



Sustainable Business Design & ENTREPRENEURSHIP



Bring ideas to life
VIA University College

Can we meet the needs of the present fashion production and help ensure the future generations ability to meet their needs?

This elective is about how we can change the perception of fashion and lifestyle business development and production. Now, tomorrow and in the future. We are happy to have you on board this challenging trip into circular economy and sustainable design.

At VIA Design, we are very proud to announce our close collaboration with the The Danish Foundation for Entrepreneurship, The Fund for Green Business Development in Denmark and The Ellen MacArthur Foundation, without which we could'nt have done this. We also want to thank the companies striving to do a difference; BestSeller, ID-Design, Lene Bjerre Design and H2O, for being a part of this elective, as your internship innovative partners.

Dame Ellen MacArthur, Founder of the Ellen MacArthur Foundation puts it this way:

"The circular economy is gaining increasing attention in Europe and around the world as a potential way for our society to increase prosperity, while reducing dependence on primary materials and energy. The European Commission is expected to propose a "circular economy package" by the end of 2015, and many business leaders embrace the circular economy as a path to increasing growth and profitability. At the same time, a lively debate is going on about the attractiveness of a circular economy for different stakeholders and its implications for employment, growth, and the environment."

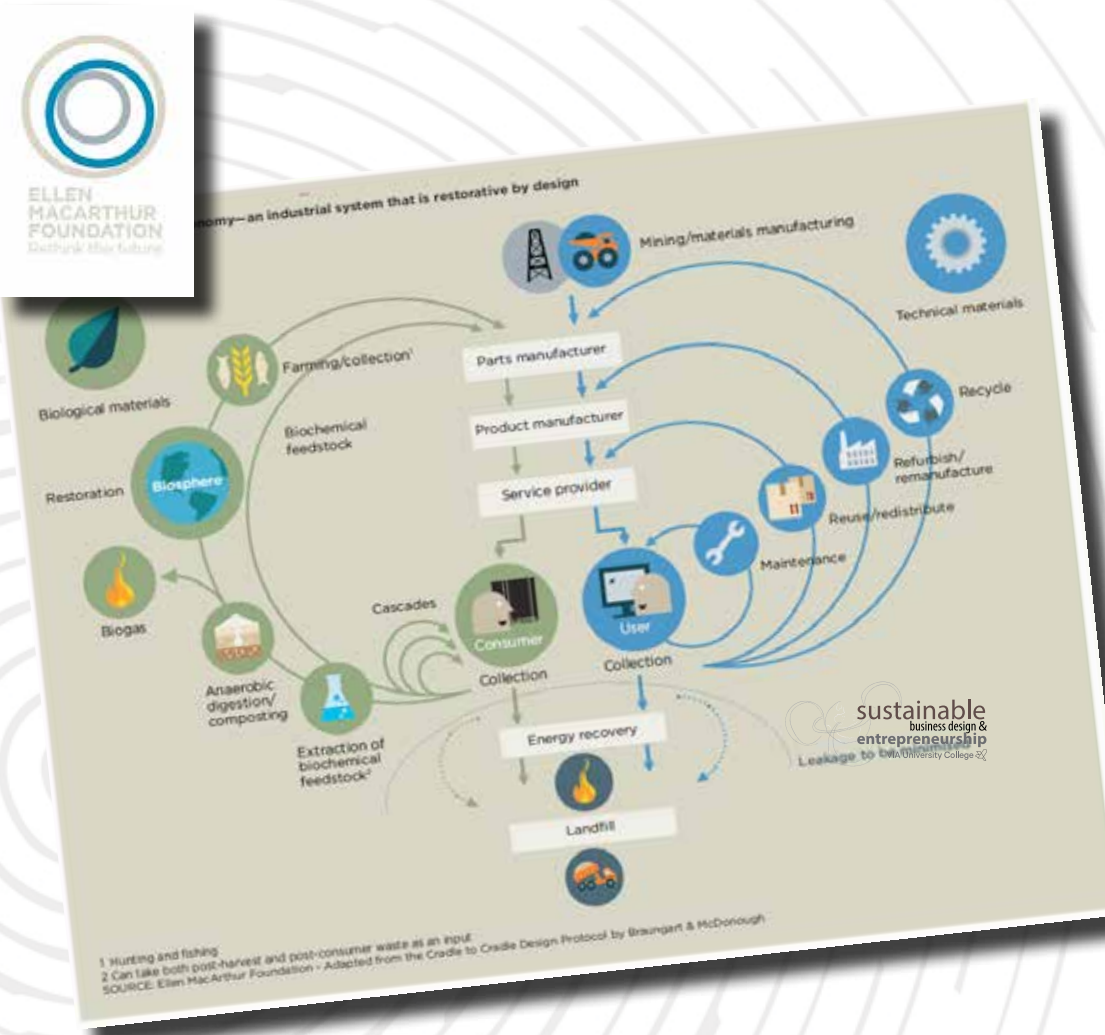
BACKGROUND:

In 1984, the United Nations established an independent group of 22 people drawn from member states of both the developing and developed worlds, and charged them with identifying the long-term environmental strategies for the international community.

In 1987, the World Conference on Environment and Development published their report entitled, 'Our Common Future' (WCED, 1987), often known as the 'Brundtland Report', after its chair, the Prime Minister of Norway, Gro Harlem Brundtland. The report used the term 'sustainable development' widely, and defined it as;

'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs'.

In 1994 the English Economist John Elkington defined the principle of 'The Triple Bottom Line' - reconsidering Planet, People and Profit in Business Models. In 2002 McDonough & Braungart developed The Cradle to Cradle: Remaking the Way We Make Things - a complete circular mapping of ways of production in a sustainable scope.



The Ellen MacArthur Foundation's work for integrating circular and sustainable thinking into business is the foundation of this elective. Please visit: www.circulareconomy.com

More background...

In 1994 a private enterprise “The International Institute for Sustainable Development” developed the first business-approach for sustainable development and innovation (Weybrecht, 2010), as well as the model for “The Triple Bottom Line”, became the first taxonomy for sustainable production and innovation in the business world. The International Institute for Sustainable Development put it this way:

“For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future” By the end of the 90’ties the role of Corporate Social Responsibility emerged, as well as the American Environmental Agency developed The Life Cycle Assessment Tool.

And for the Fashion Industry the latent challenges are obvious. The Industry **has** to change. This industry is the second most polluting and socially disturbing factor in the world. Regulations are just around the corner in the UN, EU and national legislations, regulating the industry. This is what this elective is all about.

Today, companies, governments, NGO’s, educations and associations all focus on a new agenda; The Circular Economy.

“Europe is in the middle of a transformation towards a circular economy powered by Cradle to Cradle; a socio-economic system which is smart, cross-sectoral and full of positively defined opportunities and challenges. Step by step we leave the linear economy behind, so we are able to safeguard our future without using concepts that are only trying to make the unfixable errors in our old system right. Especially during those transition periods, we need to ask fundamental questions and further develop and sharpen the concept of a circular economy in order to understand its true meaning and the options for practical realisations. It is not just about materials, but it also concerns designing high-quality products, the use of renewable energy, effective water management and social equity. Real innovation and effectiveness increases prosperity and liveability in Europe, which is beneficial for everyone.” Michael Braungart, Academic Chair “Cradle to Cradle for Innovation and Quality” RSM, Erasmus University Rotterdam; Scientific Director, EPEA

The former Danish Minister of Environmental affairs, Ida Auken put it this way, in 2015:

“The circular economy should be a central political project for Europe, as it offers the potential to set a strong perspective on renewed competitiveness, positive economic development, and job creation. Growth within: a circular economy vision for a competitive Europe makes a strong case for business models centred on use, rather than consumption, and regenerative practices that have, on top of economic advantages, beneficial impacts for society as a whole.”

In an idealistic world, we’d all buy organic, sustainable and circular goods. So some of the key questions remain unanswered. How far is the fashion industry and what are the most crucial challenges in the industry? As a student, you may actually help us, the industry, the researchers and initiators of change to identify what the real challenges are. There will be no quick answers and no smart fixes. But everyone will do an effort to make a change.

The Industry is in need of new approaches, skills, designers, branders, retailers, purchasers and material/pattern designers who have the capacity to make this change happen. But they also realize the interdisciplinary dependency between skills, traditions and professions.

Making transdisciplinary solutions is the only way forward - thinking fashion, circularity, design and sustainability into new sustainable ways.

Thank you for choosing this elective - hopefully we will bring new issues, ideas, business models and solutions to the industry together.

Dorte Rye Olsen, Sustainability Manager, Bestseller

Thomas Husted, Managing Director, ID

Christian Trads Hansen, Owner, H2O

Suzanne Sand, Creative Director, Lene Bjerre Design A/S

The VIA Design Team behind the elective; Thomas, Hanne, Poul Erik, Erik, Per, Rene, Lisbeth and many more...



DESCRIPTION OF THE ELECTIVE

During the elective you will have the opportunity to interact with and have internship / visits at one of the participating business. You are expected to present a final, pre- and prototyped design on the third of march for the Business participating.

You will be introduced to the major topics of sustainable challenges within the value chain, corresponding with your specialties; Design, Purchase, Materials, Retail and Branding, as solutions and designs have an inter-disciplinary dependency.

On the first day you will be introduced the challenges. In the first week you'll be visiting the business, and therefore it is crucial for you to read the assembled PDF's to be able to keep up with the pace of the elective. The first week consists of circular design, economy and business models. By the end of this week you will meet with the business and research on your challenge.

In week two you'll start working on you concept and have courses in Purchase, Design, Branding and in week three also in the labs with a focus on materials. Please see the full lesson plan on the following pages.

During the weeks you will re-visit and interview / challenge the business and work on your solutions / concepts and insights.

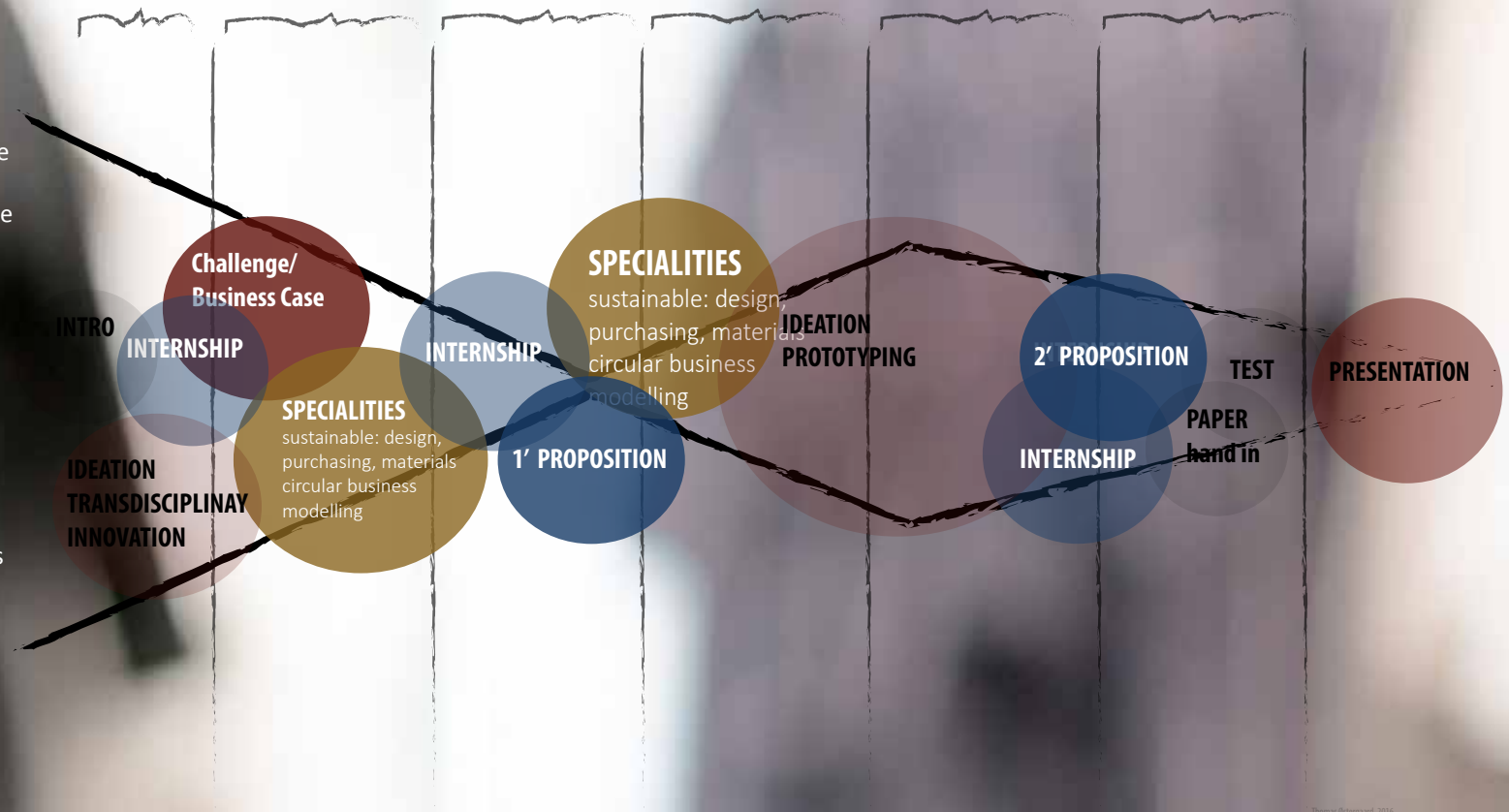
The methodology of this elective is based upon The Ellen MacArthur Foundation. (EMF) Please visit: www.circulareconomy.com

Before starting, you should have a look at the methods introduced by EMF, at; www.circulardesignguide.com

The elective uses the designtool developed by University of the Arts, Lonson, Mistra and TFRC, called the TEN: www.tedresearch.net/teds-ten - the circular designguide.

