off colors [Score: 0]
- ☐ vaaleita pastellivärejä/light pastel colors [Score: 0]

22) Pitkään käytössä olevat vaatteeni ovat materiaaliltaan (pääosin)/The clothes I have used for a long time are [Score: 0]

- ☐ villaa/wool [Score: 0]
- ☐ nahkaa/leather [Score: 0]
- ☐ polyesteriä/polyester [Score: 0]
- ☐ puuvillaa/cotton [Score: 0]
- ☐ pellavaa/linen [Score: 0]
- ☐ jotain muuta, mitä/something else, what [Score: 0] _____

23) Pitkään käytössä olevat vaatteeni ovat tyyliltään/The clothes I have used for a long time are... style [Score: 0]

- ☐ klassisia/classical [Score: 0]
- ☐ muodikkaita/fashionable [Score: 0]
- ☐ retrohenkisiä/retro fashion [Score: 0]
- ☐ oikeasti vanhoja/real old clothes [Score: 0]
- ☐ hiljaisia perusvaatteita/silent basic clothes [Score: 0]
- ☐ näyttäviä/bold [Score: 0]

24) Pitkään käytössä olevat kodintekstiilit ovat väriltään /The hometextiles I have used for a long time are [Score: 0]

- ☐ mustia /black [Score: 0]
- ☐ valkoisia/white [Score: 0]
- ☐ harmaita/grey [Score: 0]
- ☐ sinisiä/blue [Score: 0]
- ☐ punaisia/red [Score: 0]
- ☐ keltaisia/yellow [Score: 0]
- ☐ vihreitä/greev [Score: 0]
- ☐ oransseja/orange [Score: 0]
- ☐ violetteja/violet [Score: 0]
- ☐ ruskeita/brown [Score: 0]
- ☐ kirkkaita perusvärejä/ basic bright colors [Score: 0]
- ☐ taitettuja tummia värejä/dark, off colors [Score: 0]
- ☐ vaaleita pastellivärejä/light pastel colors [Score: 0]

25) Pitkään käytössä olevat kodintekstiilit ovat materiaaliltaan (pääosin)/The hometextiles I have used for a long time are [Score: 0]

- villaa/wool [Score: 0]
- nahkaa/leather [Score: 0]
- polyesteriä/polyester [Score: 0]
- puuvillaa/cotton [Score: 0]
- pellavaa/linen [Score: 0]
- jotain muuta, mitä/something else, what [Score: 0]

26) Pitkään käytössä olevat kodintekstiilini ovat tyyliltään/The hometextiles I have used for a long time are... style [Score: 0]

- klassisia/classical [Score: 0]
- muodikkaita/trendy [Score: 0]
- retrohenkisiä/retro style [Score: 0]
- oikeasti vanhoja/real old textiles [Score: 0]
- hiljaisia perustekstiilejä/silent basic textiles [Score: 0]
- näyttäviä/bold [Score: 0]

27) Kiitos vastauksistasi. Jos haluat vielä osallistua arvontaan, laita tähän sähköpostiosoitteesi. / Thank you for answering. If you still want to take part in the lottery, please add your e-mail address here [Score: 0]

Sivu1

Print

Tulevaisuuden tekstiilit ja vaatteet Kuluttajakysely

Aalto-yliopisto

Taustatiedot [Score: 0]

1) Sukupuoli [Score: 0]

○ nainen [Score: 0] ○ mies [Score: 0]

2) Ikä vuosina [Score: 0]

○ 18-25 [Score: 0] ○ 26-35 [Score: 0] ○ 36-45 [Score: 0] ○ 46-55 [Score: 0] ○ 56-64 [Score: 0]

3) Koulutustausta [Score: 0]

○ kansa- tai peruskoulu [Score: 0]
○ 2. asteen tutkinto esim. ammattikoulu [Score: 0]
○ ylioppilas [Score: 0]
○ ammattikorkeakoulu [Score: 0]
○ akateeminen loppututkinto [Score: 0]

4) Tuloluokka [Score: 0]

○ ei tuloja [Score: 0]
○ alle 2000€ kuukaudessa [Score: 0]
○ 2001-3000€ kuukaudessa [Score: 0]
○ 3001-5000€ kuukaudessa [Score: 0]
○ 5001€ tai yli kuukaudessa [Score: 0]

5) Asuinlääni [Score: 0]

○ Etelä-Suomen lääni [Score: 0]
○ Länsi-Suomen lääni [Score: 0]
○ Itä-Suomen lääni [Score: 0]
○ Oulun lääni [Score: 0]
○ Lapin lääni [Score: 0]

Sivu1

Kuluttajien asenteet ympäristöasioihin ja tuotteiden eettisyyteen [Score: 0]

6) Olen kiinnostunut yleisesti eettisestä kuluttamisesta ja tuotteiden ympäristövaikutuksista [Score: 0]

täysin eri mieltä

7) Toimin kuluttajana eettisesti (ostan vähemmän, ostan ekomerkittyjä tuotteita,luomuruokaa, lähialuetuotantoa, kierrätän ym.) [Score: 0]

täysin eri mieltä

8) Tekstiilituotteen ja -tuotannon eettisyys, turvallisuus ja ympäristöhaitat vaikuttavat ostopäätöksiini [Score: 0]

ei koskaan

9) Missä ovat mielestäsi suurimmat esteet toimia kuluttajana eettisesti tekstiilejä ostaessa [Score: 0]

	täysin eri mieltä [Score: 0]	jokseenkin eri mieltä [Score: 0]	en osaa sanoa [Score: 0]	jokseenkin samaa mieltä [Score: 0]	täysin samaa mieltä [Score: 0]
Tiedon saanti tuotteen eettisyydestä ja ympäristövaikutuksista on vaikeaa [Score: 0]	○	○	○	○	○
Eettisiä tuotteita ei ole tarpeeksi markkinoilla [Score: 0]	○	○	○	○	○
Eettiset ja ympäristöystävälliset tuotteet ovat kalliita [Score: 0]	○	○	○	○	○
Eettiset ja ympäristöystävälliset tuotteet eivät ole kiinnostavia [Score: 0]	○	○	○	○	○
Suurin osa tekstiilituotannosta on siirtynyt halpoihin Aasian maihin [Score: 0]	○	○	○	○	○

10) Onko olemassa jotain muita esteitä eettiseen kuluttamiseen? Voit halutessasi kirjoittaa tähän oman mielipiteesi [Score: 0]

Sivu2

Ostotarve [Score: 0]

11) Mieti viimeisimpiä vaatehankintojasi (esim. kolme viimeksi hankittua) ja kerro mihin tarpeeseen ostit tuotteen. Voit valita useamman vaihtoehdon. [Score: 0]

- ☐ en osta vaatteita [Score: 0]
- ☐ todellinen tarve [Score: 0]
- ☐ halu uudistua [Score: 0]
- ☐ muodin seuraaminen [Score: 0]
- ☐ impulssiostos [Score: 0]
- ☐ vakaa harkinta [Score: 0]
- ☐ kauneuden kaipuu [Score: 0]
- ☐ tarve saada sosiaalista hyväksyntää [Score: 0]
- ☐ tarve vaikuttaa muihin [Score: 0]
- ☐ tarve kuulua johonkin ryhmään (esim. ammattiryhmä) [Score: 0]
- ☐ tarve osoittaa omaa ideologiaa [Score: 0]
- ☐ muu, mikä [Score: 0]

Ostopäätös [Score: 0]

12) Mieti edelleen viimeisimpiä vaatehankintojasi ja arvioi 5 eniten ostopäätökseesi vaikuttanutta tekijää [Score: 0]

- ☐ hinta [Score: 0]
- ☐ tyyli [Score: 0]
- ☐ yritys/merkki [Score: 0]
- ☐ laatu [Score: 0]
- ☐ kotimaisuus [Score: 0]
- ☐ väri [Score: 0]
- ☐ materiaali [Score: 0]
- ☐ istuvuus [Score: 0]
- ☐ uutuus, muoti [Score: 0]
- ☐ tuotteen ekologisuus, eettisyys [Score: 0]
- ☐ vesipestävyys [Score: 0]
- ☐ tuotteen pitkä käyttöikä [Score: 0]
- ☐ tuotteen sopivuus muihin vaatteisiisi [Score: 0]
- ☐ muu, mikä [Score: 0]

13) Mietitkö missään seuraavissa vaiheissa vaatteen ympäristövaikutuksia (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ en missään vaiheessa [Score: 0]
- ☐ kun ostotarve herää [Score: 0]
- ☐ kun tutustut eri vaihtoehtoihin [Score: 0]
- ☐ kun sovitat vaatetta [Score: 0]
- ☐ varsinaisessa ostopäätöstilanteessa [Score: 0]
- ☐ maksuvaiheessa [Score: 0]
- ☐ käyttövaiheessa [Score: 0]
- ☐ tuotteen poistuessa käytöstä [Score: 0]
- ☐ muu, mikä [Score: 0] _____

14) Mihin asioihin olit tyytyväinen kolmessa viimeisessä vaateostoksessasi (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ odotukset tuotteesta [Score: 0]
- ☐ ostokokemus [Score: 0]
- ☐ tuotetiedot: tiedot materiaalikoostumuksesta [Score: 0]
- ☐ tuotetiedot: hoito-ohjeet [Score: 0]
- ☐ tuotetiedot: tiedot valmistusmaasta [Score: 0]
- ☐ laatu [Score: 0]
- ☐ väri [Score: 0]
- ☐ materiaali [Score: 0]
- ☐ hoito-ominaisuudet [Score: 0]
- ☐ käyttö-ikä [Score: 0]
- ☐ käyttö-kokemus [Score: 0]
- ☐ tuntu [Score: 0]
- ☐ istuvuus [Score: 0]
- ☐ kauneuskokemus [Score: 0]
- ☐ muiden palaute [Score: 0]
- ☐ tuotteen ekologisuus [Score: 0]
- ☐ tuotteen eettisyys [Score: 0]
- ☐ muu, mikä [Score: 0] _____

15) Mihin asioihin et ollut tyytyväinen vaateostoksissasi (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ odotukset tuotteesta [Score: 0]
- ☐ ostokokemus [Score: 0]
- ☐ tuotetiedot: materiaalikoostumus [Score: 0]
- ☐ tuotetiedot: hoito-ohjeet [Score: 0]
- ☐ tuotetiedot: valmistusmaa [Score: 0]
- ☐ laatu [Score: 0]
- ☐ väri [Score: 0]
- ☐ materiaali [Score: 0]
- ☐ hoito-ominaisuudet [Score: 0]
- ☐ käyttö-ikä [Score: 0]
- ☐ käyttökokemus [Score: 0]
- ☐ tuntu [Score: 0]
- ☐ istuvuus [Score: 0]
- ☐ kauneuskokemus [Score: 0]
- ☐ muiden palaute [Score: 0]
- ☐ tuotteen ekologisuus [Score: 0]
- ☐ tuotteen eettisyys [Score: 0]
- ☐ muu, mikä [Score: 0] _____

Sivu3

Tekstiilien ympäristövaikutukset [Score: 0]

16) Mikä tekstiilituotannon vaihe huolestuttaa sinua ympäristön kannalta (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ ei mikään [Score: 0]
- ☐ kuidun tuotanto [Score: 0]
- ☐ kuidun prosessointivaihe [Score: 0]
- ☐ tuotteen valmistusprosessi [Score: 0]
- ☐ kuljetusvaiheet [Score: 0]
- ☐ tuotteen käyttövaihe (energian- ja vedenkulutus) [Score: 0]
- ☐ tuotteen elinikä [Score: 0]
- ☐ tuotteen poistuminen käytöstä [Score: 0]
- ☐ tuotteen valmistusmaa [Score: 0]
- ☐ muu, mikä [Score: 0] _____

Sivu4

Tuotteen käyttö [Score: 0]

17) Arvioi pitkäikäisimpien käytössä olevien vaatteidesi todellinen elinikä [Score: 0]

- ○ alle 1kk [Score: 0]
- ○ 1-2kk [Score: 0]
- ○ 3-6kk [Score: 0]
- ○ 6kk-1vuosi [Score: 0]
- ○ 1-2vuotta [Score: 0]
- ○ 2-3vuotta [Score: 0]
- ○ 3-4vuotta [Score: 0]
- ○ 4-5vuotta [Score: 0]
- ○ yli 5vuotta [Score: 0]
- ○ muu, mikä [Score: 0] _____

18) Kerro lyhyesti, mikä tekstiilituote kestää sinulla käytössä pitkään ja miksi [Score: 0]

19) Arvioi lyhytikäisimpien käytössä olevien vaatteidesi todellinen elinikä [Score: 0]

- ○ muutama käyttökerta [Score: 0]
- ○ muutama viikko [Score: 0]
- ○ alle 1kk [Score: 0]
- ○ 1-2kk [Score: 0]
- ○ 3-6kk [Score: 0]
- ○ 7kk-1vuosi [Score: 0]
- ○ 1-2vuotta [Score: 0]
- ○ 2-3vuotta [Score: 0]
- ○ 3-4vuotta [Score: 0]
- ○ 4-5vuotta [Score: 0]
- ○ yli 5vuotta [Score: 0]
- ○ muu, mikä [Score: 0] _____

20) Kerro lyhyesti, mikä tekstiilituote on sinulla käytössä lyhyen aikaa ja miksi [Score: 0]

Sivu5

Uudet tuotanto- ja palvelutavat [Score: 0]

21) Vastaa allaoleviin väittämiin [Score: 0]

	täysin eri mieltä [Score: 0]	jokseenkin eri mieltä [Score: 0]	en osaa sanoa [Score: 0]	jokseenkin samaa mieltä [Score: 0]	täysin samaa mieltä [Score: 0]
Tekstiilituotteen kotimaisuus on minulle tärkeä ostokriteeri [Score: 0]	○	○	○	○	○
Haluan, että tekstiilit ja vaatteet on tehty lähialueella [Score: 0]	○	○	○	○	○
Minulle on tärkeää, että tekstiilituotanto on vähän ympäristöä kuormittavaa [Score: 0]	○	○	○	○	○
Haluan tietää ostamani vaatteen tuotantotavoista ja ympäristövaikutuksista [Score: 0]	○	○	○	○	○
Olen huolestunut tekstiilituotannon eettisyydestä [Score: 0]	○	○	○	○	○
Olen huolestunut tekstiilituotannon ympäristövaikutuksista [Score: 0]	○	○	○	○	○
Voin vuokrata vaatteen tai tekstiilin lyhyeen käyttöön [Score: 0]	○	○	○	○	○
Voisin vuokrata vaatteen pitkäkestoiseen käyttöön (esim. 1 vuosi) [Score: 0]	○	○	○	○	○
Voisin vuokrata kodintekstiilin pitkäkestoiseen käyttöön (esim. 1 vuosi) [Score: 0]	○	○	○	○	○
Tekstiili ja vaate tulee suunnitella optimin käyttöiän mukaan ja käyttöikä tulee ilmoittaa tuotteessa (esim. tekstiili on suunniteltu käytettäväksi 6kk tai 3 vuotta) [Score: 0]	○	○	○	○	○
Voisin ostaa lyhytikäisen tekstiilin tai vaatteen, jota ei tarvitse lainkaan pestä lyhyen käyttöiän aikana [Score: 0]	○	○	○	○	○
Vaatteille voisi kehittää palautus/vaihtopalveluja valmistajan toimesta [Score: 0]	○	○	○	○	○
Vaatteet voisivat olla päivitettäviä (esim. osia voisi vaihtaa tai kokonaisuutta täydentää uusilla osilla vaihtopalvelusta) [Score: 0]	○	○	○	○	○
Voisin käyttää vaatteen korjauspalvelua [Score: 0]	○	○	○	○	○
Voisin käyttää vaatteen muokkaus- ja uudistamispalvelua (vanhasta vaatteesta tehdään kokonaan uusi vaate) [Score: 0]	○	○	○	○	○
Olen kiinnostunut vaatteen yksilöllisistä suunnittelupalveluista [Score: 0]	○	○	○	○	○
Olen kiinnostunut kodintekstiilin yksilöllisistä suunnittelupalveluista [Score: 0]	○	○	○	○	○
Minua kiinnostavat modulaarirakenteiset vaatteet, joita voisi helposti korjata, muokata tai jopa valmistaa itse [Score: 0]	○	○	○	○	○
Olen kiinnostunut vaikuttamaan tekstiilin valmistusprosessin esim. netin välityksellä [Score: 0]	○	○	○	○	○
Olen kiinnostunut vaikuttamaan tuotteen suunnitteluprosessiin esim. netin välityksellä [Score: 0]	○	○	○	○	○
Vaatteiden tulee olla kierrätykseen kelpaavia (kuidun kierrätys uudeksi vaatemateriaaliksi) [Score: 0]	○	○	○	○	○
Olen kiinnostunut käyttämään ekologiseen vaatetukseen erikoistuneen vaateneuvojan palveluja [Score: 0]	○	○	○	○	○
Toivoisin, että ekovaatteet löytyisivät keskitetysti esim. yhdestä tavaratalosta [Score: 0]	○	○	○	○	○
Toivoisin, että ekovaatteet löytyisivät keskitetysti esim. yhdeltä nettisivustolta [Score: 0]	○	○	○	○	○

22) Jos haluat, voit kertoa alle, mitä uusia tuotanto- tai palvelutoimintamalleja toivoisit tekstiili- ja vaatesektorille [Score: 0]

23) Olen valmis ostamaan laadukkaan, pitkäikäisen, korjattavan ja hinnakkaan tekstiilituoteen ja käyttämään sitä pitkään vähentääkseni omaa ympäristökuormaani [Score: 0]

täysin eri mieltä

Sivu6

Tuotekiintymykset [Score: 0]

24) Kiinnyn ja käytän pitkään tekstiilejä ja vaatteita, koska... (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ ne ovat kauniita [Score: 0]
- ☐ ne ovat laadukkaita [Score: 0]
- ☐ väri miellyttää minua [Score: 0]
- ☐ tyyli miellyttää minua [Score: 0]
- ☐ kuvio miellyttää minua [Score: 0]
- ☐ materiaali miellyttää minua [Score: 0]
- ☐ ne ovat helppohoitoisia [Score: 0]
- ☐ ne ovat muodikkaita [Score: 0]
- ☐ ne ovat nimekkään brändin tai suunnittelijan [Score: 0]
- ☐ ne ovat kalliita [Score: 0]
- ☐ ne ovat istuvia tai käyttöönsopivia [Score: 0]
- ☐ muu, mikä [Score: 0] _____

25) Pitkään käytössä olevat vaatteeni ovat väriltään (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ mustia [Score: 0]
- ☐ valkoisia [Score: 0]
- ☐ harmaita [Score: 0]
- ☐ sinisiä [Score: 0]
- ☐ punaisia [Score: 0]
- ☐ keltaisia [Score: 0]
- ☐ vihreitä [Score: 0]
- ☐ oransseja [Score: 0]
- ☐ violetteja [Score: 0]
- ☐ ruskeita [Score: 0]
- ☐ kirkkaita perusvärejä [Score: 0]
- ☐ taitettuja tummia värejä [Score: 0]
- ☐ vaaleita pastellisävyjä [Score: 0]
- ☐ lempivärejäni [Score: 0]
- ☐ muotivärejä [Score: 0]
- ☐ neutraaleja värejä [Score: 0]
- ☐ muuta, mitä [Score: 0] _____

26) Pitkään käytössä olevat vaatteni ovat materiaaliltaan (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ villaa [Score: 0]
- ☐ nahkaa [Score: 0]
- ☐ puuvillaa [Score: 0]
- ☐ polyesteriä [Score: 0]
- ☐ pellavaa [Score: 0]
- ☐ bambua [Score: 0]
- ☐ viskoosia [Score: 0]
- ☐ jotain muuta, mitä [Score: 0] _____

27) Pitkään käytössä olevat vaatteeni ovat tyyliltään (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ klassisia [Score: 0]
- ☐ muodikkaita [Score: 0]
- ☐ retrohenkisiä (vanhoja tyylejä kopioivia) [Score: 0]
- ☐ oikeasti vanhoja [Score: 0]
- ☐ hiljaisia perusvaatteita [Score: 0]
- ☐ näyttäviä [Score: 0]
- ☐ jotain muuta, mitä [Score: 0] _____

Sivu7

28) Pitkään käytössä olevat kodintekstiilini ovat väriltään... (voit valita useamman vaihtoehdon) [Score: 0]

- ☐ mustia [Score: 0]
- ☐ valkoisia [Score: 0]
- ☐ harmaita [Score: 0]
- ☐ sinisiä [Score: 0]
- ☐ punaisia [Score: 0]
- ☐ keltaisia [Score: 0]

- [ ] vihreitä [Score: 0]
- [ ] oransseja [Score: 0]
- [ ] violetteja [Score: 0]
- [ ] ruskeita [Score: 0]
- [ ] kirkkaita perusvärejä [Score: 0]
- [ ] taitettuja tummia värejä [Score: 0]
- [ ] vaaleita pastellisävyjä [Score: 0]
- [ ] lempivärejäni [Score: 0]
- [ ] muotivärejä [Score: 0]
- [ ] neutraaleja värejä [Score: 0]
- [ ] muu, mikä [Score: 0]

29) Pitkään käytössä olevat kodintekstiilini ovat materiaaliltaan (voit valita useamman vaihtoehdon) [Score: 0]

- [ ] villaa [Score: 0]
- [ ] nahkaa [Score: 0]
- [ ] puuvillaa [Score: 0]
- [ ] polyesteriä [Score: 0]
- [ ] pellavaa [Score: 0]
- [ ] bambua [Score: 0]
- [ ] viskoosia [Score: 0]
- [ ] jotain muuta, mitä [Score: 0]

30) Pitkään käytössä olevat kodintekstiilini ovat tyyliltään (voit valita useamman vaihtoehdon) [Score: 0]

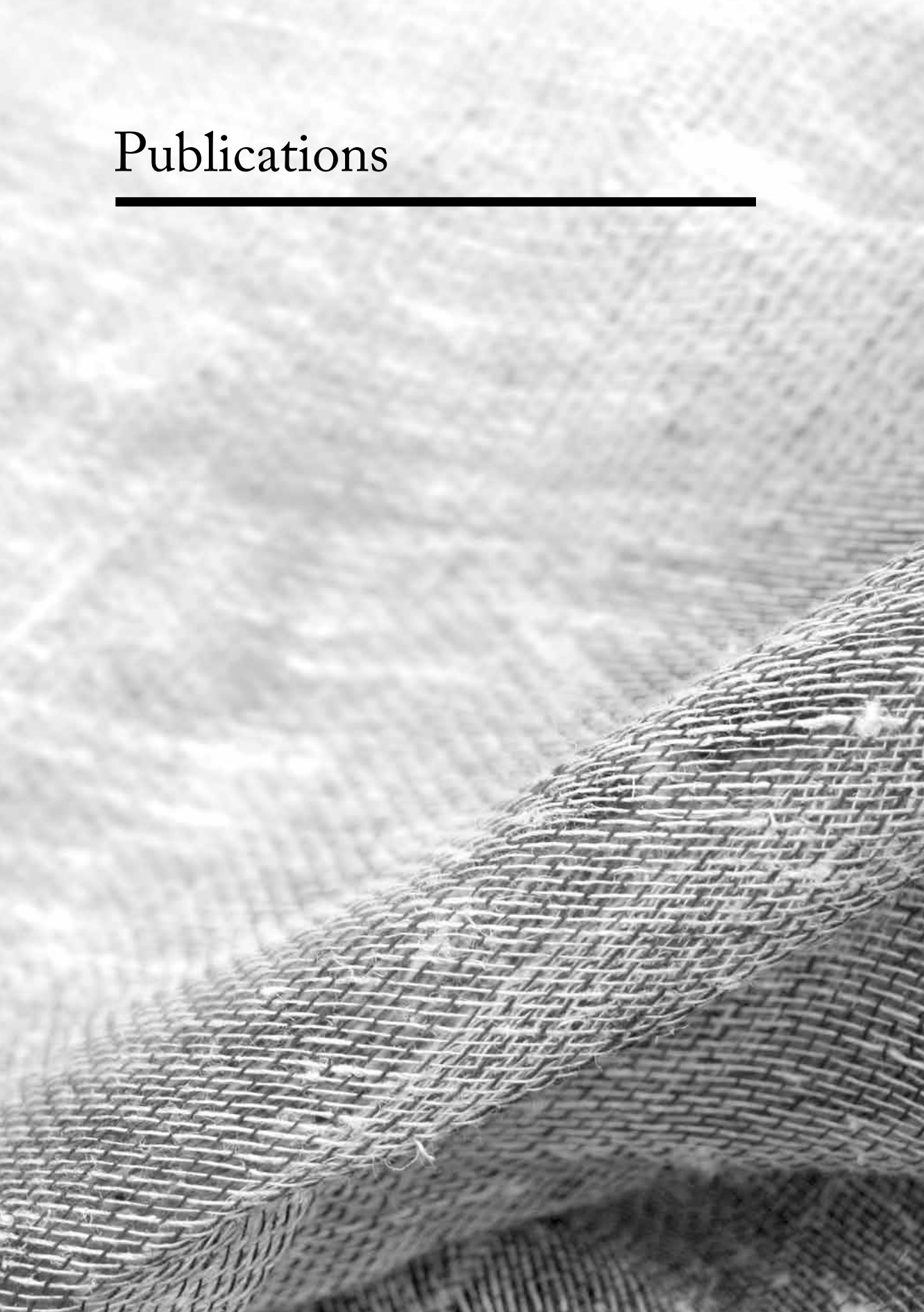
- [ ] klassisia [Score: 0]
- [ ] muodikkaita [Score: 0]
- [ ] retrohenkisiä (vanhoja tyylejä kopioivia) [Score: 0]
- [ ] oikeasti vanhoja [Score: 0]
- [ ] hiljaisia perustekstiilejä [Score: 0]
- [ ] näyttäviä [Score: 0]
- [ ] jotain muuta, mitä [Score: 0]

31) Jos haluat, voit lisätä tähän kommentteja aihealueeseen tai kyselyyn liittyen [Score: 0]

32) KIITOS VASTAUKSISTASI! Jos halua osallistua tuotearvointoihin, laita alle yhteystietosi [Score: 0]

Sivu8

Publications



Publication I

Consumer Values and Eco-Fashion in the Future

Kirsi Niinimäki
In M. Koskela, & M. Vinnari, (Eds.), Future of the Consumer Society: Proceedings of the Conference "Future of the Consumer Society", Tampere May 28–29, 2009. Turku: Finland Futures Research Centre, School of Economics, 125–134. Available http://www.tse.fi/FI/yksikot/erillislaitokset/tutu/Documents/publications/eBook_2009-7.pdf

This paper discusses the consumer values, attitudes and expectations regarding sustainable textiles and clothing. Consumers' interest in ethical issues is currently raising ethical questions in the mass market. What does a consumer expect from sustainable products in the apparel industry? And what is future eco-fashion?

1. Introduction and background

The growth in cheap industrial mass production has led to growing consumption: the postmodern consumer is marketing-prone, and inexpensive products tend to lead to unsustainable consuming behaviour. This materialistic way of fulfilling inner needs leads to a negative attitude towards the environment.[1]

However, cheap textile and clothing production in low-cost countries has taken on a bad reputation, and this is slowly changing the attitudes of consumers. Fortunately, the principles of sustainable product design are rather well researched, and material innovations and technological development have provided new eco-design and -production possibilities in the textile and clothing field. Even radical changes in system design and production are possible. Still, rather little has been studied regarding the consumer's readiness to accept these new eco-possibilities. Development in the textile and clothing field has been technological and cost-sensitive up to now. The textile industry has emphasized the price of the end product and efficiency in production. The question remains, however: what kind of textiles and clothes do future consumers want?

This paper discusses future eco-design opportunities and links these to consumer attitudes and wishes. The main interest is in the consumer's ethical purchasing decision, clothing and fashion consumption, and how it interlinks to identity construction. The paper also discusses possibilities to help a consumer's ethical decision-making by increasing the amount of available ethical information, changing textile maintenance habits, increasing the producer's environmental responsibility and public authority's actions. Finally the paper concludes future possibilities to do eco-design according to consumer attitudes.

II. Eco-design

Product design and development has a fundamental role in designing and producing sustainable products. The decisions made during the product design and development process affect up to 80% of the environmental and social impacts of a product. The choices made in materials, forms, colours and production systems also affect the use and disposal of the product in the whole life cycle, and the designer thereby also influences patterns of sustainable consumption.[2]

In product development there have been two main approaches to sustainability since the 1990´s: eco-efficiency and eco-sufficiency. In eco-efficiency the principle is to produce the same or more products from less material. In eco-sufficiency the aim is to gain the same welfare benefit out of fewer goods and services.[3]

Eco-design includes product life-cycle thinking. In designing for the environment the designer must consider not only aesthetical, trend and fashion issues, but also the production process, logistics, the use and maintenance of textile items and finally the recycling or disposal of the product.[4]

III. Consumer attitudes

An inquiry into the attitudes and expectations of Finnish consumers towards sustainable products in the textile and clothing field was conducted as an online survey in April 2009 by the author. A total of 246 respondents participated in the survey. The survey is thus not extensive regarding Finnish consumers, but it nevertheless offers some guidelines to future eco-design opportunities. The largest group of respondents was students, 40.4%, and the second largest group consisted

of civil servants (29%). The majority of respondents were fairly young: 38.4% of them were 18 to 25 years old, and 41.6% were 26 to 35 years old.

In earlier studies of consumers' ethical attitudes it has been pointed out that environmentally-active consumers appear to be more educated, have a high income, and are more often female. This shows that women in general are slightly more interested in ethical purchasing than men. In a study by Oksanen, for example, it was found that in Finland, 74.3% of women say that ethical aspects do affect their purchase decisions. With men, the number is 63.2%.[5]

In the 2009 consumer attitude study by author, 91.8% of respondents were women and 8.2% men. Regarding the respondents' interest in ethical consumption and products' environmental impact, 62.7% of the respondents answered that they were very interested in this issue and 28.3% were somewhat interested (total 91%). Regarding actual ethical consuming behaviour 20.8% agreed that they behave ethically as consumers and 57.1% agreed slightly with this. This group thus totalled 77.9% of all respondents. This shows that people are rather sincere while estimating their attitude and desire to act ethically and their real, everyday consuming behaviour. When asked about the ethicality, product safety and environmental impact aspects of textiles and clothing while purchasing, 49.2% reported thinking about these aspects often and 16.7% always. And when asked about their real textile and clothing purchasing decision and how often consumers have actualized ethical thinking in clothing purchasing decisions at some level, 56.1% of these respondents have done so (always 8.9%, often 47.2%). (See Table 1.)

Table 1. Consumers' interest in ethical consumption

Attitude	never %	seldom %	can't say %	often %	always %
ethical interest in general	4,1	3,7	1,2	28,3	62,7
real ethical consuming behaviour	2,4	14,7	4,9	57,1	20,8
ethical interest in textiles and clothing	1,6	24,4	8,1	49,2	16,7
real ethical purchasing decision in textiles and clothing	2,4	28,9	12,6	47,2	8,9

IV. Ethical purchasing decisions

Ethical consumption refers to ethical, environmentally-conscious consumption decisions as well as, instead of buying products, investing in services. In the textile field this involves, for example, promoting Fair Trade products, regionally produced items, eco-labelled products, recycled materials and less purchasing in general.

In the centre of attention should emerge the eco-efficiency of consumer choices and the importance of environmental aspects in consumers' everyday purchasing decisions[6]. Yet consumer choices are somewhat irrational and not always well connected to his/her values. A consumer fulfils deep inner motivations and unconscious needs by consuming.

Consumption includes two kinds of functions while fulfilling a person's needs, targets and values. The consumer can try to achieve individual or collective benefit by consuming. Ethical products manifest individual motives or collective benefit for the person. Individual benefit involves issues such as price, quality, saving of time and purchase convenience.[7]

Ethical decision-making relates to the consumer's social orientation, ideals and ideology. Ethical consumption can create an individual, symbolic feeling of advantage which links to a certain lifestyle or expression of personal identity and other social values.[8]

Lifestyle as a theoretical concept means the totality of a person's social practices as well as the story that he/she tells about them. Person thereby states reasons for himself/herself and others about his/her actions. When a person realizes that his/her thinking is contradictory to his/her own everyday choices, practices, habits and routines through some new perspective (for example ethical consumption), and these old habits do not bend to his/her new inner picture of himself/herself, for example as a ethical consumer, he/she will change his/her habits and practices. He/she thus harmonizes his/her own self-image and tries to maintain an undamaged one. Through this shift a person keeps his/her dignity and self-conception, and he/she balances his/her "life story" with his/her everyday routines.[9]

This is how a consumer's discourse awareness develops, changes and is challenged, through discussion, new information and experiences, and, on the other hand, this discourse awareness changes into practical knowledge that the consumer uses in everyday routines.[10] The entire time the consumer has to balance between individual needs and social benefit. At the same time the consumer wants

to fulfill his/her present desires and future needs.[11] While consuming ethically, the consumer knows that he/she acts morally correctly and in this way he/she approaches an ideal ethical world[12].

v. Consuming fashion and self constructing

Fashion is symbolic production. As a concept it differs from clothing, which is material production linked to physical needs for protection and functionality. Fashion links us to our emotional needs; it expresses our inner individual personality by external marks and symbols, brands and status items.[13]

Psychological human needs include affection, understanding, participation, creation, recreation, identity and freedom[14]. Fashion enables identity building, participation in social groups and class, and also creativity.