ELECTIVE-FLOW

Sustainable Business Design & Entrepreneurship



Thomas Østergaard, 2016

Description of the elective:

COURSE, COMPETENCES AND EXPECTATIONS:

1. Our contract: You, your capacities, passion, networks and skills.

We are going to design the course together; the more you give, - the more you get.

2. Sustainable Design; Prototyping, designing, case and fieldwork.

The course is based upon Trans-disciplinary Design and “minds-on” interaction with the company. You will be given the chance to use the labs and workshops at Campus Herning in order to be able to prototype, test and validate your ideas fast. Be prepared - be compassionate and helpful towards your fellow students.

3. Tools and Methods.

The Course will introduce you to some of the latest tools within sustainable Design, such as the Social Design Methods Menu and The Triple Layered Business Canvas Model, as well as Sustainable Value Chain Design.

4. Documentation You are expected to provide full documentation of your design process, from start to end. You can do this by using the MUVI cameras, sketching or photography. But first and foremost the elective provides insight into the transdisciplinary dependencies between disciplines in a business, as well as you will get to know how to work closely together in a cross disciplinary way, integrating e.g. Design Thinking and People Planet Profit concepts.

Main Contents:

- Hands on real company insight regarding circular economy and sustainability potential and challenges
- Introduction to Circular economy and sustainability models
- Paradigms and approaches to sustainability and circular economy

The elective consists of both lectures and workshops. Company- and research visits will be included. Self-study days are planned with research and project working days. The project is a team project.

The project is completed with a report, and an oral presentation of the solution to the company and the professors. See the lesson plan on the following pages.

All teams are expected to deliver:

A: Minimum 15 pages of project / system description relating the product / concept or idea to theories and literature used during the course.

B: Documentation; You are expected to provide full documentation of your design process, from start to end. You can do this by using sketching, filming or photography. This can be done as sketchbooks; how do we collaborate?, who are we working with? what are our challenges etc, etc.

C. Presentation of the Concept; min. 20 minutes relating it to social, environmental, sustainable, viable, and business related issues.

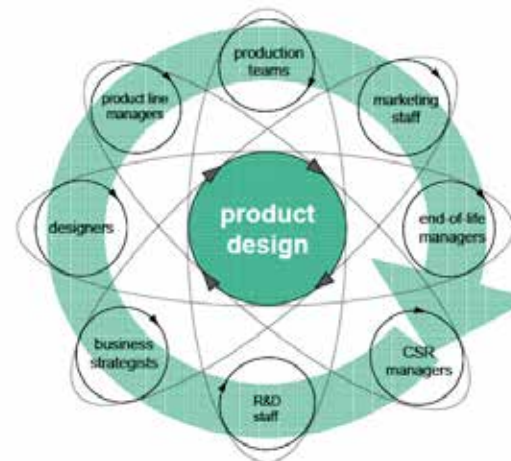
The students will solve a real sustainability case in close cooperation with the company/organisation. A part of the elective is an internship in the company. The duration of the internship will be planned based upon the specific case in the company/organisation

The methodology of this elective is based upon the research and contributions to making a change towards circular production in the World by Ellen MacArthur Foundation. (EMF) Please visit: www.circulareconomy.com

Before starting, you should have a look at the methods introduced by EMF, at;

www.circulardesignguide.com

The elective uses the latest design tool developed by University of the Arts, London, MISTRA and TFRC, called the TEN: www.tedresearch.net/teds-ten - the circular design guide.



As depicted at left, integrative product design connects participants around the life cycle and in ongoing learning loops throughout the design process.

It represents a reflective design process that encourages ongoing learning and innovation.

Participants in this process need to build their literacy about sustainability, as well as to increase their awareness of the entire design process. To depict this need, the circle around each group mimics the learning cycle in the overall diagram.



TEAM 1 · H2O

Anders Bang Pedersen, Brand /Marketing (BM)
 Csenge Sandor, Design (DE)
 Esther Hebsgaard Knudsen, Purchase Management (PM)
 Irene Nøhr Sørensen, Purchase Management (PM)
 Maria-Bianca Munteanu, Retail Design Management (RDM)
 Maibritt Kibsgaard Pedersen, Design (DE)



TEAM 2 · ID Design

Anna Ratkai, BM
 Michelle Bødker Pedersen, DE
 Maria van Beusekom, PM
 Sofie Harskov Loczi, RDM
 Marie Brask Andersen, PM



LENE BJERRE
DENMARK

TEAM 3 · Lene Bjerre Design

Anne-Sofie Bøtcher Iversen, BM
 Katja Kudal Jessen, BM
 Morten Schnedler Jørgensen, Furniture Design
 Miranda Jongsma, PM
 Sahar Maghsoodi, DE



BESTSELLER

TEAM 4 · Jack&Jones TECH

Nanna Victoria Søe Pedersen, BM
 Sarah Brøgger Poulsen, DE
 Tine Marli Skou, DE
 Nanna Mathilde Hou Paysen, PM
 Thea Romanus, PM
 Sophia Kalb Møller, RDM

BUSINESS CONTACTS:

H2O· Christian Trads Hansen, Owner, H2O

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Mail: cth@h2o-sportswear.com

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8000 Århus C

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Mobile+45 8110 8921

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mail: lsp@id.dk

Lene Bjerre Design A/S· Suzanne Sand, Creative Director, Lene Bjerre Design A/S

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Cell: +45 2967 3260

mail: ssp@lenebjerre.com

Mette Frimor Frølund,

mail: mff@lenebjerre.com

Skalhuse 10 , 9240 Nibe

www.lenebjerre.com

BESTSELLER/ JACK & JONES TECH · Dorte Rye Olsen, Sustainability Manager, Bestseller

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Mobile+4525513594

mail: dorte.olsen@bestseller.com

Camilla Skjønning Jørgensen:

mail: camilla.jorgensen@bestseller.com

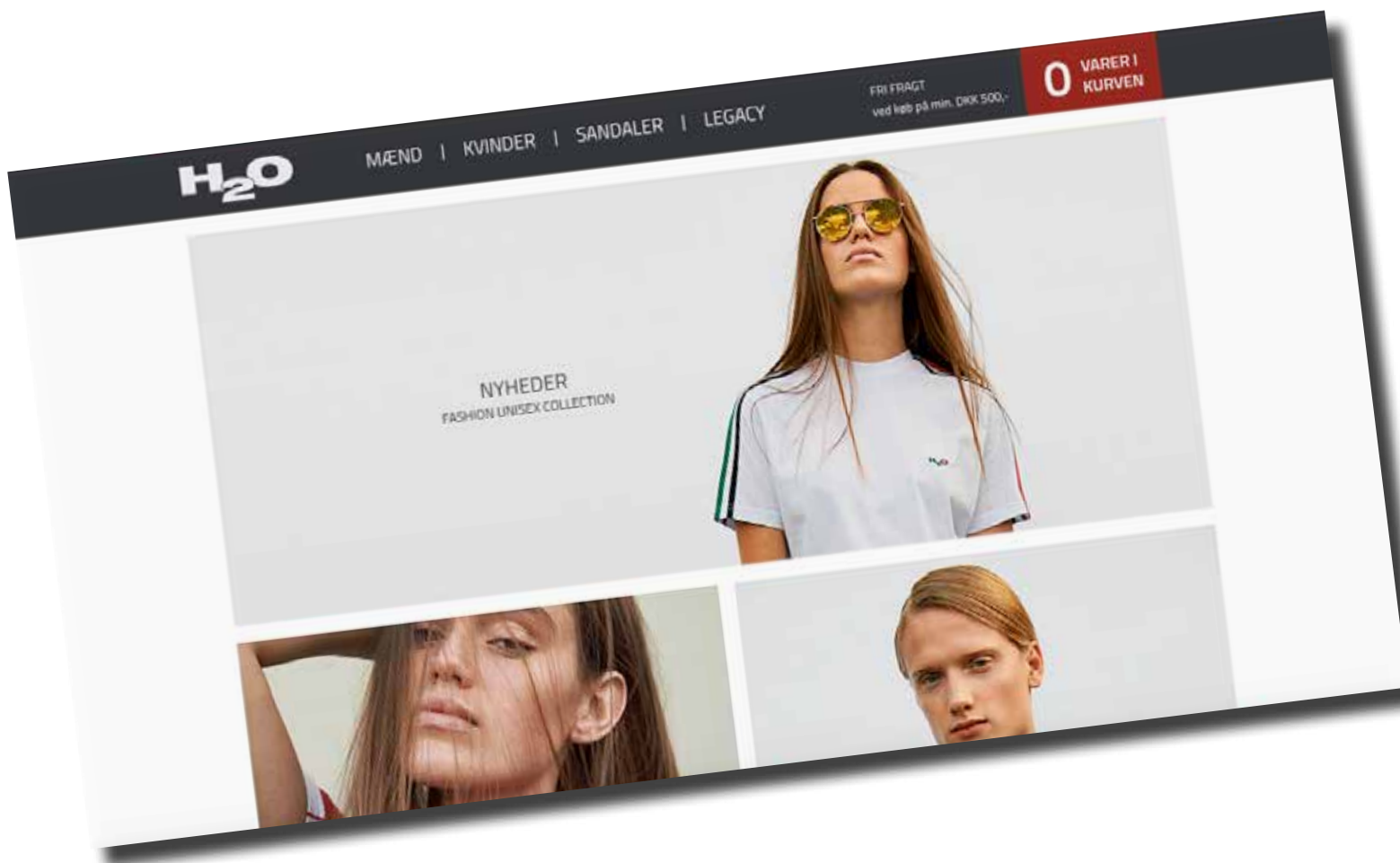
Hella Lynggaard Nielsen:

mail: hella.nielsen@bestseller.com

BESTSELLER.COM

BESTSELLER A/S

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H2O

Christian Trads Hansen

Owner, H2O

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Balticagade 10, 2. Sal

8000 Århus C

TEAM 1

H2O

Anders Bang Pedersen, Brand /Marketing (BM)

Csenge Sandor, Design (DE)

Esther Hebsgaard Knudsen, Purchase Management (PM)

Irene Nøhr Sørensen, Purchase Management (PM)

Maria-Bianca Munteanu, Retail Design Management (RDM)

Maibritt Kibsgaard Pedersen, Design (DE)

VISIT DATES:

PLEASE NOTE: 30.1: Presentation at H2O, Balticagade 10, 2. Sal 8000 Århus C.