Up to now fashion and trends have led consumers' choices in the clothing business. In the USA in 2004, eight out of ten consumers said that environmental issues are important. They considered themselves as environmentalists. However in real life when buying clothes they do not actualize environmentalist thinking and values. Price and style are more dominant factors when they buy clothes and especially fashion items. The consumer's need for newness and to practice a form of fashion has created the opposite situation to sustainable values. How can fashionable and environmental aspects in clothing be combined in the future? Or can sustainability become a fashion?[15]

In this study 84.1% of respondents said that price affects their clothing purchase decisions. However, suitability, colour, and quality are also important factors while shopping for clothes, according to this study.[16]

Fashion cycles are short, and the race for cost efficiency is tight. The cost of clothing and the value of goods have steadily gone down.[17] However, the 'Slow' movement has also reached designers and producers in the clothing industry. 'Fast' fashion and cheap mass production is especially stimulating a counter-reaction among consumers. Slow fashion is produced at a slower rate; clothes are made with more care, resulting in better quality. Slow fashion needs deeper consideration, taking responsibility for one's own clothing purchase acts and their effect on the environment as well as social responsibility. While making a 'slow fashion' decision the consumers respect high quality, made-to-last characteristics as well as ethical or even local production and the lowest possible environmental impact of

the production and use of product.

Future consumers want to feel good about their consuming behaviour. Yet the concept of feeling good and happiness may change in the future. Perhaps consumers will make a selective purchase decision according to their inner ethical values. Consumers may even feel good when avoiding shopping, fashion, and external processes of identity construction. Consumers may also feel good when changing the purchasing decision to renting or other services.

In the 2009 study respondents were also asked about the meanings of clothing. A total of 91.4% answered that clothes mean the owner's own identity, and when asked if clothing reflects the direction in one's life (for example building identity), 53.9% of the respondents agreed strongly or slightly with this. When asked if clothing means practicality to you 93.5% agreed with this statement.

The respondents were also asked about the facts that strongly affect their clothing purchasing decisions: they answered in the following way. "Suitability" was chosen by 98.3%, "multi-functionality" 94.9%, the real need for new clothing 93.5%, colour 93%, quality 92.2%, price 84.4%, need to renew 62.2 %, brand only 28.4%, and following fashion trends 19.5%. Perhaps these respondents have stronger ethical values than the average consumer, or consumers do not recognize when they are following trends or fashion, even ethical ones. It can be stated thus that fashion and trends affect us also in a subconscious way.

VI. Environmental information

In this 2009 study 56.7 % of consumers strongly agreed that it is difficult to find information about products' environmental impact and ethicality, and 36.3% somewhat agreed with this (total 93%). Finding ethical information from the consumer point of view is problematic. Because consumers do not find this information, they still select products on the basis of price, appearance, design, convenience, ergonomics and functionality.[18]

In Oksanen's study of ethical products, according to the opinion of 74.2% of the surveyed consumers, finding ethical information is complicated. Younger generations and the group of higher educated respondents are also suspicious of the information companies give about their ethicality.[19]

In the 2009 study the respondents estimated which sources of environmental and ethical information in textiles and clothing are the best sources, and the

most reliable ("excellent") were standardized environmental labels. Second-best ("good") was information from authorities, civic organizations and the Consumer Office. The mass media seems to be satisfying as an information source only to the same level as companies, producers, importers and trade organizations.

It confuses consumers that a company might have one ethical line and, at the same time, produce unethically; producers thus do not help consumers to make ethical purchase decisions by offering contradictory information[20]. Consumers cannot easily find ethical or environmental information from different products and at the same time there are so many different kinds of this information on textile products that it is very difficult to compare it. Lately the public focus has shifted toward the ethical production of clothes, and this information has become more common in the textile area.

Nevertheless the consumers' need to acquire information is strong. In the 2009 inquiry it was also asked what environmental information the consumer wants to find regarding textiles and clothing in the future. All the existing labels were given strong support: the Nordic Swan and European environmental labels, as well as the Fair Trade logo and Ethical Production labels. This reveals that producers simply must provide more ethical and environmental information for consumers' use. At the same time researchers have to develop further environmental labelling so that it is easy for the consumer to evaluate products on the basis of sustainability.

VII. Ethicality and pricing

The consumer's expectations of ethical products are somewhat unrealistic. Consumers prefer the sustainable products to be at the same price level as other products. In this case purchasing decisions would be easy to make on the basis of environmental aspects.

On the other hand consumers realize that sustainable production following better and newer processing technologies and using safe and sustainable materials also means extra costs that have an influence on the end price of the product. In the 2009 study 58,8% of the respondents agreed that it is too expensive to consume ethically. When they had to estimate how much more they would be ready to pay for sustainable textiles and clothing, the dispersion was rather widespread. A total of 29.7% said that they would be ready to pay 10-14% more, and 19.9% said that they would be ready to pay 5-9% more. Only 3.7% said that they do not want to

pay more at all, and, on the other hand, 9.3% were even ready to pay more than 25% for sustainability. (See Table II.)

how much more you would be ready to pay	respondents
not at all	3.7%
1-4% more	12.6%
5-9% more	19.9%
10-14% more	29.7%
15-19% more	14.2%
20-24% more	10.6%
more than 25%	9.3%

Table II. Consumers' readiness to pay more for sustainable textiles and clothing.

Traditional products which harm the environment are not priced to include all environmental costs of their production. Externalities associated with production are often subsidized by society and the result is lower prices for the consumer. In contrast less environmentally harmful products are not subsidized by society and therefore all costs from development are passed on to the consumer in the form of higher prices.[21]

Some researchers recommend pricing the product by taking into account also the environmental load of production. The pollution load would affect the final price of the product. This system would be controlled by public authorities, and the responsibility would thus move from consumers to public authorities.[22] Environmental and green taxation seems to be a very effective way to move towards sustainability[23]. The idea of adjusting product prices by green taxation has received encouragement from consumers. In the 2009 study 51.2% of respondents strongly agreed and 34.8% somewhat agreed that mass production with a heavy environmental load should be levied a tax (total 86%). There is a will and interest from the consumers' side to change industrial processes towards more sustainability and ethicality even if it means higher prices.

In the same study 92.2% of respondents said that while buying clothes quality is an important aspect and higher quality means a higher price. The consum-

er weighs up the purchasing decision more when buying valuable items. If the clothes are expensive, they will be used longer; they will be repaired, maintained and recycled, especially if they are made of high quality materials. This raises the following question: how can good quality products be produced and, at the same time, make sustainability and ethical production such important elements that it will be accepted that they raise costs? As one of the respondents answered: "We should return in our consuming behaviour back to the time, to the stage where we bought a little, but expensive and good. Now cheap products block in the way to realize this ideal." The best decision for sustainable development would be minimizing consumption in total, in which case an increase in prices in general would be a best alternative as this would affect more the total volume of consumption[24].

VIII. Textile maintenance

Textile and clothing manufacturing creates a big environmental impact through the fibre cultivation and manufacturing processes. Maintenance of the textiles, however, especially clothing, also has an important environmental load (washing, drying, and ironing). These two processes are critical when doing a textile LCA. Textile maintenance uses very much energy and water. One study done in the Netherlands found that the average piece of clothing stays in the wardrobe for 3 years and 5 months. The customer has worn it for 44 days during that time, and it is worn for 2.4 to 3.1 days between washing.[25] Clothes frequently washed have the highest environmental impact. By optimizing the best textile materials and product colours for each purpose and use, the designer as well as the consumer can minimize the number of washing times during the use of textiles.

Clothing, workwear and household textiles have a large relative environmental impact during use. Their impact during production and disposal are estimated to have a small relative impact.[26] Depending on the material and its need to be washed frequently, the impact of consumer care can be as high as 75-80% of the total environmental impact of a cotton shirt.[27] In this case better environmental (eco-labelled) material choices do not actually offer much improvement to the environmental aspect in the total LCA.

In the same 2009 study the consumers were asked about their interest in finding more information about products' environmental impact during wear and maintenance. A total of 66.7% of consumers were keen to find this kind of informa-

tion on textiles and clothing in the future. This kind of information is completely lacking at the moment, yet it seems that consumers are interested in their own actions and how they link to environmental load. Still, information about the environmental load of textile manufacturing was more important from the consumers' point of view (85.8% would like to find this information in the future).

Furthermore minimizing ironing and lowering washing temperatures can also have a strong effect. When asked how many would be ready to lower the washing temperature for environmental reasons, 76.6% were ready to do this. It is estimated that lowering the washing temperature by 10 degrees essentially lowers the energy consumption during consumer care. This is quite possible to do by selecting suitable materials for 30°C washing in regularly laundered clothes.

But when asked if textiles' and clothing's maintenance will need more work in the future (for example, hand-washing with cool water), 69.3% did not agree with this statement. However, 50.8% agreed when asked if future textiles and clothing could be less frequently washed and if consumers could change their conception of cleanliness a bit. In addition, when asked if the consumer himself would be ready to do this (wash clothes less frequently) 65.7% were ready to change their washing behaviours. We know that only 7.5% of laundry is heavily soiled. The majority is washed more for cultural or behavioural reasons.[28]

Yet it is even possible to design clothes that need minimum washing or do not need washing or ironing at all, and their quality and style can be optimized for the real lifespan of the clothes. With the right kind of material choices clothes can be designed so that they last a certain time of use and after use they can be recycled. However consumers are not ready to buy short life-cycle clothes. Only 7.9% of the respondents agreed with this. However, if the clothes designed to last a short time are biodegradable 34.5% were ready to consider this kind of fashionable clothing. At the same time 96.7% want clothes to be made with high quality and 98.4% want clothes to be long lasting.

Clothes can also be designed with a modular structure so that only those parts that actually become dirty will be washed. The consumers studied are even ready for this (56.4%).

IX. Global consumer

While textile manufacturing has moved to lower-cost countries so also are the environmental impacts. In the Western world and especially in the EU environmental laws are strict; the situation is quite different in Asian countries, however. Through consuming more and more mass-produced, cheap textiles, consumers affect environments on the other side of the world.

Lately the ethical production of textiles has been strongly in public discussion but not yet the environmental impacts that western countries' consumer habits have on other countries. This can also be seen in the answers of the 2009 study: 91.8% wanted to see information on the ethicality of production and 92.6% of respondents wanted to see the Fair Trade label on the product in the future. Through regular information in the mass media, unfair production systems have become familiar to Western consumers.

There are several options for informing the end user about the global impact of textile production. These concepts are the carbon footprint and water footprint. A carbon footprint is the estimated figure of the impact a person's activities has on the environment: it includes all greenhouse gases. It is estimated that in a typical person's total carbon footprint in the developed world, 4% goes to clothing. The carbon footprint includes the primary footprint of direct CO_2 emissions (also including domestic energy consumption and transportation) and the secondary footprint (the whole life cycle of products we use). It is also possible to calculate individual products' carbon footprint, and this gives the consumer the possibility to compare different products. In cheap, mass-produced clothes, cotton cultivation and logistics result in a very large footprint.[29]

A water footprint is an indicator of both direct and indirect water use of a consumer or a producer. Many countries, especially in the Western world, have externalized their water footprint by importing water-intensive products from elsewhere. Global international trade implies international flows of virtual water. For example the water footprint of one cotton shirt is 2700 litres.[30]

The carbon footprint and water footprint are also linked directly to the total amount of consumption and welfare of nationalities. These are good indicators to evaluate consumption levels and consumption's environmental load.

In the 2009 study respondents were asked about their interest in seeing this information, the water footprint and carbon footprint, on textiles and clothing. A total of 72.6% of respondents wanted to see a water footprint figure and 77.1% a

carbon footprint figure on clothing products. While these are rather new figures, last summer in England there was a strong demand for carbon-footprint-labelled clothes.

The whole production chain of textiles is very fragmented and complicated. The "Made in" label does not truly give the needed information any longer. Nonetheless in the same study 91.3% of respondents want to see a "Made in" label (the origins of the product) in future textiles and clothing, and 60.5% want future clothing to be produced in neighbouring areas.

x. Power given to the consumer

In the 1990's Finnish public authorities believed that by increasing information about sustainable products and product life cycles, consumers will act wisely and choose products with less environmental load. It would thus be possible to decrease the environmental load of consumption and industrial production. A key responsibility was thereby moved onto the shoulders of the individual consumer. It was also presupposed that in this way the number of ethical products on the market would increase. A majority of consumers feel that their values are based on ethicality, but the authorities have given too much power and, at the same time, too much responsibility to individual consumers.[31]

In the 2009 study consumers were asked about their wishes regarding products' environmental optimization. A total of 73.4% of respondents agreed that it would be good if products in the future were automatically optimized according to environmental impact and thus no extra environmental labelling would be needed (38.8% somewhat; 35.1% strongly).

While discussing best practices to change the present development in consumption, the respondents raised some interesting comments. Some consumers want public authorities and producers to take responsibility more clearly in environmental matters. "Producers have to carry the responsibility. In shops there should only be ecological and ethical clothes and other products. It is incomprehensible that now the responsibility has been pushed to consumers and while maximizing profits we have ended up in a situation where consumers have to separately demand ethicalness and 'ecological-ness'. Enterprises should somehow be forced to follow ethical and ecological principles with the help of legal institutions and laws, and these have to be tight enough."

More information about the ethical bases of production and the actual tracing of makers (Made by labels and transparent production) in textile and clothing production are desired by 96.7% of respondents. This reveals that consumers are most eager to find more information and actually have the possibility to themselves check the background values of a product.

While asked about the best ways to change consumer consumption behaviour 41.6% feel that increasing information is the best way and 37.4% feel that increasing green taxation and other public authorities' controlling measures would be the best way to make an essential change.

In conclusion, consumers still want to have the power and possibility to weigh their own individual purchase decisions, but at the same time they wish to have help from producers, legislation and authorities.

XII. Acceptance of eco-concepts

We do have various possibilities to design and produce textiles and clothing differently in the future. Yet these new eco-concepts, material choices, designs, aesthetical concepts, and maintenance habits depend on the consumer's acceptance and willingness to change his/her preconceptions and routines.

Consumers connect strongly to social mores, which have a moral connotation and are based on the central values of the culture[32]. Acceptance of mores is considered mandatory. Rules on dress necessitates appropriate professional appearance such as a coat and tie for a man.[33] In the 2009 study one of the respondents said, about the meaning of clothes: "I have tested it: in my workplace I make progress only when I am dressed in the code of my profession, that means wearing a tie."

In some situations clothes have the function to confirm or change our own role, and this affects other people's attitudes. Clothes and fashion are linked to acceptance and social codes and consumers have the deep need to participate in social groups and classes. Can we break or change even some of these accepted social norms? When the maintenance of clothes has a significant environmental impact, can we change this aspect of clothing? All assumptions and preconceptions have a slow historical change pattern. Our conception of cleanliness has changed radically in 100 years. The technical development of washing machines, tumble dryers and better detergents has also driven our concepts of the cleanliness of clothes. The same kind of change can be seen in the concept of comfort and convenience in

clothing. Convenience as a concept is linked to rush and an existing busy lifestyle. This interconnects to the use of polyester clothes, easy washing, tumble drying and no need for ironing. Yet we know that polyester clothes need more frequent washing because they cause more sweat.[34]

Can future fashion be wrinkled, recycled, less colourful and acceptable in the office? This new eco-fashion concept seems to be not as easy to accept among consumers. In the study 70% of respondents want eco-clothes to look exactly the same as ordinary clothes. Consumers do not want apparel to be different in design or appearance. Only 30.2% of consumers want clothes to declare eco- aesthetics. It might be more advisable to develop the eco aspects in materials, production and textile maintenance than in new design concepts.

XIII. Eco-fashion in the future

Value change is the most important factor in sustainable development[35]. For sustainable development it would be best to consume less. However nowhere near all consumers are willing to reduce consumption and by doing so create their identity without external symbols. Behind the need to consume there are, besides the actual need, other deeper reasons such as the need to be associated with some social class, or constructing personal identity through product symbols and brands, and this is obvious in consuming clothes and especially fashion. To change this tendency in consumption, critical aspects can be seen in individual consumers and their set of ethical values.[36]

Yet in the future through material innovation and production processes it is possible to produce textiles and clothes with different quality and life cycles and target these for different consumer groups. Perhaps there should be fast fashion and slow fashion production systems and different taxation and labels for these.

Slow fashion would be designed according to an ethical consumer's values. The clothes would be designed to be durable, high quality and in sustainable materials. The production lines would be ethical and perhaps even local production. The style would be more classical and longer lasting in design, colour and print. The clothes would be long-life products made from durable materials. The material choices would be optimized so that the clothes need very little maintenance, especially washing and ironing. And materials and clothes could also be reused and even recycled into a new textile material. Multi-functionality and a modular structure

is important, and producers can also offer new service concepts, such as repairing, recycling, changing, renting and leasing clothes.[37]

Fast fashion would be directed towards the younger generation, and it would be based upon their need to consume and build identity with fashionable items. This might mean new sustainable clothing materials which are optimized for the real lifetime of the product. Perhaps they are used for only 6-12 months, and they are then recycled into new materials. They are mainly made from recycled materials and not virgin ones. There would be a good recycling system for these clothes or they could be biodegradable. Perhaps they would not need to be washed at all during their short lifetime. Fast fashion could also mean do-it-yourself design or tuning, and this could deepen the customer's relationship to the product as well as his/her level of self-actualization, thus extending the product lifespan.

In the future we all have to satisfy our needs in a longer lasting manner than by consuming products. This means a huge step and change in our behaviour. By balancing prices between sustainable and unsustainable products using green taxation, this might help consumers to behave more rationally. As one of the respondents commented, cheap clothes confuses consumers rational behavior, meaning to buy more expensive clothes and also to invest in better quality and sustainability. In this inquiry 94.6% of respondents were ready to buy better quality, durable, repairable, more expensive clothes in the future and use them longer to decrease their own environmental impact.

XIV. Discussion and conclusion

Better consideration of what consumers expect and value in the future might offer new design and production opportunities. Sustainability and eco-design will be a megatrend, and consumers are ready for this and even ready to pay more for sustainability. When production systems, designers and retailers understand better the consumers' values it is possible to extend the supply of sustainable items on the market.

Enterprises have been taking into account production systems' environmental impacts more and more in recent years. In Finland producers are far ahead in terms of using LCA tools, but a true radical change in design thinking is still waiting to emerge. A radical systematic approach to sustainable design is needed, and we have to challenge the consumer to actualize his/her own ethical values

into purchasing behaviour. To change consumption habits, the consumer wishes to have help from producers and public authorities.

If concern for the environmental actualizes in radical political measures such as green taxation, sustainability may also be the only way of designing and producing products in the future. The early bird catches the worm: it may therefore be advisable for producers to specialize in sustainability as soon as possible.

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Publication II

Eco-clothing, Consumer Identity and Ideology

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Sustainable Development (2010)
Volume 18 • Issue 3
pp 150-162
DOI: 10.1002/sd.455

Article info: Received 15 December 2008; revised 10 July 2009; accepted 19 July 2009
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Abstract

This paper aims to contribute to a better understanding of eco-fashion consumption and consumer purchase decisions while constructing one's self with external symbols, such as appearance, clothing and fashion items. This study approaches sustainable clothing from a grounding in design research and the meanings of material culture. The study uses sociology and social psychology; hence the meaning of appearance and especially clothing and fashion is understood in a social context. This paper also takes an interdisciplinary approach to eco-clothes as cultural and design objects in a social and sustainable development context, objects that intertwine consumers' ethical attitudes and values and how they construct a concept of 'self' using external symbols.

Keywords: eco-clothing; eco-fashion; ethical consumer; ethical commitment; identity construction

Introduction

This study makes a contribution to the discussion on ethical clothing and eco-fashion, and it especially addresses the attitude-behaviour gap in ethical consumption in the clothing field. The paper focuses on consumer attitudes and values, individual thought processes, and identity formation and construction of self processes using external symbols in a sustainable development context.

As we are primarily interested in understanding the nature of contemporary consumer culture, clothing consumption, and consumer purchase decisions, one way to approach this is to examine the commitment of the ethical consumer in the clothing field. This paper thus views eco-clothing consumption through the lens of individuality and personality factors such as ethical commitment. The purpose of this paper is to investigate, both theoretically and empirically, how recent eco-fashion corresponds to a consumer's values and his/her ethical commitment.

This study thus seeks to address the following questions: what the internal drivers are when a consumer makes his/her ethical purchase decision in the apparel field; why an attitude-behaviour gap exists in eco-fashion purchasing decisions; and how eco-clothing intertwines with consumers' identity and ideology.

In seeking to answer these questions, the aim is to provide an understanding of the contradiction in ethical consumption in the clothing field and the ethical attitude-behaviour gap in the apparel field in contemporary society. This paper is a small contribution towards filling this gap in our knowledge in the eco-clothing field. It argues that despite recent studies in the area of eco-fashion, producers and designers still lack knowledge of what the consumer desires and values in the eco-fashion field. Hence we present a hypothesis that the present trends in eco-fashion and ethical clothing appeal to only a limited number of consumers and their concept of aesthetics, and this may be one reason for the existing attitude-behaviour gap in the eco-fashion field.

The following presents a description of the background discussion to which the research contributes. The paper begins with an overview of the recent research in consumer ethical purchasing decisions in the eco-fashion field. The next theme further expands the issue of clothing consumption and how it is a fundamental element in our construction of self and identity formation in a postmodern world and in the social context. The discussion moves on to the theme of change in postmodern society and also change in our identity and needs: hence the continuous change process in our appearance and apparel. The paper makes use of the results of an online inquiry made in Finland in spring 2009 on consumers' attitudes towards sustainable clothes and eco-fashion, and the analytical section of the paper reflects a theoretical interpretation of the survey results.

We come to the conclusion that an ethical commitment in clothing purchasing and ethical values form a significant driver towards purchasing eco-clothes. Consumers that are "Ethical hardliners" prioritize a strong personal ideology as a value in their purchasing decisions. If the consumer has a strong ethical commitment

this becomes even more important a value in clothing than one's own identity or aesthetic values. The "Ethical hardliners" however are a minority group and remain a niche. Nonetheless, for all consumers quality and aesthetic aspects in clothing are highly important when purchasing clothes and fashion, including eco-clothes.

In the concluding discussion we also argue that manufacturers need to find new ways to see consumer commitment, wishes, needs, values, desires and emotions as a key starting point for the design process in the eco-fashion field. Producers should facilitate new ways to conduct design processes together with consumers in order to meet customers' needs and in this way deepen product attachment. This in turn adds value to the product, creating longer product lifespans and hence better products, and slowing the cycles of fashion.

Ethical purchasing decisions

Consumers in the developed world are well aware of the environmental impact of present industrial production and the impact of present consumption behaviour. Regarding sustainable development, consumer choices and the importance of environmental aspects in consumers' everyday purchasing decisions should be the centre of attention (Jalas 2004). Yet consumer choices are somewhat irrational and not always well connected to his/her values. A consumer fulfils deep inner motivations and unconscious needs by consuming. Consumption includes two kinds of functions when answering to a person's needs, targets and values: the consumer can try to achieve individual or collective benefit by consuming. Ethical products manifest individual motives or collective benefit for the person buying. Individual benefit involves issues such as price, quality, saving of time and purchase convenience (Moisander 1991).

Consumers' attitudes towards ethical consumption are positive; nonetheless actualization of ethical interest into ethical purchasing decisions is more complex. The moral norm-activation theory of altruism by Schwartz (1973) defines a precondition in activating personal norms into action. In Schwartz's theory the assumption is that environmental quality is a collective good, which activates consumers to act in a pro-environmental way. On the basis of this theory the following hypothesis can be formulated: by acquiring information about the life cycles of different products and their environmental impact, consumers will wisely select products with less environmental load. This approach to sustainability also em-

phasizes the consumer's responsibility and hypothesizes that the number of ethical products will increase in the markets simply by sharing more information. Hitherto this hypothesis has not come true in practice.

The ethical consumer and his/her motivations have been studied widely. According to Clavin and Lewis (2005) a consumer who takes ethical issues into consideration behaves according to his/her ethical values, and he/she realizes these values in consumption behaviour even if the behaviour does not reflect well on him/her. This kind of consumer has committed himself/herself to a social value base. The consumer's ethical awareness is high, and he/she knows which enterprises function ethically. Ethical decision-making relates to the consumer's social orientation, ideals and ideology. According to Freestone and McGoldrick (2007) social motivators are a stronger lever for ethical behaviour than personal ones. Ethical consumption can create an individual, symbolic feeling of advantage that links to a certain lifestyle or expression of personal identity and other social values (Moisander 1991).

Carrigan and Attala (2001) argue that despite consumers caring about the ethical behaviour of companies this care does not translate into consumption choices that favour ethical companies and punish unethical enterprises. They also highlighted that consumers do not want to make ethical choices if that necessitates inconvenience to them. Ethical purchasing will take place only if there are no costs to the consumer in terms of higher price, loss of quality or discomfort in shopping. The same situation can also be seen in the global clothing business: consumers are interested in eco-fashion but they do not want ethical purchasing to cause inconvenience, such as through higher prices or uncomfortable materials (Joergens 2006).

Behind the need to purchase there are, besides the actual need, other deeper reasons such as the need to be associated with some social status, constructing identity through product symbols and brands, or desire for certain lifestyles. Lifestyle as a theoretical concept means the totality of a person's social practices, the routines incorporated into habits, as well as the story that he/she tells about them. A person thereby states reasons for himself/herself and others about his/her actions and routines. Each small decision a person makes every day builds routines and creates a lifestyle. Yet routines are open to changes because of the character of mobility in self-identity, something that will be discussed further later in this paper. When a person realizes that his/her thinking is contradictory to his/her own everyday choices, practices, habits and routines through some new perspective and these old habits do not bend to his/her new inner picture of himself/herself, for

example as a ethical consumer, he/she will change his/her practices. A person tries to harmonize his/her self-image, and the goal is an undamaged self-identity and a balanced life story. While acting ethically, the consumer knows that he/she acts morally correctly and in this way he/she approaches an ideal ethical world (Giddens 1991; Spaargaren & van Vliet 2000; Oksanen 2002).

Moisander and Pesonen (2002) argue that green consumers and consumerism represent a certain lifestyle or desire to be a certain kind of person. This representation is actualized through a certain way of thinking and acting. They also describe the moral dimensions in green consumerism being like an "aesthetic of existence"; thus there is an ongoing process of questioning and reinventing the self. Hence the moral and aesthetic criteria of green consumerism are not stable and they are in complex interplay.

New information and experiences thereby develop and challenge the consumer's discourse awareness. Hobson (2003) argues that this discourse awareness changes into practical knowledge that the consumer uses in everyday routines. Jackson (2008) argues that the consumer has to constantly balance between individual needs and social benefit. This is evident in the contradiction in ethical consumption. At the same time the consumer wants to fulfil his/her present desires as well as future needs.

As aforementioned, ethical consumption and ethical purchase decisions are complex systems. Haanpää (2007) defines in her dissertation that green consumption consists of three kinds of constituent elements: contextual factors (such as economic, cultural and social resources, normative factors), individual factors (such as economics and socio-demographic factors, situational factors, routines and habits, and choice), and personality factors (such as values, beliefs, worldviews, attitudes, needs, and intentions). Connolly (2008) moreover argues that theories of reflexive modernization provide an approach to understanding how sustainable consumption is tied into broader social and cultural change, and through this lens the researcher has a better possibility to analyze the role of green consumption in consumers' lives and its relevance to self-identity.

Eco-fashion

Eco-fashion can be defined as clothing that is designed for long lifetime use; it is produced in an ethical production system, perhaps even locally; it causes little

or no environmental impact; and it makes use of eco-labelled or recycled materials (e.g. Joergens 2006; Fletcher 2008). Sustainable issues in clothing production are very complex because the supply chain in the clothing industry is fragmented, complicated and global. The manufacturing processes are less transparent than in food production, for example. Hence sustainability and ethicality in eco-clothing are evaluated only through a limited and very narrow lens: for example, the use of an environmentally friendly material or production method (Fletcher 2008; Beard 2008).

Consumers need to be viewed as responsible actors in fashion. Purchasing at the beginning of the twenty-first century can be seen as a reaction against the late 1990s trends of mass consumption and must-have goods (such as brand bags). The public discussion about the use of child labour and "sweatshops" in clothing manufacturing has also raised the question of ethics in the clothing business. At present there is a deep contradiction between the need to fulfil consumer needs quickly or in a more sustainable way in the clothing industry (Beard 2008, Solomon & Rabolt 2004).

Much of the research focus on ethical fashion and sustainable clothes has centred on the subject of ethical manufacturing or consumer interest in ethical clothing (e.g. Legoeul 2006). Nonetheless ethical markets have expanded only very slowly in the clothing field and markets are still full of low-cost, low quality clothes made in Asian countries in unethical processes. Why does this increasing ethical consumer interest not actualize in purchasing behaviour? There does indeed exist an attitude-behaviour gap in consumers' ethical interest and purchasing behaviour in the clothing field (e.g. Salomon & Rabolt 2004).

Joergens (2006) argues that the consumer does not actually have a real opportunity to choose ethical clothing, because almost all garments are produced in cheap Asian countries, prices are not comparable in ethical clothing, and the design and appearance of eco-clothing are unfashionable and unattractive or do not suit the consumer's wardrobe needs or his/her personal style. Beard (2008) argues that it is not enough that the clothes are only produced ethically: they also have to be fashionable and suit the consumer's aesthetic needs. Otherwise eco-clothes remain a niche market since they do not reflect the broad scope of consumers' lifestyles. Environmental aspects have to be combined with good design and fashion to produce more desirable eco-clothing.

Solomon and Rabolt (2004) argue that in the clothing industry, fashion and trends lead consumer choices. When purchasing clothes consumers do not think

about sustainability. Price and style are more dominant factors when they buy fashionable items. In fashion, the desire to renew one's appearance according to changing fashions and identities is in contradiction with sustainable consumption.

McCracken (1988) states that clothing belongs to a category of "high involvement" goods the consumer purchases in order to take possession of a small part of the style of life to which they aspire. Consumption behaviour is linked to the need to participate, and products represent a bridge towards the desired lifestyle. As soon as the consumer possesses this desired object, however, he/she will transfer anticipation to another object: one individual product cannot fulfil the consumer need to achieve a certain lifestyle. In order to deal with the dissonance between the "real" and the "ideal", individuals use a fundamental model of displacement of meaning. Consumer goods can be seen as bridges or access to something meaningful. Nonetheless access to the "ideal" with the help of one garment is very limited, and the consumer remains emotionally unsatisfied.

As a result markets are full of low-cost clothing which tempts the consumer into unsustainable behaviour despite the consumer's inner ethical values, as can be seen in the following quote from the author's inquiry.

> We should return in our consuming behaviour back to the time, to the stage where we bought a little, but expensive and good. Now cheap products hinder us from realizing this ideal.

It is most difficult to be opposed to an effective production and marketing system that constantly produces new, easily fulfilled needs and temptations with a reasonable price.

Despite the amount of research attention given to eco-fashion in recent years, the buyer side of the exchange process remains under-researched: hence we need better understanding of different consumer groups' attitudes, values and needs in order to design and produce more attractive ethical fashion directed to different consumers' needs and aesthetic expectations. Clothing and fashion consumption converge strongly with construction of self and one's own individuality, in order to express deeply one's own personality, such as ethical values and aesthetic preference. Through our individual appearance we all seek the acceptance of others, as e.g. Kaiser (1990) has highlighted. This issue is discussed further in the following section.

Construction of self through clothing and fashion

According to Kaiser (1990) fashion is a symbolic production. As a concept it differs from clothing, which is material production and something that fulfils our physical needs for protection and functionality. Fashion merges us with our emotional needs; it expresses our inner individual personality by external marks and symbols, brands and status items. Fashion is also a dynamic social process that creates cultural meanings and interaction.