13 and / or 14.2

21.2: PROTOTYPE PRESENTATION FOR THE BUSINESS



ID DIRECT

Torben Søgaard

Category Manager ID Direct

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Line Sittrup Pradsgaard

Sustainability Manager

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DK-7500 Holstebro:

www.id.dk

TEAM 2

ID Design

Anna Ratkai, BM

Michelle Bødker Pedersen, DE

Maria van Beusekom, PM

Sofie Harskov Loczi, RDM

Marie Brask Andersen, PM

VISIT DATES:

PLEASE NOTE: 3. og 6. of February: Presentation at Lægårdvej 138 DK-7500 Holstebro:

13 and / or 14.2

21.2: PROTOTYPE PRESENTATION FOR THE BUSINESS at Lægårdvej 138 DK-7500 Holstebro:

Lene Bjerre Design A/S

Suzanne Sand, Creative Director, Lene Bjerre Design A/S
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Mette Frimor Frølund,
mail: mff@lenebjerre.com
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TEAM 3 · Lene Bjerre Design

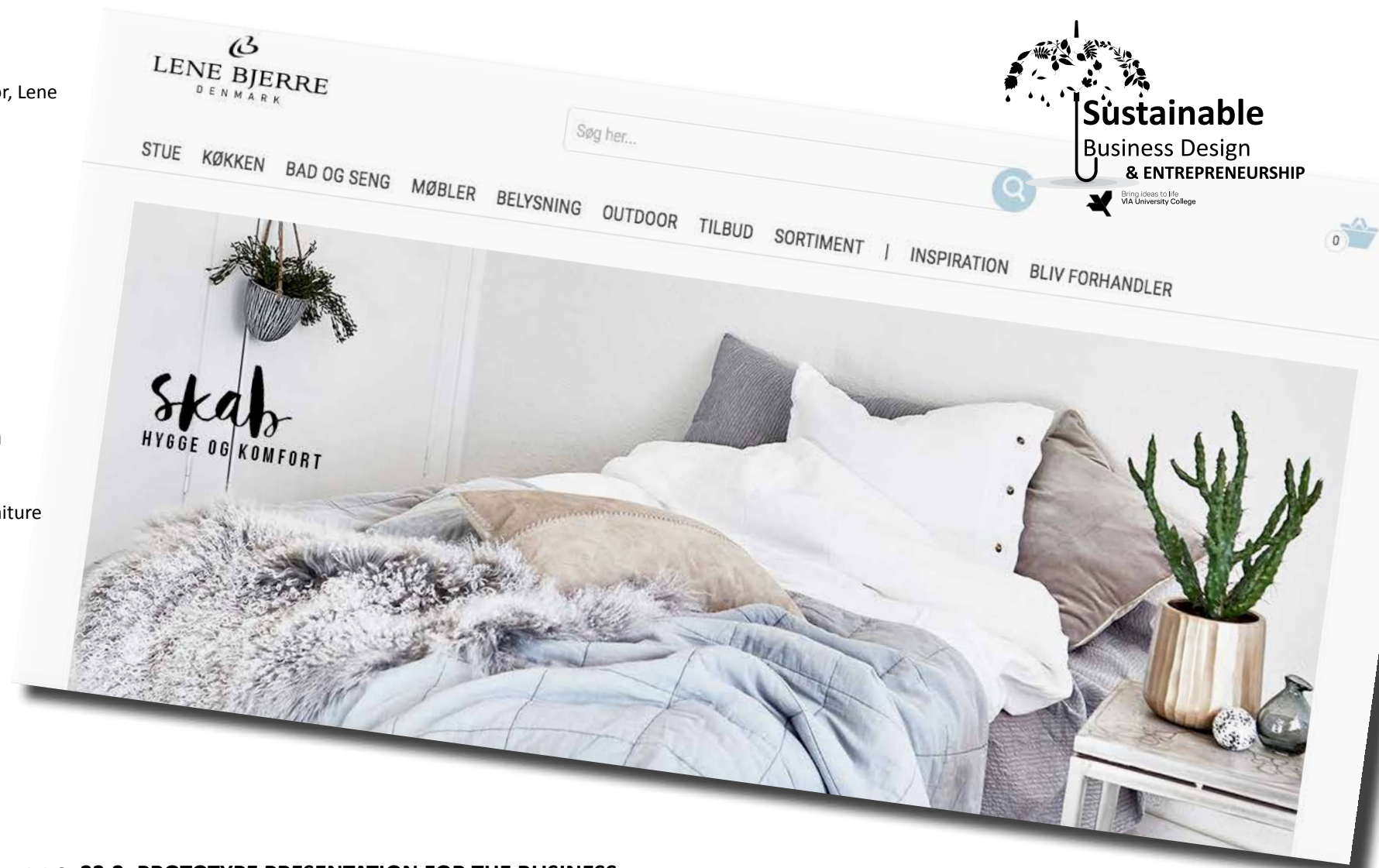
Anne-Sofie Bøtker Iversen, BM
Katja Kudal Jessen, BM
Morten Schnedler Jørgensen, Furniture Design
Miranda Jongsma, PM
Sahar Maghsoodi, DE

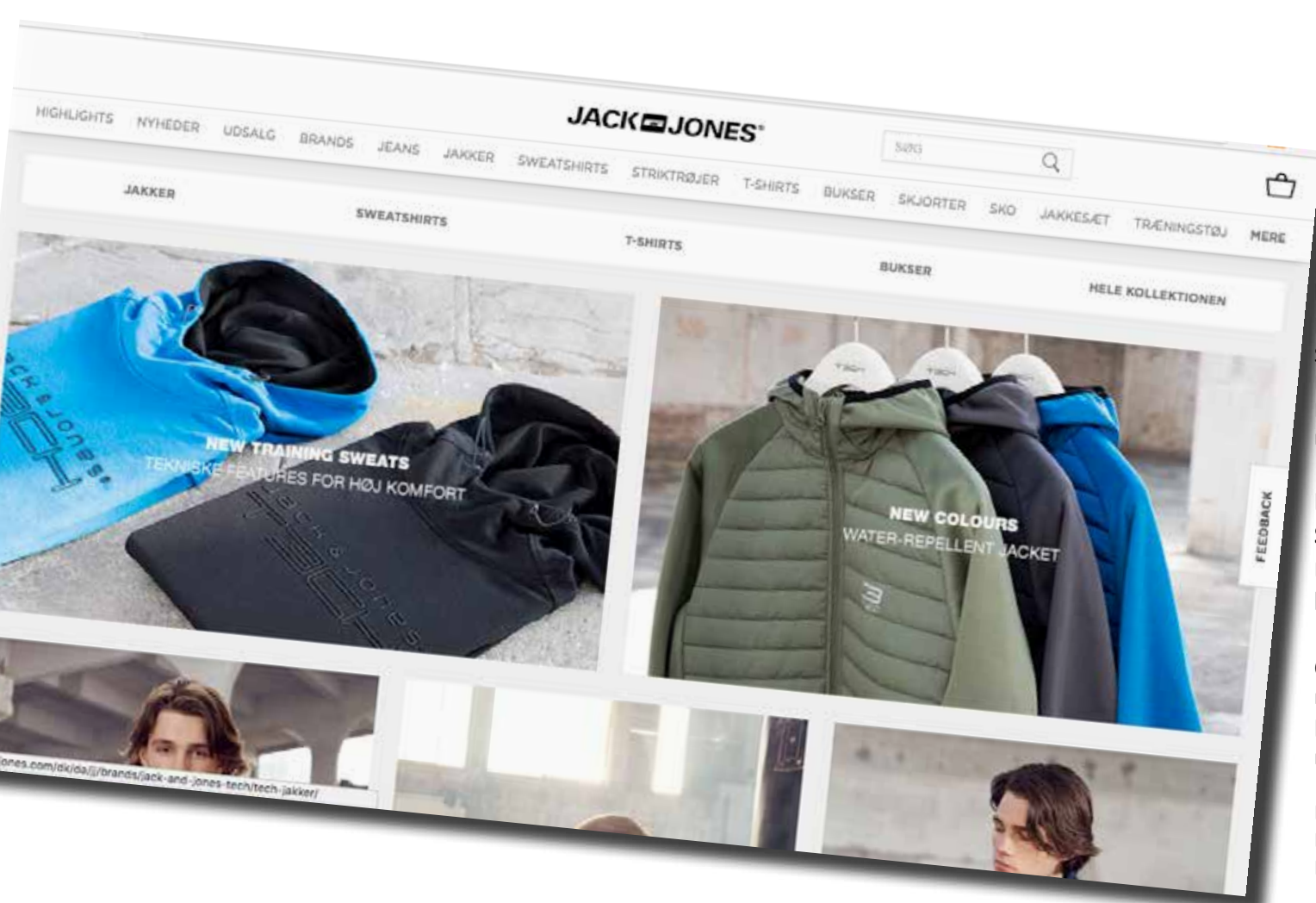
VISIT DATES:

2' and / or 3' of February.

Please Note alteration: VISITDATES: 13.2 & 23.2: PROTOTYPE PRESENTATION FOR THE BUSINESS

Other dates and visit times must be arranged and confirmed with Suzanne Sand / Mette Frimor Frølund.





BESTSELLER/ JACK & JONES TECH

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BESTSELLER A/S

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TEAM 4 · Jack&Jones TECH

Nanna Victoria Søe Pedersen, BM

Sarah Brøgger Poulsen, DE

Tine Marli Skou, DE

Nanna Mathilde Hou Paysen, PM

Thea Romanus, PM

Sophia Kalb Møller, RDM

VISIT DATES:

PLEASE NOTE: 2& 3 of February: Presentation at BESTSELLER A/S FREDSKOVVEJ 1, 7330 BRANDE

13 and / or 14.2

PLEASE NOTE: All dates and visit times must be arranged and confirmed with Hella, Camilla and Dorte.

21.2: PROTOTYPE PRESENTATION FOR THE BUSINESS

READING GUIDE

Circular Economy and Circular Design:

You'll find the PDF "Sustainable Fashion - New Approaches, Ed. Kirsi Niinimäki, Aalto University, 2014, on Studynet. The article and the book is part of the mandatory literature and reference to the different approaches to Sustainable Design. Please read the article, page 14-29, The Fashion Industry and Garment Consumption, by Kirsi Niinimäki. The article introduces the different challenges facing the industry and the variety of design approaches present. To use other designs / business models, you can find inspiration in the "Fashion Futures" published in February 2010 (PDF). To learn more go to: www.forumforthefuture.org/projects/fashion-futures

On the Studynet you'll also find the PDF "Growth Within: a Circular vision for a Competitive Europe, Ellen MacArthur Foundation, 2015", which introduces the theory and practice of circular economy.

Innovation and Business Models

In order to operate in and develop new business models, we've picked "The Triple Bottom Business Model Canvas, Pigneur, et al., 2016." - which is mandatory to use. You could also read and / or use Koen van Renswoude, Arthur ten Wolde and Douwe Jan Joustra, Circular Business Models Part 1: An introduction to IMSA's circular business model scan, IMSA Amsterdam, April 2015(PDF) or IDEO's Aligned for Sustainable Design - an A-B-C to sustainable Business Models. (PDF)

Retail:

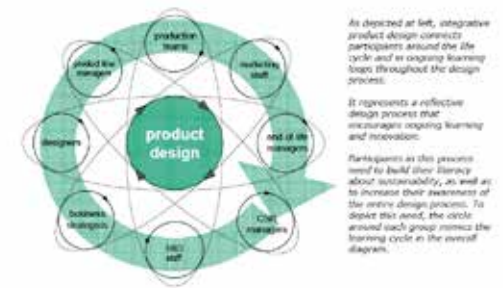
You'll find the paper (2 pages) which is a note from the international Retail Forum, regarding Retail management and Sustainability.

Supply Management / Purchasing

The text; Supply Chain Sustainability- A Practical Guide for Continuous Improvement, © 2010, UN Global Compact Office and Business for Social Responsibility (PDF) is mandatory for all students.

Branding / Marketing

The text; Sfjhsd fjds fsd fjdsfksjdfklsdfjsd fjksd fjdsjf lfdskj sdlkfsd jfsdlkfj sdfjs dfkjsd fkj slfdkk jsdfj fsjfkdsj fjslfk skfld fjdsdlkf jdklfjs klfsdkf jslkdfjsdjfksl jflsjfk sjfl sjflskdjfl jkskljf l



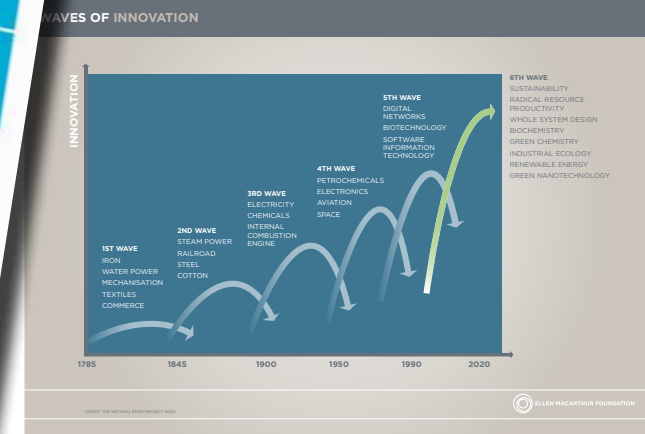


The methodology of this elective is based upon the research and contributions to making a change towards circular production in the World by Ellen MacArthur Foundation. (EMF)

Please visit: www.circulareconomy.com During the course we use the methods introduced by EMF, at; www.circulardesignguide.com.