According to Max-Neef (1992) psychological human needs include affection, understanding, participation, creation, recreation, identity and freedom. Fashion enables inter alia identity building, participation in social groups and class, and individuality and differentiation from others. Clothing and fashion also stand for creativity and beauty. According to Raunio (1995) clothing has a strong impact on emotions, and apparel can thus give stimulation, energy or feel-good messages to the wearer. Kaiser (1990) argues that clothes can be seen as a fundamental part of our communication in social interaction.

Biological, aesthetic and social levels as well as cultural standards of clothing interact while the consumer constructs his/her identity through clothing choices, and he/she expresses a self-construction process through appearance inter alia with clothing. According to Roach and Eicher (1973) climate and the concept of beauty influence the dress people wear in all societies. Consumers select apparel that approximates the aesthetic ideal of their own society. Cultural standards are linked to the consumer desire for social acceptance. Expressions such as "appropriate", "proper" and "in good taste" express approval of the apparel. Personal characteristics and preferences, that is to say, one's own individuality, also strongly affect consumer clothing choices. Tischler (2004) argues that consumers are strongly connected to social mores, which have a moral connotation and are based on the central values of the culture. Acceptance of mores is considered mandatory. Rules on dress necessitate appropriate professional appearance such as a jacket and tie for a man. The following extract from the author's inquiry further illustrates the meaning of clothes and proper social code. When asked if future eco-fashion could look different from today, one male respondent answered the following:

> I have tested it: in my workplace I make progress only when I am dressed in the code of my profession – that means wearing a tie.

Uniqueness, individuality, constant change and materialistic values are at the centre of our society, and they deeply affect the consumer's concept of self and his/her own identity formation.

Uotila (1995) argues that clothes are not only objects: they are also acts. Hence we have to reflect on garments in social interaction processes, and the need to gain approval from others in a social context is essential in individual clothing choices. The ongoing construction process of self through external feedback and through one's own self-reflection therefore necessitates a constant building and rebuilding of one's own identity. Fashion as a creation process can also be seen as an act, a "fashion act", where the consumer modifies fashion styles and rules to create a deeper individuality in the object: hence the garment better expresses their own identity, values, emotions, who the consumer is or wants to be.

According to Kaiser (1990), while making clothing purchase decisions, the consumer undergoes a silent dialogue between the "I" and the "Me". The "I" discovers, feels and interprets the garment as it occurs, subjectively. "Me" evaluates the style option as the implications for the self and thinks about how others may respond to the new look. "I" is the creative side, "Me" is evaluating and judging, and together they comprise the self.

Joergens (2006) argues that in ethical purchasing, it is easier to purchase for example organic food than ethical fashion. Food directly affects one's own health, and hence the choice reflects a benefit to the consumer self whereas when purchasing clothes, an unethical choice does not affect the consumer's own health so directly. Consumers show more ethical commitment when the purchase has a direct positive influence on their own health and wellbeing. The ethical purchasing decision in the eco-clothing field is therefore complicated, and other actors than an ethical value-base, such as beauty, fashion, trends, emotions, desires and social acceptance, significantly affect purchases in the fashion field.

Ongoing change process in postmodern society and identity

According to Bauman (1996) the postmodern era is seen as a period of individualism, changing values, freedom of consumer choices, changing lifestyles, and new social movements. Society is constantly going through a change process, and this change is also transferred into the cultural meanings of artefacts. McCracken

(1988) argues that designers and producers therefore gather this meaning change process up and achieve its transfer to consumer goods. Bauman (1996) describes the present constantly changing society as a "liquid society", which has implicit constant fluidity and uncertainty as well as effects on a consumer's constant self-critique. Hence the consumer has an ongoing need to renew his/her appearance and clothing according to a mobile self. This leads to consumer insecurity while he/she has to evaluate the purchase decision on the basis of social acceptance, between the externalities of fashion apparel and ethical values of consumption.

Therefore clothing and especially fashion are in constant change; change is unavoidable. This transition can also be seen in identity construction with external symbols and in the aesthetic concept of clothing. The consumer has to consciously or unconsciously check what is culturally valid and how he/she can maintain an appealing self-type within the limits of what is culturally acceptable (Roach & Eicher 1973).

> A structural model of self is derived from the cognitive perspective and suggests that self-image involves structured thought processes that are likely to be relatively stable until they no longer function adequately or apply to one's life. When these structured thought processes change, then the change occurs at a cognitive or mental level. Some change in clothing style may also result. Comments such as the following may be typical responses about the self that fit a structural model: my dress is me. It (clothing) fits my character. (Sontag & Schalter 1982, cited by Kaiser 1990, 148)

The concept of the self is thereby a process. Clothes must express one's own self: the consumer wants to feel that this garment expresses my inner mood and identity, me. Clothes are closest to our body and they are therefore very intimate; at the same time it seems that they are also closest to our inner self and values, which we can express or hide with clothes.

> These statements of who we are or are not (or no longer are), are likely to coexist with ambiguous identity spaces that are "under construction" (Kaiser 1995, p. 43).

Kaiser (1995) also argues that this identity construction process can include environmental sensitivity. Producers and consumers are seeking new ways to link ma-

terials and processes to environmental awareness, and this process is still emerging. While weighing up ethical clothing purchase decisions the consumer is all the time balancing between inner values: "Me" works as a guide to environmental concerns and the "I" addresses needs for vanity, beauty and newness.

Slater (1997) highlights that in the postmodern era relations between consumption, communication and meaning have changed, and this creates new flexibility in status and identity. The structure of status and structure of meaning thus become unstable, flexible and negotiable.

He also highlights that

> [g]oods can always signify social identity, but in the fluid processes of a post-traditional society, identity seems to be more a function of consumption than the other, traditional, way round (p. 30).

Giddens (1991) writes about the increasing process of individualization. Throughout our social life circumstances change, and thus the concept of a constantly rebuilding reflexive self, as such the narrative of self-identity, has to be rebuilt.

The mobile self in a liquid society therefore needs an ongoing construction of self, and this change process of self and identity is full of desires, temptations and consumables. Therefore the change in clothing, styles and fashion is unavoidable, and manufacturers and effective marketing systems maintain this change process in contemporary society.

Clothing, identity and ideology: the inquiry

In this section we will present the results of a small consumer inquiry. The inquiry was carried out as an online inquiry in spring 2009 in Finland. A total of 246 respondents participated in the inquiry. Although the sample can be judged as small, the aim was to produce a relevant range of contexts that would enable us to study consumers' interest in eco-clothing, their ethical purchase decisions, and values, needs and expectations in the eco-fashion field. The inquiry is thus not extensive regarding Finnish consumers, but it nevertheless offers some guidelines on consumer interest and ethical commitment in the clothing field.

The majority of the respondents were students, 40.4%, and the second largest group consisted of civil servants, 29%. The participants' ages ranged from 18 to 65

while the majority of respondents were under 35 years old (80%). Only 8.2% of respondents were male: hence the result is dominated by a female standpoint. Perhaps this data gathering limits the meaning of the results. However, it is important to be aware that this study only provides a very general picture of consumers' eco-clothing interest.

Lea-Greenwood (1999) argues that it is difficult to study consumer attitudes regarding ethicality as consumers tend to give more positive answers than their actual consumption and purchasing behaviour reveals. Consumers give socially desirable or "correct" answers rather than truthful ones. Even then the results in this study indicate a rational approach to the respondent's own attitude and behaviour in consumption. When asked about ethicality, product safety and the environmental impact aspects of textiles and clothing while purchasing, 49.2% reported thinking about these aspects often and 16.7% always. When asked about their real textile and clothing purchasing decisions and how often consumers have actualized ethical thinking in clothing purchasing decisions at some level, 56.1% of these respondents have done so (always 8.9%, often 47.2%).

A division was made regarding respondents' personal ethical commitment in eco-clothing purchasing decisions, and the following results were analyzed according to this commitment (see Table I). Thus we bring into the analysis one component of identity, environmental commitment especially in the clothing field, and explore other answers through this lens. As illustrated earlier in this paper individuality and personality factors are one lens, one possibility, through which to study green consumption (Haanpää 2007). In the next section these aspects are explored empirically.

Thogersen (1999) states that there is a general assumption that cost monopolizes the interest and attention of consumers and this assumption is not always correct. In this study on average 84.1% of respondents said that price affects their clothing purchase decisions, but all consumers value strongly the following aspects in clothing: fit, quality, colour, compatibility with existing clothes and a real need for new clothes.

There is a wide divergence of opinions on issues such as the need to renew one's appearance with clothing and the importance of eco-materials in clothing purchasing decisions (see Table II). Hence we can argue that when consumers' ethical commitment is high, the more weight he/she puts on issues such as eco-materials and less important is the need to renew his/her appearance. If we accept the idea that "Ethical hardliners" know themselves better, they know their taste, values and

Table I. Consumers' interest in ethical consumption

Attitude, Ethical interest, Purchasing behaviour	never [%]	seldom [%]	can't say [%]	often [%]	always [%]
ethical interest in general	4.1	3.7	1.2	28.3	62.7
everyday ethical consuming behaviour	2.4	14.7	4.9	57.1	20.8
ethical interest in textiles and clothing	1.6	24.4	8.1	49.2	16.7
real ethical purchasing decision in textiles and clothing	2.4	28.9	12.6	47.2	8.9
Division made according to real ethical purchasing decision in textiles and clothing	Not interested	Do what I can		Conscientious Consumer	Ethical hardliners

who they are, hence they have made an ethical commitment, and this value base guides their clothing decisions more than average consumers. The same ethical base for purchasing decisions can be seen in the importance of domestic design and production, as can be seen in "made in Finland" answers. A total of 90.9% of "Ethical hardliners" value the "made in Finland" aspect in clothing while only 33.4% of the "Not interested" group value this as an important aspect in clothing purchasing decisions.

This ethical commitment argument also garners support from the question of what clothes mean to you. Ethical values can be seen in these results, where the meaning of one's own ideology can be strongly seen in the answers of "Ethical hardliners" (see Table III). One's own identity and how it is expressed through clothing is very important for all consumers; however "Ethical hardliners" want to show their own ideology in their appearance. Therefore, when asked if clothes mean your own ideology, e.g. green values, the answers of "Ethical hardliners" show that one's own ideology is even more important than one's own identity for this consumer group. A strong personal ideology is thus a prioritized value in purchasing decisions. It is an even more important value in clothing than one's own identity or beauty and creativity aspects, that is, aesthetic values, if the consumer

has a strong ethical value base. Brooker (1976) argues that consumers who commit themselves strongly to socially conscious consumer behaviour also appreciate high self-actualization (cited by Newholm & Shaw 2007). A strong and stable ethical value base gives the consumer a stronger and, we argue, less mobile self-identity. Hence the "Ethical hardliner" knows who he/she is and what kinds of clothes express his/her inner values. He/she knows what suits him/her, according to Kaiser (1990): what cloth he/she is cut from.

According to Roach and Eicher (1973) when a consumer makes a conscious clothing selection and interprets fashion styles, he/she feels that he/she in this way has achieved individuality. This can also be seen in ethical consumption and clothing. In this enquiry some respondents wish future fashion to be made with good quality, meaning long-time use of clothes, but they also see the opportunity to use the material again to create unique clothes by redesigning the garment to produce their own unique look. The statement "should future eco-clothing be somehow unique and individual" also earned support in this study. Consumers respect beauty and creativity as a meaning of clothing in all consumer groups, as can be seen in Table III. Beauty and creative elements in clothing can be interpreted as fashion acts as illustrated earlier in this paper and also as acts where the consumer tries to reach a desired lifestyle or desired personality that fits to his/her inner self and values.

According to Schwartz (1992) hedonism is one strong human value: its motivational goal is pleasure and self-indulgence. These are strong actors also in clothing choices. As hypothesized from the earlier conceptual discussion, clothing expresses our inner mood to others, but clothing also reflects a good mood, inspiration and a concept of beauty back to the self. As some respondents mentioned in the enquiry, clothing means self-expression, a good feeling, joy and fun (see Table III). Hence through clothing choices a person can consolidate his/her inner self, his/her own identity, also at an emotional level, not only in social interactions. Schwartz (1992) argues that stimulation and self-direction are important values in a person's acts. Doran (2009) has established in her study of Fair Trade consumption that loyal ethical consumers rank self-direction higher than other consumer groups. In this study 33.4% of "Not interested" consumers value self-direction as a meaning in clothing while 59.1% of the "Ethical hardliners" value this aspect. Moreover, as can be interpreted from Table III, for "Ethical hardliners", beauty and creation are as important aspects in the meaning of clothing as for all the other consumers. The social and emotional levels of the meaning of clothing, as illustrated earlier, can

Table II. What affects the clothing purchasing decision the most

	Not interested	Do what I can	Conscientious Consumer	Ethical hardliners
What affects your clothing purchasing decision the most	fit real need quality colour durability compatibility with existing clothes [100%] design multi-functionality [83.4%] need to renew appearance [83.3%] price [66.7%] suitability for water washing [50%]	fit [100%] price [98.6%] colour [92.9%] suitability for water washing [91.5%] real need compatibility with existing clothes [88.7%] quality [87.3%] easy care multi-functionality [81.7%] durability [73.3%] need to renew appearance [69%] design [67.6%] reparability [49.3%] made in Finland [31%]	fit [98.3%] real need [96.6%] quality [94.8%] colour [91.3%] suitability for water washing [89.7%] durability [89.6%] compatibility with existing clothes [88.8%] multi-functionality [88%] design [79.2%] price [78.4%] easy care [77.6%] reparability [74.1%] eco-materials [68.1%]	quality [100%] durability colour fit real need eco-materials [95.5%] made in Finland [90.9%] suitability for water washing compatibility with existing clothes [86.4%] design [81%] multi-functionality [77.3%] production in neighbouring area [77.2%] reparability [68.2%]

	Not interested	Do what I can	Conscientious Consumer	Ethical hardliners
What affects your clothing purchasing decision the most	made in Finland reparability [33.4%] brand easy care fashion following [33.3%] media advertisements designer production in neighbouring areas [16.7%] expendable from use eco-materials [0%]	brand [23.9%] fashion following [21.2%] advertisements [16.9%] expendable from use [11.2%] designer [9.9%] eco-materials [9.8%] media [8.5%] production in neighbouring area [5.6%]	made in Finland [64.3%] need to renew appearance [62.9%] production in neighbouring area [43.5%] brand [29.3%] designer [26.8%] expendable from use [25.9%] fashion following [17.2%] media [12.9%] advertisements [7.8%]	easy care [63.6%] price [59.1%] need to renew appearance [36.4%] brand designer expendable from use [31.8%] fashion following [13.6%] media [9.5%] advertisements [9.1%]

Table III. Meaning of clothing

	Not interested	Do what I can	Conscientious Consumer	Ethical hardliners
What clothes mean to you	shelter protection [100%] own identity [83.4%] practicality beauty creativity [83.3%] social status vanity [50%] approval direction in my life (construction of self) own ideology [33.4%] fashion [33.3%] control occupational appearance [16.7%]	practicality [95.7%] beauty [95.6%] shelter [91.3%] own identity [88.4%] creativity [72.5%] protection approval [59.4%] direction in my life (construction of self) [47.8%] fashion [40.5%] vanity [31.8%] own ideology [29%] occupational appearance [27.5%] social status [23.2%] control [17.6%]	own identity [94.7%] practicality [92.3%] beauty [90.5%] shelter [89.6%] creativity [81%] own ideology [66.4%] direction in my life (construction of self) [58.2 %] protection [51.3%] approval [44.8%] fashion [34.5%] vanity [28.5%] occupational appearance [20.7%] control [15.5%] social status [14.7%]	practicality [95.5%] own ideology [90.9%] own identity [86.3%] beauty creativity [77.3%] shelter [77.2%] direction in my life (construction of self) [59.1%] protection [45.5%] approval [18.2%] social status fashion [18.1%] vanity control [13.6%] occupational appearance [9.1%]

	Not interested	Do what I can	Conscientious Consumer	Ethical hardliners
Something else?		- consolidating own role - affecting others - good feeling, pick-me-up - self-expression - comfort - dissimilarity	- self-expression - story - good feeling - memory	- self-expression - joy, fun

all be found in these answers. Nonetheless there is not a large divergence in these answers regarding consumer ethical commitment.

Do consumers want to declare eco-aesthetics and eco-values with their clothes? When asked if eco-clothing should be the same in appearance and aesthetics as all other clothes (cannot be distinguished from other clothes in style, design, material, colour etc.) 70% of all respondents in general agreed with this statement. Table IV presents the results to the question "Can eco-clothes state eco-values in appearance?" According to consumers' ethical commitment, "Ethical hardliners" are more willing to obviously show their inner ethical values through apparel. A total of 45.5% of respondents from the group "Ethical hardliners" want clothes to express obvious eco-values or eco-aesthetics. An ethical commitment is also visible in the results of this question: Are you ready to buy a garment made from recycled material, even if the quality is not as good as in products made from virgin material? A total of 81.9% of "Ethical hardliners" were willing to purchase recycled products, whereas only 16.7% of "Not interested" respondents were ready to do so.

Clearly, as was illustrated earlier, clothing has to interconnect strongly to a person's own self-image and identity, and eco-clothing is no exception. Yet the majority of current ethical clothing has been mainly of a certain style of design. Hemp and other obviously recognizably eco-materials create a certain style of eco-aesthetics in clothing that does not appeal to the majority of consumers. Redesign has also been a strong trend in recent years, and in the redesign trend the origin of the recycled clothing material has been obvious. If the consumer has chosen redesigned clothing made in this style he/she wants to show environmental values

Table IV. Can state eco-values in appearance (eco-aesthetics)

	Not interested [% agree]	Do what I can [% agree]	Conscientious Consumer [% agree]	Ethical hardliners [% agree]
Can clothes state eco-values in appearance	16.7	27.7	30.7	45.5

Table V. Consumers' readiness to pay more for eco-clothing.

How much more would you be ready to pay for eco-clothes	Respondents [%]
not at all	3.7
1-4% more	12.6
5-9% more	19.9
10-14% more	29.7
15-19% more	14.2
20-24% more	10.6
more than 25%	9.3

with his/her clothing. At the very least it is not a negative aspect to show that your clothes are made from recycled materials: it can even be top fashion.

As van Nes and Cramer (2005) have argued in their study of influencing product lifespans, what consumers

> ...basically want is a well-functioning and up-to-date product that meets their altering needs. The dynamic nature of this desire requires a similar approach: the development of dynamic and flexible products. (p. 297)

In this study consumers were asked to give their wishes regarding future eco-fashion, and the strongest support went to the statement that clothes should be long-lasting, durable and made with high quality. Style, colour, fit and quality are more dominant factors than ethicality when purchasing clothes in general. The eco-aspect can only add value to the product when the product is otherwise attrac-

tive, and thus the eco-aspects give the final reason to buy the garment. The ethical and eco-issues seem to be drivers only to ethical committed consumers, the "Ethical hardliners", who are still only a niche in clothing markets, as mentioned. Berchicci and Bodewes (2005) have highlighted that successful green products must not only meet environmental demands, but they also must fulfil market requirements. They further suggest that environmental concerns should be translated into product design; this means understanding consumer preferences, which may even result in radical sustainable design innovations.

Carrigan and Attalla (2001) argue that ethical purchasing will take place only if there are no costs to the consumer in terms of higher price, loss of quality or discomfort in shopping. In this inquiry the same tendency can be seen: all consumers want high quality and durable clothes. Consumers also wish to buy eco-clothes in hypermarkets (37.9%) or special shops (24.7%). Other options such as the internet, fairs, or flea markets did not attract strong interest. There was a general wish that eco-clothes would not cost any extra; nonetheless nearly all consumers were ready to pay more for eco-clothes (see Table V).

Discussion and conclusions

According to Raymond (2003) customers will be more active and influential in markets in the future. However, markets in general are going to be fragmented and not following any logical patterns. In the future, there will not be an average customer who follows the trends but instead several small groups of customers who behave irrationally, emotionally and chaotically. Radical consumer groups might lead the markets in more complex developments also in the eco-clothing field.

Future consumers can also be selectively ethical in clothing markets. Hence it is most important for manufacturers to identify which ethical factors are important to each customer group. Carrigan and Attalla (2001) have argued that

> …perhaps in time new generations of consumers will not only think more ethically, but also act more ethically, and while product value, price and quality will always be key consumer issues, future consumers may also consider good ethics to be equally crucial. (p. 577)

According to the results of this inquiry, we have come to the conclusion that an ethical commitment and ethical values are a strong driver towards purchasing eco-clothes, eco-materials, recycled clothing, and ethically made garments. A strong personal ideology is a prioritized value in purchasing decisions for "Ethical hardliners", even more important in clothing than one's own identity or aesthetic values. The "Ethical hardliners" however represent only a niche market. Nonetheless, for all consumers quality and aesthetics are highly important when purchasing clothes and fashion, even eco-clothes. In fashion the main driver for change is the consumers' desires, not guilt.

This paper concludes that manufacturers, designers and retailers do not truly know what consumers want and expect from eco-fashion, and hence the present trends in eco-fashion and ethical clothing appeal only to a limited amount of consumers and their aesthetics. This might therefore be one reason for the existing attitude-behaviour gap in the eco-fashion field. In addition the ever-increasing amount of cheap and fashionable clothing manufacturing in Asian countries tempts consumers into unsustainable consuming behaviour in the clothing field despite their ethical interest and inner values. As one of the respondents commented, the availability of cheap clothes confuse consumers' rational behaviour, preventing them from buying more expensive clothes and investing in better quality and sustainability.

In this inquiry 94.6% of respondents were ready to buy better quality, durable, repairable, more expensive clothes in the future and use them longer to decrease their own environmental impact. Hence the fashion industry should not only pursue low costs in the manufacturing process and a cheap end price of the product. The production side needs to treat the consumer with higher respect in the future and see him/her as one of the stakeholders. Thus consumers should engage in the design process to accomplish eco-fashion that better reflects consumers' different needs and desires. On the other hand designers have to find new ways to ensure that consumer commitment, wishes, needs, values, desires, aesthetic concept and emotions become a key starting point for eco-clothing design. At the end of such a design process it is thus possible to deepen consumers' product attachment and at the same time add value to the product through sustainability. This will create better products with longer product lifetimes that better fulfil customers' needs at functional, emotional and identity constructions levels, thereby slowing the current rapid cycles of fashion.

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Publication III

Developing sustainable products by deepening consumers' product attachment through customizing

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In J. Suominen, F. Piller, M. Ruohonen, M. Tseng, & S. Jacobson (Eds.), Mass Matching – Customization, Configuration & Creativity: Proceedings of the 5th International Conference on "Mass Customization & Personalization MCPC 2009", Helsinki Oct 4 –8, 2009. Helsinki: Aalto University School of Art and Design.

Abstract.

This paper aims to contribute to a better understanding of consumers' product attachments in the field of home textiles. The study approaches product attachment through the user's emotional bonding with home textiles. The paper also explores the meaning of individuality, uniqueness and customizing in textiles. Thus this study seeks to address the following questions: how consumers become attached to home textiles, what the meaning of uniqueness is in home textiles; if individual and customized design can deepen product satisfaction and product attachment and in this way if the product lifetime can be extended and sustainability in consumer choices increased. Uniqueness and customizing is approached through the use of digital textile technology together with a design service.

Keywords.

Product attachment, Customizing, Uniqueness, Home textile, Sustanainable Design, Digital textile techniques.

Introduction

In the textile industry the development of new technologies, materials and machinery has always been at the forefront of industrial development. In the textile industry "…an improvement of product is possible only through production innovations aiming at better or 'other' kinds of products, instead of emphasizing, for example, higher speed" (Wiberg, 1994, 130). Wiberg also argues that textile design is a field where art, or as she argues even poetry, craft and technology interconnect, and it thus offers new ways to understand design and industry.

In the postmodern era non-material goods play an important role in the consumer society and even material goods have a greater non-material component. According to inter alia Slater (2002) there has been a shift from mass manufacturing to service industries, where consumers talk more and more about product experiences. Mass manufacturing of textiles has moved from the Western world to lower cost countries, to the East back in the 1990's. Since then the European textile industry has shrunk and today it exists in a tough competitive situation where brands, aesthetics, ever-renewed trends, price and quality issues make it even harder to find a way to make profit. The competition for consumer attention is fierce, and global markets are more demanding and diverse than ever before. What kinds of possibilities, then, does the new digital textile technology offer in finding new markets, even niche ones, in producing new kinds of textiles that interconnect the consumer need for individuality with a better design service? Through a design service and customizing, a consumer's product attachment might even deepen, and through this it is possible to design long-lifespan home textiles.

Digital textile printing started in the 1990's. At first and even still now the majority of digitally printed textiles are for commercial purposes. In Finland the leading enterprise using this technology has been Oy Vallila Interior Ab. Vallila Interior began to co-operate with Bauman at the end of 1990's as the textile printing technology was developing such that surfaces could be printed also on different bottom fabrics. At the same time quality improved, which meant the possibility to widen the use of digitally printed fabrics also to interior purposes. (Grönqvist, P., interview, August 14, 2009)

In the 21st century digital printing technology has gained popularity on the side of the strong trend in home interior design and decoration. Currently digitally printed surfaces can be produced not only on textiles but also on hard materials such as wood, glass and metal. The positive side of the technique is savings in the

use of inks and base materials, while the decoration can be printed only in the size and shape that is needed each time. For example the decoration for the slipcover of a chair can be printed only inside of the pattern of the slipcover, and the consequent saving in the use of inks and fabric is remarkable; this aspect makes the technique more sustainable. Comparing this technique to mass textile manufacturing, second-class quality and inaccuracy in printing can affect several meters while the printing machine begins to print a new roll of cloth in the latter method.

The other sustainable aspect in digital printing is that the end production can be situated close to the end user. Hence it is possible to decrease the environmental impact of transportation.

Digital textile techniques have expanded the possibilities to design and produce uniqueness in home textiles. Digital embroidery, laser cutting machines and digital weaving machines also offer wide opportunities to realize consumers' individual desires. With the help of digital techniques the designer can create a real individual and unique home. The designer can strongly emphasize his/her own visual aspect and vision in the design process or (s)he can place the consumer's attachments, emotions, and wishes at the centre of the design process and create new kinds of product attachments. What this means at the level of product satisfaction and sustainability is discussed further in the following text.

The following consists of a background discussion to which the research aims to contribute. The paper begins with an overview of the research on product attachment. The text further continues to the issue of identity construction in the home environment and the meaning of individuality in contemporary consumer society. Subsequently follows the theme of the meaning of home textiles to consumers. The paper makes use of the results of an online inquiry made in Finland in spring 2009 on consumers' attitudes towards sustainable textiles, and the analytical section of the paper reflects the theoretical part of the results of the inquiry.

Product attachment

Schifferstein and Zwartkruis-Pilgrim (2008) define the degree of consumer—product attachment as the strength of emotionally engaged experiences a user has with a product. The authors are interested in durable product attachments and the emotional tie between the consumer and a product. Durable product attachment emerges towards objects that are special and that mean a lot to the user: if this

kind of object becomes lost, the user experiences emotional loss. Hence this kind of product is unlikely to be disposed of.

In contemporary society consumers create attachments to some objects whereas they easily dispose of other products. According to Schifferstein and Zwartkruis-Pilgrim (2008) it is important to lengthen the life span of the product from a sustainability viewpoint. It is important that designers try to strengthen the product attachment that consumers create in order to lengthen the life span of durable consumables. They have identified seven determinants of product attachments: enjoyment; memories to persons, places, and events; support of self-identity; life vision; utility; reliability; and market value. They state that from these only memories and enjoyment contribute positively to the degree of attachment.

According to Chapman (2009) most products are incapable of sustaining a durable relationship with users. He also states that while aiming for sustainability, extending products' lifetimes is the correct way to design objects. He proposes that for the starting point of the design process it might be useful to gather deeper, more profound and poetic human needs in order to achieve emotionally durable design.

Csikszentmihalyi and Rochberg-Halton (1981) argue that objects and products symbolize many things to the user, for example past and present. Products can also act as a sign of the self or the family. Objects embody memories and social networks. Artefacts represent the practicality of the home, and this practicality also represents beauty in the home environment.

According to Koskijoki (1997) meanings associated with objects can be cultural or subjective; they can be lasting or temporary. Memories, visions and symbols render objects meaningful for the consumer. Products and objects are basically unchangeable but their relation to their owner changes over time, while the owner and his/her identity changes.

Chapman (2009) argues that the discursive engagement between user and product develops through time and stimulation. He also states that user experiences, which often are not even consciously realized, build meaningful associations with object, material or experience through time. These subconscious experiences are influential as the consumer establishes a durable emotional and rational connection with the product. Chapman highlights that all consumers respond emotionally differently to the object as we all are unique individuals. Creating products that evoke clear emotional response will arouse a felt sense of individuality, self-definition and confirmation of identity within the users.

Norman (2005) states that there are three levels in processing and approaching design and objects: 1. visceral design (appearance), 2. behavioural design (the pleasure and effectiveness of use), and 3. reflective design (self-image, personal satisfaction, memories). The first two levels happen now, but the third differs as it includes the effect of time. Reflective design works with long-term relations. People remember the past and puzzle over the future through reflection. The relationship with a reflective design object emerges through possessing, using and presenting the object in the long term. The deepest emotions, feelings and both thoughts and emotions, are also experienced at the reflective level. A consumer's self-identity is located within the reflective level and therefore the next theme further expands the identity issue regarding home textiles.

Home and the construction of self

According to Crozier (1994) the concept of home is a complex one, and it has deep emotional significance. It means sentimentality, affection and identity, but it also exposes a more intense emotional response. Material objects form a consumer's identity and the family level interlinks to an extended self concept. In this extended self concept home and its items is also included. Home can be seen as a symbolic body for the family, and it is quite a central aspect to an individual's identity. We all surround ourselves with personal and important objects at home. Objects that include valued possessions also have self wrapped up in them. Consumers link their identity strongly to objects that have been personified and kept for a long time. (Solomon, et al. 2002; Csikszentmihalyi & Rochberg-Halton, 1981)

Objects around us and material possessions in general symbolize to us and others who we are. Consumption and consumables represent our personality, social standing and wealth, but also our values, history and relationships with others. The user's needs beyond functionality are of increasing interest to researchers and designers, and this has necessitated that the concept of empathic design has emerged. (McDonagh, et al. 2002)

According to Soronen and Sotamaa (2005) consumers associate home with some kind of state of mind or atmosphere. This atmosphere is maintained through shared practices, common presence and also attachment to personal objects. In contemporary consumer society home is made one's own through personal objects and decoration. Commodities are also made one's own and authentic by shaping

them symbolically and concretely. According to Slater (2002) consumer individuality, sovereignty, is a forceful image of freedom. The basic idea of freedom and privacy is the foundation of the postmodern consumer society and herewith the strong need for individuality, expression of one's own uniqueness, is carried out through purchasing and possessing. With consumables we construct the self, we make up our social appearance and social networks like lifestyles.

Norman (2005) argues that the material objects we possess, also homes, are public presentations of our selves. Aura et al. (1997) state that habitation can be considered as a matter of attachment, a safe place and consolidation of identity. He also argues that a habitation changes to a home through personalization. According to Sarantola-Weiss (2003) habitation is made one's own and part of one's own identity through furnishing, arranging objects, and decoration. Home and its objects thus presents individuality, personality, which represents one's own identity. Home works as an extension of one's own identity. Through the objects in one's home one can toughen and confirm also the links to one's own past. Many objects exist as a symbol of the consumer's deep inner feelings or memories, or they represent deep meanings, such as family values or history.

Memories and home textiles

According to Koskijoki (1997) objects can act as containers of memories. Very often and especially with meaningful objects, products represent history, past events, memory, and a reminder of some important event, place or a person. The object carries the memory but also acts as a promise to the experience and as a keeper of the memory of the experience. Luutonen (2007) states that consumers have many different craft items, products and objects around them, which have the task of keeping and maintaining the connection to something important, perhaps a past period of life, like one's childhood, or a dead close relative.

The important things around us are those which evoke special feelings, memories and stories. Things represent those important memories and feelings for us. One of the most important items including significant personal association are old family photographs, which are highly valued and cherished. Family photos maintain family bonds even over generations and often the history of the family is passed from generation to generation. (Norman, 2005)

The importance of family ties can also be seen in digitally produced textiles.

Many digitally printed textiles are based on family photos. Päivi Grönqvist (Interview, August 14, 2009) describes one example where the family ordered seven similar digitally printed textiles of grandmother's wedding photograph. All seven grandchildren wanted to share this old family treasure and with new technology it was easy to duplicate and print it in a suitable form and size. Grönqvist also describes that now in home interior decoration a longing for history can be seen. When renewing their home interior consumers want to conserve some meaningful objects, which are often linked to their family history. It is also possible that those historical family objects might be taken down from the attic and all the rest of the interior is designed around those old objects. Grönqvist now sees a deep longing back to the roots, and grandmothers' items represent history in a modern context.

Money (2007) states that objects can be seen as inter alia markers of memory. Cherished social relationships are carried in goods. Home textiles keep the connection between generations which is also often a memory of a mother or grandmother or link to one's childhood. Inherited home textiles have a strong connection to one's own family history or even historical places such as a farm and a field. They might also be made with deep craft skills, such as old bed linens with handmade lace or embroidery. Well-kept, valued textiles are made by mother or grandmother, they might be carefully considered presents, and they thus remind us of the care and love of close ones.

Individuality and uniqueness

Authenticity, known origin and uniqueness are important in a consumer society where everything is so easily manufactured, repeated and reproduced. A product's uniqueness and rarity is transferred to its owner, and the goal is in individuality. Everyday aestheticization and the continuous construction of self leads through individualization to demand for individual customization and demand for deep experiences in products. Consumers want products to fit their identity or their ideal identity and desired lifestyle. (Kälviäinen, 2002)

Govers and Schoormans (2005) argue that consumers prefer products with a product personality which matches their self-image and self-concept. Jordan (2002) has described product personalities the same way as human personalities. He also argues that consumers have a preference for products they feel reflect their own personality at some level. In contemporary society the feeling of uniqueness is a

strong demand from the consumer's side. The tight global competition in production also leads enterprises to produce more personal products. According to Govers and Schoormans (2005) product personality is important in individualization.

According to Kälviäinen (2002) uniqueness is sought in the search for individuality in contemporary consumer culture. There exists a constant discussion about exclusive versus common. Grönqvist (Interview, August 14, 2009) says that earlier uniqueness used to be expensive and exclusive, but today uniqueness, thanks to new digital textile techniques, is of average price; uniqueness is therefore today's and perhaps even more tomorrow's way to do home decoration and individualization. Uniqueness is an emerging trend in home interiors. As mentioned earlier the personalization process is fundamental when a habitation is transformed into a home and in this way the home environment expresses one's own identity as well as the concept of ideal self and family life.

Uniqueness and the product's personality is also linked to craft and the aspect of the handmade especially in home textiles. In home textiles something handmade is often linked to some close relative such as a mother or grandmother and hence interlinked to deep emotional meanings. According to Schifferstein and Zwartkruis-Pelgrim (2008) deep product attachment is constituted if the product gives the feeling that the product user is loved or cared for, if the product awakens memories of some person who is important to the product user. The product is also important if it symbolizes a bond with friends or family or if some special person has been in contact with the object. All these levels can be seen in attachment with home textiles, which will be discussed further in the empirical part of the paper.

An aforementioned aspect can be useful in the design process. Cagan and Vogel (2002) state in their theory of breakthrough products that value opportunity in design differentiates the product in competition such that the consumer's needs, wants and desires affect the purchasing decision. The greater the experience the product offers to the user the greater the value of the product to the user. Cagan and Vogel have identified value opportunities classed as the following: emotion, aesthetics, identity, ergonomics, impact, core technology and quality. All these also relate to the product's usefulness, usability and desirability. They furthermore state that a successful product must connect with the personal values of the consumer.

When a consumer becomes attached with a product (s)he will take better care of it and (s)he is also not eager to replace the product easily with another one. This is uniqueness in the product that may arouse a deeper product attachment in

the consumer's mind, thus a deeper product attachment may extend the product's lifetime. Hence uniqueness in design is one possibility promoting sustainable consumer culture. (Mugge, et al. 2004)

If the designer can link the new product deeply with a consumer's emotions, identity, aesthetic needs (that is, values and lifestyle) and personal memories, the design process can achieve a deep product satisfaction and product attachment. This is possible through a good design service and technologies which offer possibilities for individual and unique design as is the case with digital textile technology.

To better understand consumer product attachments in the home textile field, the following describes a study on Finnish consumers' product attachments in home textiles. These will be reflected upon later regarding the issue of uniqueness and customizing.

Product attachment in home textiles

In this section are represented the results of a consumer inquiry in Finland. The inquiry was carried out as an online inquiry in spring 2009. A total of 246 respondents participated in the inquiry. The survey offers several guidelines to consumer interest in home textiles and some interesting findings on product attachment and the meaning of uniqueness in home textiles. In the conclusion these findings and their meanings to customizing are summarized.

Textile purchasing decision
Suitability 94.4%
Real need 93.9%
Suitability for existing interior decorating and furnishing 93.1%
Quality 92.3%
Colour 90.3%
Easy-care 89%
Suitability for water washing 87%
Price 85.3%
Long life span 85%

Table I. What affects the home textile purchasing decision.

The purchasing decision in home textiles

For the background of this study the consumers were asked about their purchasing decisions. While asked which elements mostly affect the purchasing decision in the home textile area the respondents answered in the following way. The most important aspect is the product's suitability for the intended use. Second is the real need for a new textile and third is the suitability for the existing interior decoration and furnishing. (See Table I.)

The product's functionality is vitally important for the success of the product (McDonagh, 2002). Besides functionality important aspects are also appearance and aesthetics in home textiles. Consumers also respect quality and a long lifetime of textiles which links to sustainability issues. To better understand emotional bonding to home textiles the paper continues to analyze the user's needs beyond functionality.

The meaning of home textiles

When asked in the inquiry what home textiles mean to the consumer, the respondents answered as follows. The most important meaning is practicality, secondly is beauty and the aesthetic aspect, and the third is the creativity aspect. With home textiles it is most easy to renew the atmosphere in the home. It is also reasonable in cost to make colour and pattern changes with textiles. With home textiles everyone can express their own creativity easily and implement their own or trend magazines' dreams for a perfect ideal home. This aspect intertwines with the construction process of own individuality and self in the home environment and in the context of contemporary consumer culture. (See Table II.)

Table II. The meaning of home textiles

The meaning of home textiles
Practicality 94.2%
Beauty 93.4%
Creativity 77%
Own identity 69.6%
Protection 69.1%
Own ideology (for example green values) 55.2%
Safety 50.1%%
Direction in one's life 37%

In open answers comments were given that home textiles mean memories, cosiness and stability. Textiles can also create a strong link to one's own individuality and feeling of uniqueness, as in the following quotation.

> One's own home feels like one's own mainly because of curtains and carpets and because of the colours and patterns in the furniture.

Product attachment in home textiles

When asked about the reasons through which the consumer feels attached to textiles, again the significant aspects were functionality and aesthetics. Respect for good quality can also be seen in these answers and good quality interlinks to the long life span of textiles. However, as stated earlier in this paper, in product attachment memories are issues of substance. Uniqueness and individual design were in sixth place. Despite this position, 64.4% of respondents consider this as significant. Uniqueness is an important element in product attachment in home textiles. Rather many respondents also respect handmade, self-made and textile age aspects while estimating product attachments in textiles. A high price on the other hand does not create deep product attachment itself, since only 40.8% of respondents agreed with this alternative. (See Table III.)

Table III. Product attachment in home textiles

I am attached to the textile because it
1. is well functioning 96.7%
2. is aesthetical 94.7%
3. is made with good quality 91.2%
4. evokes memories 74.9%
5. is inherited 71.6%
6. is unique, designed just for me 64.4%
7. is handmade 64.1%
8. is self-made 62.1%
9. is old 61.1%
10. is valuable 40.8%

Respondents also mentioned more functional and practical reasons regarding why the textile has been saved. They mentioned the good quality in old textiles and

compared this to new textiles, which they think are generally made with bad quality. Consumers also mentioned classical design, durability in design and quality and also the practicality of the textile. The following is a quotation by one respondent:

> The most lasting home textiles are the ones which are original, individual, and this is the reason you are attached to them and that's why they last long.

The following texts analyze more closely the emotional bonding in home textiles according to the inquiry.

CONNECTION TO FAMILY

As pointed out earlier in this paper and according to Norman (2005), the consumer becomes attached to objects if they have a significant personal association. Significant personal associations include the connection to his/her own family history. This can also be seen in the results of this inquiry. When the respondents were asked to talk about the oldest home textile they possess, nearly all of the textiles were somehow linked to their own family history, grandmother, mother or some other relative such as an aunt or father, or to their own childhood.

One respondent stated the following:

> The textile has been saved because I want to retain these memories by taking good care of the textile.

Meaningful textiles carry memories, they act as containers of memories (Koskijoki, 1997), and they are well kept; they are cherished, they have emotional value and they last over time even if the user's identity changes or home moves to another place and changes appearance. It seems to be especially important that home textiles often link to the female continuum of family history as can also be seen in the following theme of work.

WORK AND EFFORT

Textiles with a long life span are full of memories, stories, connection to family, and symbolic values. In addition, the appreciation of time, time-consuming work methods and the handmade aspect were mentioned in several texts. When asked about the stories about the oldest textile the respondent possesses, several mentioned hand embroidery, hand weaving, hand printing and crocheting. The con-

sequent interpretation is that the effort in hand work and slow, time-consuming techniques is a valuable aspect for the owner. The following is one quotation.

> …which my grandmother has made herself quite from the beginning: she has cultivated the linen, she has made the yarn from the linen, she has woven the textiles by herself and made the hand embroidered marking using her maiden name.

Another example talks about the old times, when women had to make the bride's outfit before the wedding.

> Inherited bed sheets are made of self-cultivated linen and they are part of the bride's outfit.

Textiles valuable enough to be considered as inherited items are old handmade linen sheets. Making by hand is an ephemeral skill in our present fast way of living. At the same time it is appreciated especially when it links to our own mother's or grandmother's efforts and skills. As described earlier, in old textiles someone important has actually been in physical connection with the textile. There is a strong emotional charge in those textiles that have been made by the hands of our own mother or grandmother.

SELF-MADE

The self-made aspect is linked to the earlier aspect of work and effort but at a lighter level. Contemporary hand-making involves light modifying and fast creativity that is not as time consuming a handcraft as those described in the previous paragraph. The self-made aspect can be seen as persons needing to realize their own individuality and creativity in our contemporary consumer society where everything is bought so easily: everything can be found as a mass manufactured option. Self making can be something small like a hobby, modifying an already existing object or sewing new curtains for your living room. It can also be more challenging and demanding and can include processes such as learning new techniques, as described in the following quotation.

> The textile includes a lot of happiness in the success and development of my own creativity.

Self–making is also linked to deeper meanings of one's own creativity, construction of self and the context of modern handicraft. As stated earlier in this paper in the section on individuality and uniqueness, the level of uniqueness can also be seen in the need to build one's own individuality through self-making and the context of individuality in a postmodern society.

CHILDHOOD

Often textiles carrying childhood memories are the most special, perhaps falling to pieces but still deeply loved. They represent some already extinct period of a person's life. Childhood memories can be bittersweet ones. They carry an ideal concept of home and family life, but they can also fill us with melancholy, as in the following quotation.

> The blanket has already got fluffy and time-worn, but it has followed me over ten years from a broken home. It is really not used anymore, but sometimes with my siblings we drag it out and then we remember the good childhood memories that are also interlinked with the blanket.

The blanket from childhood is brought out when sisters and brothers want to remember good memories of an ideal, wholesome family. The textile symbolizes the neverending, always happy and carefree childhood life, which no longer exists. Perhaps it even gives comfort to the user in conflict situations in adult life.

TOUCH, TACTILE MEMORY

In meaningful childhood textiles tactile memories are also connoted, as can be seen in the following quote from the inquiry.

> I have a blanket that has followed me from childhood. At the moment it has begun to fall to bits at the seams, but because it feels extremely comfortable it will continue for years in service after repair.

In texts about childhood textiles touch was often mentioned: the feeling of the textile, comfort, and the softness of the fabric. The tactile element appears to be essential when developing important childhood memories, and these tactile memories seem to follow into adulthood.

SPECIAL MOMENT, FEELING OF SOMETHING SPECIAL

Objects are the carriers of memories from special situations, moments or feelings, as stated earlier. They carry us years back just in a moment, and we remember again the strong feelings and connections. One fine example is the following, where the writer describes one special moment which connects her to her childhood. In the quotation the respondent is writing about a childhood blanket that has followed her for over seventeen years.

> I remember the day when I and my two brothers were with mother and father buying those (blankets). The boys got blue ones, which were made of rough material, but I, the only girl, got a lilac one, which happened to be a soft and slippery fabric, and which the boys were afterwards very jealous about.

This text illustrates not only the memory of that very special moment experienced together with the family but also this girl's special place in the family. She felt special and received different attention from the boys. The blanket was also the object of desire and jealousy. This textile has reminded her of this feeling of special and parental attention throughout her life.

DIRECTION IN LIFE

Direction in life is one aspect linking strongly to home textiles. Especially the moment when a person becomes independent, that is to say, moves into their own home and begins an adult life, evokes strong memories of home textiles. In the inquiry's open answers several narratives can be found about these memories either linking to an independent life or life together with a husband or wife, as the following quotation describes well.

> The first duvet covers, bought once together with my wife, have a huge emotional charge.

Another respondent said:

> Duvet covers, which I bought 27 years ago, when I moved to our first rented home together with my husband. The duvet covers have needed repairs a couple of times, but I still remember the feeling when I washed

them the very first time and I hung them up outdoors to dry: I have moved away from my childhood home and I can do this by myself whenever and however I want to.

In these stories the textile symbolizes a new direction in life, the beginning of adulthood and a new kind of responsibility and freedom.

Uniqueness in home textiles

According to this consumer inquiry, in general 53.9% of respondents were willing to see uniqueness in textiles in the future. A division was made regarding the respondents' personal ethical commitment. In this inquiry"Ethical hardliners" were those consumers who were in general more interested in ethical consumption than the other respondents: they realize an ethical interest in their purchasing behaviour more often than other respondents, and while purchasing textiles "Ethical Hardliners" always take into account the ethicality, product safety issues and environmental impact.

According to this analysis, "Ethical hardliners" are more interested in uniqueness, modifying possibility and the possibility that the textile would be designed and made just for her/him. A total of 86.4% of "Ethical hardliners" were interested in unique textile products, whereas only 50% of ethically "Not interested" consumers were interested in the uniqueness in textile products. The same tendency can be seen in the answers to this question: should future textiles be designed and made just for you, and in this way can it be possible to deepen the product relationship and thus decrease consumption? A total of 59.1% of "Ethical hardliners" were interested in this option, whereas only 16.7% of "Not interested" respondents agreed with this. (See Table IV).

According to Norman (2005) one powerful way to achieve a strong positive sense of self is a personal achievement, as in a hobby, where people can create unique things and through this they earn appreciation of others and themselves. Can this same attitude be seen in the interest in seeing textile products which are suitable for modifying? As illustrated earlier the strong need for individuality in our contemporary consumer society can be seen in the need for a "made by myself" attitude. Can a design service, and the aspect of the end-user taking part in the design process, be seen as a contemporary self-making, modern handmade proc-

Table IV. Can future eco-textiles be unique, suitable for modifying and designed just for you?

Can future textiles be	"Not interested in ethical consumption"	"Do what I can"	"Conscious consumer"	"Ethical hardliners"
somehow unique	50%	63.7%	81.7%	86.4%
suitable for modifying	33.3%	43.4%	53.9%	63.6%
designed just for me	16.7%	36.2%	34.7%	59.1%

ess? Can this kind of design process give the same kind of satisfaction as the real making-by-hand process? The following is a quotation from the inquiry. When asked the story of a long-life home textile one respondent commented that the textile has been durable, because:

> I have been involved in the design process of the textile and it includes my favourite colours. Originally the textile was designed for one of my homes and it carries one state of my life in it. The textile product can be reconstructed to fit the space and you can change the shape of it. The product in a new place looks like it has been designed just for that place, and the materials have lasted well.

From this comment it can be interpreted that the owner of the textile has developed a deep product attachment, not only because the textile is unique, but also through being involved in the design process and having the possibility to influence the final outcome of the design process. The respondent also continues the design process when moving into a new home: the user has a new experience with the product when rebuilding a new composition with the textile, which has a modular structure. The user can thus actualize her/his own creativity and be part of the continuing design process. Hence (s)he is creating meaningful uniqueness.

According to Anne Berner (Personal communication, August 21, 2009), Managing Director of Vallila Interiors, the best way to increase the life span of textiles is through uniqueness, a designed-just-for-me aspect in the product. Second best

is the aesthetic aspect and thirdly the classicism of the design. Achieving uniqueness in textiles requires a personal design service, and hence a personal and deeper product attachment is developed. From a sustainable development perspective Berner believes that uniqueness in products means a deeper product attachment, meaning that this kind of unique product will be replaced less frequently than mass-produced ones.

Berner (ibid) has also evaluated those aspects that are important in unique digitally printed textiles. She made the evaluation through one personal example, a textile designed for her home whose starting point for the visual design was her grandfather's diary. The most essential aspect, according to Berner, is the suitability for the interior. The second-most important aspect in this product is the connection to her own family history. The third aspect is the aesthetic of the product. The fourth one is the theme for the design, and subsequently the colour, long lifetime of the product, and finally the importance of uniqueness is at the seventh level. (See Table V.)

The important aspects of a uniquely designed textile
1. Suitability to interior
2. Connection to family history
3. Aesthetics and design
4. Theme for the visual design
5. Colour
6. Long lifetime of the product
7. Uniqueness, designed just for me

Table V. The important aspects of a uniquely designed and digitally printed textile through personal experience

When asked to make an evaluation according to a general interest in digitally designed and produced textiles, Berner (ibid) prioritizes the aspects in the following way. She estimates that the most essential aspect to the desirability of digitally printed textiles is the implication that it is designed just for you. Following this were the aspects relating to aesthetics and beauty, the functionality of the product, a classical design, the design service, the price and finally a well-known brand or designer. (See Table VI.)

Desirability of digitally produced textiles
Uniqueness, designed just for me
Aesthetics and beauty of the product
Functionality, suitability for the interior
Classical design, timeless product
Design service
Price
Well-known brand or designer

Table VI. The important aspects that create desirability of digitally produced textiles

Digital technology gives new design service and production possibilities in the home textile and decoration area. It also offers quite new possibilities to deepen product attachment and thus uniqueness which interconnects to sustainability. Through this kind of design process it is possible to place the consumer's attachments, emotions and meaningful visual elements at the centre of the design process; the outcome is deeper product satisfaction and hence extended product lifetime.

Discussion and conclusions

The various approaches to product attachment discussed in this paper not only address many levels of product attachment in meaningful home textiles but also reclaim the end users' emotional level in a customized design process. According to Schifferstein and Zwartkruis-Pilgrim (2008) the relevance to design practice is to intensify the emotional bond that users experience with the products and in this way create durability in consumer choices. From a sustainability perspective to product design it might be advisable to design products with deep product attachment. According to Mugge et al. (2004) it is essential and valuable if the designer can influence the degree of attachment consumers experience to their products. To realize this, one possibility is to design products that better interlink with the user's needs and emotions, and hence the design service that produces unique home textiles with the help of digital technology is one opportunity to produce meaningful and durable textiles, close to the end user.

From the inquiry it can be interpreted that meaningful home textiles evoke strong memories. As Norman (2005) states these meanings are included at the lev-

el of reflective design where the activities of self-image, identity construction, personal satisfaction and memories happen. As Cagan and Vogel (2002) argue these are also the value opportunities in breakthrough products. Identifying meaningful product attachments in home textiles offers the designer a better understanding upon which (s)he can base her/his design work in an individual design service process. As the aesthetic and identity aspects are significant in long-lifespan home textiles these are also possibilities towards which to lean the design process and in this way create deep product satisfaction, joy and positive experiences with home textiles.

From the inquiry it can also be interpreted that an important product attachment in the home textile area is the connection to family history (especially mother, grandmother or childhood), and the possibility to make it yourself or to take part in the design process. It is an important opportunity for a design service connected to digital techniques to design individual textiles based on the consumer's personal memories and emotions. Hence it is possible to create deep product attachment and satisfaction through customizing. Added to this it is possible to create textiles that include a rebuilding possibility, changing the composition aspect and even a do-it-yourself level. Thus this creates a deeper creativity, individuality and self-construction experience for the user. As Chapman (2009) stated the meaningful discursive engagement between the user and product develops through time and stimulation. In this context the user is an active partner or player in the design process, not only a passive spectator. This discursive level can be actualized through modifying the textile, having the possibility to construct the textile from smaller pieces (modular structure) or by partaking in the design process itself.

The need for individuality leads to the demand for uniqueness in our present consumer society. Uniqueness combined with good design and a design service creates deep product satisfaction and attachment. As represented earlier, consumers with strong ethical commitment are more interested in uniqueness in textiles. Digital techniques may likely stay in niche markets, but they could be marketed as a sustainable way to design and produce meaningful, long-lifespan textiles, close to the end user (mentally as well as physically), and in this way create desirability for consumers.

Experts strongly believe that uniqueness shall emerge as a larger trend in home interiors in the future (P. Grönqvist, interview, August 14, 2009; A. Berner, personal communication, August 21, 2009); According to Aura et al. (1997) a habitation changes to a home through personalization. Therefore in the home environment

uniqueness and customizing has a large potential to deepen the product satisfaction and hence extend the lifetime of meaningful home textiles. In summary textile design has the potential to connect to customers' deep emotionally meaningful memories, profound and poetic human needs for modern design, and in this way achieve emotionally durable textile design.

Designing unique home textiles with the help of digital technology is one way to focus on deep product attachments and better consumer emotional satisfaction with a customized design service. Customizing home textiles might be one opportunity to focus on sustainable textile design in the future.

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Publication IV

Forming Sustainable Attachments to Clothes

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Proceedings of the 7th International Conference on Design & Emotion,
IIT, Chicago Oct 4–7, 2010.

Abstract:

This paper presents a study of how people form attachments to clothing. The aesthetic dimension is a fundamental attribute when consumers are forming product attachment. Yet the concept of beauty in clothing can be approached through a social, cultural and temporal context and in a multi-sensorial way. Furthermore positive experiences, memories, family ties, expressions of self, promises of future experiences, and emotions are essential characteristics that allow consumers to construct an attachment to clothes. In addition certain design styles, colors and materials enable sustainable attachments to form. The notion of sustainable attachment includes reflective dimensions, which can lead to a more discursive engagement with clothing. The study explores these issues and creates arguments for sustainable attachments based on an online consumer questionnaire conducted in Finland in 2009. In this study a table has been constructed which summarizes sustainable product attachments to clothing.

Key words:

Product attachment, Sustainable attachment, Attachment to clothes, Sustainable design

1. Introduction

Despite recent studies in the area of eco-fashion, producers and designers still lack knowledge of what consumers desire and value in the fashion field and in the context of sustainable design. Development in the textile and clothing field has been technological and cost-sensitive up to now, and the textile industry has emphasized the price of the end product and efficiency in production. Hence low prices tempt the consumer into increasing consumption and shortening the use time of clothes. Designers and manufacturers have no particularly profound knowledge of what the consumer values, and hence ever-changing trends, short product life spans and easy profit drive how clothes are currently designed. [1]

In the context of sustainable development it is crucial to consume less and to invest in products with longer life spans. To ensure this future path it is most important to focus on designing better product satisfaction and experiences. Through deeper satisfaction it is possible to create deeper engagement with products, thereby avoiding disposable products. Consumers create an emotional bond with certain products, and this emotional bond is an opportunity to increase the life span of the product. [2]

Product satisfaction is formed from different elements according to product type. It is easier to identify the operative dimensions of a product than the reflective ones. Reflective dimensions are interlinked with individuals' feelings and how they ascribe meaning, and it is therefore much more difficult for a designer to have any control over these aspects. Individuals can operate with objects according to different feelings and in any way chosen. Someone can interact with a product through its operative value, its poetic dimension or its social significance. Hence all individuals have different experiences with products, and moreover a person's own product experience can change over time according to his/her values, attitude, personal history, past experiences and creation of meaning. [3] Experience design is based on an empathic approach in design, and this approach can result in better satisfaction of commercial, societal and individual needs in the future [4].

When studying product attachment we have to understand people holistically. In other words, we cannot only employ a user-based approach; we also need a pleasure-based approach to design. The latter concept needs a much wider, richer picture of the person than the former. Product relationships are constructed from physiological, psychological, social and ideological dimensions. [5] All these di-

mensions can also be found in people's attachments to clothes, and they will be discussed further later in this paper.

This study contributes to consumer-centered knowledge regarding sustainable design by exploring product attachments. The paper addresses this question: what are the essential elements of product attachment in the field of clothing? A table has been constructed that summarizes sustainable product attachments to clothing, and this knowledge can be used in further discussion of durable clothing design. The paper makes use of an online questionnaire conducted in Finland in 2009, where an internet survey was administered to a random sample of 246 respondents. The answers are dominated by the young female point of view, as the majority of the respondents are female (91.8%) and under 35 years old (80%).

2. Product attachment

We engage with objects and artifacts in our environment to create experiences. According to Dewey [6] things interact with a person's needs, desires, purposes, and capacities, and the result of this interaction is the experience. The relationship is constructed through both objective and internal conditions. Objective conditions refer to the existing environment, while the internal conditions are within the person. The internal and the objective interplay during the experience: i.e. a transaction occurs. A person's own individuality and narrative coherence serve to create a worthwhile meaning for the situation, which in turn creates a sense of experience. Moreover, as previously mentioned, the interaction between the user and artifact has two dimensions: operative and reflective. The operative aspect is constructed during use situations and use experience. The reflective level is interlinked with the user's feelings and the meaning that the user attaches to the object. These two dimensions intertwine with each other, and both levels also serve to create sustainable attachment [3].

Jordan [5] distinguishes several levels when evaluating product benefits, i.e. practical, emotional and hedonic benefits, and he defines the product's pleasurability as existing in the interaction between a user and a product. Pleasurability can be achieved through several levels and in a multi-sensorial way in the context of clothing.

Table I presents the answers of the 240 respondents. When asked about the attributes through which they feel attached to textiles and clothing, the respondents

reported that the aspects of functionality, beauty and high quality are significant. Deep emotional attachments can also be seen in these answers, through, for instance, memories and family associations. On the other hand monetary value does not create as deep an attachment to clothes and textiles.

I am attached to the textiles and clothes because they	%
1. function well	97
2. are beautiful	94
3. are made with good quality	91
4. evoke memories	75
5. are inherited	72
6. are unique, designed just for me	64
7. are handmade	64
8. are self-made	62
9. are old	61
10. are valuable	41
11. are a present	38
12. are designed by a famous designer	21

Table I. Product attachments in textiles and clothing

The respondents were asked in an open question about the oldest clothes they possessed and why they have kept them. In all, 171 respondents wrote short texts that were analyzed, and several quotes from the responses are used in the following text. Table II presents the overall picture of the respondents' open answers, and the different elements are presented in the order of incidence (the highest incidence is number one).

The oldest clothes or textiles carried a strong connection to a particular person: they could be inherited, a present or simply represent a memory of someone close, be they mother, grandmother, father, another relative or a friend. Emotional value also emerges through memories that are linked to particular places, situations or life stages such as one's own childhood or even life achievements.

The following section presents several of these responses from the questionnaire, and thereby a deeper description of how we become attached to clothes.

Table II. The elements of attachment in clothes with a long life span

The elements of attachments in clothes with a long life span
1. connection to memories which are linked to some person or family
2. quality
3. style
4. beauty
5. durable material that ages aesthetically
6. other memories and emotional values (places, events, life stage, self)
7. the way it is manufactured (hand-made, self-made)
8. color
9. maintenance, reparability, modification possibility

3. Clothes as home for a body

> [It is a] beautiful, blue festive dress, which I had in my childhood. The dress is so beautiful that I haven't yet been able to throw it away.

People engage with objects and surroundings aesthetically [7]. The interaction between user and object is on the basis of the aesthetic experience and at the same time pleasure that the object offers us [8]. Clothing unifies roles connected to identity, sexuality and sociality, and furthermore clothing choices externalize the inner self [9]. According to Kaiser [10] temporal, fashion and aesthetic aspects belong to a cultural contextual approach to clothing. Other conceptual levels in clothing are e.g. group affiliation, social situation, immediate body space, personal characteristics, kinetic interaction and garment/body interaction [10]. The dress, the body and the self in the social context are perceived simultaneously, and we can approach clothing as an embodied experience that is socially constituted and situated [11].

Aesthetic attributes in clothing have an emotional effect on the wearer. In the survey, for example, one respondent said that a dress has become important because "I feel pretty when wearing it". Clothing has a strong impact on our emotions [12], and it can elevate the wearer's mood [9]. Jordan [5] points out that the emotional benefits of a product are those aspects that affect a person's mood. We

feel attached to clothes because of their aesthetic beauty, as well as through beauty experiences over time that develop in social situations and through positive and multi-sensorial use experiences. Nevertheless the functional and practical aspects are also fundamental in clothing attachments, as one of the respondents commented: "Very often practicality wins over aesthetics."

The beauty of clothing is not only visual, but also entails tactile, olfactory and kinetic experiences, such as the feeling of comfort, the weight of the material against our body, and pleasant touch and odor. The pleasure clothing offers to the wearer deeply involves the garment/body interaction, and this has a strong and profound connection to tactile memory and our personal experiences and history. The meaning of tactile experience and comfort is illustrated in the following responses.

> My oldest piece of clothing is a pair of shorts inherited from my aunt. They are really comfortable to wear, yet rather ugly.
>
> I still use the upper part of some flannel pajamas, which I inherited from my grandfather (the flannels have worn out already years ago). There is an emotional value, a feeling of safety.
>
> My oldest piece of clothing is a big woolen sweater which my grandmother bought for me and which I wear at home when I'm working at the computer… it gives me a cozy feeling.
>
> A wonderful and soft sweatshirt that I use at home. I got it from my nanny when I was a child, and it is somehow valuable to me. I feel safe when I am wearing it.

Important clothes that are cherished and deeply loved are not always beautiful. In the questionnaire there were several references to clothes that offered a feeling of safety and at the same time had high emotional value. This is often linked to the soft material touch against the skin. These clothes are used in the home environment only, and they are often connected to some important person (such as mother, grandmother or grandfather). Important memories emerge when wearing these clothes. They may be old and full of holes, but are still deeply loved.

Clothes offer a pleasant touch on the skin, comfort, and a warm and safe feeling. The multi-sensorial way we experience clothes creates a layered experience, which

can give the user a deep emotional experience, creating meaning linking the piece of clothing to the wearer's history, present and future. Clothes become as a home for our body as well as an access to our memories or mental stage: the feeling of home.

4. Memories and narratives

> I have preserved some clothes from childhood that evoke some fragile memories. These clothes stay alive also in photographs.

Meaningful things represent history, past events, and memory, and they may be a reminder of some important event, place or a person. The object carries the memory and acts as a keeper of the memory of the experience, but also acts as a promise to be able to repeat the experience. Meanings associated with objects can be lasting or temporary, cultural or subjective. Objects are basically unchangeable: it is their relation to their owner that changes over time. [13]

People possess many different craft items and objects that have the task of maintaining a connection to something important, perhaps a past period of life, such as one's childhood, or a dead close relative [14]. In this questionnaire there were several references to hand-made, self-made or self-designed aspects in esteemed clothes. The following is a response from the questionnaire.

> The knitted Norwegian woolen sweater, which has a grey bottom and white pattern and is made by my mother. I myself selected the pattern and colors. I thought that the combination was beautiful, restrained and multifunctional, even if I liked brighter colors during that period. I haven't ever worn it a lot, because I think that mother knitted it too tight and hard. Anyway I haven't been able to throw it away in any move. I am getting emotional while I am writing this. My mother died six months ago.

Special objects we possess are items that include special memories or associations. These things evoke special feelings or stories that are meaningful. This history of interaction, the association with the objects and the memories they evoke, thus serves to construct a more discursive engagement with the object. Long-lasting emotional feelings are constructed through sustained interaction with things.

Hence the narrative level carries obvious importance when evaluating the discursive level in our engagement with objects. [15]

Very much emotional value is thus embedded in clothes, as well as important narratives from years back. Some stories even go through generations, and they carry several meanings and family histories. They may offer us some insight into our own childhood that we may not even remember ourselves. Some narratives include the love of mother and father and the importance of self in the continuation of generations. Warm, nostalgic and happy feelings give these narratives color.

> On my bookshelf I have blue sandals that I had been wearing before I learned to walk. I don't remember this myself, because I was under one year old at that time. The shoes were a present from my godmother from Germany. I had even kicked away one shoe when I was in the pram, when my parents and I were in Switzerland. Because of its emotional value several people had searched for this shoe, and it was finally found on top of a pillar, where some nice person had placed it.