You are expected to present using these techniques and methods. You'll find a wide variety of usefull approaches to design and circular design using either this or the designtool developed by University of the Arts, Lonson, Mistra and TFRC, called the TEN: www.tedresearch.net/teds-ten - the circular designguide. So please use it and get use to it.-)

You will find a PDF on studynet called: **Growth Within: a Circular vision for a Competitive Europe**, Ellen MacArthur Foundation, 2015. This litterature is mandatory and basic for the elective.





BUILDING THE BUSINESS CASE FOR SUPPLY CHAIN SUSTAINABILITY



ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACTS EXIST THROUGHOUT EVERY STAGE OF SUPPLY CHAINS.



METHODS-GUIDE

Circular Economy and Circular Design:

The elective uses the designtool developed by University of the Arts, London, Mistra and TRFC, called the TEN: www.tedresearch.net/teds-ten - the circular designguide.

We also use the inspiring tools from EMF, at; www.circulardesignguide.com, where you can find, download and use templates for your circular research.

All students are expected to have an understanding of the Value-Chain of a company - have a look at the text on Study net: 'Value Chain' Definitions and Characteristics.

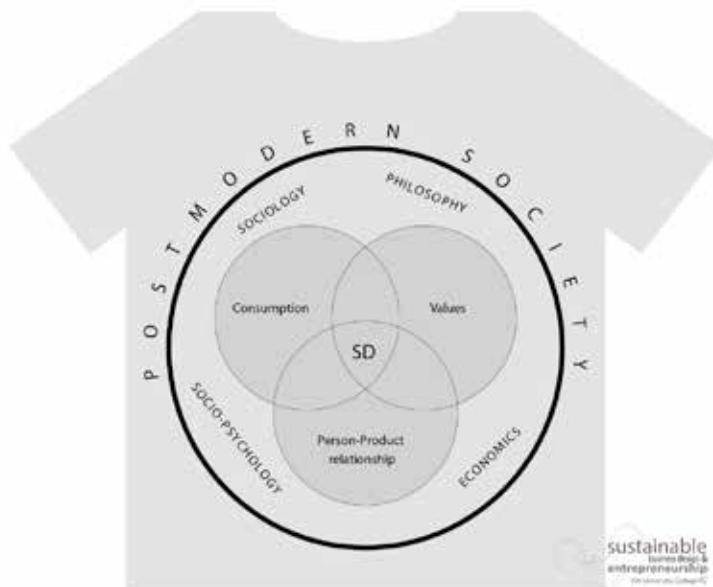
By reading the article by from Sustainable Fashion (Aalto) you should get a fundamental insight into the most important tendencies and challenges in the industry right now.

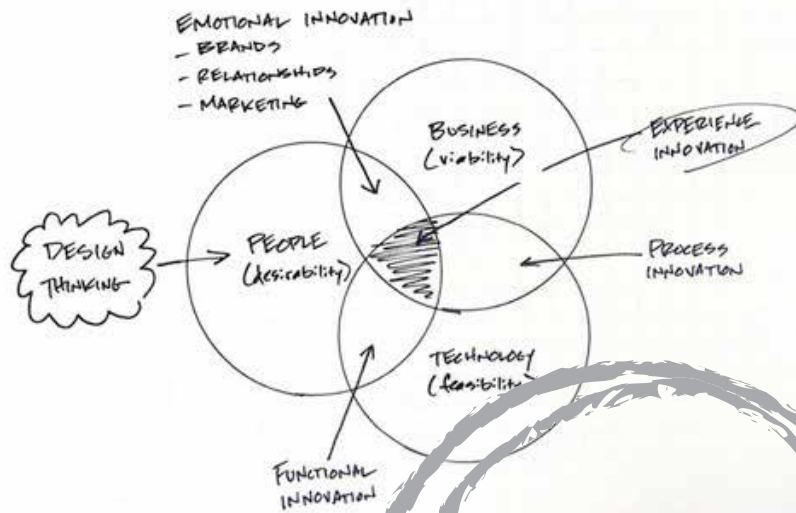
Innovation and Business Models

In order to operate in and develop new business models, we've picked "The Triple Bottom Business Model Canvas, Pigneur, et al., 2016." - which is mandatory to use.

You'll have an introduction to the methods, but you are expected to explore them on your own in the teams.

Framework for of a holistic understanding of Sustainable Design (SD)
by Kirsi Nihimäki





SOCIAL

people

people · desirability

collaborative designs

co-creation

digital sharing and production

sharing economy

corporate social responsibility

ECONOMIC

profit

business · viability

circular economy

life cycle assesment & management

local production & distribution

production proces design

ENVIRONMENTAL

planet

technology · feasibility

viable designs

cradle to cradle

DfE - Design for Environment

sustainable designs

engagement

collaborate designs

social design / ecopreneurship

design thinking: humans · desirability · people



EMOTIONAL INNOVATION

collaborate consumption
sustainable branding
customer relationships

circular economy

design thinking: business · viability · profit

new circular business models
sustainable materials
circular production & purchasing

EXPERIENCE INNOVATION

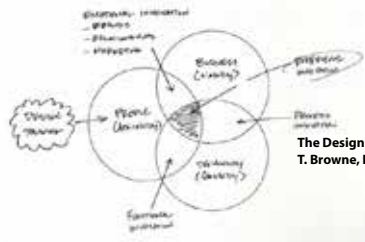
PROCESS INNOVATION

sustainability
cradle to cradle
material innovation

sustainable design

design thinking: technology · feasibility · planet

FUNCTIONAL INNOVATION



The Design Thinking Model, from Stanford D-School,
T. Browne, IDEO, 1992, Design to Change.

The elective uses the Design Thinking Model; Humans, Business, Technology - as stepstone for integrating a Triple Layered Business Model; People, Planet, Profit in Three major parts: **Entrepreneurship & Innovation** (People/ Humans / desirability), **Sustainable Design** (Technology / feasibility / Planet) and **Circular Economy**, design thinking: business · viability · profit.

TEACHERS / Assistant Professors allocated the elective:

Thomas Østergaard, Assistant Professor, initiator of the elective, VIA Design, Speciality; Entrepreneurship, Design for Change, Circular Economy, Sustainable Design, Sustainable Business Model Innovation. Thomas will be your contact and continuous councillor throughout the elective.

MAIL: thos@via.dk

PHONE: +4530628670

Hanne Bøttcher, Assistant Professor, VIA Design, Speciality; Fashion Design, Sustainable Design, Materials, access to and guidance in the workshops and laboratories, material Library, etc.

MAIL: hanb@via.dk

Per Tøffner, Assistant Professor, VIA Design, Speciality; International Trade, Purchase Management, Relation Management, International Culture and Purchase Logistics

MAIL: pkn@via.dk

Rene Claus Larsen, Assistant Professor, VIA Design, Speciality; Sustainable Branding / Marketing, Business Development and Relation Management

MAIL: rcl@via.dk

Poul Erik Jørgensen, Assistant Professor, Material Engineering, Senior Consultant, VIA Design, Projectmanager. Poul will help you access the workshops and laboratories, material Library, etc

MAIL: pejo@via.dk



LESSONPLAN: Sustainable Business Design & Entrepreneurship, Spring 2017



MONDAY 30' jan 9.00-10.15. INTRODUCTION TO THE ELECTIVE (Thomas Østergaard, THOS)	TUESDAY 31' jan 9.00-10.15. INTRODUCTION TO THE CIRCULAR ECONOMY Presentation of The Ellen MacArthur Foundations material (Thomas Østergaard, THOS)	WEDNESDAY 1' Feb 9.00-11.15. Triple Bottom Business Model Canvas & Business-models in the Cirkular economy (THOS)	THURSDAY 2' Feb INTERNSHIPS / VISITS	FRIDAY 3' Feb INTERNSHIPS / VISITS
10.30 - 11.15: CHECK IN: YOU and the Sustainable Paradigm How does the new paradigm; sustainability and circular economy effect your profession and perception of the Fashion Industry? Prepare a 10 liner regarding your concerns and thoughts.	10.30 - 11.15: Circular Economy Presentation of The Ellen MacArthur Foundation Tool Box: Please visit: www.circulareconomy.com The Circular Design Guide: www.circulardesignguide.com Username: Design Password: Future	Litterature: The Triple Bottom Business Model Canvas, Pigneur, et al., 2016. (PDF) Lunch Litterature: Koen van Renswoude, Arthur ten Wolde and Douwe Jan Joustra, Circular Business Models Part 1	PLEASE NOTE: TEAM 1 · H2O VISITS H2O on monday the 30' January at 17.00 in Aarhus.	
Lunch 12. 15 - 13.15 The Threat - Sustainable Fashion in a circular world Introduction to the dilemmas and challenges facing the fashion industry. Litterature: Sustainable Fashion: New approaches, s. 14-29, Kirsi Niinimäki (ed.), Aalto University, 2013,	Lunch 12. 15 - 14.40 C2C & Sustainable Design (Hanne Bøttcher, HANB) The elective uses the TEN: www.tedresearch.net/teds-ten - the circular design-guide.	12. 15 - 14.40 Preparation of Business Visits / Internships (Per Tøffner, PKN)		
13.30 - 14.40 The Business Challenges CASE PRESENTATIONS	Litterature: (PDF) Growth Within: a Circular vision for a Competitive Europe, Ellen MacArthur Foundation, 2015. (PDF)			

LITERATURE & MODELS

Sustainable Fashion: New approaches, s. 14-29, Kirsi Niinimäki (ed.), Aalto University, 2013,

Growth Within: a Circular vision for a Competitive Europe, Ellen MacArthur Foundation, 2015. (PDF)

Koen van Renswoude, Arthur ten Wolde and Douwe Jan Joustra, Circular Business Models Part 1: An introduction to IMSA's circular business model scan, IMSA Amsterdam, April 2015(PDF)

The Triple Bottom Business Model Canvas, Pigneur, et al., 2016. (PDF)
Lunch

TOOLS:
www.circulareconomy.com

The Circular Design Guide:

www.circulardesignguide.com

The TEN:
www.tedresearch.net/teds-ten - the circular designguide.

LESSONPLAN: Sustainable Business Design & Entrepreneurship, Spring 2017



MONDAY 6' Feb

FIELD RESEARCH

PREPARE FOR; Consumer Behaviour (individual)

TUESDAY 7' Feb

9.00-11.15.

CONSUMER BEHAVIOUR
(Rene Claus Larsen, RCL)

Lunch

Prepare for Ethical dimension of sustainable marketing/Stakeholder (individual)

WEDNESDAY 8' Feb

9.00-11.15.

Ethical Dimension of Sustainable Marketing / Stakeholder
(Rene Claus Larsen, RCL)

Lunch

Prepare for Sustainable purchase

THURSDAY 9' Feb

Sustainable purchase

(Per Tøffner, PKN)

Litterature: Supply Chain Sustainability; A Practical Guide for Continuous Improvement

Lunch

**12. 15 - 14.40.
TEAMWORK &
PROTOTYPING**

FRIDAY 30' jan

ALL DAY:

1' st Prototype design, business models
(Thomas Østergaard, THOS)

LITTERATURE & MODELS

Supply Chain Sustainability- A Practical Guide for Continuous Improvement, © 2010, UN Global Compact Office and Business for Social Responsibility (PDF)

Sustainable Fashion: New approaches, s. 14-29, Kirsi Niinimäki (ed.), Aalto University, 2013,

Aligned for Sustainable Design, An A-B-C-D Approach to Making Better Products, Business for Social Responsibility, IDEO, 2012

The Triple Bottom Business Model Canvas, Pigneur, et al., 2016. (PDF)
Lunch

LESSONPLAN: Sustainable Business Design & Entrepreneurship, Spring 2017



MONDAY 13 Feb
INTERNSHIP

TUESDAY 14 Feb
INTERNSHIP

WEDNESDAY 15 Feb
Sum up - Internship

TEAMWORK /
PROTOTYPING

THURSDAY 16 Feb

GUIDANCE

(Hanne Bøttcher, HANB)

(Thomas Østergaard, THOS)

FRIDAY 17 Feb

LABS & WORKSHOPS

(Hanne Bøttcher, HANB)

(Poul Erik Jørgensen, PEJO)

LITERATURE & MODELS

LESSONPLAN: Sustainable Business Design & Entrepreneurship, Spring 2017



MONDAY 20 Feb

PITCH & PREPARATION OF PRESENTATION FOR BUSINESS
(Per Tøffner, PKN)

TUESDAY 21' Feb

PROTOTYPE PRESENTATION FOR BUSINESS'
(Thomas Østergaard, THOS) (Rene Claus Larsen, RCL)

PLEASE NOTE:

Each team visits their company and presents their temporary concept, prototypes and designs.