> One of the oldest pieces of clothing I possess is a woolen sweater bought by my mother and father for their joint use in Italy in the 1980s. It was their first proper trip abroad, and because of that the sweater has been saved. I found it myself over ten years ago in a storage room and I took it to use myself. The model is a rather classical cable pattern, and it can be modified to different styles. This sweater is my favorite while the hippie and grunge style is my thing. Even if it is rather grubby it has a history. It feels safe to wrap myself in it.

These respondents' stories contain connections to several persons. Not all represent family ties, but also connections to an old friend, boyfriend, husband, etc.

> A woolen sweater I bought 28 years ago, when I went to visit my school-time friend in Turku. I haven't met my friend after that, but I do remember him always when I am wearing the pullover. Still, it is a bonus that the pullover still looks beautiful; it is in good condition and it fits me, even if it is a narrow model.

Clothes can also represent the achievements in a person's life, such as a special trip abroad (perhaps the first one) or some life stage (such as pregnancy, or the period of entering into adulthood). The respondents' answers also contain stories where the person has been saving money for a longer period to acquire some desired clothing.

> During the 1990s' recession period I saved from my weekly allowance for over one year to get my first pair of brand jeans. For a teenager it was some kind of status thing. Nowadays those jeans are still in use after several repairs. In those days you still got value for your money.

5. Ageing gracefully

> My oldest piece of clothing is probably a dark green leather jacket, which was tailored for my grandmother in the 1970s. I have had it already for 15 years. Between use periods it is in the attic and then I dig it out and wear it a lot. It has a timeless cut, and grandmother was a rather similar size to me, so the jacket fits me well.

Papanek [18] argues that we have a longing for objects which age well, for instance, antiques, and we appreciate products and artifacts that have the stamp of its maker. Antique and craft objects are made carefully with high quality. According to this study attributes of quality, aesthetic aspects (color, print and style) and ageing well are fundamental when respondents describe attributes of meaningful clothing (see Table III). Clothing that had a long life span due to its high quality, that is, good materials and good design, received the highest rating. Materials mentioned often were high quality wool and leather. Both these materials have the characteristic that they age in an aesthetically pleasant way: gracefully. In leather especially the user can see the ageing process, which gives the product a certain attractiveness related to the temporal dimension. In high quality wool ageing does not show as obviously, and the material looks good even if it has been used for several decades.

> I have a woolen jumper that I got from my grandmother. She bought it in Helsinki in the 1930s. The jumper is simple, classical in style and timeless in color (black/red), and very well kept. From its appearance no one can guess that it is so old.

Design aspects:
High quality [92]
Color or print [50]
Classical style, timeless design [39]
Functional style [18]
Multifunctionality [12]
Materials which age aesthetically:
Wool [31]
Leather [11]

Table III. Sustainable design attributes in clothing attachment

The open answers contain several references to clothes from the 1950s, 1960s and 1970s. Clothes from the 1950s were mainly self-made or hand-made, and very often even the fabric itself was self-woven. This has resulted in high quality materials and sewing techniques, and these clothes seem to be especially cherished. There were several references to the high quality of old clothes which the users can no longer find in contemporary clothes. At the same time these items were very often linked to the user's own family history, as in the following responses.

> Wadmal [old wool fabric] knee pants, which I inherited from my uncle. Originally they were my uncle's school trousers from the 1950s, and the length of the trousers was determined by the width of the fabric. The product has lasted, because the material is long-lasting and high quality (the fabric was woven by great-grandmother's weaver neighbor) and the product was sewn together especially well (by great-grandmother's sewer neighbor). The product has since then been correctly taken care of (washed rather rarely with cold water and mild soap, aired, and protected from moths). Still in use rather often during wintertime.

> [Clothes] inherited from my grandmother, which I have worn for 20 years. Old clothes get old beautifully, and they are connected with so many memories that there is no reason to ever throw them away. I do store clothes, even if I don't use them…

> I especially cherish old clothes from my mother, which were made during the time when clothes were made so well that they lasted through generations. You can also find these kinds of clothes in flea markets. You also gladly want to take these kinds of clothes to repair, if the basic quality is good enough. It is not worthwhile buying these current mass-manufactured clothes from flea markets, because they look time-worn already when you are buying them from the shop.

Clothes from the 1960s and 1970s were industrially made from high quality materials, and at that time the textile and clothing industry still existed in Finland. The style from these periods is also recognizable and forms part of the ongoing retro fashion. On the basis of this questionnaire it can be concluded that the quality of the clothes from this era is the essential reason to possess and cherish these particular clothes. They also represent the history of textiles, as those factories and brands no longer exist. It can also be interpreted from the responses that regarding the quality of clothing, the end of the 1980s and the early period of the 1990s seems to be the turning point. This is the period when more and more clothing manufacturing moved from Finland to lower cost countries: first to Europe and later to Asian countries.

6. Expression of Self

> From the very beginning I felt a sense of ownership with this clothing; it works in all occasions, the quality is high, it is timeless, I enjoy wearing it, and it ages beautifully. Moreover it has helped me create a personal clothing style through a combination with different clothes. The product expresses my personality.

One important issue in the product world is the expression of one's self. A favorite object may be a symbol of some characteristic, uniqueness or value we want to connect to ourselves [15]. This level is very important in clothes. Beauty is one of those attributes we want to connect to ourselves. The expression of personality or uniqueness through appearance is also obvious in the context of clothing.

> The self-made winter coat from my high school period. The material is grandmother's old furniture fabric from the sofa and the lining is an old bedspread. I sewed it myself and in the totally wrong way, because I hadn't yet studied the profession. It is already ripped and repaired at the seams of the sleeves, but it is my most loved coat. When you have made it yourself, you know the structure, and it is easy to repair it. Moreover it is the right size, looks beautiful and expresses my personality. No one else has a similar looking coat.

Through clothing choices an individual can consolidate their inner self, their own identity, at an emotional level, not only in social interactions. The following quote from one respondent is a good example of the meaning of clothes that can give emotional stimulation to the inner self and serve as a reminder to the wearer of who s/he actually is or was back in history.

> A winter coat from 15 years back. It has a fur lining, a traditional green 'activist' coat, one of my first clothing items I bought at the flea market after my environmental awareness was awakened. It is still warm in cold winter weather, even if there are fewer frosty days every year. The coat for me is still linked to my youth's uncompromising attitude and idealism.

7. Promise of experience

> I designed a woolen sweater for myself which my mother knitted for me. I wore it for 15 years. Now I am going to felt it (I hope it will felt) and make a bag from it or something.

Many old clothes offer an opportunity for change, the possibility to modify, as a promise of an experience to come. These clothes are made of high quality materials, which remain useful for modification. Several answers included this modification issue, where it was a strong reason for keeping the clothes.

> I have a lot of basic clothes, which have lasted for years and which can be combined with more individual clothes. Moreover I have bought a lot of

> sensational clothes from flea markets, which can be worn as themselves or I modify them. Through them I express myself.

Users interact with products, and through this acting with, thinking about and discussing them, meaning is created. When we are interacting with products, we begin to value them in a certain way, and as time goes on we create new meanings and experiences with the product itself, which are also based on our previous thoughts about it. [17]

Some clothes contain the promise of an experience which is developed through the earlier use of the product. "My mother's old and black slip, which works as a perfect party dress." Based on this answer the interpretation can be made that this woman has experienced fun evenings while wearing this party dress, and she wants to repeat these experiences.

One respondent describes the story of a simple, traditional cotton Marimekko dress, which she bought from her friend ten years ago. The dress itself had already been in use then for about 10-20 years. The dress is easy to wear in multifunctional combinations. The fabric is high quality and durable. She also describes how she has made a copy of the dress, which is nearly as good as the original. The dress is so important to the user that she wants to extend and repeat the experience with the dress; hence she has ended up replicating it.

One piece of clothing mentioned in the responses was a men's dinner jacket that includes many levels of meanings and memories, personal association, as well as links to past, present and future promises of deep experiences. Not only has the quality of the material made the piece long lasting, but also all the meaningful associations at the cultural and subjective level and experiences have created a unique value for this object. The following is a quote from the questionnaire.

> Obviously the dinner jacket, which represents the 1920s. It was originally handmade for the movie Fanny & Alexander. Unfortunately I don't know who wore it in the movie. I bought it at the flea market in Stockholm Söder, Bondegatan [Bonde Street], sometime in 1981 or 1982. First I wore the jacket every day, and when I got bored of it I lent it to my friend, who also wore it frequently. I got married wearing that jacket (in fact twice). Now it is in the wardrobe, not used so much anymore. Sometimes I wear it at festive occasions. Now it has collected so much emotional value that it would be most difficult to give up.

8. Reflective attachment and discursive engagement

> My father's old, chocolate brown Nature Conservation organization's sweatshirt from the 1970s, which transferred first to my mother, then to my two sisters, and now to me. It has been kept like a delicate flower, except when my youngest sister took it in to make it fit better. To all of us it is somehow special. We have kept good care of it just like the threatened ringed seal pictured on the front. I use it only on special occasions. The ribs have worn out and they have to be renewed soon.

There are three different levels when processing product experience: the visceral, behavioral and reflective levels. The visceral level is the immediate one linked to appearance, where we make rapid judgments. This level is also a starting point for affective processing. The second level is the person's behavior with the object, and at the behavioral level pleasure and the effectiveness of use are the dominant factors. The last level is the highest level, the reflective one, where a person can reflect upon his/her experience. These three levels interact with each other. Hence the stimulation to act or experience can come from the lowest level, visceral, or the highest, the reflective level. When the stimulation comes from the highest level it is driven by thought processes; when coming from the bottom level stimulation is driven by perception. The reflective level comprises feelings, emotions, self-image, personal satisfaction, memories and cognition. At this reflective level, therefore, both emotions and thought processes are fully operating, while at the lower level there is no interpretation, understanding or deep reasoning, only direct effect. [15]

The obvious difference in these three levels is also temporal. The lower levels, visceral and behavioral, are about now, whereas the reflective level is under construction during a longer period. Through reflection a person connects the current experience with his/her past experiences, personal history and also with a vision of the future and individual values. Therefore the reflective dimension in design concerns the satisfaction created by owning, displaying, and using an object. [15]

The reflective level is fundamental in discursive engagement, which develops over time and connects the user with his/her inner discussion, identity construction, deep values through use, experience and satisfaction with the product. In discursive engagement new elements also act as a stimulus to sustained interaction with the product, and new elements help to focus attention on the object. Hence

discursive engagement includes the change factors that develop or emerge during time and use. [4]

Chapman argues [4; p. 67] that most current products made according to existing design and manufacturing practices do not have "evolutionary souls". On the other hand users are in a constant self-constructing process, and a change process is unavoidable. Discursive engagement needs new properties or qualities in the object that the user discovers: possibilities that only come visible through time and frequent use. In other words the product should include opportunities for change.

9. Sustainable product attachments to clothes

Csikzentmihalyi and Rochberg-Halton [18] have created a framework to distinguish meaning categories related to objects. They describe meanings related to the person, which are dimensions linking us to self, immediate family, kin and non-family aspects. There is also a non-person level that includes the past (memories and associations), present and future (experience, intrinsic quality of the object, style, utility and personal values). When forming an attachment to a new product enjoyment may be important, while attachments we form with old products are influenced by memories. [19]

Forlizzi et.al. [20] present a framework for an emotional product concept consisting of a short and reflexive emotional response (emotional statement) and sustained and reflective response (emotional experience). They propose that when designing products the following qualities should be included in the brief: a degree of interaction, capacity to provide a satisfying experience through enjoyable use, ongoing use or release, physical attributes, style and utility. They suggest two ways to approach user-product experience. The first is to consider the emotional function that acts as a stimulus for new experience, extenders of current experience and proxies for past experience. The second is to consider product characteristics that represent interaction, a satisfying experience, physical attributes, style and utility.

Based on the responses to the questionnaire a table has been drawn up of several attributes that create sustainable product attachments to clothes (see Table IV). These can be used in further discussion on durable clothing design as well as on implications for future design practice. The level of experience is very individual, and hence while the accumulation of memories is the most promising strategy regarding product attachment, it is a difficult task for a designer to achieve. Dimen-

sions of product attachment related to the past (memories and associations) are based on individuals' experiences. On the other hand present and future dimensions (experience, intrinsic quality of the object, style, utility and personal values) are easier to include in the design process, or at least opportunities can be created for these attachments to emerge through experience and time. [19]

Meanings created through time, based on personal experiences, history, and sensitivity and situated in a temporal and socio-cultural context entail too large a task for one designer. A designer or better still a multi-disciplinary group of researchers and designers together can nevertheless create possibilities for positive product interaction and foremost create a positive attitude towards a company offering these meaningful opportunities for experiences [21].

Table IV. Attributes that create sustainable attachments to clothes

Attributes that create sustainable attachments to clothes	
design/style	classical, timeless design, not overly loud visual messages strong design, represents some unique period of design style the experience of beauty in multi-sensorial ways
quality	high quality in design, materials and manufacturing durability
material	ageing well, aesthetically and gracefully (e.g. wool, leather)
functionality	multifunctionality fit reparability
personal values	uniqueness tailor-made self-made self-designed made for me expression of one's own ideology
emotional values	memories (history/past, places, people, moments, childhood) family ties positive associations (e.g. safe and soft tactile feeling) expression of self
present/future experiences	promise of experiences (e.g. modification possibility, party clothes, opportunities for narratives to emerge) family ties and continuity aspect suitability for gift-giving satisfying experiences

When attachments to clothes have developed to the stage where the items have gained personal symbolic and sentimental value, they have earned cherishability [4]. When we value and respect the product in a deep emotional way, the product becomes meaningful, precious to us and it deserves to be well taken care of [22]. In this questionnaire several respondents mentioned the good care and repair of old cherished and loved clothes, as well as the modification aspect or the possibility to modify a garment in the future, as reasons explaining the long lifetime of certain clothes.

In the future, a promising approach to design research is to study the relationship between the user and the object and try to understand the many levels through which individuals create engagements with objects: not only through visual appearance but also at tactile and emotional levels [23]. The attributes highlighted in this study could be used in sustainable design strategies to drive a longer-term use of clothing.

10. Conclusions

The consumer perspective offers knowledge of product attachment to clothes, and this can provide a designer with a better understanding of the sustainable attributes in clothing. The creation of meaning is one of the most important issues a designer must consider in the context of sustainable design, and therefore the meanings behind sustainable clothes provide the most important insight for a designer. Through studying the consumer's product attachments, the designer has the opportunity to create reflective dimensions into the product in order to promote discursive engagement and emotionally durable design. The designer can use certain design styles, material choices, quality aspects, functionality considerations and strategies for designing and manufacturing in a consumer-centered way when aiming for deep product attachment in order to promote sustainability. Other dimensions such as emotional values and the promise of future experiences are a more problematic task to tackle in design; nevertheless understanding these aspects may offer very new design opportunities and result in deeper product satisfaction, thereby extending the life span of products.

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Publication V

Sustainable Consumer Satisfaction in the Context of Clothing

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In C. Vezzoli, C. Kohtala & A. Srinivasan (Eds.), Product-Service System Design for Sustainability. (2012) Sheffield: Greenleaf Publishing. In print.

The current system of mass-manufacturing products in low-cost countries and manufacturers emphasizing only the cheap end price of the product has resulted in products' weak intrinsic quality. As a further consequence of low quality and cheap prices the life spans of products have shortened, and more and more products end up in landfills faster and faster. This, however, is how manufacturers currently maximize sales and profit. Short product life spans nevertheless cause dissatisfaction among consumers and over-consumption. This chapter opens the discussion on planned obsolescence in the current industrial system through studying consumer satisfaction in the context of clothing. Moreover the chapter provokes a discussion on consumer satisfaction in Product-Service Systems from an industrialized (Western) point of view. Two approaches to satisfaction are taken: firstly, a narrow approach is used to provide deep insight into consumer satisfaction and secondly a wider approach is used to draw design strategies and services into discussion about consumer satisfaction in the context of clothing.

1. Introduction

During the last three decades industrial manufacturing has decreased its environmental load through technological development. On the other hand increased production volumes and simultaneous growing consumption has caused the rebound effect: the growth of material consumption (Throne-Holst et al. 2007). Hertwich (2005) sees this as a backfire effect, i.e. efficiency and cheaper prices lead

to increased demand. Accordingly products' cheap prices and low quality tempt consumers into unsustainable consumption behaviour: impulse shopping, short use time of products and easy product disposal. Even while it is technically possible to manufacture durable products, the practice is hindered because of economic, institutional or psychological reasons (Mont 2008).

The current economic and industrial system is based on products' fast replacement and planned obsolescence. Hence products are not designed for long-term use, and it is no longer worthwhile to repair products. Accordingly most products are throwaway articles in the Western world. There are increasing numbers of products that do not last the optimum use time and are discarded prematurely. (Mont 2008.)

Products are discarded, not only because they are worn out but because consumers actively seek novelty. Nevertheless product durability and long-term use are prerequisites for sustainable consumption (Cooper 2005). Cooper (2005) argues that consumers associate durability with high quality and not with environmental impact, yet it is most essential to extend products' life span in the context of sustainable development.

The clothing industry is a good example of the planned obsolescence existing in the current industrial system. Clothing design and manufacturing is based on extremely fast cycles of fashion and consumers' unsustainable desires. This unsustainable way of manufacturing is also becoming more common in the area of everyday commodities. Low quality, short-term use, frequent clothing replacement and increasing textile waste contribute greatly to the environmental burden. In Britain clothing and textile waste is estimated to be the fastest growing waste stream between the years 2005-2010, and currently it amounts to 1.5 to 2 million tonnes annually (Defra 2008). This is a direct consequence of the increase in textile and clothing consumption, which rose over thirty per cent in the period 1995-2005 in Britain (Defra 2008). It is estimated that fast fashion with its low quality currently accounts for 20% of the British market, and it doubled its growth between the years 1999-2006 (Defra 2008).

Effective marketing systems create new temptations and desires for consumers in the form of fashion and trends. Fast-changing trends contribute to psychological obsolescence, which according to Burns (2010) can be divided into aesthetic and social obsolescence.[1] Burns (2010) argues that consumer products that relate

1 Technological obsolescence is not as relevant in the context of clothing.

to our appearance and self construction are evaluated on both aesthetic and social grounds. Products have a symbolic meaning to us, connected to psychological satisfaction through an emotional response; e.g. clothing and fashion enable consumers to gain social acceptance, affiliation with particular groups, and emotional beauty experiences.

Earlier studies have shown that Western Europe consumers purchase garments for the following reasons, in order of priority: change in trends and fashion: attractive price; need for new clothing for special occasion; brand; purchase habbits and to replace old worn-out garments (e.g. Vezzoli 2000, 8). Consumers fulfil many unconscious needs by consuming, alongside their practical or utilitarian needs. Therefore decreasing consumption is a difficult task. Consumers' emotional needs also have to be fulfilled in sustainable ways, and we thus need to acquire more knowledge on ways to extend the product life span through deeper consumer satisfaction. It is therefore important to study consumers' satisfaction in long-term product relationships and moreover define the determinants for short-term use: i.e., why people discard clothing. Only few attempts to develop scenariors for sustainable consumer behaviour in the context of clothing have been made, e.g. SusHouse project (Vezzoli 2000, 4).

This chapter hence investigates consumer satisfaction with regard to clothing from the industrialized, usually Western, point of view. Furthermore the knowledge on consumer satisfaction is framed by design strategies and PSS thinking, providing a discussion on how services can deepen the satisfaction process and accordingly profoundly affect sustainable consumption. This chapter takes both a micro and a macro view on satisfaction: a narrow and wide approach. Firstly the narrow approach is used to provide novel consumer-centred research knowledge about satisfaction in the context of clothing, and secondly the wider approach is used to include design strategies and service aspects into the satisfaction discussion. By doing so the chapter provides both deep empirical insight into consumer satisfaction and a more open and conceptual discussion on satisfaction through PSS thinking.

2. Consumer-Based Eco-Efficiency

We need to find new sustainable ways to create a win-win situation both for consumers and manufacturers by questioning the current economic and indus-

trial system based on planned obsolescence (Burns 2010). Burns (2010) proposes that a new sustainable balance could be driven by social and environmental goals such as reducing environmental impacts and waste, increasing consumer satisfaction and encouraging emerging technological evolution and positive social change. Until today consumer satisfaction has not been widely researched in the context of clothing and in the design discipline. Hence knowledge on how to deliver sustainable satisfaction for consumers in different product groups is still largely lacking. The satisfaction approach is proposed to enlarge the design focus from a single product to the system of products and services and further to include into this satisfaction system all different stakeholders that together fulfill a given demand of needs and desires: i.e. a given demand for satisfaction. (Vezzoli 2007)

Throne-Holst et al. (2007) argue that in the sustainable transformation process to change consumption patterns, there is a need to understand consumption more deeply. The sustainable consumption production (SCP) agenda concludes the same: the balance in sustainable development needs research and understanding on both sides: production and consumption. While the eco-efficiency approach has focused on the production side only, rather little is known about eco-efficiency based on the consumer perspective.

The eco-efficiency principle generally means 'doing more with less'. This has meant improving technologies and systems towards less resource intensity and at the same time it has meant cost savings. It involves a techno-economic and engineering approach that attempts to decrease the environmental impact of industrial manufacturing. Industry's interest in the eco-efficiency approach since the 1990s has not led to a significant development towards sustainability, as it forgets the dimension of human needs in current unsustainable consumption patterns. In short, even while industry has moved towards more effective processes, the volumes of production and consumption have increased due to the cheap prices of commodities. (Michaelis 2001.)

Park and Tahara (2008) argue that eco-efficiency can be used only as an evaluation tool for design alternatives, not to identify key sustainability issues in products. They propose that producer-based eco-efficiency needs to be combined with considering *consumer-based* eco-efficiency in order to better identify key eco-design issues. In this process not only the environmental aspects of a product are analysed, but also product quality and consumer satisfaction can be assessed. Consumer satisfaction is best addressed by offering good performance in those attributes and

dimensions that are important to the consumer and by increasing intrinsic product quality. This entails robust knowledge on what consumers truly expect and value, which is not based on what they actually currently purchase.

3. Consumer Satisfaction

Earlier studies on product attachment have shown that positive emotions, memories, special meanings and reflective levels operating between the product and user create deep attachment (e.g. Csikszentmihalyi and Rochberg-Halton 1981; Mugge et al. 2005; Niinimäki 2010a). The reflective level of product attachment comprises feelings, emotions, self-image, personal satisfaction, memories and cognition, and it is constructed during a longer period (Norman 2005). Therefore these emotional attachments are very individual and related mainly to old garments that may no longer even be in use (Niinimäki 2010a). We have less knowledge about the consumer–product relationship during ownership or use, even though this phase is critical for understanding product replacement (Mugge et al. 2010).

Several research studies have pointed out that stimulating a positive product experience must be examined more profoundly. Positive product experience refers to the product's capacity to provide a satisfying experience through enjoyable use, psychical attributes, style and utility (Forlizzi et al. 2003); through operative dimensions relevant during the use phase (Margolin 2002); and intrinsic quality attributes (Schifferstein and Zwartkruis-Pelgrim 2008).

3.1 Clothing satisfaction

Studies on product satisfaction have focused on the (dis)confirmation paradigm, i.e. consumer satisfaction is based on the size and direction of the consumers' disconfirmation experience. In other words, consumers have certain expectations to be satisfied regarding product performance, and when the product performs worse than expected dissatisfaction will result (Churchill and Surprenant 1982; Oliver 1980). According to Oliver (1980) consumers' product expectations create a frame of reference against which the consumer makes his/her product judgment.

The evaluation frame of reference is connected to the use situation, and hence it differs according to product and each type of use situation. The use situation and the symbolic meanings of the product define the attributes related to expectations. Accordingly different attributes are determinants in different use contexts in

clothing satisfaction. For example clothing in the official work environment has to meet certain expectations regarding social acceptance and social codes expressing professional status. In the home environment clothing provides a relaxed and soft tactile feeling, and this experience symbolizes safety. In sport clothing important aspects are functionality and durability. Moreover a consumer's own personal factors influence the evaluation frame of reference and what satisfaction attributes are important to each consumer.

According to Swan and Combs (1976) clothing performance can be instrumental or expressive: the instrumental performance of clothing interlinks with its physical properties, while the expressive performance is linked to the consumer's psychological response to the garment. Instrumental requirements must be satisfied first, but fulfilling only the instrumental requirements will not result in satisfaction. Therefore, consumers' emotional needs regarding the clothing also have to be met if the consumer is to be fully satisfied. Consumers evaluate products through a limited set of attributes: some are determinants leading to satisfaction while others are related to dissatisfaction. A good performance in certain attributes and dimensions that are important to the consumer is the best route to ensuring product satisfaction. (Swan and Combs 1976)

In clothing satisfaction, therefore, not only the use experience but also emotional levels are important. Fashion is a symbolic production that merges us with our emotional needs; fashion expresses our inner individual personality via external symbols and status items (Kaiser 1990). On the other hand clothing as a concept is material production, and it fulfils our physical needs for protection and functionality (ibid.). The aesthetic experience, which relates to expressive performance, is important in clothing satisfaction. We experience clothing aesthetics in a multisensorial way. The beauty of clothing is not only visual, but also entails tactile, olfactory and kinetic experiences, such as the feeling of comfort and the weight of the material against our body (Niinimäki 2010a).

To gain more information about clothing satisfaction in long-term use, a survey was conducted in Finland in 2010.[2] Table 1 presents the responses from the questionnaire, and it thereby provides a general overview on consumer environmental attitudes in the area of clothing. It confirms, for example, the deep contradiction

2 The questionnaire was based on a "snowball sampling" method with 204 respondents. Most of the respondents belonged to the age group under 35 years old, and 70.4% of the respondents were women.

Table 1: Respondents' attitudes. The numbers refer to the percentage value of the statement "totally or somewhat agreed".

Statements	All Respondents [%]	Respondents with high sustainable commitment [%]	Respondents with low sustainable commitment [%]
I am interested in ethical consumption and environmental impacts of products in general	93	100	86
Ethicality, safety issues and environmental impact of textiles and clothing affects my purchasing decision	62	100	0
It is important to me that garments are made in the domestic area (Made in Finland)	44	64	31
Clothing production has to have a small environmental impact	67	100	46
I want to know the manufacturing process and environmental impact of the garments I am purchasing	65	97	37
I am worried about the ethical issues in the clothing production	76	97	53

between consumer wishes and reality – offerings do not meet consumers' wishes. We know that in Western countries, for instance, currently about 90% of garments are imported (Defra 2008) while 44% of consumers would prefer to buy a domestically manufactured garment. In addition manufacturers provide very little environmental or socio-ethical information (e.g. regarding employer responsibility) about the manufacturing process of textiles and clothing – whether customers would wish it or not.

In analysing the questionnaire responses, the division has been made according to respondents' environmental interest and readiness to actualize their sustainable values during clothing purchasing. Respondents with a high sustainable commitment said that they always take sustainability issues into account when purchasing garments; i.e. ethical, safety (free of toxic chemicals) and environmental issues al-

ways affect their garment purchasing decisions.[3] Respondents with a low sustainable commitment are those for whom ethical, safety and environmental issues in clothing do not affect their purchasing behaviour.[4] How these aspects affect consumer satisfaction is described in more detail later in this chapter.

3.2 Satisfaction and dissatisfaction

In the questionnaire respondents were asked to evaluate their latest garment purchases, and their responses regarding consumer clothing satisfaction and dissatisfaction are presented in Table 2. According to the questionnaire, aesthetic aspects are important to consumers, while fit, colour, tactility and the beauty experience are important in clothing satisfaction.

Satisfaction	%	Dissatisfaction	%
Fit	60	Product information	25
Colour	56	Life span	23
Tactility	52	Quality	21
Quality	49	Maintenance quality	16
Material	48	Fit	11
Use experience	42	Material	6
Beauty experience	37	Use experience	6
Product expectations	36	Product expectations	5
Life span	27	Tactile feeling	4
Maintenance quality	21	Beauty experience	4

Table 2: Consumer satisfaction and dissatisfaction in latest clothing purchase

3 (n=37)

4 i.e. they totally or somewhat disagreed with the statement or did not know if these aspects affect their purchasing (n=77)

On the other hand the life span of the product seems to trouble consumers, and the product information, which includes information on the manufacturing location ("Made in"), material consistency and consumer care instructions. The location of manufacturing specifically relates to quality evaluation during purchasing, and it is an important extrinsic quality cue for consumers (described in more detail in section 3.4).

Clothing satisfaction is fundamentally connected to clothing quality. According to Swan and Combs (1976) consumers often take the quality and durability of clothing as obvious or self-evident, and when asked about these issues in questionnaires, consumers point out that in clothing satisfaction appearance is more important than durability. Swan and Combs (1976) highlight that when consumers are asked what they are interested in when purchasing for new garments, the expressive attributes are dominant, but only if the consumers are satisfied with the garment. The instrumental attributes in satisfaction are then most essential, but as mentioned previously, the instrumental performance requirements have to be satisfied first before any consideration of the garment's expressive performance and how it is experienced. In other words expectations regarding the garment's physical properties and experienced quality have to be met first before one can proceed to the consumer's emotional response to the clothing, and thereafter to a sense of deep satisfaction.

3.3 Long- and short-term use

In the Finnish survey, when asked what aspects in clothing worry them, 78% of women and 68% of men were worried about the short life span of garments. When asked to estimate the life span of their oldest and most used garments 74% of men and 66% of women answered over five years. When asked to estimate the shortest time they have used some garments 10% of men and 22% of women answered less than one month (see Table 3). Moreover the consumers' interest in socio-ethical and environmental issues affects the life span of garments: 84% of those consumers whose sustainable commitment is high reported using garments for more than five years while only 14% reported using some garment less than one month. Of the respondents with low sustainable commitment, 59% reported using some garment for over five years and 22% said that they have used some garment for less than one month. In summary, the respondents' sustainable values are connected with how long they tend to use their garments.

	Men [%]	Women [%]
Less than 1 month	10	22
1-2 months	12	9
3-6 months	26	30
7 months-1 year	26	28
1-2 years	22	13

Table 3: Respondents' estimation of the shortest use time of garments

In this questionnaire 51% said that the reason to buy a new garment had been the need to renew their appearance.[5] Of those respondents who actualize a sustainable value base while purchasing clothes (respondents with a high sustainable commitment), 19% said that their latest garment purchase had been impulse shopping, compared to 31% of respondents with a low sustainable commitment.

Some respondents commented that they had bought a cheap garment with low quality on impulse, which they had not even expected to last for a long time. Moreover some respondents reported that less consideration is used for cheap garments during purchasing. Several statements were made in the open answers that impulse shopping had resulted in the wrong purchase decision. Consumers noticed that the garment did not fit in a satisfying way, the colour was strange or wrong, the material felt uncomfortable in use, or that the garment did not fit into the existing wardrobe: i.e. the expressive performance did not fulfil consumers' expectations. These kinds of garments purchased in error may not be used at all, according to the responses. Accordingly cheap prices tempt consumers into impulse purchasing, which often results in dissatisfaction and garment disposal.

In general respondents mainly related good quality with high prices and low quality with low prices in their comments. Furthermore consumers gave more thought before buying when the product price was higher. Respondents also gave reasons for long-term use, such as the longer life span of seasonal or festive clothing that are not in frequent use (e.g. winter/summer garments, festive dresses). In the following sections the three key determinants of the long-term use of clothing are described: quality, aesthetics and functionality.

5 77% of the respondents answered that the main reason for the latest purchase had been a real need for a new garment

3.4 Quality

Ophuis and Trijp (1995) raise the topic of *perceived* quality, where quality evaluation depends on the consumer's judgment. According to the authors, perceived quality is a result of four factors: the process of perception, factors related to the person, the use context and product performance. They also divide quality into quality cues and quality attributes. Quality cues are product characteristics that can be observed without actual use or consumption, while quality attributes can only be experienced through the use situation. Ophuis and Trijp also add to the aforementioned intrinsic and extrinsic levels, where the intrinsic level is linked to the product's physical characteristics. The extrinsic characteristics are also related to the product, but they are not physically part of it, e.g. price.

Consumers thus form judgments about products' quality attributes experienced during use situations and credence quality attributes that stay at the cognitive level (Ophuis and Trijp 1995). Credence quality attributes in clothing can include values such as ethical manufacturing and low environmental impact. These attributes cannot be experienced directly from the appearance of the garment or use experience. According to Ophuis and Trijp (1995: 180) a consumer's individual values, including their socio-ethical and environmental interest, "will affect the degree to which one attaches importance to certain credence quality attributes." Consumers who have a high interest in environmental issues place a higher value on eco-materials, ethical manufacturing and a long garment lifetime than other consumers (Niinimäki 2010c). Table 4 represents different quality levels in clothing.