Be Sharp and prepared:-)

Make sure to get a useable feedback form.

WEDNESDAY 22' Feb

Sustainable Marketing Strategies

THURSDAY 23' Feb

ALL DAY: GUIDANCE
(Thomas Østergaard, THOS)

FRIDAY 24' FEB

TEAMWORK & PROTOTYPING

LITERATURE & MODELS

The Triple Bottom Business Model Canvas, Pigneur, et al., 2016. (PDF)
Lunch

Please visit:
www.circulareconomy.com

The Circular Design Guide:

www.circulardesignguide.com

LESSONPLAN: Sustainable Business Design & Entrepreneurship, Spring 2017



MONDAY 27' Feb

Hand In of project

TUESDAY 28' Feb

ALL DAY: Prepare company presentation

WEDNESDAY 1' Mar

ALL DAY: Prepare company presentation

THURSDAY 2' Mar

ALL DAY: Prepare company presentation

FRIDAY 3' Mar

**Company Presentations
LOCATION: VIA DESIGN**

(Thomas Østergaard, THOS)
(Rene Claus Larsen, RCL)

LITERATURE & MODELS

Sustainable Fashion: New approaches, s. 14-29, Kirsi Niinimäki (ed.), Aalto University, 2013,

Please visit:
www.circulareconomy.com

The Circular Design Guide:

www.circulardesignguide.com

Introduction to a new design paradigm.

Assistant Professor Thomas Østergaard, VIA Design, 2017.

In 1987 The UN commission, “World Commission on Environment and Development”, issued the so-called Brundtland Report, named after the former norwegian primeminister, who was chairman of the work. Over the last 30 years designers have had an increased societal, environmental and social focus.

In 1994 the english economist John Elkington developed the Triple Bottom Line, stressing the interaction and interdependence between activities between economics (profit), environmental issues (planet) and ethics / social impacts (people).

The International Institute for Sustainable Development (Weybrecht, 2010, p. 14), introduced new models for sustainable, socially responsible and viable production in 1994: “For the business enterprise, sustainable development means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future” In 2002 McDonough & Braungart developed “Cradle to Cradle: Remaking the Way We Make Things” - a circular mapping of the present and future production, design and deliverances processes. McDonough, W., & Braungart, M. (2002). *Cradle to Cradle: Remaking the Way We Make Things*. New York: North Point Press.

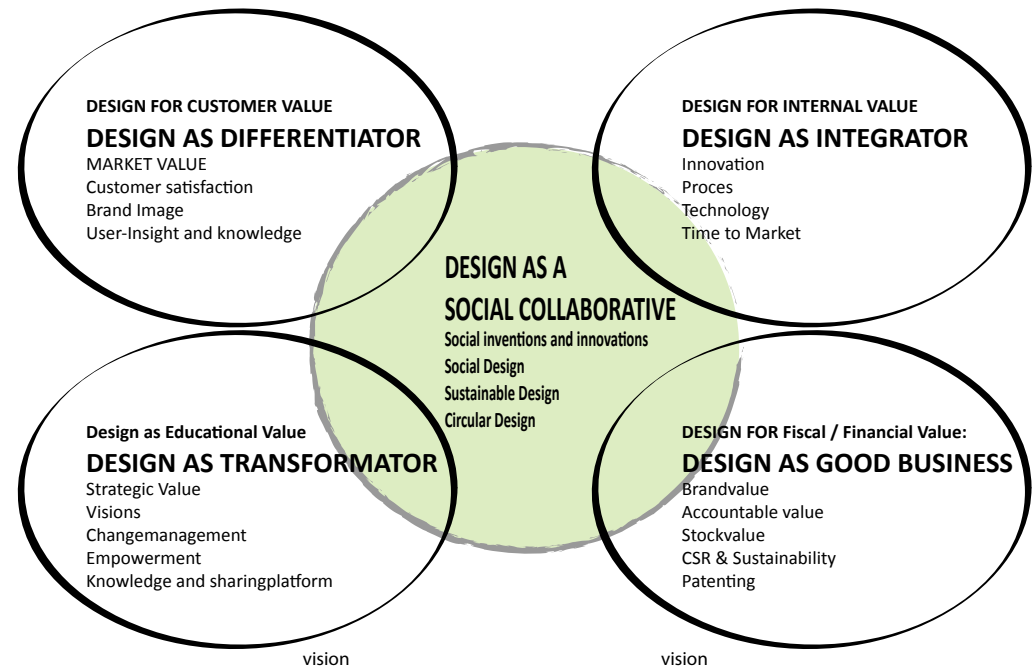
In the late 90' and by the the Life Cycle Assessment tool was developed by the US environmental Programme. According to the ISO 14040 and 14044 standards, a Life Cycle Assessment is carried out in four distinct phases. The phases are often interdependent in that the results of one phase will inform how other phases are completed. Within the design world “Sustainable Design” soon included social design. In 2009 The Desis Lab was established, connecting more than 30 designschools over the world in the attempt to bring design for social and sustainable innovation into the curriculum. (See: <http://www.desis-network.org/>)

So a new breed of social and sustainable designers strive to establish a “Social Design Agenda”. The agenda of social design is inspired by among others' Victor Papanek's idea that designers and creative professionals have a responsibility and are able to cause real change in the world through good design. Papanek writes about responsible design. During the Course we'll use the methods and traditions which have emerged over the last 10-15 years, deriving from designers such as T. Browne, Ezio

Lucy Kimbell describes “Three Distinctive Accounts of Social Design” in Social Design Futures:

1. Design for Social Innovation involves expert design contributions that help to identify, support and develop opportunities for amplifying changing social practices (Jégou and Manzini 2008). It includes working closely with participants to explore everyday activities and outlooks, and to develop design responses through prototyping, implementation and evaluation.
2. Socially Responsive Design is less programmatic in its methods than design for social innovation. Here, the axes of the ‘T-shaped’ designer - who has a breadth of understanding of different related fields and a deep knowledge of the technical and processual elements of design -- are reversed. Instead, they are experts in particular knowledge domains - such as health, crime or local government -- but bring a designerly understanding to them (Gamman and Thorpe 2011).
3. Design Activism is more explicit in its political intentions than the two previous categories. It includes the creation of artefacts and experiences associated with political discussion and protest, but also results in designs that intervene into everyday lives while raising political consciousness concerning collective challenges (Markusson 2013, Julier 2013). It usually sits outside commercial or governmental structures and works through settings such as grassroots activities, community action or pressure groups.

Design has, in other words, come to a cross-road, in which its role as a value-, change or growth-buster will change.



Model over 'the balanced scorecard' after Borja de Mozota and Design2Innovate, Virksomheders strategiske tilgang til design", D2i Working Paper, december 2013, Jensen, Suanne og Rind, Poul, (2013)

Lucy Kimbell also describes “The Current Relevance of Social Design Research” in Social Design Futures, as:

1. Society currently faces extensive large-scale complex challenges, which social design is suited to addressing. The challenges of climate change, migration, ageing populations, chronic disease, wealth disparities, and pressures on public sector finances require smarter and more agile responses to how problems and opportunities are identified and framed, and how new solutions are generated, explored, prototyped, resourced and realised. There is growing awareness of the impact of designing and of design work in understanding and framing problems and finding solutions in collaboration with communities, impacting on societies and the wider environment. Additionally, research in design studies has highlighted the negative designers make in contributing to some of these issues in the first place, especially consumer culture, climate change and sustainability (e.g. Fry 2011). Despite the claim that designers have the potential to address these issues, the question remains as to whether they are adequately equipped to deal with them (Nussbaum et al 2010, Kiem 2013, Miller 2013).

2. Cross-disciplinarity is a priority now in research and design as a discipline has strengths in promoting interactions between other disciplines. Despite frequent calls for cross-disciplinary working in research and in organisational projects, how collaboration can best take place remains unclear. Design-oriented research can provide a bond between a number of fields, including policy and planning, community development, sociology, anthropology, human geography, and development studies. Design’s material practices make the knowledge and contributions of other fields actual and observable. Buchanan (1992) argued that designers have a ‘quasi subject matter’ because they work with the particular and specific, rather than the general. As a kind of ‘glue’ (Kelley and Van Patter 2005), design practices bring issues and their publics into view (Marres 2005) and manifest and hold together a social world. Design consultants act as knowledge brokers between different fields of knowledge (Hargadon and Sutton 1997).

3. Design is operating in an expanded field and research has not been keeping up.

Design expertise is being promoted as a vital contribution to addressing social and public challenges by governments, commercial consultancies, design associations and HEIs across the world. Partly associated with the term ‘design thinking’ (Kimbell 2011a, Kimbell 2012), this rests on a view of design operating within an expanding field, as well as specific new fields such as interaction design and service design (Meroni and Sangiorgi 2011, Kimbell 2011b). Further there is strong undergraduate and postgraduate design student demand for engaging with public and collective issues, which is not being met by current academic resources. Design research has historically focused more on its technological or commercial applications emphasising the production of traditional design objects. Social design incorporates broader, more strategic considerations.

Wicked Problems in Design Thinking after Richard Buchanan
Kilde: Design Issues, Vol. 8, No. 2, (Spring, 1992), pp. 5-2, The MIT Press



THE FASHION INDUSTRY AND GARMENT CONSUMPTION

To understand the scale of the problem in the current fashion system, the following paragraphs will give some key figures on the global textile and fashion industry. The textile and fashion industry is one of the biggest and oldest industrial sectors in the world. It uses more water in its processes than any other industry except agriculture, and it releases huge amounts of toxic chemicals into the environment. The total volume of textile and fashion production at the global level is estimated to be more than 30 million tons annually, and therefore the environmental impacts of this industry are remarkable (Chen & Burns 2006).

The textile and clothing industry has moved with increasing speed and volume into low-cost Asian and Far East countries during the last 25 years. For example in Finland the watershed year was 1987, when textiles and clothing export figures were bigger than import rates for the last time; in the following year these figures reversed (Moilala 2013). Today it is estimated that in Finland, for example, about 95% of sold garments are imported; this figure is by and large the same in all Western countries (mostly between 90-95%). And production has not only moved into long logistic chains, but it also has grown and is still growing. It is estimated that the global textile industry grew 25% between 2002 and 2010 (Economy Watch 29.6.2010). Yet this tendency

started already in the 1980s: industry growth at the global level stood at 143% between the years 1979–1990 and the Far East had the highest textile export growth of 430% during that period (Lim 2003).

On the consumption side rapid growth is also evident. For example in the UK the consumption of fashion has increased by 37% between 2001 and 2005 (the amount of clothes purchased per capita) (Allwood et al. 2006). In Sweden the amount of clothes and home textiles released on the market rose by 40% between the years 2000 and 2009 (Carlsson et al. 2011 in Tojo et al. 2012). In Finland the total volume of clothes sold in 2010 was 70 212 tons (Tojo et al. 2012), which, for a population of 5 426 674, equals an average of 13 kg of textiles per person. This Western overconsumption causes environmental and social problems on the other side of the globe, where the fibres are cultivated, fabrics are woven, dyed and finished with chemicals, and sewn into garments in poor working conditions.

Efficient mass manufacturing in lower cost countries has brought about low end-prices of garments. Cheap product prices lead consumers to impulse purchases and unsustainable consumption behaviour: overconsumption, very short use time of products and premature disposal of the product (Niinimäki 2011). Growing

consumption also leads to increasing textile waste streams. The American consumer disposes of 31 kilograms of textiles and clothing each year, most of which ends up in landfill (about 85%), and it is estimated that in the UK over 900 000 million items of clothing are disposed of each year (Brown 2010). Finnish consumers discard nearly 17 kilograms of textiles and clothing a year, 75% of which ends up in landfill (Moisala 2013).

Fashion markets are oversaturated and because of the extremely effective mass manufacturing system, the world is full of not only new fashion items and fashion shops but also unsold clothing. Discount sales in fashion shops seem to be a permanent phenomenon. In addition not all new garments even enter the market; some go to landfill directly from the factory, because of imperfect quality. Furthermore some garments are never sold to consumers from the shop because there are too many offerings on the market, which is oversaturated. No one actually seems to know the amounts of these unsold garments, which end up in landfill. It is estimated that these unsold garments may account for even 5-10% of the whole fashion production. Fashion companies try to maintain their brands' reputations in this risky business and would rather destroy the unsold garments than discount them and release them onto the market in too big quantities.



You'll find the PDF
"Sustainable Fashion -
New Approaches, Ed.
Kirsi Niinimäki, Aalto
University, 2014, on
Studynet.

This article and the
book is part of the
mandatory literature
and reference to the
different approaches
to Sustainable Design.

Please read this
article, page 14-29:-)

Some fashion companies are trying to build a positive reputation by working together with designers in a new way with these unsold garments. In some cases 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 phenomenon was the second ReUse Republic event in Helsinki (8–9 April 2011), where thirteen young designers sold their unique fashion made from fashion brand donations, pre-consumer garments made into new apparel.



ReUse Republic event in Kamppi shopping centre in Helsinki, Finland (Photo: Kirsi Niinimäki)

Textile and clothing consumption is estimated to comprise about 5% of the environmental impact and carbon emissions of households. Even if that figure is relatively low, textile and clothing consumption is ever increasing (e.g. Spangenberg 2001), and the more recent shortening of the life spans of especially fast fashion items increases the environmental burden of the industry: all those resources are wasted if the garments are worn for only a very short time or even not at all. Furthermore textile waste is growing problems in all Western countries and additionally the chemical burden of textile manufacturing is a huge problem in Asian countries.

In landfills most textiles do not decompose (polyester not at all while some natural materials do but often too slowly), and the problem is that they are not planned to be suitable for composting. Fibres include many toxic chemicals, colours and finishings, and most garments are made of blended materials unsuitable for composting. Composting is also problematic from the environmental viewpoint as it produces a lot of methane, which contributes to greater greenhouse gas emissions and global warming.

Many consumers donate their old garments to charity shops, where some garments are re-sold to consumers and some are transported to other destinations like Africa. In Africa this inva-

sion of Western garments has largely destroyed local textile and garment production. In this way Western consumers have moved their consumption problems to the developing world and simultaneously helped to destroy the cultural value of local production and local textile traditions.

SUSTAINABLE DESIGN

In the 1970s, when environmental thinking started, the focus was more narrowly on solving waste problems caused by industrial production; currently sustainable thinking looks for ways to find sustainable balance in the use of economic, social and environmental resources while simultaneously taking care not to destroy the ability of future generations to fulfil their needs in a sustainable way. The notion of the triple bottom line means taking into consideration all three areas: people, planet and profit in a sustainable manner. Additionally sustainable design and business strategies today include ethical and value-based thinking. While true sustainable thinking is rather wide and needs a holistic understanding and approach on many levels, it is more common to focus on one narrower approach to eco-design and sustainability, for example focusing on the environmental impacts of manufacturing, substituting materials with eco-materials, or focusing on ethical issues in manufacturing (e.g. CSR, corporate social responsibility). This same kind of narrow thinking is also seen in the use of eco-labels. Even though all these aforementioned approaches are important, and it is positive that companies are interested in eco- and sustainable fashion, according to holistic thinking these strategies are limited and very often do not face the real problem areas. Such narrow approaches alone therefore cannot solve the actual problem, the overproduction and overconsumption

of clothing. The fashion discipline is far behind for example industrial design in producing scientific environmental knowledge for designers' use, trying new design methods to solve problems in more creative ways (Thomas 2008), or engaging consumers in sustainable transformation processes. We need more creative thinking in designing, manufacturing, consuming and doing business in the sustainable context.

By definition eco-design and design for the environment (DfE) include environmental consideration and especially life cycle thinking. The sustainable design approach adds to the aforementioned the ethical and social dimensions of the product, in its manufacturing, use and disposal phases (Tischner & Charter 2001, p. 120). Environmental consideration means that we use all renewable resources in a manner where the use does not jeopardise the resources' ability to renew: there has to be a balance. The use of non-renewable materials should be minimised, all materials should be recycled effectively, waste should be avoided, and any waste that is produced should be treated appropriately without environmental risk. Social sustainability involves considering the well-being of individuals, communities and societies at large. Finally, since the triple bottom line approach includes environmental, social and economic approaches to sustainability, financial feasibility is accordingly an important aspect (Elkington

1994). This notion is also known as "People, Planet & Profit" (alternative prosperity) (Visser et al. 2008).

The European Commission has defined principles of environmental design as follows:

- Use low-impact materials whenever it is possible: non-toxic, sustainably produced or recycled materials which require little or no natural resources (such as energy and water) to transport and process, and whose use does not threaten bio-diversity
- Focus on resource efficiency: create manufacturing processes, services and products that consume as few natural resources as possible
- Invest in high quality and durability: longer lasting and better functioning products, which age aesthetically and therefore reduce the impact of product replacement
- Reuse, recycle and renew: design products that can be reused, recycled or composted (SEC 2009, p. 21).

Sustainable fashion should include life cycle thinking, which takes into account all phases: design, manufacturing, logistics, retail, use and disposal. It is said that it is better to design life cycles instead of products; sustainable design includes

consideration of the use phase and end-of-life thinking. At best the product has the possibility to have several life cycles: it should be designed how the product can be used after the first life cycle is over. From the environmental point of view it is best to use the product as it is, the second best option is to redesign a new product from it (e.g. through minor modifications), and the third option is to recycle the materials.

In the fashion field several guidelines and checklists have been created in recent years. Sandy Black (2011, pp. 46–47) gives the following guidelines for a sustainable fashion designer: design for the entire garment's life cycle (including use and disposal)

- reuse waste materials
- recycle
- upcycle
- repair and remodel garments
- recreate (e.g. existing design concepts)
- reduce (use of resources and creation of waste)
- use ecological materials
- use mono materials
- use new technologies
- create longer lasting products
- design multifunctional clothes
- design for delight.

CRADLE-TO-CRADLE

The cradle-to-cradle principle was originally suggested by Stahel in the 1970s (Lovins 2008, p.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 such a manner that multiple life cycles of the product or materials are possible. The cradle-to-cradle principle counsels that after the use phase the product will continue in technical or biological life cycles, meaning it will be recycled into a new material or it will be composted. This means that materials, dyes, chemicals and auxiliaries have to be suitable either for recycling or composting (i.e. be biodegradable). This is a challenging task since, for instance, only few textile colours or chemicals in the fibres can be composted without environmental problems.

REDESIGN

The redesign of old materials into new fashion products has become popular at the beginning of the 21st century. Reuse and redesign is sometimes called an eco-efficiency approach (Fletcher 2008) even though these strategies do not address the real problem: the increase in production and consumption. Reuse and redesign need no changes in current consumer practices, so it is easy to accept. And since we have huge amounts of textile and clothing waste, redesign has begun to be a popular and trendy fashion design approach. In the redesign approach it is beneficial to remember that all textile materials are not designed for clothing purposes, which might make them feel uncomfortable in use and even unsuitable to wear against the skin.

RECYCLING

Recycling means that the product is recycled into new material or fibres. Recycling can mean downcycling or upcycling. In downcycling processes we lose some of the value of the material and the quality is lower than in the original material. Therefore downcycled material is mainly used for filling purposes. Upcycling, in contrast, aims to keep the product's quality high and it can even mean increasing the value of the material e.g. through design.

The recycling approach needs mono materials, which means that the whole garment is made from one material only (including threads, buttons, zipper etc.). This makes it easy to recycle as one piece and one material (e.g. as with Patagonia's products). Another possibility is that all parts are easy to disassemble and products have to be designed in this manner. But this is complicated to realise in clothing where disassembling would be too time-consuming and costly. Mono-materials in fashion items are also not very common and nearly all garments are made of fibre blends that are complicated or impossible to recycle.

If we accept the current consumption practices as they are, and the concomitant huge amount of textile and clothing waste, we have to invest in a recycling economy; then polyester is our choice. Polyester can be melt-spun and this results in high quality material. Even though we see savings in e.g. energy, the process still needs a certain amount of virgin polyester material, and this approach locks us into polyester production and the accompanying oil production.

MATERIALS

We do have more and more environmental information about textiles' impacts during cultivation, manufacturing processes and the use phase. While a full compendium of this information is out of the scope of this publication, a short summary of materials' environmental impact is given below, as choosing materials for garments is one of the most problematic phases in the sustainable fashion design process.

Even though new materials are entering the field of fashion, the most commercially important fibres used in the fashion industry are cotton and polyester, together accounting for over 80% of all fibres, and the use of polyester has grown each year. Fibre consumption figures for the year 2005 are shown in Table 1.

Table 1. Fibre use (Simpson 2006)

FIBRES USED WORLDWIDE IN 2005 (MILLION TONS)	
NATURAL FIBRES	
Cotton	24.4
Wool	1.23
Silk	0.13
	Total 25.76
MANUFACTURED FIBRES	
Cellulosics	2.53
Synthetics	
Acrylic	2.63
Nylon	3.92
Polyester	24.70
	Total 33.78
TOTAL	59.54

Because diversity is an important value in sustainable development it is important to have variety in textile fibres. Accordingly the current predominance of cotton and polyester can be seen as a problem from the viewpoint of diversity. More recently hemp, which is considered a more environmentally friendly alternative to cotton, has increased its share in sustainable fashion markets. Hemp grows fast, produces long fibres and needs little pesticide. It even improves the soil structure and can be cultivated in colder climates. Environmental friendly enzymes can also be used in hemp processes. A similar fibre is flax (linen).

It is not possible to say which fibres are more environmentally friendly, natural fibres or manufactured fibres. Each fibre has its own environment burden. Production of acrylic, viscose and cotton into fibres needs a lot of water, and acrylic, polyester, viscose and cotton need a lot of energy in the production process. The land area used to cultivate natural fibres might be better used in food production, and some natural fibres have a big environmental impact during cultivation, e.g. the water and pesticide use in cotton cultivation. In this regard organic cotton is a better choice; its cultivation uses fewer chemicals (pesticides and fertilisers).

Many synthetic fibres are by-products from petroleum production and they are not renewable; on the other hand they can be recycled more easily into good quality material (e.g. polyester) while cotton is mainly downcycled. Nonetheless high quality and recycled cotton has recently entered the market.

New fibres are being developed and bio-based plastics, for example, offer future potential also in the fashion field. These fibres can be produced from e.g. corn or soybean protein. Milk (casein) can also be used for fibre production. The best situation would be that all these new materials are by-products from agriculture, should be biodegradable, and from renewable sources.

The ecological viscose Tencel (lyocell) is made from wood pulp and from trees specifically cultivated for this purpose. Tencel processing has been developed to have low environmental impact and the material is biodegradable and renewable. (Chen & Burns 2006)

Bamboo is a contradictory material: while it is marketed as an ecological choice (fast growing and renewable), in reality, its viscose process from fibre to yarn has a rather large environmental impact. However it is also possible to process bamboo fibre in a more environmentally friendly way, not in a viscose process but as a normal fi-

bre process. This environmentally better bamboo fibre has been developed in Switzerland (Steffen et al. 2013).

Some synthetic fibres have bigger environmental impact because they induce more sweating during use and need to be washed more often than garments made of natural fibres. Recent research has pointed out new problem areas in the use of, for example, polyester. Microplastics from washing machine wastewater are polluting beaches and marine environments. These tiny particles come loose when clothes made from synthetic fibres, like polyester, acrylic and polyamide, are being washed. (Browne et al. 2011.) Frequently laundered polyester sport clothing especially causes this problem.

The organisation Made By has categorised textile materials according to their environmental impact (see Table 2). Class A consists of fibres that have the lowest environmental impact (according to Made By).