Quality in clothing

Intrinsic quality cues	**Extrinsic quality cues**
Material Manufacturing quality Fit	Price Brand Manufacturing location
Experienced quality attributes	**Credence quality attributes**
Fit Maintenance quality Tactile feeling Functionality Life span	Ethical production Low environmental impact Safety Local production

Table 4: Consumer perspective on quality in clothing

The quality attributes as experienced by the consumer are essential to the long-term use of clothing. According to the Finnish questionnaire good quality was the most significant reason for longevity in clothing. Respondents further described high quality to mean durability, durable materials and high manufacturing quality.

In the respondents' answers some noteworthy comments were made, which define the determinants for the short-term use of clothing. Several connected low quality with short-term use. Furthermore there were several comments that some garments may stay in use only until the first wash, after which the garment has lost its fit, size, or colour or the material simply looks old after laundering. Many consumers experienced changes in the fit (e.g. garments wrinkling or stretching sideways) or problems in colour fastness during the first laundering. Some garments had come apart even before or during the first laundering. Low durability and especially weak maintenance quality seem to be key determinants in consumer dissatisfaction, and they lead to the short-term use of clothing.

3.5 Aesthetic aspects

Consumers' need to have an aesthetic beauty experience is obvious in clothing choices, and this is connected to clothing evaluation in the social context. When asked in the questionnaire what need they were addressing with their latest garment purchase, 38% of female and 8% of male respondents were yearning for beauty. In the same question 13% of men and 6% of women said that social pressure for a certain kind of appearance affected their latest garment purchase. When asked about the important factors in their latest garment purchase respondents answered that style (69%), fit (67%), suitability to existing wardrobe (51%), material (44%) and colour (42%) were important factors. All these characteristics are aesthetic attributes, and some of them are even more important factors than price (64%) and quality (54%) when purchasing garments.

Aesthetic attributes correspond to the expressive performance in clothing satisfaction and relate to the psychological response to clothing. Respondents respect aesthetic attributes also in the long-term use of clothing. In the open answers the following attributes associated with clothing longevity were mentioned: good fit, personal cut, nice colours and comfortable materials. Tactility in garments is important to the wearer, and some respondents even commented that the comfortable feeling some materials provide becomes even nicer (i.e. the material is softening) during long-term use.

Consumers also pointed out that garments stay in use because of their more classical style or colour, which looks good even when fashion change. As one of the respondents described, garments that are 'trend free' stay long-term in use. Accordingly an obvious reason for the short-term use of clothing is too trendy a look or a feeling that the garment is out of his/her own style, i.e. psychological obsolescence. This psychological obsolescence results in premature disposal of product even if the product is still functional. On the other hand some respondents pointed out that a garment has been kept because of a certain beautiful colour or special style. In these situations the expressive performance has been above average, resulted in satisfaction and has become the reason to keep the garment.

A pleasant, aesthetic garment ageing process requires not only a more classical style and high quality, but also durable materials. Some materials look old even after a rather short use time: e.g. because of pilling or looking old after few washes. Respondents also commented that garments needing frequent washing may look old rather fast, faster than materials that need less frequent laundering. Some textile materials age in a more aesthetically pleasing way than others. Earlier studies have shown that in high quality wool the aging process does not obviously show, and real leather is considered to age in an aesthetic way (Niinimäki 2010a). When asked about the material from which the respondents' long-term garments were made, 83% of respondents said cotton, 68% wool, and 40% leather. Polyester, which currently has the largest share of global fibre production (62% in 2000, Sipilä 22.10.2003), was mentioned by only 18% of respondents.

3.6 Functionality

When asked in the questionnaire which attributes enable one to become attached to clothing, most respondents, 84% chose the option "I become attached to textiles and clothing and use them long, because they fit perfectly or they are suitable for the use situation". Practicality and functionality were also mentioned several times in the open answers in connection with clothing longevity. Good design was mentioned above all in specialized clothing, e.g. sports garments or extreme hobby clothing. Sports clothes are designed for heavy use, and the material and manufacturing must be durable. Consumers purchase sportswear even for everyday use, because of their high quality and durability. One respondent commented that the best garments are those in which durability and functionality have been designed into the garment, and the consumer can experience the high quality in design, as is the case in e.g. clothing for sailing or mountaineering.

Easy maintenance was also mentioned in the open answers as an attribute for longevity in clothing. Products that do not need frequent washing or can be refreshed by airing (e.g. wool) appeal to consumers. Good care was also given as a reason why the garment had stayed long in use. Good care refers to gentle washing and repairing of the garment or even modifying it to postpone its replacement.

3.7 Summary of longevity in clothing

The respondents' answers highlight the following attributes for longevity in clothing: quality aspects, which include durable materials, durability in use, durability in laundering and high manufacturing quality. In addition functional aspects are important for the consumer: i.e. easy maintenance, suitability in use and satisfying use experience. Easy maintenance means that garments are suitable for water washing (no chemical laundering) and they do not need frequent washing, as some synthetic fibres do (see Table 5). Furthermore the following aesthetic attributes were emphasized: beauty, style, colour, fit and tactility (comfortable material). Good design can be related to all of these attributes, in terms of high quality, good functionality and the aesthetic dimension.

Satisfaction attributes

Quality aspects	**Functional aspects**
Good fit (size and cut) Durable materials Durability A) in use B) while laundering (stability in fit, material, colour) High quality in manufacturing (sewing work)	Suitability in use Use experience Easy maintenance
Aesthetic aspects	**Values**
Beauty Style Colour Fit Tactile feeling (material and fit)	Local production Ethicality Ecological Long life span

Table 5: Satisfaction attributes for longevity in clothing

For those consumers who have a strong interest in ethical and environmental issues the following values are important in clothing choices, and they also play a role in clothing satisfaction: local or ethical production, eco-materials and long

life span of garments. These environmental attributes are linked to a consumer's individual values and are defined to be credence quality attributes. For these consumers, sustainability attributes are included in their individual frame of reference of product expectations against which the consumer makes her/his product judgment. Their expectations regarding the garment's sustainability dimensions also have to be fulfilled in order to achieve deep product satisfaction.

Consumers report that they would be ready to pay more for higher quality and a longer product lifetime, if it would be possible to estimate these aspects at the time of purchasing[6]. The lifespan of the garment and the quality are difficult to evaluate at the point of purchasing. Yet currently there is no information on the quality of the clothing or its optimal use time. Hence, when aiming to provide deeper product satisfaction to consumers, producers could offer information about the intended lifetime of the product. Moreover since the maintenance quality is critical to longevity in clothing, manufacturers could also provide information on how many washes the garment will take and still look good. This information could also make the quality visible and moreover it would be possible to set a price on high quality and the durability and long lifetime of the product. (Niinimäki 2010b.)

4. Satisfaction through Design Strategies and Pss

Thus far this chapter has examined consumer satisfaction in the context of clothing using a very narrow approach and consumer-centred knowledge. Next a wider perspective on satisfaction will be adopted to move into the area of design strategies and PSS and their possibilities to deepen the satisfaction the consumer experiences with the product or through service approach. This will entail a conceptual discussion on how to extend product life spans or decrease the environmental burden inside this industry through various design strategies. Section 4.7 will summarize the consumer interest in and potential acceptance of these strategies.

4.1 Multiple life cycles

McDonough and Braungart (2002) have established the principle of cradle-to-cradle, which takes into account the product's next life cycle. The benefit is the

6 Eighty-three per cent of respondents in the study somewhat or totally agreed with this statement.

decrease in the use of virgin materials and in energy consumption during the manufacturing process. Steinhilper (2006, cited by Gray and Charter: 14) argues that remanufacturing uses approximately 85% less energy than the manufacturing process using virgin materials. A significant reduction in CO_2 emissions is thus possible through this technology: e.g. the Japanese Tenjin Fibers Ltd. reports a 77% reduction in CO_2 when manufacturing polyester from recycled material (Tenjin Fibers Ltd.).

Remanufacturing concepts require deep consideration when designing the original product. The product has to be suitable for easy disassembly after its first use, and it cannot include parts or mixed materials that cannot be recycled again. In clothing recycling is currently problematic, as most garments are made of mixed materials and constructed in such a way that they are not easy to disassemble. Furthermore the quality of today's clothing is so low that recycling is no longer profitable inside this industry. Currently about 70% of clothing waste ends up in landfills, and the rest is reused or recycled (Fletcher 2008).

The essential issue in remanufacturing is quality. During the recycling process, the quality of material reduces over time, as does the value of the product and the material – this is known as down-cycling (McDonough and Braungart 2002). Some materials are better suited to go through remanufacturing cycles (e.g. polyester, nylon, and polypropylene) while others face significant reduction in quality in the following rounds and can be recycled effectively only once (e.g. cotton). Focusing strongly on multiple life cycle strategies, however, can steer the textile industry to polyester production, which is conditional on nonrenewable oil production.

Existing examples of this concept can be seen in e.g. the Austrian company Backhausen's "Returnity" Trevira CS fabric, which is made to be recycled and according to an environmentally-friendly chemical process (Backhausen). The fabric can be returned to the factory after the first use phase. Similarly, the Swedish Houdini Sportswear has organized the take-back of their garments through a recycle box at the retailer shops or directly to the manufacturer (Houdini Sportswear). In an eco-efficient, multiple life cycle strategy, the purchase could include a deposit from the consumer, encouraging him/her to return the goods to the store after use; e.g. the Swedish company Klättermusen offers a deposit for returning the clothes back to the shop again (Klättermusen).[7]

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7 Based on Niinimäki, K. and Hassi, L. (2010) 'Emerging Design Strategies for Sustainable Production and Consumption of Textile and Clothing', first draft for unpublished manuscript.

Since, according to the study being discussed here, 61% of respondents considered the environmental impact of textiles when disposing of the garment and a further 76% of respondents were worried about the short lifetime of the garment, the multiple life cycle approach could offer value for the consumer through which they can become satisfied with their garment choices. Recycling as such does not extend the use time of clothing, but it offers an environmentally healthier way to produce new garments than the currently existing system. It offers consumers an easy route to decreasing their own environmental impact, but it does not demand any significant changes in their consumption patterns; this approach is therefore easy to accept by consumers and manufacturers. Yet it also entails new approaches to designing garments that are suitable for recycling and the need to construct effective recycling system for garments and textile materials.

4.2 Local production

Moving production of raw materials and manufacturing of the product closer to the end market reduces carbon emissions from transportation. Transport-related emissions and costs are high in global textile and clothing manufacturing. Furthermore we need alternatives to the current monoculture of globalized industrial business, which is dominated by only a few very large companies (Fletcher 2008). Focusing on locality also offers diverse options in textile materials and manufacturing patterns. For example flax, nettle and hemp can be cultivated in Finland. These fibres need little or no fertilizers and pesticides as long as water is available. Bast fibres (linen, hemp, and jute) can be cultivated on land that is unsuitable for food production. (Härkäsalmi 2008, Fletcher 2008.) In bast fibre processing enzymes can be used to avoid pollution of the environment. Enzymes act as biocatalysts, and they can be used in different fibre processing states such as flax softening. Without enzymes these processes need more energy and chemicals. (Nieminen et al. 2007.)

Recently the trend in local production has moved towards small design companies whose interest lies in ecological thinking and who use the benefits of global eco-material production to sell their products effectively through networks and online. For example the company Muru in Finland uses Indian eco-cotton, which is dyed in Germany using an ecologically-friendly process, and the design, industrial knitting of the material and sewing work is then done in Finland in small-scale processes. This design-centred way of producing small collections by combining contemporary design, imported eco-materials and local production with online selling is popular among young designers.

Since local production is a value for a rather large group of consumers, it would be worthwhile to offer this alternative. Consumers evaluate the quality and the environmental impact of clothing manufacturing according to the location of the manufacturing, and hence it is a credence quality attribute for consumers. Manufacturers often fail to even offer information about the location of the garment manufacturing, and consumers see this as a negative aspect in clothing. In other words, consumers assume that manufacturers disregard their opinions and values. This means that consumers' expectations are not fulfilled, and consumers stay dissatisfied at this informational level.

4.3 Slow/Fast

For environmental reasons it would simply be best to consume less. However, most consumers are not willing to reduce consumption. The concepts of slow and fast fashion design accept this situation as the starting point and take into account the needs of these two different consumer groups. By optimizing material choices and maintenance needs according to the intended lifespan of the product, it could be possible to minimize the environmental impact of textiles and clothing and address the preferences of the two opposing consumer groups in a more sustainable manner. Information about the product's intended life span should be included in consumer information.

Garments' use times have shortened. In the study discussed here, respondents were asked about the shortest time they have used some garment: 18% of respondents estimated that they have worn some garment for less than one month, 10% said one to two months, 29% three to six months, and 27% seven to twelve months. One study done in the Netherlands found that the average piece of clothing stays in the wardrobe for 3 years and 5 months. The customer has worn it for 44 days during that time, and it is worn for 2.4 to 3.1 days between washings. (Uitdenbogerd et al. 1998, cited by Fletcher 2008) Clothes frequently washed have the highest environmental impact and optimizing this phase decreases the environmental burden of passionate fashion consumers.

The use phase of clothes can cause as large or even larger environmental impact than the cultivation or manufacturing phase. The maintenance phase can use energy and cause environmental impacts that may add up to two-thirds of the whole energy consumption and environmental load of the life cycle. Depending on the material and product, the use phase may consume as much as six times more energy than the actual manufacturing process. (Talvenmaa 1998; Franklin Associates 1993, cited by Fletcher 2008.) As the use of polyester in clothing production has

increased so has the need for laundering.

Slow fashion is designed to aim for longer utilization, a longer life span of products through durability and high quality. It is also made in an ethical way, e.g. locally in small batch processes, in good working conditions, and mainly from eco-materials. The design lasts over time: styles and colours are classical and the materials age well, which affects aesthetic longevity. (Niinimäki 2009a, Fletcher 2008.) A good example of slow fashion is the German company Hess Natur. On the basis of a customer survey Hess Natur designed a collection with the following aims: durable design from healthy and natural materials, fashionable and aesthetic, high quality, easy to use, update-able, repairable and multifunctional. Their clothing collection "Longlife" guarantees that the clothes last a certain period of time (e.g. three years), and this information is presented in the consumer information. (Paulitsch 2001.) A product with a long lifetime appeals to consumers with a high sustainable commitment. High intrinsic quality in the product and a "life-time guarantee" will bring satisfaction to environmentally interested consumers.

The fast fashion concept is more appropriate for consumers who need to follow trends closely and build a personal identity with external fashion symbols (especially younger consumer groups); hence the product life span is short. To be able to meet the needs of this customer group in a more sustainable way, the product has to be optimized for its real lifetime, the impact of the maintenance phase has to be minimized (e.g. no or minimum laundering during the use phase), and the materials must have a low environmental impact and be recyclable or biodegradable. Fast fashion may be worn only for a couple of months and then returned to an effective recycling system or to an exchange network or stocks e.g. operating through the internet. (Niinimäki 2009a, Fletcher 2008.)

Mugge et al. (2005) point out that it may be wise to combine different eco-design strategies to promote sustainable consumption. In clothing design this means e.g. combining slow fashion with local production to achieve high quality and sustainable value. Moreover adding into this approach a design service element (see the following section) could result in long-term product satisfaction and even in a strong product attachment between the consumer and product. On the other hand fast fashion must be combined with multiple life cycle strategies that benefit the consumers, e.g. including reverse logistics. Adding services to the aforementioned concepts, e.g. an online garment exchange system, may intensify the garment's use and extend its use time, thereby lowering the environmental burden of the younger and not as stable consumer group.

4.4 Uniqueness and achievement

Products carry symbolic meanings through which consumers construct their own individuality. According to Norman (2005) products are a medium we use to express ourselves, and they may serve as a symbol of some characteristic, uniqueness or value we want to connect to ourselves. Govers and Schoormans (2005) argue that consumers prefer products with a product personality that matches their self-image and self-concept. Chapman (2009) points out that if products are easily personalized, there is an opportunity to create deeper product satisfaction and an emotional product relationship. This is an opportunity to extend the product's lifetime.

Design services are one opportunity to add consumer satisfaction through connecting the design outcome deeply with the consumer's personal needs and aesthetic preferences. By using digital textile technologies that offer possibilities for individual design, meaningful uniqueness can be designed (Niinimäki 2009b). Mass customization uses flexible digital manufacturing technologies, and the aim is to satisfy both the manufacturer's and the individual user's needs in fragmented markets (Pine 1993; Lee and Chen 2000). Furthermore unique design and "made-to-measure" services offer better product satisfaction by meeting a consumer's individual needs and preferences better than mass-manufactured garments.

According to Norman (2005) personal achievement has a strong connection to a positive sense of self. A "made by me" element in design offers the consumer positive experiences through a sense of effort and achievement and the opportunity to realize her own creative skills. If the user builds the product herself, she acquires a deeper knowledge of the product and therefore will also be able to repair the product if needed (Papanek 1995). Products could be designed in a modular structure, which enables the consumer to sew the clothing together or even create a unique style.

Stimulating a sense of uniqueness and achievement through design services or "self-making" approaches are a promising route to deeper consumer satisfaction. Through satisfaction it is possible to create or strengthen the emotional bond between the product and consumer, and this meaningful attachment in turn is the best way to postpone the product's disposal. When the product or its use is somehow special to the consumer, she will take good care of it to extend its enjoyable use time.

4.5 Services for longer and intensive utilization

Van Nes (2003) proposes the following design strategies for products' longevity: design for reliability and robustness, design for upgradability, design for repair and

maintenance, design for product attachment, and design for variability. Many of these strategies are based on good product quality and durability. If the garment is of high quality and it is expensive, it becomes worthwhile to take good care of it, repair it, modify it or even redesign a new garment from it.

As stated above, better product quality and durability usually leads to longer utilization of the product. This kind of high-quality product can also be targeted for shared and intensive utilization, e.g. renting and leasing. Other services, such as upgrading, modifying and lending, can also offer service possibilities in place of new product manufacturing, thus dematerializing the satisfaction of consumer's wants and needs.

As consumers' needs and aesthetic preferences change over time, the question is how to avoid the psychological obsolescence of garments, as was highlighted earlier in this chapter. The challenge in extending product lifetimes is in achieving continuing satisfaction with the product. Chapman (2009) argues that new elements act as a stimulus to sustained interaction with the product. Services that offer modification or redesign possibilities for quality garments make it possible to extend the product life span. Internet pages that advise on "how to refashion old garments yourself" also encourage consumers to extend the use of clothing. A modular clothing structure can offer the possibility of upgradeability to the consumer. Moreover garment exchange services operating through the internet can offer change and novelty, and moreover they suggest new business models. Products aimed for long-term use, for example renting, must be of high quality and durable, and this approach decreases the environmental impact of manufacturing and consumption.

Services that aim for product life extension offer new business opportunities both at local (e.g. renting, upgrading) and the global level (e.g. mass-manufacturing, online exchange stocks, and do-it-yourself concepts). Operating online allows manufacturers to be in direct contact with the consumers and better address their wishes, and it eliminates distributors (Stahel 2001). Guaranteed satisfaction at a guaranteed service per unit thinking offers consumers a sustainable way to fulfil their needs. It also offers flexibility in utilization, which ownership does not. Accordingly ownership of goods should be questioned whenever possible, and we should focus on offering more services, function and satisfaction than products.

4.6 Co-creation

Co-creation offers multiple stakeholders, including end-users, the opportunity to co-create: to collectively solve problems (Fuad-Luke 2009). This process can re-

sult in a more satisfying design outcome, as the consumer has the opportunity to take part in the design process or decision-making. Fuad-Luke (2009) argues that through this kind of process manufacturers can even create value together with consumers. When the user is in an active role s/he forms an attachment to the product more easily and feels emotional fulfilment and satisfaction through partaking in the design process.

Consumers have shown an interest in affecting the design process and the manufacturing, as will be shown in the following section. Through the internet manufacturers have the opportunity to activate their customers and even develop new possibilities to hear individual consumers' opinions through for example voting or rating systems. A co-creation approach even opens opportunities to create models combining a mix of products and services, which are together able to meet a particular consumer demand and at the same time fulfil manufacturers' and other stakeholders' expectations in value creation and the production chain of satisfaction. Until now manufacturers have used the internet mainly as an information channel, for example in CSR issues and the socio-ethical dimensions in clothing manufacturing. New PSS systems could be developed exploiting the strengths of the internet: for example, different kinds of manufacturing systems according to consumers' values and wishes, systems for lifetime guarantee of garments, environmental impact calculation systems for consumers, and so on.

Some interesting internet solutions have been developed (e.g. for customizing) but mainly only to sell more products, not to profoundly offer any new role for consumers in decision-making in the context of sustainable development. The American company Threadless is an example of a business concept based on co-creation: customers send their designs to the website where the entire customer base evaluates the most interesting ones, places their orders, and once a design has a sufficient number of buyers, it is sent to be printed. The company therefore knows exactly what kind of clothing to produce and how much (Threadless). A similar concept has been adopted by the Finnish Bon Bon kakku, which provides consumers the possibility to vote each month on which printed fabrics will be put into production. Anyone can submit their print designs on this webpage for open evaluation (Bon Bon kakku).8

8 Based on Niinimäki, K. and Hassi, L. (2010) 'Emerging Design Strategies for Sustainable Production and Consumption of Textile and Clothing', first draft for unpublished manuscript.

In addition open source fashion is a recent phenomenon driven by the internet. Fashion designers can still sell their design skills through patterns and construction information, but the end-users implement the design outcome. This approach changes the consumer's role from a passive user to an active maker and offers wider decision options for the consumer: in other words, it opens up the fashion business and makes it more democratic.

4.7 Consumer interest in PSS

Relatively little has been studied regarding consumers' interest in PSS. What ownership of a product means to a consumer differs according to the product group and the symbolic meaning of a product. Furthermore consumers' own individual values (e.g. materialism versus environmentalism) affect the meaning of product ownership. Products symbolic meanings are not only connected to individuals identity construction but also individuals own values (Wang and Wallendorf 2006). Through materialism individuals set value and meanings in his/her possessions (Richins and Dawson 1992). On the basis of these individual values, consumers evaluate products and their symbolic values and moreover consumers with stronger materialistic values appreciate possession and try to gain happiness through owning (ibid.). Some products are easier to rent and the consumer can simply focus on utilization. In the context of clothing, the element of intimacy, the deep connection to construction of self and one's own identity, and how clothing is evaluated in social contexts all make this product group less suitable for e.g. long-term renting. On the other hand these issues and the symbolic meaning of clothing open up opportunities for design services and personalization of the garment.

Table 6 illustrates respondents' interest in various design strategies and services in the field of clothing. The results show that women are more interested in these issues than men, but the overall picture suggests opportunities to develop new PSS approaches and business models in the clothing area. Repair and modification services, upgradeability, and customization interest both male and female consumers. Short-term renting is familiar to most consumers, for example festive dresses, but it could be expanded to other use categories as well. This needs radical innovation and a significant change in the consumer's role so that s/he can participate in the innovation process. This is more likely to result in social acceptance of radical new PSS innovations. Consumers are also most interested in the garment exchange system. Moreover garment recycling interests consumers and can easily find acceptance, as a recycling strategy needs no significant changes in their own consumption habits.

Table 6: Consumer interest in services

	Men [%]	Women [%]	Respondents with sustainability commitment [%]	Respondents without sustainability commitment [%]
I can rent garments for short-term use	58	63	73	53
I can rent garments for long-term use (e.g. 1 year)	15	24	24	14
Garments have be designed according to an optimal use time and this has to be informed (e.g. 6 months or 3 years)	47	51	57	59
I could buy a garment for short-time use, which does not need any washing during its short life span	9	13	11	17
I am interested in the customization possibilities of clothing	56	72	68	61
I am interested in clothing with a modular structure, because I could repair or even make the garment myself	45	65	64	47
I could use repair and modification services	85	86	95	80
Garments could be upgradeable (you can change parts in your outfit)	53	81	87	65
Manufacturers could offer exchange and return services for garments	56	72	73	65
I am interested in taking part in the design process (for example through the internet)	59	61	65	51
I am interested in affecting the manufacturing process (for example through the internet)	37	57	75	31
Garments have to be suitable for recycling	77	86	90	73

Consumers are not attracted to the approach of optimizing a garment's short use time, but in reality, some garments stay in use for an extremely short time as was shown previously in this chapter. Optimizing the use phase of short life span garments would decrease the fashion lovers' environmental burden.

Those consumers with high interest in ethical and environmental issues are more interested in an individual look in their clothing and home textile choices, and modification possibilities for uniqueness and design services interest these consumers more than others (Niinimäki 2009b; 2010c).

This interest in sustainability could be exploited to promote these services as a more sustainable alternative than traditional, industrial mass-manufactured products. As most Western consumers are worried about the environmental impact of current industrial manufacturing systems, the sustainable way to offer consumer satisfaction can be seen as a benefit in marketing, and it offers new business opportunities.

5. Discussion

Earlier studies have shown (Niinimäki 2010c) that consumers' ethical commitment affects the meaning of clothing and the important determining aspects when purchasing garments. Those consumers whose ethical and environmental interests are high prioritize eco-values and ethical aspects, and long life spans in clothing and local production. In the current study 70% of those consumers who said they always actualize their sustainable attitude when purchasing garments reported that the ecological aspect was also an important factor in their latest garment purchase (only 7% of respondents with a low sustainable commitment chose this option). If the consumer knows that his/her choices are sustainable and this connects to his/her own individual values (environmental concerns), this leads to emotional and ideological satisfaction. Accordingly manufacturers should strongly emphasize and communicate to consumers that the PSS approach is sustainable and thereby a better choice for consumers than traditional products. Any change made through new, innovative PSS approaches will not be valid, even if more sustainable, if consumers do not accept these changes.

Present ways to design and manufacture textiles and clothing do not take into account consumers' wishes, values and environmental interest. To change the patterns in manufacturing and in consumption we need to engage consumers more

deeply in the discussion on new sustainable value creation through PSS. Including values into the discussion about radical change and sustainable innovations in PSS offers a new approach to ensuring sustainable consumer satisfaction. As clothing as well the consumer's appearance is always evaluated in a social context, discussion on new sustainable values may make sustainable PSSs more attractive among consumers also in the context of clothing. Considering the consumer as one of the stakeholders in the design process widened with service thinking provides important insight into the satisfaction opportunities in different product groups. Combining offers with values according to different consumer groups values offers opportunities to better fulfil consumers utilitarian and psychological needs; e.g. offering long life guarantee for environmentally interested consumers or change stocks for fashion lovers with need for constant change. Consumer-based eco-efficiency needs consumer-centred research knowledge through which it is possible to identify satisfaction attributes and opportunities to define the satisfaction unit in different use contexts.

In clothing, consumers' expectations and estimation of the product quality may substantially differ before and after use: the low quality of garments especially can surprise the wearer in the use phase. Accordingly it is most essential to study product quality and consumer satisfaction in the use context. The determinants for long-term use of products can be investigated and these dimensions taken into account in the design process to better achieve longevity and a satisfying use experience.

Moreover Park and Tahara (2008) emphasize that product value has to be defined in the use context, not only at the point of purchase. If this is accomplished, price should then be profoundly connected to quality, durability and utilization of the product; in turn, the product value should be connected more deeply to consumer satisfaction and sustainability aspects, e.g. the environmental impact of a product or its use. Based on this the product or service value can be defined according to the satisfaction unit. It is then possible to change the design focus from aesthetic aspects and product manufacturing to its use and moreover to the satisfaction the use of the product provides to the consumer. In this process the sustainable attributes of products can also be seen as values that enable deep consumer satisfaction. Consumer satisfaction results in more loyal consumers (Jacobs 2007), and accordingly it should also be regarded as a value for the enterprise. This is simply further evidence that a focus on consumer satisfaction is a future way to do sustainable business.

6. Conclusions

It is possible to slow consumption and increase the longevity of products by design strategies related to intrinsic product durability, good product maintenance and deep consumer satisfaction. This chapter has attempted to show why product satisfaction and an increase in intrinsic quality are most important when aiming to lengthen the product lifetime. Furthermore this chapter has shown that through services there is an opportunity to extend the enjoyable use of the product or connect the product more deeply to the consumer's identity construction; through these strategies deeper satisfaction can be delivered to the consumer.

This chapter has brought consumer-based knowledge into the discussion on consumer satisfaction, and furthermore it identifies the attributes associated with longevity in clothing. There are certainly psychological barriers to using products longer; nevertheless the essential problem in current garments is their very short life span, especially in the West, stemming from planned obsolescence in the current industrial system. In consumer satisfaction in clothing, long-term use is mainly determined by the experienced quality during the use phase. Furthermore expectations regarding expressive performance and consumers' emotional needs must be fulfilled in order to elicit clothing satisfaction.

In consumer satisfaction it is essential to identify those dimensions through which the consumer makes an evaluation of the product in each product group and different use contexts. It is essential then to aim for good product performance in those attributes that are important to the consumer. A satisfying use experience can result in deep emotional satisfaction, which will postpone product disposal and thus extend the product's life span.

Consumer satisfaction can be deepened and product lifetime extended through a PSS approach. PSS thinking can postpone psychological obsolescence of garments through offering new kinds of services, e.g. upgradability, modification services, or exchange stocks. PSS thinking as such guides manufacturers to consider more profoundly the utilization, functionality and durability of the product while in a PSS the consumer purchases functions, product meanings and satisfaction instead of products. Accordingly a PSS approach offers ways to better ensure sustainable consumer satisfaction and thereby decrease overall clothing consumption. Yet it is most important to include consumers in the innovation process of more sustainable products connected to PSS. This is important in two ways: firstly to gain deep insight about consumer satisfaction attributes and the meaning of the

product or its use from the consumer point of view. Secondly participatory innovation processes enable a sustainable change process in individual consumers' consumption habits and at the level of societal acceptance. New PSS models that combine satisfying quality products with services to extend the enjoyable use time of products could create sustainable consumer satisfaction and dematerialize consumer satisfaction in the design field.

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Publication VI

I Love This Dress, It Makes Me Feel Beautiful!

Empathic Knowledge in Sustainable Design

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The Design Journal (2011)
Volume 14 • Issue 2
pp 165-186
DOI: 10.2752/175630611X12984592779962

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Abstract

This paper presents a study on sustainable product relationships with an eye on textiles and clothing. A framework is constructed which integrates sustainable product relationships and the field and role of design. As a result, it studies how an empathic design approach could improve a sustainable design process. In order to promote sustainability, designers need to aim at enhancing long-term product relationships. By studying the user's relationships with and attachments to products, designers have the opportunity to create deeper product satisfaction and thereby long-term product relationships. This paper concludes by evaluating how an empathic approach can be of primary importance in promoting sustainable product relationships by deepening current methods of understanding consumers' needs, values and emotions.

Keywords:

empathic knowledge, sustainable design, product relationships, product attachment

Introduction

Most contemporary products are not designed for durability; instead they are throwaway articles because of their low unit price and low quality. It is no longer worthwhile to repair products, and the whole economic system in the industrialized world is actually based on products' fast replacement and planned obsolescence (Mont, 2008). The textiles and clothing field is no exception. Current industrial production and consumption of textiles and clothing function by and large on an unsustainable basis, and textile waste is increasingly going to landfill. Consumers fulfill many needs by consuming, and cheap product prices tempt them into fast and unsustainable consumption. Hence we need more knowledge about possibilities to extend product lifetimes in order to promote sustainable development.

To reach a more sustainable future path it is not enough merely to redesign existing products and make eco-efficiency improvements in products or manufacturing processes. Manzini (1994) argues that the actual focus in sustainable development should be on people's consumption behavior, and he calls for a new radicalism to stimulate a drastic change in consumption patterns. Hence Manzini states that designers should concentrate on designing longer product life spans, and at the same time consumers need to build a deeper relationship with the product in order to form a deeper attachment and care for the product.

Material possession represents our personality, social standing and wealth, but also our values, history and relationships with others; hence objects around us symbolize to us and others who we are. For example clothing unifies roles connected to identity, sexuality and sociality, and furthermore, clothing choices externalize the inner self (Woodward, 2005). The consumer's needs beyond functionality are of increasing interest to researchers and designers, and this has necessitated the emergence of the concept of empathic design (McDonagh, et. al. 2002).