Table 2. Textile materials' environmental impact (Made by <http://www.made-by.org/benchmarks/environmental>)

<p>CLASS A</p> <p>Recycled cotton Recycled nylon Recycled polyester Organic hemp Organic flax (linen)</p>	<p>CLASS B</p> <p>Tencel® (Lenzing lyocell product) Organic cotton In conversion cotton</p>	<p>CLASS C</p> <p>Conventional hemp Ramie PLA Conventional flax (linen)</p>
<p>CLASS D</p> <p>Virgin polyester Poly-acrylic Lenzing Modal® (viscose product)</p>	<p>CLASS E</p> <p>Conventional cotton Virgin nylon Rayon Bamboo viscose Wool Generic viscose</p>	<p>UNCLASSIFIED</p> <p>Silk Organic wool Leather Elasthan Acetate Cashmere wool Mohair wool Fibre-based bamboo, etc.</p>

When choosing materials for garments, the material's attributes and how they suit the particular wearing practices have to be considered carefully. It is also important to evaluate the material's aging process so the material does not look old too fast. Studies have shown that materials that are considered to age aesthetically include high quality wool and leather (Niinimäki 2010). In contrast materials like acrylic look old after a rather short use time, as pilling will occur. This is also seen with commonly used soft fleece-type polyester.

THE USE PHASE

Textile maintenance uses much energy and water, in washing, drying and ironing. We know that only 7.5% of laundry is actually heavily soiled. The majority is washed more for cultural or behavioural reasons (Catton 2007). Garments frequently washed have the highest environmental impact. By optimising the best textile materials, fit and colours for each purpose and use, the designer as well as the consumer can minimise the number of washes.

Garments and workwear textiles have a large relative environmental impact during use, compared to their impact during production and disposal which is estimated to have a small relative impact (Fletcher 2008). Depending on the material and its need to be washed frequently, the impact of consumer care can e.g. be as high as 75–80% of the total environmental impact of a cotton shirt (Lewis & Gertsakis 2001). In this case eco-material choices do not actually offer much improvement to the environmental footprint in the total LCA (Life Cycle Analysis).

While the goal in EU energy efficiency policy is to decrease the use of energy, new problems are arising also in clothing care. The EU demands that all new laundering machines have a 20°C temperature washing programme. Washing garments in cold water saves energy but on the other hand stronger chemicals are needed to get all dirt away from the fibres. This causes a new environmental problem because strong chemicals stay in the wastewater.

Furthermore the use of stronger chemicals in laundering might stimulate allergic reactions. Therefore it might be better to use higher laundering temperatures instead of lower temperatures with stronger washing powders. (Vaatteiden Kylmäpesu Voi Lisätä Kemikaalien Käyttöä 2013)

Chemical use in general is an increasing problem in the textile and fashion industry. Production processes might include a lot of chemicals which are a risk not only for textile factories' workers but also for the end-users. Lately we have seen several product recalls where garments have contained too many harmful chemicals. In the EU the REACH chemical regulation tightly restricts chemical leftovers in textiles and garments as well as chemical waste in the textile industry. Therefore if the garment is made in EU countries, it has a higher guarantee that it is safe for the end-user.

One of the most important factors in the environmental impact during the use phase is the garment's lifetime. Currently garments 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 impulse-buy cheap garments and low quality textiles. These kinds of low quality and cheap garments are easy to discard. Extending the life span of garments is one of the most critical issues for sustainable development.

In the UK a study showed that almost half of people's clothes have sat in a closet without being used during the last twelve-month period. It is estimated that this means 2.4 billion items in the UK alone. And most of these unused clothes are owned by young consumers aged 25–34. (Belz & Peattie 2011, p. 125) Another study from the Netherlands showed that the average piece of clothing is owned for three years and five months. During that time it is worn for only 44 days and laundered after being used for 2.4 to 3.1 days. (Uitdenbogerd 1998, as cited by Fletcher 2008)

Contrary to the current system, product durability and long-term use are prerequisites for sustainable consumption (Cooper 2005). To slow down consumption it is important to invest in good quality and durability as well as in aesthetically aging materials, high design and lasting style. In this regard services that aim to extend how long garments are used offer value in the sustainable development context. One challenge in the current system is how to design products added with services that encourage consumers to adopt more environmentally responsible behaviour. When focusing on ethical and sustainable use and consumption, the following issues should be considered:

CSR AND SUBCONTRACTING

- Purchasing fewer garments
- Investing in meaningful garments (promoting emotional bonding)
- Investing in durable garments, more classical style and high quality
- Investing in eco-materials and eco-labels
- Extending garments' owning time and using them more frequently
- Washing less, letting garments rest and air between use times
- Maintaining garments, also repairing
- Using services to intensify use and to extend the use time (e.g. repair, upgrading).

Consumption and consumerism lie at the core of Western societies. Consumption is an important function in people's everyday life. Current consumption patterns are strongly connected to industrial manufacturing systems, economic systems and the underlying economic values supporting this unsustainable system. Consumption and purchasing situations often involve a strong emotional experience for consumers. Therefore we should also create systems that offer other kinds of emotional experiences and satisfaction than from buying new stuff. This could happen for example through strategically sustainable design that includes services (Niinimäki 2011).

In today's reality in the fashion field more and more garments are manufactured in other countries, very often on the other side of the globe. Globally about 80% of clothing exports are shipped from undeveloped countries to developed economies. For example in Finland about 90% of sold garments are imported from Asian and Far East countries, about 5% from EU and other countries, and only about 5% are manufactured in Finland. In this fragmented and globalised supply network the main issue is risk management. From the recent accidents and fires in Bangladeshi textile factories we know that lack of awareness about the weak points in the supply chain create a reputational risk, at the very least. Corporate Social Responsibility (CSR) tackles these issues: i.e. what enterprises' responsibilities are regarding their impacts on society. Additionally corporations should integrate social, environmental, ethical human rights and consumer concerns into their strategy in cooperation with their stakeholders. Corporate Social Responsibility is used in parallel with the terms Corporate Citizenship, Corporate Responsibility and Corporate Sustainability.

If the producer wants to address sustainability issues in the supply chain to a greater extent, it is important to select subcontractors well and demand good practices. Code of Conduct

principles help companies in this process, and standards like SA 8000, ISO 14001 and EMAS help when considering environmental and social aspects in design and manufacturing practices. Additionally the UN has defined ten principles called the "Global Compact" to set standards for subcontractors (<http://www.unglobalcompact.org/AboutTheGC/>). These principles take account of issues from human rights, labour issues, environment initiatives and issues in anti-corruption. Several companies have voluntarily accepted these principles and follow them in their own subcontracting arrangements, for example Puma, GAP and Nike. Checklists exist where producers can pick requirements for their subcontractors (e.g. <http://www.csrcompass.com/>).

Better than just giving the code of conduct list to manufacturers is to work in collaboration to improve the situation. Working with subcontractors and establishing good and tight relationships, mutual understanding and trust takes time. The producer's goals and requirements in sustainability have to be well communicated and preferably based on mutual motivation. Furthermore to build motivation it is good to show good successful examples of how to work with sustainability in the fashion field. (Kruger et al. 2012)

Companies can benefit and gain great advantages by using charity or donation in their CSR

LOCAL PRODUCTION

strategies. The charity work should be rooted in the companies' actions strategically so that it engenders long-term business opportunities and "improves the competitive surroundings through charity..." (Porter & Kramer 2006, as cited by Kruger et al. 2012, p. 15) It is important to realise that acting responsibly and promoting CSR do not necessary mean direct revenues to the company. The motivation to act responsibly is based on values other than economic but actions might also be (or should be) economically successful in the long run.

The sustainability strategies should also be included at all levels inside the company. All departments should commit to sustainability practices and all processes and products should include sustainability principles. Furthermore the sustainability of business is most important so the business must be profitable. It is also important to understand that sustainability and CSR needs constant evaluation; therefore it is a constant commitment and learning process (van Dyk 2008).

Transparency is important in the fashion field, and all actions should be opened up to build consumers' trust. This can also mean publishing all information about the supply chain, the names and locations of the suppliers and sub-contracting partners. A good example of this practice

is the company Patagonia, which has been a leader in supply chain transparency for many years. Patagonia has set sustainability principles as a core in their strategy. The company offers information not only about all its manufacturing locations worldwide, but also background information about the factories they are collaborating with, as well as general environmental and social information about global manufacturing. Consumers can find all this information in Patagonia's webpages.

In the global fashion business it has become challenging to identify the origin of a product since production processes are fragmented into several countries and supply chains are complex. Yet this information is valuable for consumers, and more transparency is demanded especially in clothing manufacturing. The "Made by" label 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, p. 68)

Some companies have chosen the strategy to produce locally and even in their own factories to prevent risk in subcontracting. One example is the company American Apparel, which doesn't outsource any of its operations. All products and all processes, e.g. dyeing, cutting and even packing, are done in its own factories; the company employs 5000 workers in southern California. According to the company their workers earn the highest pay worldwide in the textile and apparel field. They say that through this strategy they gain better and more consistent quality, environmentally better processes (following regulations) and stronger employee morale. (Briefing: supply chain 2012) While the use of global supply chains creates risks, keeping or returning manufacturing to the local level lessens risks and ensures quality in the manufacturing. It is also good to remember that environmental regulations and laws are tight in EU countries while the situation is totally different in many Asian countries, which causes risk from the environmental point of view. Moreover many chemicals that are banned in EU countries are largely still used in textile factories in undeveloped countries, which causes risks to the workers, the environment as well as for the product's end-user.

Another example of local production is the Finnish M.A.S.I Company, which produces jeans in its own factories in Keitele, Finland, and

EXTENDED PRODUCER RESPONSIBILITY (EPR)

Estonia, for, for example, the brand Lee Cooper. This allows the company to easily control production, working conditions and the quality of the product. M.A.S.I does not do any sand-blasting of jeans, which is most harmful for workers and lowers the quality of the denim, weakening it. They also invest in better fit for consumers, by developing their own standards: i.e. measuring 250 consumers to create better fitting jeans measurements and focusing on styles that highlight the behind. (Moilala 2013.) Good fit is the most important design aspect in jeans design.

Recently the approach of extended producer responsibility has gained a lot of attention and discussion in the EU. Extended producer responsibility (EPR) requires the original manufacturer or producer to take back the product after its use. In EPR the goal is that already in the design phase producers think about and plan how they can reduce environmental impact of the product after its use.

This post-consumer waste should be reused, redesigned or recycled. In this concept companies are forced to have a waste management system and preferably take-back systems based on closed or open loop thinking, or, if not, pay waste treatment costs. Closed loop thinking means that all off-cuts, waste and products after their use time are treated inside the factory's own processes and open loop means that leftovers are handled by some other outside partner. The principle is familiar in e.g. electronic products but not yet in textiles.

EPR doesn't yet cover the fashion and textile field but it soon might, and this would change fashion companies' action logic, as old garments mean extra cost through waste treatment. EU policy aims for waste prevention, closing landfills and effective material recycling systems. This would also cover textiles and fashion. Right now textile waste ends up in landfills or as energy

waste in most European countries. France is one exception. There producers, distributors and importers of clothes, linen and footwear have had to take back old products since 2008. A company has to have a take-back system itself or it can join a scheme, which is accredited by the French government, and pay into it (right now EcoTLC). (Tojo et al. 2012.)

The environmental benefits of digital textile printing compared to rotation printing are as follows (Digital inkjet textile finishing 2013, p. 35):

- savings on energy up to 60%
- savings on water up to 80%
- savings on inks up to 90%
- savings on colour waste up to 90%
- reduced stock up to 70%.

The amount of dye applied on fabric is precisely controlled in digital printing and this saves on the use of dyes. It is also possible to print only according to need or according to orders and therefore surplus production is avoided. Furthermore it is possible to print small amount of fabrics or even inside the garment's patterns. This saves dye as well as fabric.