Emotions play a strong role in consumption. Textiles and clothing represent the desired lifestyle to which a consumer aspires (McCracken, 1988), and furthermore they are expressions of self and one's own identity. Textiles and clothing belong to the category of self-expressive products, which inspire consumption-related emotions, at least immediately after the purchase event. According to Richins (2008) these feelings of excitement at purchase point are important for a consumer, but as consumption-linked emotions they have no link to product attachment, unlike the emotions stimulated during the use phase. At the same time, Mugge et. al. (2008) argue that the product's utilitarian level is connected to the consumer's need ful-

fillment, and this process does not ensure that an emotional attachment will develop. As Mugge et. al. (2005) point out, if the product performs according to consumers' expectations, this in itself does not lead to attachment. According to these authors some special meaning must be associated with the product or its use to inspire a deeper attachment, and through this product replacement is postponed. On the other hand, positive use experience may lead to deeper product satisfaction, thus enabling the product's long-term use.

Many design processes are already familiar to consumer-centric designers: design styles, material choices, quality aspects, and functionality considerations. On the other hand the current system of manufacturing and doing business is based on products' fast replacement and planned obsolescence, and this system does not make it possible to design increased product longevity by increasing intrinsic quality (Mont 2008). This paper explores how an empathic approach can help to understand consumers' deeper values and needs and how such an approach can serve as a foundation for making more sustainable design. Other, deeper dimensions in product relationships – such as emotional values and the promise of future experiences – are a more problematic task to tackle with current consumer-centric methods and, this paper argues, require empathic design methods.

The present study investigates product attachments and long-term use in the context of textiles and clothing. This paper presents a framework that describes the designers' work field and role in fostering sustainable product relationships. The paper is structured in the following way. After the introduction section the data collected is presented. The many levels of product attachments with textiles and clothing are then described, and the determinants for textiles' and garments' long-term use are defined. Subsequently the study reflects this knowledge against the designers' work field and argues that it is essential to use consumer-centered empathic knowledge when aiming to extend product lifetimes. Especially the person-product relationship needs closer study and an empathic approach to consumers' long-term product relationships. Finally a framework is constructed that unifies sustainable product relationships, emotional values in products, and the field of design.

Materials and methods

This study focuses on the consumer perspective and is constructed on the basis of two questionnaires conducted in Finland. The study employs a qualitative case

study method, and it can be described as in-depth investigation (Anttila 2006). The qualitative case study method has been selected in order to reveal the complexities in product relationships and to make these relationships understandable (Stake 2005). According to Stake (2005) this can be defined to be a collective and instrumental case study, which is extended to several cases (several respondents) to offer possibilities to generalize. It is most valuable to gather insights directly from the consumers themselves; an online questionnaire makes it possible to involve a larger group of respondents. The responses from the questionnaires were content-analyzed in the context of product attachment and product satisfaction, and throughout the study the empirical findings interact with theory. In the latter part of this paper the knowledge produced through the questionnaires is used to investigate designers' opportunities to use an empathic approach in offering long-term product relationships to consumers. The limitation in the case study is that the results may not be repeatable as such in other cultural contexts; nevertheless the textile and clothing consumption patterns in Finland are similar to those in other Western countries.

The first questionnaire was conducted as an online survey in April 2009. The link to the questionnaire was disseminated among design students in Helsinki Metropolia University of Applied Sciences, and Lapland University. Furthermore the link was available for the staff in the University of Art and Design Helsinki, as well as on the following web pages: Fashion Finland, Eettinen Kuluttaja (Ethical Consumer), Vihreät Vaatteet (Green Clothes), and Kierrätystehdas (Recycling Factory). A total of 246 respondents participated in this questionnaire. A total of 91.8% of respondents were women and 8.2% men. The majority of respondents were fairly young: 38.4% of them were 18 to 25 years old, and 41.6% were 26 to 35 years old. One part of this questionnaire considered product attachments. Respondents were asked to write about their oldest garment as well as the oldest home textile they possess and reasons for keeping the garment or home textile. In all, 171 respondents wrote short texts about garments and 162 wrote texts about home textiles. The following section "Product Attachments" is based on this questionnaire.

The next data collection was conducted in March 2010. This questionnaire was based on a "snowball sampling" method with 204 respondents. The link to the questionnaire was randomly sent to about 30 people (equally male and female in different age groups) who were then asked to further disseminate the link to their acquaintances. Most of the respondents belonged to the age group under 35

years (29.4% were 18-25 years old and 48.5% were 26-35 years old), and 70.4% of the respondents were women. This questionnaire included a section on clothing satisfaction. Respondents were asked to write short descriptions of the textiles and garments which stay long-term and also short-term in use and further the reasons for longevity or short-term use. A total of 195 consumers answered the open question about long-term use, 197 answered the question about short-term use, and most of these responses considered clothing. These texts were analyzed in order to identify the determinants for long-term use of textiles and clothing. The results are presented in the section "Long-term Use and Product Satisfaction".

Product attachments

Schifferstein and Zwartkruis-Pilgrim (2008) define the degree of consumer-product attachment as the strength of emotionally engaged experiences a user has with a product. Durable product attachments emerge towards objects that are special and mean a lot to the user: if this kind of object is lost, the user experiences emotional loss. Hence this kind of product is unlikely to be disposed of.

Consumers create attachments to some objects whereas they easily dispose of others. From a sustainability viewpoint, it is important to lengthen the lifespan of many products. Hence designers should seek to strengthen the product attachment that consumers create in order to lengthen the lifespan of products. According to Schifferstein and Zwartkruis-Pilgrim (2008) seven determinants of product attachments can be identified: enjoyment; memories to persons, places, and events; support of self-identity; life vision; utility; reliability; and market value. The authors state that of these, only memories and enjoyment contribute positively to the degree of attachment.

Table 1 is constructed on the basis of the responses of the 2009 consumer questionnaire. Respondents were asked to write short stories about the oldest garment and home textile they possess. These replies painted a broad picture of how people emotionally bond to textiles and clothing. The oldest garments or textiles carried a strong connection to a particular person: they could be inherited, a present or simply represent a memory of someone close, be they mother, grandmother, father, another relative or a friend. Emotional value also emerges through memories that are linked to particular places, situations or life stages such as one's own childhood or even life achievements. Emotional attachments need to develop temporally, and

often these meaningful and cherished products are linked to an individual's own history, some important person or memory. These emotionally meaningful textiles and garments may not even be used at all; hence they are kept for memory reasons only. (Niinimäki, 2009; 2010a.)

Table 1. Attachments to textiles and clothing (based on Niinimäki 2009; 2010a)

Attachment attributes	
Emotional values	Memories (history/past, places, people, moments, childhood) Family ties Positive associations (e.g. safe and soft tactile feeling)
Quality	High quality in design, materials and realization Durability
Functionality	Multi-functionality Fit Reparability
Design/Style/Beauty	Classical, timeless design, not too loud visual messages Strong design, represents some unique period of design style The experience of beauty in multi-sensorial ways
Material	Ageing well, aesthetically, gracefully
Connection to 'Self'/ Personal values	Expression of 'self' Uniqueness Made for me One's own ideology
Effort, Achievement	Handmade Tailor-made Self-made Self-designed
Present/future experiences	Promise of experiences (e.g. modification possibility, party garments, opportunities for narratives to emerge) Family ties and continuity aspect, objects as heirlooms Suitability for gift-giving Satisfying experiences

The interaction between user and object is on the basis of the aesthetic experience and at the same time pleasure that the object offers us (Lang, 1988). The dress, the body and the self in the social context are perceived simultaneously, and we can approach clothing as an embodied experience that is socially constituted and situated (Entwistle, 2000). Aesthetic attributes in clothing have an emotional effect

on the wearer. For example, one respondent said that a dress has become important because "I feel pretty when wearing it". Clothing thus has a strong impact on our emotions (Raunio, 1995), and it can elevate the wearer's mood; according to Jordan (2000), this effect on a person's mood constitutes the emotional benefits of a product. We feel attached to garments because of their aesthetic beauty, as well as through beauty experiences over time that develop in social situations and through positive and multi-sensorial use experiences. The beauty of clothing is therefore not only visual, but also entails tactile, olfactory and kinetic experiences, such as the feeling of comfort, the weight of the material against our body, and pleasant touch and odor. The pleasure clothing offers to the wearer deeply involves the garment/body interaction, and this has a strong and profound connection to tactile memory and our personal experiences and history (Niinimäki, 2010a).

According to Crozier (1994) the concept of 'home' is a complex one, and it has deep emotional significance. It represents sentimentality, affection and identity, but it also exposes a more intense emotional response. As stated earlier, material objects represent a consumer's identity, and the family level interlinks to an extended 'self' concept. This extended self concept encompasses the home and its items, including textiles. Home can thus be seen as a symbolic body for the family, and it is quite a central aspect to an individual's identity. We all surround ourselves with personal and important objects at home. Objects that include valued possessions also have 'self' wrapped up in them. Consumers link their identity strongly to objects that have been personified and kept for a long time. In contemporary consumer society home is made one's own through personal objects and decoration (Solomon, et. al. 2002; Csikszentmihalyi and Rochberg-Halton, 1981). To illustrate this, when asked in the questionnaire what their home textiles meant to them, one respondent answered the following:

> One's own home feels like one's own mainly because of curtains and carpets and because of the colors and patterns in the furniture.

When attachments to products have developed to the stage where the items have gained personal symbolic and sentimental value, they have earned cherishability (Chapman, 2009). When we value and respect the product in a deep emotional way, the product becomes meaningful, precious to us, and it deserves to be well taken care of (Walker, 2006). In this questionnaire several respondents mentioned the good care and repair of old cherished textiles and garments as reasons for lon-

gevity (Figures 1, 2 and 3). Furthermore the possibility to modify a textile or garment in the future was a reason to postpone the disposal of a product (Niinimäki, 2010a).

> The textile has been saved because I want to retain these memories by taking good care of the textile.

> I have a lot of basic clothes, which have lasted for years and which can be combined with more individual clothes. Moreover I have bought a lot of sensational clothes from flea markets, which can be worn as themselves or I modify them. Through them I express myself.

Long-term use and product satisfaction

Meaningful attachments are not easy to embed in design, as they are personal and connected to an individual's history or personal experiences as described in the previous section. However experiencing positive emotions in the use situation leads to product satisfaction, and hence positive use experience is important in long-term product relationships.

Some quality attributes contribute to long-term use, and they are strongly linked to product satisfaction. Swan and Combs (1976) argue that the physical properties of clothing interlink with the instrumental performance in clothing, while the consumer's psychological response to the garment is linked to its expressive performance. In product satisfaction the instrumental requirements must be satisfied first; however, fulfilling needs in instrumental performance alone will not result in satisfaction. The consumer's psychological needs with the product also have to be fulfilled. When consumers evaluate products through a limited set of attributes, product satisfaction is best achieved by ensuring a good performance in those attributes and dimensions that are important to the consumer (Swan and Combs, 1976).

The March 2010 questionnaire was conducted to gain more information about attributes in the long-term use of clothing and textiles. Respondents were asked to write about examples of garments and textiles that stay long-term and also short-term in use and the reasons for longevity or short-term use. From the questionnaire the following attributes can be defined to be the determinants for long-term

Figure 1. Uniqueness is linked to the aspect of the handmade especially in home textiles. This pillow was made by the owner's mother, and it cannot be disposed of even though its style no longer fits into the home interior.

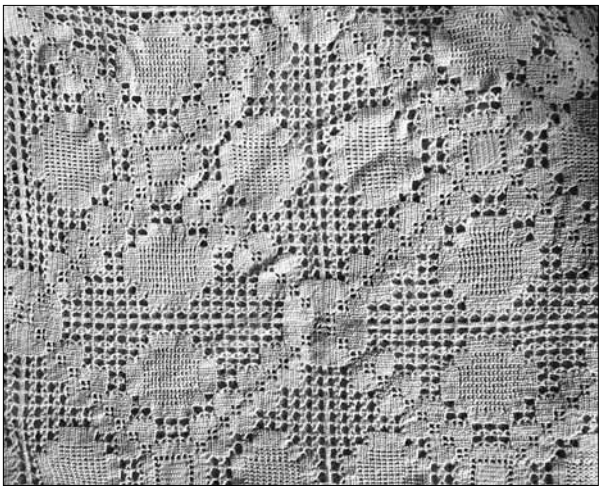


Figure 2. This hand-crocheted bedspread made by the owner's godmother is too emotionally valuable to be disposed of. It has taken a long time to make, and it symbolizes effort and love.

use of textiles and clothing: quality, aesthetical dimensions and functionality. According to the responses, the quality aspect includes durable materials, durability in use, stability while laundering (dimensional, material and color stability) and high manufacturing quality. Functional aspects are also important for the consumer: i.e. easy maintenance, suitability in use and satisfying use experience.

Furthermore, the following aesthetical attributes can be found as an important dimension for the consumer: beauty, style, color, fit and positive tactile experience (good fit and especially comfortable materials in use). Moreover textiles and gar-

Figure 3. Objects from one's childhood have a special meaning to the owner. They represent a long vanished period of a person's life.

ments stay long-term in use due to a more classical style or color, which looks good even when trends are changing. On the other hand a beautiful color or special style can be the reason to keep the product. In these situations the expressive performance has been above average and resulted in satisfaction, and hence the reason to keep the product has been the beauty experience (Figure 4).

When considering satisfaction with textiles and clothing the main determinants are the experienced quality attributes. The product has to fulfill the consumer's expectations in quality levels: i.e. a good instrumental performance is fundamental.

Figure 4. In leather the aging process is considered to be aesthetical.

Figure 5. If the textile or garment has a connection to some special person, it has a significant personal association and emotional value. In the photo is my mother's handmade dress from the 1950's.

Furthermore, an expressive performance, i.e. the aesthetic experiences, must also be addressed to achieve deep product satisfaction, and this relates to the emotional response to clothing such as a sense of fashion and construction of self with external symbols.

Low durability and especially poor quality are determinants in dissatisfaction and result in short-term use of clothing according to the current study. Swan and Combs (1976) have shown that clothing quality is fundamentally linked to clothing satisfaction. They state that consumers often take the quality and durability aspects for granted, and when asked about these issues in questionnaires, they point out that in clothing satisfaction, appearance is more important than durability. However, as mentioned, the instrumental attributes in satisfaction are most essential, as the instrumental performance requirements have to be satisfied first before satisfaction can move towards experience of expressive performance (Swan and Combs 1976). In other words, expectations regarding the garment's physical properties and experienced quality have to be realized and fulfilled first in order to proceed to the consumers' emotional response to clothing and through this process achievement of deep product satisfaction (Figure 5).

Currently there are more and more products that do not last the optimum use time or they are discarded prematurely due to e.g. changing fashions (Mont 2008). Consumers experience a psychological obsolescence of products because of

fast changing trends, social pressure or consumers' own changing emotional needs. In this dimension the discussion about consumers' deep inner needs and values could guide consumers, producers and designers towards sustainability: e.g. when consumers' ethical commitment is high, the more value s/he puts on products' environmental benefits such as eco-materials, ethical manufacturing and eco-labels. "Ethical hardliners" tend to prioritize a strong personal ideology as a primary attribute in purchasing decisions. These kinds of ideological and personal values also have to be addressed if the consumer is to gain a sense of deep product satisfaction (Niinimäki, 2010b).

Empathic knowledge in sustainable design: the designer's field

These studies suggest that sustainable design needs to intensify the emotional bond or the satisfaction that consumers experience with the products. From a sustainability perspective it is advisable to design products that offer deep product attachment and satisfaction, which results in durable product relationships. This section maps out the design opportunities to promote sustainability through creating long-term product relationships via various design approaches. By highlighting selected quotes from the questionnaires, this section deepens the discussion on reflective attachment, discursive engagement and continuation aspects in product satisfaction.

Several studies have shown that the following design strategies offer the opportunity to create value in sustainable consumption: reliability and durability, easy maintenance and repairs, long life-guarantee, design for upgradability and variability, classic style, and a strong person-product relationship (e.g. Mugge 2005; Van Nes 2003; 2006). Van Nes (2003; 2006) points out that what consumers need in the end is a well-functioning and up-to-date product that fulfils their changing needs. Accordingly the challenge in extending product lifetimes is in achieving continuing satisfaction with the product or forming deep product attachment over time.

To foster these long-term, deep product relationships, which are typically not "designable" as such, one needs new design strategies. Here we enter a methodological problem. As most of our knowledge about product attachment and long-term product relationships comes from questionnaires, i.e. it is based on what people say. It does not give designers the kind of detailed information they need to promote

long-term product relationships. Hence, an empathic approach to consumer-based knowledge is needed.

Empathic design approaches originally addressed the need to address precisely those hard-to-catch emotional product relationships that escape questionnaires and interviews. In empathic approaches, the idea is to let people define what is relevant rather than work through researchers' categories. Essentially, the researcher's job is to observe, probe and listen to people in order to understand what kinds of meanings products have for them. By analyzing pieces such as family jewelry, researchers can learn how they come to symbolize notions such as sorrow or connection to family over generations, both those long gone and those to come (Ahde and Koskinen, 2010). The problem with such relationships is that they are unique constructions and, correspondingly, not easy to reach through theory. For this reason, empathic designers have adopted more interpretive approaches. Instead of trying to break down the product relationship analytically, they have looked into the structure of specific product relationships, grounding theory in data.

An empathic approach provides a promising way to study the relationship between the user and the object. Consumers create a relationship with products at many levels. Some of these levels are accessible through consumer-centric industrial design techniques – especially everything related to visual appearance and tactility, quality and functionality aspects – but deeper emotional levels are not. There are several empathic techniques that can be applied here (Black, 1998; Segal and Fulton Suri 1997). One promising way to do design differently is co-design, giving people an active role in the design process itself: i.e. the designer can create proactive partnerships with end users and through this connection and knowledge thereby better understand the user and his/her individual needs (Rizzo, 2009). Another way to deepen the product attachment and postpone the product replacement is through personalization and do-it-yourself practices, which symbolize an accomplishment to the consumer and expression of one's own individuality. Halfway products, modular structures, customization, co-creation, and design services offer this dimension in textile and clothing design.

If the designer can connect the design outcome deeply with a consumer's emotions, identity construction, aesthetic needs and personal memories, that is, values and lifestyle, the design process can achieve a deep product satisfaction and product attachment (Figure 6a and 6b). The designer can influence the degree of attachment through designing products that better interlink with the consumer's needs and emotions. A design service that produces unique products, e.g. with the

help of digital technology, is one opportunity to produce meaningful uniqueness and emotionally durable textiles. In this process the design process can be based on individual consumers' memories and meaningful associations (Niinimäki, 2009).

Reflective attachments and discursive engagement

Positive product experience can result in product satisfaction as well as product attachment. Norman (2005) argues that there are three levels when processing product experience: the visceral, behavioral and reflective levels. The visceral level is the immediate one linked to appearance, where we make rapid judgments. This level is also a starting point for affective processing. The second level is the person's behavior with the object, and at the behavioral level pleasure and the effectiveness of use are the dominant factors. The last level is the highest level, the reflective one, where a person can reflect upon his/her experience. The reflective level comprises feelings, emotions, self-image, personal satisfaction, memories and cognition. At this reflective level, therefore, both emotions and thought processes are fully operating, while at the lower level there is no interpretation, understanding or deep reasoning, only direct effect (Norman, 2005).

As Chapman (2009) highlights, the reflective level is fundamental in discursive engagement, which develops over time and connects the user with his/her inner discussion, identity construction, deep values through use, experience and satisfaction with the product. In discursive engagement new elements also act as a stimulus to sustained interaction with the product, and new elements help to focus attention on the object. Hence discursive engagement includes the change factors that develop or emerge during time and use (Chapman, 2009).

While the surprise element is important in discursive engagement, a designer should aim to embed a positive change factor in the product design. The following is a quotation from the questionnaire of 2009. When asked the story of a long-life home textile one respondent commented that the textile has been durable, because:

> I have been involved in the design process of the textile and it includes my favorite colors. Originally the textile was designed for one of my homes, and it carries one state of my life in it. The textile product can be reconstructed to fit the space and you can change the shape of it. The product in a new place looks like it has been designed just for that place, and the materials have lasted well.

It can be interpreted that the owner of the textile has developed a deep product attachment, not only because the textile is unique, but also through being involved in the design process and having the possibility to influence the final outcome of the design process by embedding personal preferences in the textile. The textile carries a memory of a certain life stage. The respondent also continues the design process when moving into a new home: the user has a new experience with the product when rebuilding a new composition with the textile, which has a modular structure. The user can experience joy and thus actualize her/his creativity and be part of the continuing design process. Hence (s)he is creating meaningful uniqueness (Niinimäki, 2009).

Figures 6a and 6b. A unique design process can create meaningful emotional experiences. The starting point for this roller blind design has been the customer's grandfather's letters. Courtesy of Oy Vallila Interior Ab.

Furthermore, discursive engagement can be catalyzed through embedding in the product the promise of a future experience to come. One opportunity to accomplish this is through offering new kinds of services such as upgrading or updating, repairing or product modification systems or even more radical services such as product exchange stocks operating through the internet.

Continuing product satisfaction

Product satisfaction is formed from different elements according to product type. As Margolin (2002) points out it is easier to identify the operative dimensions of a product than the reflective ones. Reflective dimensions are interlinked with individuals' feelings and how they ascribe meaning, and it is therefore much more difficult for a designer to have any control over these aspects. Individuals can operate with objects according to different feelings and in any way chosen. According to Margolin (2002), someone can interact with a product through its operative value, its poetic dimension or its social significance. Hence all individuals have different experiences with products, and moreover a person's own product experience can change over time according to his/her values, attitude, personal history, past experiences and creation of meaning (Margolin, 2002).

However a satisfying use experience enables a long-term use of the product, and hence positive product satisfaction is a prerequisite for attachment to emerge in a temporal use context. Therefore through studying product satisfaction a designer can embed in product design those elements and attributes that are important to the consumer, in order to promote products' long-term use. These operative dimensions are easier to address than the reflective ones in the design process. The following is a quote from the questionnaire.

> From the very beginning I felt a sense of ownership with this clothing; it works in all occasions, the quality is high, it is timeless, I enjoy wearing it, and it ages beautifully. Moreover it has helped me create a personal clothing style through a combination with different clothes. The product expresses my personality.

One piece of clothing mentioned in the questionnaire was a man's dinner jacket that includes many levels of meanings and memories, personal association, as well as links to past, present and future promises of deep experiences. Not only has the high quality of the material and manufacturing process made the piece long last-

ing, but also all the meaningful associations at the cultural and subjective level and experiences have created a unique value for this product. This jacket has a timeless design and it is multifunctional. The following is a quote from the questionnaire (Niinimäki, 2010a).

> [The oldest garment I possess is] obviously the dinner jacket, which represents the 1920s. It was originally handmade for the movie *Fanny & Alexander.* Unfortunately I don't know who wore it in the movie. I bought it at the flea market in Stockholm Söder, Bondegatan [Bonde Street], sometime in 1981 or 1982. First I wore the jacket every day, and when I got bored of it I lent it to my friend, who also wore it frequently. I got married wearing that jacket (in fact twice). Now it is in the wardrobe, not used so much anymore. Sometimes I wear it at festive occasions. Now it has collected so much emotional value that it would be most difficult to give up.

The key to facilitating deeper product relationships thus lies in a better understanding of consumer-based quality attributes as well as in fulfilling consumers' emotional needs through the emotional and symbolic meanings of products. Taking a consumer-based view on eco-efficiency therefore suggests that is it important to study not only the product's environmental impacts, but also consumer satisfaction in conjunction with quality issues (Park and Tahara, 2008). This approach thereby also needs consumer-centered knowledge so that the designer can identify those attributes that are important to the consumer in different product groups and in different use contexts. Ensuring high performance in those attributes can result in deep product satisfaction and enable long-term use and the opportunity for product attachment to emerge.

Framework for sustainable product relationships

The previous section mapped out the possibilities designers have to embed attachment attributes as well as product satisfaction dimensions in the design process and its outcome. This section builds on that knowledge, adding the emotional aspect into the discussion on how to frame designers' field of work in terms of sustainable product relationships.

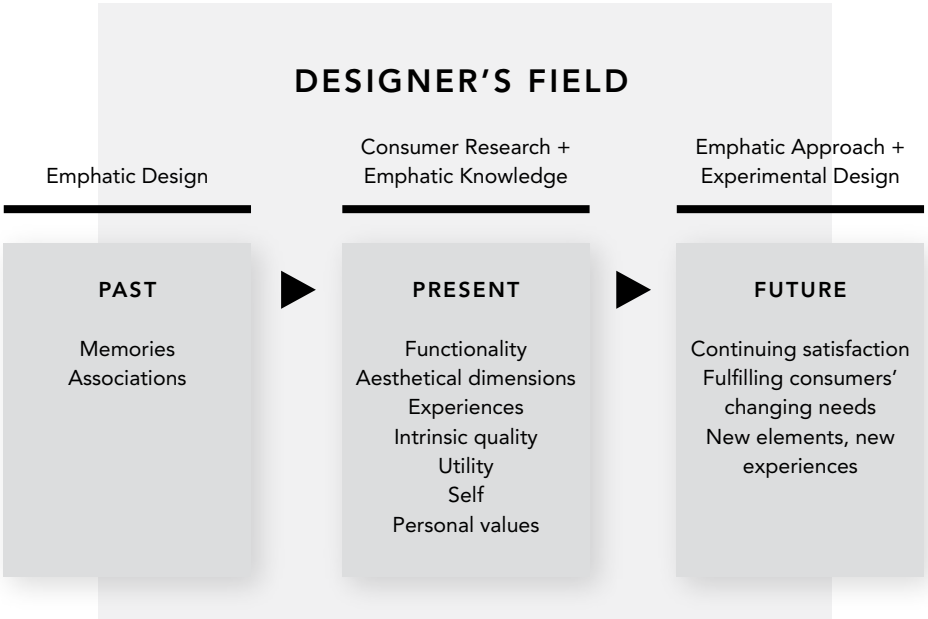
Sustainable product relationships are constructed in temporal contexts and at

many levels of meaning. Csikzentmihalyi and Rochberg-Halton (1981) distinguish certain categories of meaning related to objects. They describe objects' meanings related to the person, which are dimensions linking us to self, immediate family, kin and non-family aspects. There is also a non-person level that includes the past (memories and associations), present and future (experience, intrinsic quality of the object, style, utility and personal values). Schifferstein and Zwartkruis-Pilgrim (2008) propose that while forming an attachment to a new product, enjoyment is important, while attachments we form with old products are influenced by memories.

Forlizzi et.al. (2003) highlight that the emotional product concept consists of a short and reflexive emotional response (emotional statement) and sustained and reflective response (emotional experience). When aiming for product longevity, the reflective response is more important as it is sustained and deeper.

The level of experience is very individual, and hence while the accumulation of memories is the most promising strategy regarding product attachment, it is a difficult task for a designer to achieve. Dimensions of product attachment related to the past (memories and associations) are based on individuals' own, very personal

Figure 7. Framework for sustainable product relationships, empathic knowledge and the field of design



experiences. On the other hand present and future dimensions (experience, intrinsic quality of the object, style, utility and personal values) are easier to include in the design process. The designer can include these aforementioned attributes to create opportunities for emotional attachments to emerge through experiences and time (Schifferstein and Zwartkruis-Pilgrim, 2008).

A framework has been constructed that combines the attributes of sustainable product relationships and designers' empathic methods (see Figure 8). The framework is based on the temporal aspect of emotionally bonding with products. The designer can work with the present and future emotional experience levels in product satisfaction and opportunities for product attachments to emerge. However the designer can also use the consumer's personal history (individual meaningful memories and associations) as a starting point in the design process, aiming for unique design; this process needs an empathic design approach. At the level of the present the designer can provide good product performance in those attributes that are important to consumers and that are also determinants for the product's longevity. In this process the designer can combine consumer-centered research with empathic knowledge.

At the level of the future the designer can provide satisfying and continuing use experience through e.g. high intrinsic product quality as well as satisfying aesthetical experiences. Furthermore, providing services that enable new experiences to come or new elements to emerge in the product or its use, or which fulfill consumers' changing needs, better ensures prolonged use. This future experience level and especially the services mentioned earlier in this paper may be even more important than designing and manufacturing products when aiming for durable product relationships, consumers' sustained positive product experiences, as well as sustainable consumption with fewer but longer lasting and emotionally meaningful products. When dealing with the future level in product relationships, the designer needs an empathic approach combined with experimental design and service thinking.

The field of work for designers, what designers can do, does not encompass all the levels of meaningful and sustainable product relationships as illustrated in Figure 7. It is especially difficult to capture meaningful past experiences and include them in the design process. Secondly it is problematic to ensure a long-term product relationship in the future, since consumers can act with the products in any way chosen and dispose of them despite a satisfying use experience.

Conclusions

This study described the elements in product attachments as well as determinants for long-term use in the context of textiles and clothing. Furthermore, it described the designer's opportunities to embed these levels in his/her design work to extend the product's lifetime. Moreover a framework was presented that combined sustainable product relationships, emotional values in product experiences and attachments, the empathic approach as well as the designers' role. A satisfying use experience can be achieved by fulfilling consumers' product expectations especially in the long-term use situation. The determinants for long-term use of textiles and clothing are their intrinsic quality, functionality as well as aesthetical dimensions. Fulfilling consumers' expectations at these levels enables product satisfaction. Consumers create product attachments through many levels, such as their personal values, emotional values, memories and associations and construction of self. On the other hand some design styles, quality attributes, aesthetic dimensions including a product's aesthetical aging process, and moreover functionality aspects enable product attachments to emerge.

This paper highlighted design approaches that enable designers to embed these attachment elements and product satisfaction dimensions into the design process and its outcome.

The challenge in extending the product lifetime is in achieving continuing satisfaction with the product or forming deep product attachments through meaningful experiences over time. This challenge in sustainable design needs an empathic approach and consumer-centered knowledge. An empathic approach helps the designer to understand more deeply the consumers' needs, values and long-term product relationships, and moreover empathic knowledge enables the designer to provide deep product satisfaction as well as opportunities for future product attachments to emerge.

The task is not easy for one designer. This holistic approach to the consumer and his/her product relationships and inner emotional needs differs greatly from the approach in user-centered design or research focused on consumer preferences. In the latter the aim is for a short and reflexive emotional response instead of a sustained and reflective response, i.e. emotional experience. Hence focusing on extending the product lifetime is an appropriate place to use both multidisciplinary scientific research findings as well as an empathic approach to understand more deeply the individual consumer in our contemporary consumer society. An em-

pathic knowledge base offers a consumer-centered insight to the designer, which is of primary importance when promoting sustainable product relationships.

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ACKNOWLEDGEMENT

The authors would like to thank the editors of this Special issues for their constructive criticism and comments.

Publication VII

Emerging Design Strategies in Sustainable Production and Consumption of Textiles and Clothing

Kirsi Niinimäki, Lotta Hassi
Journal of Cleaner Production (2011)
Volume 19 • Issue 16
pp 1876-1883
DOI: 10.1016/j.jclepro.2011.04.020

Article info: Received 29 June 2010; received in revised form 27 April 2011; Accepted 29 April 2011; Available online 7 May 2011

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Abstract

This study contributes to current knowledge of sustainability in textile and clothing production and consumption. When the textile and clothing industry aims to promote sustainability, the main change factors have been linked to eco-materials and ethical issues in production. At present, however, business models are mainly linked with a large volume of sales and production. Although industrial development has moved towards smaller environmental impact, production as well as consumption has increased to levels where the benefits of technological development are reduced. A change is thus needed to reach a systemic transformation, not only in production but also in consumption. The aim of this paper is to open up the discussion on opportunities for radical change in this industry. The paper presents ways to rethink and redesign business in the textile and clothing field by offering an overview on several design strategies that exist today in niche markets. Furthermore we evaluate how interested consumers are in these design strategies and discuss the opportunities these design approaches offer to sustainable development through new value creation.

Keywords

textile industry, sustainable design strategies, value creation, strategic innovation

1. Introduction

Until recently, development in the textile and clothing industry has focused on technological and cost aspects. Emphasis has been placed on keeping the price of the final product low and increasing efficiency in production. Designers, manufacturers and retailers have paid less attention to other dimensions of the offering, e.g. ownership and related business models, as well as consumer wishes and values. Hence, the products are designed and produced according to regularly changing trends that enable quick profit, rather than radically rethinking the ways of designing and manufacturing the offering that is based on consumer needs and sustainability. Thus the question to be addressed is how textile and clothing offerings should be designed and manufactured to better suit consumer preference in a more sustainable way. At present, the business models are linked to the volume of sales and production alone. Therefore, more sustainable consumption is seen merely as leading to reduced volumes and decreasing profitability in production, not as an opportunity for a new kind of green business (Allwood et al., 2008). A radical new mindset among designers, manufacturers and consumers is needed in order to find more sustainable ways to fulfill consumer needs and to attain sustainable improvements in the relationship between production and consumption. As Perrels (2008) points out, to a large extent the issue in sustainable development is change, not only in production systems but also in consumption patterns.