Miu's digital printed fashion (Photo: Otto Nieminen)

REFERENCES

- Allwood, J.M., Laursen, S.E., de Rodrigues, C.M. & Bocken, N.M.P. (2006). *Well Dressed? The Present and Future Sustainability of Clothing and Textiles in the United Kingdom*. Cambridge: University of Cambridge, Institute of Manufacturing.
- Black, S. (2011). *Eco-Chick: The Fashion Paradox*. London: Black Dog.
- Belz, F.M. & Peattie, K. (2011). *Sustainability Marketing, a Global Perspective*. London: John Wiley and Sons.
- Briefing: supply chain (2012). *Ethical Corporation*. October 2012.
- Browne, M.A., Crump, P., & Niven, S.J. et al. (2011). Accumulation of Microplastics on Shorelines Worldwide: Sources and Sinks. *Environmental Science & Technology*. Vol. 45, pp. 9175–9179.
- Catton, G. (2007). Sustainable Cleaning, Fast, Affordable and Sustainable Fashion. ASBCI Conference proceedings, 17th May 2007.
- Chen, H. & Burns, L.D. (2006). Environmental Analysis of Textile Products. *Clothing and Textile Research Journal*. Vol. 24:3, pp. 248–261.
- Cooper, T. (2005). Slower Consumption: Reflections on Products' Life Spans and the 'Throwaway Society'. *Journal of Industrial Ecology*. Vol. 9:1–2, pp. 51–67.
- Digital Inkjet Textile Finishing (2013). *Ecotextile News*, Vol. 56 (August/September), p. 35.
- Fletcher, K. (2008). *Sustainable Fashion & Textiles*. London: Earthscan.
- Kruger, H., Himmestrup Dahl, E., Hjort, T. & Planthinn, D. (2012). *Guide Lines II: A Handbook on Sustainability in Fashion*. Copenhagen: Sustainable Solution Design Association, SSDA.
- Lewis, H. & Gertsakis, J. (2001). *Design+Environment, a Global Guide to Designing Greener Goods*. Sheffield, UK: Greenleaf.
- Lim, M. (2003). The Development Pattern of the Global Textile Industry and Trade: Part I: Evidence from Textile Exports of the EC, the Far East, and Emerging Textile Exporting Countries in the 1980s. *Journal of the Textile Institute*. Vol. 94:1, pp. 32–52.
- Moilala, S. (2013). *Tappojafarkut ja Muuta Vastuuttomia Vaatteita*. Helsinki: Into.
- Niinimäki, K. (2011). *From Disposable to Sustainable. The Complex Interplay between Design and Consumption of Textiles and Clothing*. Doctoral dissertation. Helsinki: Aalto University.
- Niinimäki, K. (2010). *Forming Sustainable Attachment to Clothes*. 7th International conference on D&E conference in IIT, 4–7 October 2010, Chicago, USA.
- Simpson, P. (2006). Global Trends in Fibre Prices, Production and Consumption. *Textiles Outlook International*. Vol. 125, pp. 82–106.
- SEC (2009). *Design as a Driver of User-centred Innovation*. Commission staff working document. Brussels, 7.4.2009, Commission of the European Communities. http://ec.europa.eu/enterprise/policies/innovation/files/design_swd_sec501_en.pdf
- Spangenberg, J. (2001). Sustainable Development. From Batchwords to benchmarks and Operational Concepts. In: M. Charter & U. Tischner (eds.). *Sustainable Solutions, Developing Products and Services for the Future*. Sheffield, UK: Greenleaf, pp. 24–47.

- Steffen, D., Marin, A.W. & Müggler, I.R. (2013). Bamboo: A Holistic Approach to a Renewable Fibre for Textile Design. *Crafting the future conference*. 10th European Academy of Design Conferences 17–19 April 2013. University of Gothenburg, Sweden.
- Tischner, U. & Charter, M. (2001). Sustainable Product Design. In: M. Charter & U. Tischner (eds.). *Sustainable Solutions, Developing Products and Services for the Future*. Sheffield, UK: Greenleaf, pp. 118–138.
- Thomas, S. (2008). The "Green Blur" to Eco-fashion: Fashioning an Eco-lexicon. *Fashion Theory*. Vol. 12:4, pp. 525–540.
- Tojo, N., Kogg, B., Kierboe, N., Kjær, B. & Aalto, K. (2012). *Prevention of Textile Waste: Material Flows of Textile in Three Nordic Countries and Suggestions on Policy Instruments*. Copenhagen: Nordic Council of Ministers.
- Vaatteiden Kylmäpesu Voi Lisätä Kemikaalien Käyttöä (2013) Helsingin Sanomat 1.12.2013.
- Van Dyk, L. (2008). Developing Strategies for a Typology of Sustainable Fashion Design. In: J. Hethorn & C. Ulasewicz. *Sustainable Fashion. Why Now?* New York: Fairchild Books, pp. 233–263.
- Visser, W., Matten, D., Manfred, P. & Tolhurst, N. (2008). *The A to Z of Corporate Social Responsibility*. New York: John Wiley & Sons.

ONLINE REFERENCES

- CSR Compasset. <http://www.csrcompass.com/>
- Economy Watch 29.6.2010. Textile Industry. <http://www.economywatch.com/world-industries/textile-industry.html>
- Made by. <http://www.made-by.org/benchmarks/environmental>
- United Nations Global Compact. <http://www.unglobalcompact.org/AboutTheGC/>

TOOLKITS I:

Here is a brief overview some of the most prominent toolkits (in the sense of easy-to-locate via Google or associated with influential organisations) that focus on social design or design for social impact. Presented in approximate chronological order by date of publication, these toolkits bring these issues into view in how these artefacts are presented and what they contain. (The descriptions below are edited versions taken from the resources' own websites and any mistakes are mine.)

The Social Innovation Lab for Kent Method Deck (2007) (SILK) created by UK consultancy Engine as part of their work for Kent County Council was an early attempt to materialise and make more widely available to relevant professionals and local residents a design-based approach to designing public services. <http://socialinnovation.typepad.com/silk/silk-method-deck.html>

IDEO Design for Social Impact guide and workbook. Commissioned by The Rockefeller Foundation, this guide based on interviews with designers involved in social sector work in 2008 explores how design firms can work differently to bring a social impact perspective into their work. <http://www.ideo.com/work/design-for-social-impact-workbook-and-toolkit>

The IDEO Human Centred Design Toolkit (2009) commissioned by the Bill and Melina Gates Foundation is aimed at social enterprises and NGOs around the world. It is one of the most widely cited and linked social design resources. <http://www.ideo.com/work/human-centered-design-toolkit/>

Project H's Design Revolution Toolkit (2009) is a teaching resource which offers a series of provocations and challenges aimed at students and teachers. <http://impact.sva.edu/core/wp-content/uploads/2010/06/DesignRevolutionToolkit.pdf>

The NHS Institute for Improvement and Innovation Experience-based Design (EBD) toolkit (2009) is a way to bring patients and staff together to share the role of improving care and re-designing healthcare services. [http://www.institute.nhs.uk/quality_and_value/experienced_based_design/the_ebd_approach_\(experience_based_design\).html](http://www.institute.nhs.uk/quality_and_value/experienced_based_design/the_ebd_approach_(experience_based_design).html)

The Social Design Methods Menu (2012) by Lucy Kimbell and Joe Julier summarises 11 methods used with both social entrepreneurs and MBA students, and suggests how to combine them into some recipes. http://www.lucykimbell.com/stuff/Fieldstudio_SocialDesignMethodsMenu.pdf

The Design with Intent toolkit (2010) developed by designer-researcher Dan Lockton focuses on behaviour change in relation to environmental impact. http://www.danlockton.com/dwi/Main_Page

Nesta's Prototyping Framework (2011), developed by UK agency Think-Public, is a guide for people working in the design and delivery of public sector services, to help them prototype services more effectively. http://www.nesta.org.uk/news_and_features/assets/features/prototyping_framework

The Design Council's Accident and Emergency (A&E) Toolkit (2011) It aims to help people understand how to use design to develop integrated quality improvement plans and improve performance against A&E clinical quality indicators. <http://www.designcouncil.org.uk/AEToolkit/>

The Danish Government's cross-ministerial innovation unit Mind-Lab has published its Methods Cards. It uses methodologies anchored in design-centred thinking, qualitative research and policy development, with the aim of including the reality experienced by both the public and businesses into the development of new public-sector solutions. <http://www.mind-lab.dk/en/methods>

The Australian Centre for Social Innovation (TACSI) published Co-designing Thriving Solutions: Radical Redesign Team (2011). <http://www.tacsi.org.au/assets/Uploads/Co-designingThrivingSolutions.pdf>

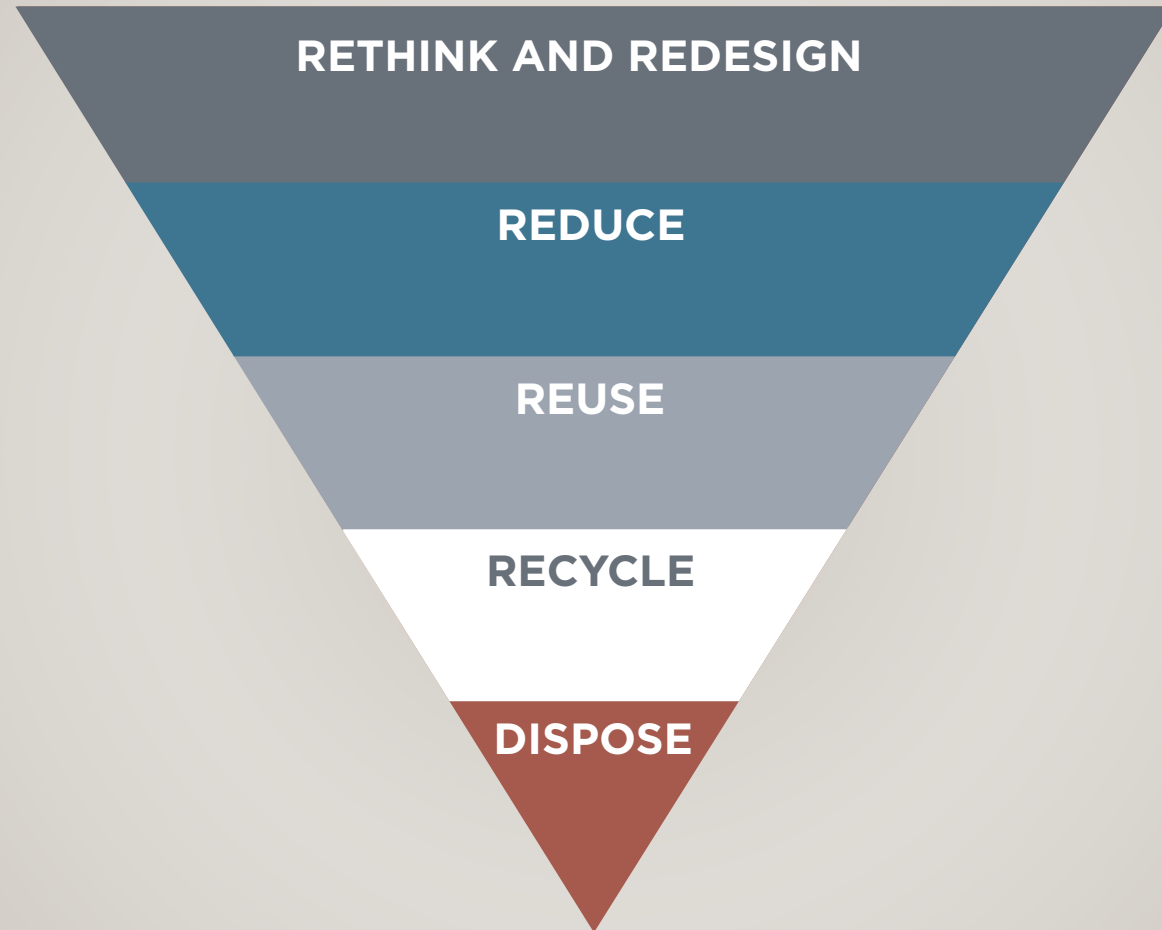
The Young Foundation Accelerator's Social Business Model Canvas (2012), created by Stuart Thomas and Lucy Kimbell, reworks Alex Osterwalder's Business Model Canvas and puts social impact at the centre. <http://growingocialventures.org/en/course-content/social-business-model-canvas>

The Design Against Crime research centre at Central Saint Martins, University of the Arts, London, describes its methodology for bringing a design-based approach to tackling crime with a focus on user/mis-user and abuser driven innovation (2010). <http://www.designagainstcrime.com/methodology-resources/design-methodology/#list-and-description>

The Frog Collective Action Toolkit (2012). This is a package of resources and activities that enable groups of people anywhere to organize, build trust, and collaboratively create solutions for problems impacting their community. <http://www.frogdesign.com/work/frog-collective-action-toolkit.html>



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