As Kemp (2008) reports, a fundamental change is needed to reach a systemic change, but transition faces resistance and it takes time to emerge. Strategic innovations are needed to create a fundamentally different way of doing business. Strategic innovation questions who the customer is, what products or services should be offered, and how to offer those products and services (Markides, 1997). In other words, it is not merely about rethinking the fundamentals on the supply side, but also about redesigning the business on the demand side, e.g. in the form of the user experience and rethinking value creation.

This paper opens up the discussion on the radical new mindset and change needed in textile and clothing design, manufacturing, business and consumption.

The paper presents design strategies that can lead development to a more sustainable path. The paper combines empirical research data with a theoretical background discussion. The paper begins with an overview on the structural change inside this industry, provides a description of planned obsolescence in a throwaway society, and then further discusses the possibilities for radical change. Section 7 extends the discussion towards the need for a new mindset and change in the pattern of designing and manufacturing textiles and garments by presenting design strategies that question today's system of mass manufacturing. Sections 6 and 8 present the results from the questionnaires, and in the final part we evaluate the environmental impact of production and consumption in the various design strategies and discuss the opportunities to redesign the business through new value creation.

2. Research material and methods

This study concentrates on the consumer perspective and is constructed on the basis of two online questionnaires. The study employs qualitative research methods and can be classified as a collective and instrumental case study, which, as defined by Stake (2005), is a case study extended to several cases to provide insight into an issue and to offer possibilities to redraw a generalization. In this study the consumer questionnaires are used to gather insightful knowledge regarding consumers' environmental attitudes interest and worrisome issues in the field of textile and clothing manufacturing and further to map consumers' interest in various design strategies. This knowledge functions as the basis for constructing a theoretical discussion on opportunities to decrease consumption and the environmental impact of this industry through various design strategies. Furthermore this study maps out the area of new value creation opportunities through certain design strategies. As Anttila (2006) points out, empirical data in a qualitative research method can be used not only as a basis for description of reality but also as a catalyst in the process of constructing a theoretical discussion, as we have done in this study. When using data for this purpose it can be descriptive. We follow the principles of qualitative research where an abductive process of drawing conclusions uses both empirical as well as theoretical viewpoints to result in deductions. The limitation in a qualitative case study is that the results may not be repeatable as such in other cultural contexts. However, textile and clothing consumption patterns as well as

the development inside this industry in Finland can be roughly comparable with the situation in other Western countries. Hence we propose that the results and conclusions can tell us something about the general attitudes towards sustainable textiles also in other Western countries.

Two online questionnaires were conducted in Finland in spring 2010. The content of both questionnaires was the same, and they included structured as well as open questions about environmental issues in the textile and clothing industry. In addition they mapped consumers' interest and worries in this field. Moreover the questionnaires included questions about consumers' textile and clothing purchasing, interest in different design strategies, and product use duration. Questionnaire A was a random sample sent to 500 respondents selected to equally represent female and male respondents and different age groups between 18 to 64 years. For this questionnaire we received 137 answers, a reply rate of 27%. Despite the low reply rate for questionnaire A, the respondents represented rather equally male (42.9%) and female (57.1%). Furthermore the respondents well represented different age categories: 17.8% were 18-25 years old, 21.5% 26-35 years old, 20.7% 36-45 years old, 25.2% 46-55 years old, and 14.8% 56-64 years old.

Questionnaire B was based on a "snowball sampling" method, i.e. a type of convenience sampling method where the respondents recommend new respondents to the researcher. Altogether 204 respondents participated. The link to the questionnaire was randomly sent to about 30 people, who were then asked to further disseminate the link to their acquaintances. In questionnaire B most of the respondents belong to the age group under 35 (77.9% were 18-35 years old), and 70.4% of the respondents were women; hence the result is dominated by a young, female standpoint.

3. Structural change

In order to study any new design approaches and new ways to create value, we must begin by giving an overview on the structural change inside this industry. The volume of the industrial production of textiles and clothing has changed dramatically in the last ten years in Finland. The production of garments has dropped by 60% during 1998-2008. At the same time, the import of garments has increased by 57%. This is a noticeable change, because in the previous ten-year period, 1988-1998, the volume of garments imported into Finland rose by 44%. During

1998-2008 the number of personnel working in the textile and clothing industry dropped from 13 870 to 7 556. However, in the early 1980's nearly 70 000 people were working in the textile and clothing industry in Finland. Obviously the tendency to move industrial production to lower-cost countries began already during the 1980's. (Federation of Finnish Textile and Clothing Industry,1999; 2009)

Table 1 presents the main countries from where textiles and clothing were imported during the years 1998 and 2008. Looking at these statistics, we can clearly see where the textile industry has moved: the winner in this game has been China. The growth in garment import from China in 2007-2008 alone was 21% (Federation of Finnish Textile and Clothing Industry, 2009).

Imports of Textiles and Clothing to Finland

	Textiles %	Garments %
EU	(78.2) 71.1	(43.8) 38,0
Other Europe	(8.9) 5.4	(23.5) 7.4
China	(1.9) 6.7	(17.7) 35.8
India	(3.2) 4.3	(3.3) 4.1
Bangladesh	(-) 0.8	(2.5) 4,0
Pakistan	(2) 1.7	(-) 1.6
Hong Kong	(-) -	(5) 1.4
USA	(2.3) 1.8	(-) -
Thailand	(-) 0.5	(-) 1,0
Vietnam	(-) -	(-) 1.5

Table 1. Imports of Textiles and Clothing to Finland in the years 1998 and 2008. The amounts concerning the year 1998 are given in parentheses. (Federation of Finnish Textile and Clothing Industry, 1999; 2009)

This structural change inside the textile industry can be seen globally. In Britain it is estimated that currently 90% of clothing is imported (Defra, 2008). Textile and clothing production has increased significantly and at the same time moved from the Western world to mainly Asian countries in the pursuit of lower production costs. The global growth in textile production between the years 1979-1990 was 143%, and the Far East had the highest export growth of 430% during 1979-1990 (Lim, 2003). It is estimated that China will take over half of all the textile and clothing manufacturing of the world in the coming years (Ulkoasianministeriö, 2005).

As textile manufacturing has moved to lower-cost countries, so have the environmental impacts. According to Chen and Burns (2006) global textile consumption is estimated to amount to more than 30 million tons a year, which causes heavy environmental impact during production.

4. Planned obsolescence in a throwaway society

During the last 25 years industrial development has achieved environmental improvements and has moved towards a smaller environmental impact. However, at the same time production as well as consumption has increased by the same levels, which erodes the environmental benefits of the technological advances: i.e. the rebound effect (Throne-Holst et al., 2007). Efficient production brings down prices and increases consumption. As textile manufacturing has moved to lower-cost countries, the quality of garments has also declined; hence, the lifetime of garments has shortened. It is not only important how much consumers buy, but also what kinds of products they buy and how they use and dispose of them. Garments are affordable and easy to buy, up to a point where repairing the garments is no longer worthwhile. Consumers possess increasing amounts of short-lifetime garments, which have been bought without deep consideration and used only a few times before being disposed of.

The clothing industry is based on extremely fast cycles of fashion and consumers' unsustainable desires; hence it is a good example of the planned obsolescence existing in the current industrial system. Accordingly, low quality, short-term use, frequent clothing replacement and increasing textile waste cause an environmental burden. In Britain clothing and textile waste is estimated to be the fastest growing waste stream between the years 2005-2010, currently amounting to 1.5-2 million tonnes annually (Defra, 2008). In landfills this waste causes methane emissions to air and pollution to groundwater through toxic chemicals (Fletcher, 2008). The increase in textile waste is a consequence of the increase in textile and clothing consumption, which saw a growth rate of thirty per cent in 1995-2005 in Britain (Defra, 2008). "Fast fashion" with low quality accounts for 20% of the market, and moreover it doubled its growth between the years 1999-2006 (ibid.). In Finland Nurmela (2009) estimated that the consumption of clothing and footwear will increase by 23% from 2006 to 2010.

An increasing amount of textile and clothing waste has led to the development

of using the textile waste, i.e. reuse and recycling – which is sometimes called the eco-efficiency approach. These approaches have faced the critique that they do not face the real sustainability problems: the increasing consumption, the growing waste problem, the environmental impact of increased textile production and the social sustainability problems of the textile and clothing industry. Fletcher (2008) points out one reason why recycling is currently so popular: it demands only a small change from producers and consumers, and this approach allows consumers to continue with their unsustainable consumption patterns. The recycling approach fits in current routines and how things are done today.

5. Change is needed

The present system in the textile and clothing industry is based on fast cycles of fashion trends that aim to continuously produce new consumer needs and products. Product life cycles are shortening, and companies want to substitute their products at an increasing pace. A study by Procter and Gamble shows how the life cycle of consumer products dropped by 50% between 1992 and 2002 (cited by Vaitheeswaran, 2007). While the supply side of the textile and clothing industry focuses on achieving low prices and effective manufacturing, other opportunities for new value creation through sustainability have not been mapped.

Sustainable innovation has traditionally been driven by the supply side. Sustainable inventions often remain as inventions instead of becoming innovations, merely due to the lack of acceptance on the demand side which, in turn, results from the lack of demand side consideration in the innovation process. Berchicci and Bodewes (2005) have highlighted that successful green products must not only address the environmental attributes, but they must also fulfill market requirements accordingly with their non-green counterparts. They further suggest that consumers' environmental concerns should be translated more deeply into the product design.

Gardner and Prugh (2008, 15) believe that innovations "fueling sustainable economics are spawning the sixth major wave of industrial innovation since the start of the Industrial Revolution." The sixth wave not only emphasizes technological innovation but takes advantage of social issues and offers a leadership role also for the consumers (ibid.). Several companies acknowledge that market competition is driven by products' *meanings*: "why" people need a product rather than "what" they

need in a product. People use things for profound emotional, psychological, and socio-cultural reasons as well as utilitarian ones. (Verganti, 2009)

A rethinking of fundamentals has to take place within the company, and the focus should be on the *outcome* the user wants to accomplish with the offering. The key is then to design the most sustainable way of producing that outcome for the user. Outcome-driven thinking places the focus on the *job* the user wants to get done (Christensen et al., 2007) and not on the solutions of how to produce or deliver the offering. The "job" can be functional, social or emotional. When searching for opportunities that do not pertain to the existing ways of operating, an outcome-driven approach is a viable strategy.

Eco-materials, ethical production, and eco-efficiency have been popular themes in the textile industry in recent years. Moreover, at the beginning of the 21st century several designers have made use of the concept of reuse and *redesign* in designing trendy products. However, a new sustainable mindset is still waiting to emerge at large, as we continue to design and manufacture textiles and clothing mainly in traditional ways. As Fletcher (2008, 121) describes the current situation, "…it uses yesterday's thinking to cope with the conditions of tomorrow".

Tischner and Charter (2001) identify four approaches to the development of sustainable design: repair, refine, redesign and rethink. They see the current emphasis being on "…repair modifications to existing products, with some movement towards increasing the eco-efficiency of existing products – the refine approach" (127). Currently changes to existing products are mainly made at the operational level, but new solutions should also offer value through sustainability and reduce the environmental impact of products and consumption in total. Hence, Tischner and Charter propose (2001) that the next shift will be towards the redesign approach, especially in the use of new technologies and materials to reduce the environmental impact of products. The next stage, *rethink*, requires a radical change in mindset, and it can offer breakthroughs for new lifestyles, the ways of living and doing things, as well as approaches to fulfill consumer needs in a more sustainable manner (ibid.). This approach needs strategic innovations that lead to new business models. As Tukker et al. (2008) argue these new practices often stay in niches for a long period until a window of opportunity opens and their breakthrough is possible.

In Section 7 we present several design and manufacturing strategies that offer a new approach to sustainability but which today still operate as niche practices. First, however, we present consumers' environmental worries in the context of textiles and clothing.

6. Consumers' environmental worries

In this section the results from the questionnaires are presented. The focus is on environmental concerns of consumers in the textile and clothing field. When asked if environmental impact as well as ethical manufacturing and safety issues affect their purchasing decisions, in Questionnaire A 21% of men and 40% of women said that these aspects often affected their textile and clothing purchasing decisions. However 74% of men and 87% of women said they were interested in ethical consumption as well as the environmental impact of products in general (Questionnaire A). Table 2 presents the results from questionnaire A regarding what consumers considered important aspects in textile and clothing. From these responses we can conclude that younger respondents were more worried about the environmental and ethical aspects in textiles and clothing. In addition, women worried about these aspects more than men. Furthermore there was an obvious interest in acquiring more information about the environmental impacts as well as ethical issues inside this industry.

Table 2. Environmental worries of consumers according to age and gender. The numbers refer to the percentage value of the statement "totally or somewhat agreed".

Questionnaire A	Age < 35 [%]	Age >46 [%]	Women [%]	Men [%]
The 'Made in Finland' aspect in textiles and garments is important to me	39	60	60	48
It is important to me that textile production has a small environmental impact	71	65	70	68
I want to know about the production and environmental impact of the garments I am purchasing	61	44	57	38
I am worried about the ethicality of textile and clothing production	64	45	64	40
I am worried about the environmental impact of textile and clothing production	71	55	77	50

Local and domestic production seemed to be more important for older respondents and women than for young consumers and men. In questionnaire A, the Made in Finland aspect when purchasing garments was important to 39% of the respondents under the age of 35, while 60% of the respondents over the age of 46 considered this aspect important. However, when asked what aspects most affected their latest clothing purchases, the Made in Finland aspect was not particularly strong: in questionnaire A 16% and in questionnaire B 7% agreed with this. It is interesting to note that local production was an important value to consumers, especially considering that most garments are currently manufactured outside Finland, mainly in Asian countries. The option to choose a domestically manufactured garment is less available to consumers today. The same tendency can be seen in other European countries, as mentioned in Section 3.

Table 3. Phases of the product life cycle that worry consumers. The numbers refer to the percentage value of the statement "totally or somewhat agreed".

	Questionnaire A [%[		Questionnaire B [%]
1. Location of manufacturing	53	1. Lifetime of the product	76
2. Product processing	45	2. Cultivation of fiber	50
3. Lifetime of the product	33	3. Product processing	47
4. Transportation	32	4. Location of manufacturing	46
5. Cultivation of fiber	24	5. Fiber processing	35
6. Disposal of the product	22	6. Transportation	34
7. Fiber processing	20	7. Disposal of the product	32
8. Use phase (the use of water and energy)	11	8. Use phase (the use of water and energy)	11

In the questionnaires we asked the consumers to point out the phases of the product life cycle they were concerned about when thinking about the environmental impact of textiles. Table 3 presents the answers of the respondents. The lifetime of the product and the cultivation of fibers especially worried respondents in questionnaire B (younger female standpoint), and the location of manufacturing and product processing worried respondents of questionnaire A. Low quality and the

short life span of the clothes are familiar issues to all consumers. When asked about the shortest time respondents had used some garment, they reported use of no more than a couple of times. In questionnaire A 30% of respondents answered this, and if we examine these answers more closely, 36% of women and 21% of men replied that they have used some garments only a couple of times. Regarding the reason for the short-term use, the main reason was low quality.

7. Design strategies

In this section we present design strategies that focus on extending the product life span. The short life span of textiles and especially clothing is one of the main problems in the current industrial system based on planned obsolescence. According to our study, as presented in the previous section, the same issue is also a worry for consumers.

7.1 Long life guarantee and product satisfaction

As Mont argues (2002), manufacturers could shift the focus of their operations from exchange value to use value, which offers new opportunities to increase the intrinsic product quality and durability. Hence manufacturers can offer a longer product life span and deeper enjoyable use experiences to consumers. Earlier studies have shown (Niinimäki, 2012) that consumers' biggest dissatisfaction in the area of clothing is with the low quality, especially experienced quality during use and maintenance stages. As the life span of the product as well as the quality of textiles and garments are difficult to evaluate at the point of purchasing, producers could offer consumers information about the intended lifetime of the product. While maintenance quality is critical to longevity in clothing, manufacturers could also provide information on how many washes the garment will take and still look good. This information could help consumers to evaluate connections between price, quality and utility; the product's life span as well as its potential aesthetical longevity; and moreover the environmental benefits of the product (Niinimäki, 2010).

A "slow design" approach aims to prolong a product's lifetime and to deepen product satisfaction. Slow fashion is designed to be used over a long time period, and it is made with high quality and high ethical values; it is durable and made of sustainable materials. The design lasts over time as styles and colors are classical, and the materials age well. This affects aesthetic longevity. (Fletcher, 2008)

7.2 Product attachment and emotionally satisfying design

A deep product attachment has the potential of extending the life span of the product. The objectives of "empathic design" and emotionally durable design are to build on a deeper understanding of the individual consumer's needs and values (e.g. Chapman, 2009). The aim is to design products that are meaningful to the user over a long period of time and thus they are not easily disposable. This often means a unique design process or co-creation with the user. These fundamentally new ways of designing and co-creating require not only a new mindset but also new business models and manufacturing systems. Accordingly new product strategies, which include all aspects, designing, manufacturing, sales, marketing, service support, and reverse logistics, have to be constructed (Fuad-Luke, 2009).

7.2.1 CUSTOMIZATION, HALFWAY PRODUCTS AND MODULAR STRUCTURES

As Chapman (2009) points out, products that are easily personalized or customizable offer an opportunity to create a deeper emotional bonding between the user and the product. Through customization, the user can create personal meanings and form attachments to products. Mass customization uses fast, flexible digital manufacturing technologies and computer-aided design. The idea is to satisfy both the manufacturers' and the individual user's needs in global, fragmented markets (Pine, 1993; Lee and Chen, 2000). Traditionally, the mass-customization concept offers the user a platform including a range of choices in styles and colors to create a personal look.

The design concept of halfway products (e.g. Fuad-Luke, 2009, 95; Papanek, 1995, 244) offers the user a more active role in the product design process and a larger opportunity for creativity than the mass-customization concept. The consumer can translate his/her own creativity and preferences and even individual memories into the product. Products that are available as *kits* and designed for disassembly are one opportunity to offer the consumer a creative experience. Kit-based products enable the user to build the products, thereby acquiring a deeper knowledge of the product and becoming able to repair the product if needed (Papanek, 1995).

A modular structure allows quick disassembly and reassembly of modules. In terms of clothing, this would mean detachable parts. This design concept offers the possibility to upgrade the product or to personalize the product through modifications; e.g. some pieces of the clothing can be changed or the consumer can select the details according to his/her favorite colors or materials. Garments with a

modular structure may also need less laundering, if the garments are designed with this aim. The parts of the garment that become soiled more easily can be detachable and thus easy to remove and wash separately. (Fletcher, 2008)

7.2.2 Co-creation and open source design

Co-design approaches encourage participation of the end users in the design process. A co-design process offers multiple stakeholders the opportunity to collectively learn, solve problems and develop a design outcome with deeper consumer satisfaction. In a co-creation process the designer interprets users' responses and through this the company can create value together with the users. (Fuad-Luke, 2009) This results in a sense of fulfillment on the part of the users, and they form an attachment to the product more easily.

However, even more radical thinking is now emerging. Open source fashion is a recent phenomenon, and the internet makes it possible to reach fashion consumers all over the world. Fashion designers can still sell their design skills through patterns and construction information, but the end-users implement the final design outcome. Open source fashion is not led by large companies or retailers. Hence the individual consumer has a leading role in decision-making, turning the consumer from a passive consumer into an active maker, and this deepens the feeling of achievement and in turn increases product satisfaction.

7.3 Services

Product-service systems (PSS) emphasize systems thinking and drive companies to focus on consumer needs (Charter and Clark, 2007). Mont (2002) describes how a product-service system focuses on competitive ways to satisfy customer needs; while doing so it also has a lower environmental impact than traditional business models. As Robert et al. (2002) point out, in a "Zero Emission Society" consumers should invest in services and purchase functions instead of products. In this type of society all materials should be automatically returned to the producer after the use phase, and this creates environmental value for the whole system.

Stahel (2001) states that consumer satisfaction in a service economy is at the center of focus, and it can be implemented by offering good product performance through services which do not increase waste streams. Guaranteed satisfaction at a guaranteed service per unit thinking offers the consumer a sustainable way to fulfill needs. Service thinking also offers flexibility in product utilization which ownership does not offer.

7.3.1 DESIGN SERVICES

Traditionally design services for textiles and clothing have been employed in tailor-made suits or in customer-centered unique design processes. The tailor-made suit is a good example of the quality–durability–price connection. A tailor-made suit is more expensive than a ready-made garment, but on the other hand, it is made according to the user's preferences, needs and measurements, offering a perfect fit physically but also emotionally.

Today, designers are able to create individual and unique looks by using digital technologies that enable placing the consumer's attachments, emotions, and wishes at the center of the design process, securing a deep product relationship and increasing the likelihood of a long life span of the product (Niinimäki, 2009). The development of small-sized and easy-to-use digital technologies in the area of textiles has created new design service possibilities. Digital textile techniques have expanded the possibilities to design and produce unique products. Digital textile printers, embroidery and laser cutting machines, and digital weaving machines offer wide opportunities to realize consumers' individual preferences and needs. These techniques enable savings in the use of materials compared to the industrial scale for manufacturing textiles; production is based on existing orders in lieu of surplus production. (Niinimäki, 2009)

7.3.2 SERVICES FOR INTENSIVE AND LONGER UTILIZATION

Services for intensive utilization question the need for ownership of a product. Through shared use of goods, it is possible to reduce the material and resource flows and achieve a more intensive utilization of a product. This can mean renting or leasing, the replacement of goods with services, and non-profit networks for lending and sharing, as well as garment exchange stocks operating through the internet. As Stahel (2001) argues these concepts require a fundamental change from global manufacturing systems to local renting systems, which benefit the locality.

Products aimed for long term use have to be made with high quality. The quality of products is directly linked with their durability. Classic and timeless design, good fit and high quality offer opportunities for longer utilization. Longer product life spans can also be achieved through services such as upgrading or updating, repairing or product modification systems or services. These services extend the enjoyable use time of the product as well as postpone the psychological obsolescence that consumers themselves feel about the product (Niinimäki, 2011).

8. Consumers' interest in the design strategies

The design strategies presented above can potentially lower the environmental impact of clothing and textiles. Table 4 presents the results from questionnaire B, where respondents were asked about their interest in these various design strategies.

Consumers' interest in design strategies	[%]
I could use repair and modification services.	86
Garments have to be suitable for recycling (multiple life cycles).	83
Garments could be upgradable.	72
I am interested in the customization possibilities of garments.	68
Manufacturers could offer exchange and return services for garments.	68
I can rent garments for short-term use.	62
I am interested in taking part in the design process e.g. through the internet.	61
I am interested in clothing with a modular structure, because I could repair or even make the garments myself.	60
I am interested in affecting the manufacturing process e.g. through the internet.	52
Garments have to be designed for an optimal use period, and the optimal use period has to be communicated.	50
I can rent garments for long-term use (e.g. one year).	22
I could buy a short-lifetime garment, which does not need any washing during its short life span.	11

Table 4. Consumers' interest in design strategies. The numbers refer to the percentage value of the statement "totally or somewhat agreed".

It is often the case that innovations with a more radical approach do not generally come from user-centered approaches, meaning that users are tied to existing solutions and socio-cultural regimes (e.g. Verganti, 2009). The most popular design concepts in the questionnaire were ones that were already familiar to the consumers. The more radical long-term renting and the optimization of the garment use time did not appeal to the respondents. Exceptions are, however, the upgradeability, modularity and co-creation concepts. New service systems such as exchange or return organized by the manufacturer also interested consumers.

Does the concept of slow fashion interest consumers? When we asked, "Are you

ready to buy a long-lifetime, repairable and more expensive garment and use it for a long time to minimize your own environmental impact?", in questionnaire B 83% and questionnaire A 78% of respondents totally or somewhat agreed with this statement.

9. Considerations on design strategies

As aforementioned in this paper consumers are worried about the environmental impacts of current industrial manufacturing systems. Moreover, as shown in the previous section, consumers' interest in new design approaches is high. Table 5 provides a summary of the potential effects the various design strategies may have on the environmental impact of production and consumption. Furthermore we have evaluated consumer interest in the different strategies. Consumer behavior is not easy to predict; if these strategies, however, create deeper product satisfaction and product attachment, there is a greater possibility that consumers will postpone replacement of products and through this decrease their own consumption. On the other hand, it is not yet verified whether this happens in reality. Consumers may still increase total consumption. Furthermore, all these strategies do not necessarily decrease the environmental impact of the production if they, for example, do not lower the amount of production in total.

Table 5. Evaluation of the design strategies

Design strategy	Decreasing environmental impact of production	Decreasing consumption	Consumer interest
Multiple life cycles	+	-	+
Slow fashion	+	+	+
Customization	+/-	+/-	+
Halfway products	+	+	+
Modular structure	+	+	+
Co-creation	+	+	+
Local production	+	+/-	+/-
Design services, unique design	+	+	+
Services for longer or intensive utilization	+	+	-

It may be wise to combine different strategies to promote sustainable consumption (Mugge et al., 2005). In clothing this may mean e.g. combining slow fashion with local production and perhaps even with customization to achieve high quality and sustainable value. On the other hand garment design must be combined with multiple life cycle strategies that benefit the consumers, e.g. including reverse logistics. Adding services to the aforementioned, e.g. a garment exchange system, may lower the environmental burden of this industry.

When consumers are active partners in the design or manufacturing process itself, it is possible to increase the uniqueness and personalization of the product. Several studies have shown (e.g. Mugge et al., 2005) that these aspects symbolize an accomplishment to the consumer and therefore deepen the product attachment, and this emotional bonding may postpone product replacement. Strategies that offer opportunities to better meet an individual customer's needs, create deep product satisfaction and thereby offer the opportunity to decrease consumption in the textile and clothing industry include halfway products, modular structures, customization, co-creation and design services.

10. New value creation and radical change

When mapping the opportunities to redesign a business, the issue of a new kind of value creation is essential. Möller (2006) identifies three value creation systems: firstly core value, which is useful in stable exchange markets; secondly value-added value creation, which works through incremental innovations; and finally future-oriented value. In relation to the design field, traditional product design and manufacturing is based on core value creation while product-service systems are based on value-added value creation systems which benefit not only consumers but also the environment and society. Möller (ibid.) proposes that visioning and sense-making can reveal how new, radical future-oriented value can be created in radically new business offerings. He also points out that future-oriented value creation needs multi-party collaboration within complex networks, and it will offer radical changes in old value systems. Since, according to Möller (ibid., 917), future-oriented value creation includes opportunities to create "new value activities" and moreover offer "radical system-wide change" it fits well as a base for new strategic thinking. Accordingly, if this new future-oriented value thinking aims to decrease the environmental impacts of production and consumption as a whole, it could of-

fer benefits for sustainable development.

According to Schlegelmilch et al. (2003) strategic innovation has three key elements. The first element is a fundamental reconceptualization of the business model: what business we are in, who our customers are, and how we achieve value. The second is the reshaping of existing markets that purposefully challenge the existing rules of the industry. For example, in modular products the lifetime of the product is viewed as a dynamic process, including modifications, additions, and updates to the initial product. In this approach the product lifetime is a process in which the user has an ongoing active role in designing the product. Thirdly, strategic innovation creates dramatic value improvements for customers; strategic innovation places strong emphasis on value and has the customer, not the competition, at the center of strategic thinking (ibid.). The strategies presented in this paper have the user at a central position in the value creation activity; the user is either an active participant in the design process or the strategy takes the user needs and satisfaction as the starting point.

As Mont (2002) highlights, focusing more on use value than exchange value offers manufacturers new possibilities to include higher intrinsic quality in the product and hence offer a longer satisfying use experience and further extended utilization of the product. Park and Tahara (2008) point out that product value has to be defined in the actual use context, and accordingly the life span of product has to be connected more profoundly to products value. Moreover Mont (2002) emphasizes that recognizing the value of use and offering value-adding services means that manufacturers could create a new service-oriented economy, a functional economy, instead of the current industrial economy. In a functional economy, utilization, function and services are at the center, not industrial manufacturing. Hence Mont (2002) defines product-service systems as a model that satisfies consumers' needs in a more sustainable way than traditional business models. Accordingly this thinking offers emotional value for the consumer through deeper use satisfaction.

Mont (2002) further argues that this change from an industrial system to a functional system creates opportunities to develop systems that provide a certain quality of life for consumers through a new kind of value creation. Na et al. (2009) define this to mean lifestyle value, where at the center lies the consumer's satisfaction on the level of both psychological wants and emotional desires, not only on the functional level. In other words, this new value creation focuses not only on utilization and the consumer's use experience with the product but also environ-

mental values which can be communicated to the consumer. By focusing on both production and consumption, this approach actually decreases the environmental impact of the whole system, thus creating environmental value and moreover sustainable development value.

A number of design strategies presented in this paper question the role of the consumer and turn him/her into an active value creator, instead of mere value consumer. All design approaches that demand more commitment and effort from the consumer's side change the consumer's role towards co-creator in value creation. A co-creation approach also offers social value for the participants. Moreover open source design questions the entire current industrial system and offers the consumer a leading role. It questions the global industrial manufacturing systems in garment manufacturing, if not in textile manufacturing, as it still needs the fabric with which to realize the garment. This approach offers deep emotional value where the consumer himself/herself can be part of the realization process, and through the resulting sense of achievement, he/she can then feel deep product satisfaction and product attachment. The result is an increase in the emotional value of the product and its use.

Moreover slow fashion, which includes local production, increases the cultural value and offers benefits for sustainable development, by, for example, decreasing the negative impacts of logistics. In addition, services that emphasize renting shift the focus from global to local actions, and hence they benefit the environment as well as local actors.

We can conclude that establishing a new value creation system is a prerequisite when redesigning more sustainable business in global textile and clothing markets. The types of values that can be promoted through these new design strategies are the following: use value, emotional value, added value through services, cultural value, social value, environmental value, sustainable development value and future-oriented value (see Table 6). A fundamental discussion on value creation can point the path to a radical new mindset and open the window for radical change, which can steer the redesign of the business. We argue that future-oriented value thinking combined with an environmentalist approach is the foundation that can initiate discussion on new value creation in the context of sustainable development. More research is still needed to make this value approach calculable and possible to communicate to consumers.

Table 6. Main value creation through particular design strategies

	Use Value	Emotional Value	Cultural Value	Social Value	Added Value through Services
Slow fashion	x		x		
Long life guarantee	x	x			
Customization		x			
Halfway products		x			
Modular structure	x	x			
Co-creation		x		x	
Local production			x	x	
Open-source design		x			x
Design services, unique design		x			x
Services for longer or intensive utilization	x			x	x

11. Conclusions

This paper presented a set of design and manufacturing strategies for the textile and clothing industry that could reduce the environmental impact of textile and clothing production and consumption. These strategies question the current industrial system and open views to new value creation opportunities inside this industry.

These presented strategies will not directly lead to sustainable practices, as the system is not yet ready for radical change. However, by focusing more on consumers' values and needs or providing better consumer satisfaction, these strategies may initiate discussion on how to start a systemic change in this industry. While the short life span of textiles and especially clothing is one of the main problems in the current industrial system, and it is also a worry for consumers, this paper presented design strategies that focus on extending product life spans through bet-

ter intrinsic quality and lifetime guarantee, product satisfaction and product attachment. Moreover we explained how services might extend the product life span.

Secondly by suggesting a new kind of value creation the paper discusses how to develop new value in the product or its use through service thinking. It points out that the product value defined during the use context is most important and should be profoundly connected to consumer satisfaction as well as product life span. Other important values for the consumer are emotional value and environmental value. Moreover we defined cultural and social value, sustainable development value and future-oriented value to be most important when redesigning a business. Rethinking fundamentals in value creation offer opportunities to develop sustainable value both in production as well as in consumption, and through this knowledge it is possible to redesign the business.

Strategies presented in this paper have the potential to break the rules of the industry and change the nature of competition, but it is the realization of these strategies that will determine whether or not it will produce a strategic innovation, one that goes beyond incremental improvements. These presented strategies exist still in the niche market, but as we have shown in this paper, consumers are most interested to change the patterns in current industrial manufacturing as well as in consumption.

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ACKNOWLEDGEMENTS

The authors would like to thank the anonymous reviewers and the editors of this Special Issue for their constructive criticism and comments. Comments on draft version of this article from PhD Riikka Räisänen are gratefully acknowledged.

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