Sustainability Cards

Functional lifetime

Emotional lifetime

Technical lifetime

FUR

Aesthetic lifetime

Functional lifetime

Emotional lifetime

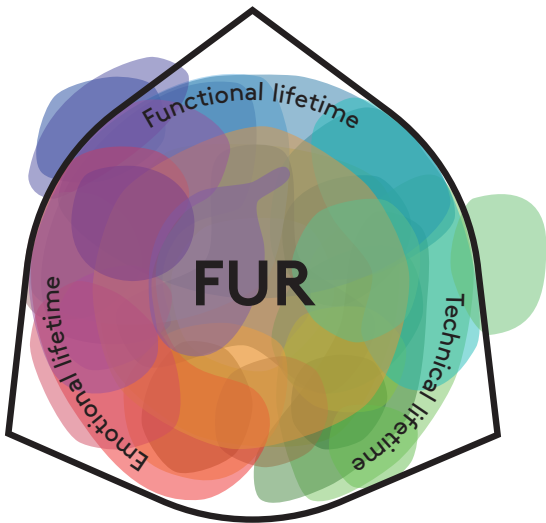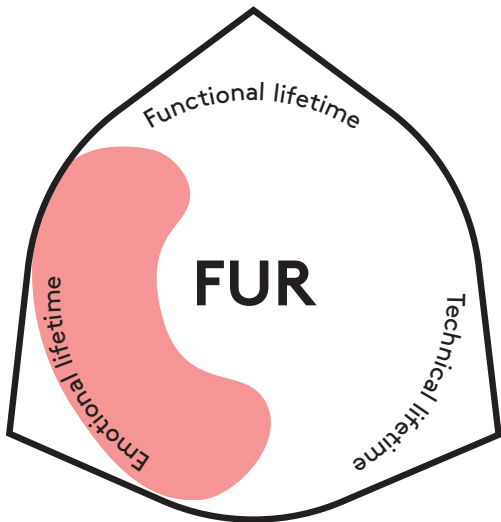Technical lifetime

FUR

Aesthetic lifetime

WHAT?
There are different approaches to working with the aesthetic lifetime of a product – for example to ensure that the intended product-lifespan is supported by the product's aesthetic expression (1), to ensure that a product age without losing aesthetic value (2) or to ensure that intended aesthetic lifetime is aligned within a circular systems thinking (3).

WHY?
The aesthetic lifetime can support product longevity. Aesthetic means can prolong product lifespan when product expression targets user and context of use and aesthetic traces of time and use can add value to a product.

CHALLENGES
– The aesthetic lifetime and aspects that define it are difficult to predict.

EXAMPLES
– Classic and simple aesthetics less influenced by fast changing trends. See e.g. the company **Armoire Officielle** (http://armoireofficielle.com)
– Aesthetic 'richness' that allow the user to 'read' and discover a product over time, e.g. through applying craft and couture techniques
– Working consciously with patina as an aesthetic value, that only increases over time. See for example full-grain leather and furniture

THIS CARD LINKS TO
/ Customisation / *Emotional lifetime* / Embeded storytelling / Formal alternations and modification

FURTHER READING
Clark (2008). **SLOW + FASHION—an Oxymoron—or a Promise for the Future ...?** Fashion Theory 12, pp. 427–446 / Niinimäki (ed.) (2013). **Sustainable Fashion: new approaches**. Aalto University, Helsinki.

Co-creation

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
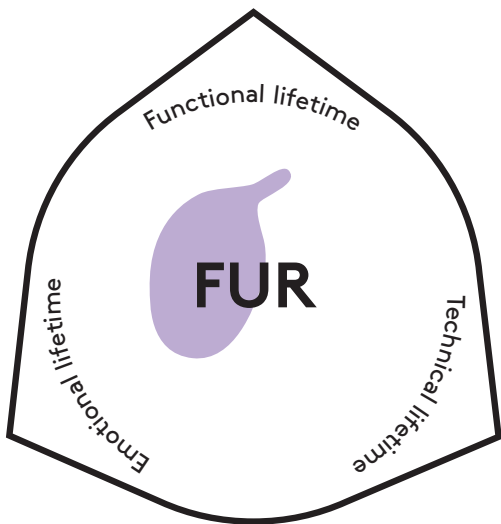
Co-creation

WHAT?
The design process is carried out, fully or partly, in collaboration with future users or other relevant actors.

WHY?
Co-creation can support product longevity:
1. Designing for user specific needs and desires.
2. Creating a sense of user ownership to product. Users are less willing to depart with products they have invested themselves in developing.

CHALLENGES
– Users may not be conscious about or able to articulate needs and desires.
– Temporal and/or financial limitations within the design process.

EXAMPLES
– **Birger Christensen**'s past practice of involving users in the design process via dialogue between designer, patternmaker and costumer in the shop and during fitting.
– **Lego**'s work with online user co-creation (https://ideas.lego.com)

THIS CARD LINKS TO
/ User understanding / Embedded storytelling

FURTHER READING
Gwilt (Ed.) (2015). **Fashion Design for Living**. Routledge / Friis (2016). **Co-Creation Cards**. U-Press / Prahalad & Ramaswamy (2004). **"Co-Creation Experiences: The Next Practice in Value Creation"**. Journal of Interactive Marketing. 18(3).

Customization

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
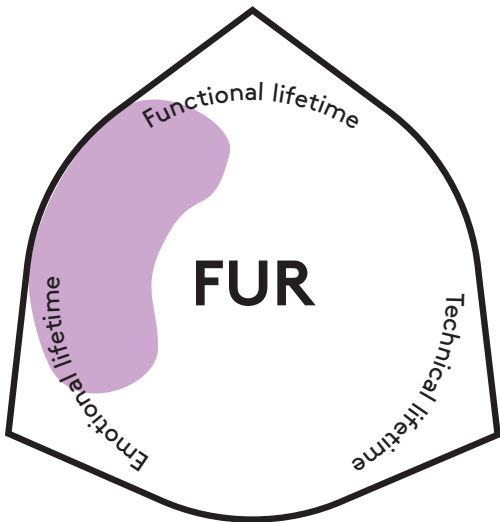
Customization

WHAT?
Users have an influence on final product, before production, in relation to individual user needs and aesthetic preferences.

WHY?
Customisation can support product longevity through stronger user satisfaction and emotional investment.

CHALLENGES
– Users may not want to make choices
– Requires a user friendly system

EXAMPLES
– Big brands such as e.g. Nike offer their users the possibility **to personalise their purchase** (http://www.nike.com/gb/en_gb/c/nikeid)
– **Bow and Drape** within high street apparel uses a 'coffee to go' strategy, i.e. users choose their own combination of pre-fixed elements: (http://www.bowanddrape.com)
– **Suiting** such as by the company **Creyate** (http://www.creyate.com)
– **Unmade**'s customised knitwear (www.unmade.com)

THIS CARD LINKS TO
/ Modularity / E-shop / Local production / *Functional lifetime* / *Emotional lifetime* / User-understanding / Production on demand / Aesthetic lifetime

FURTHER READING
Niinimäki (ed.) (2013). **Sustainable Fashion: new approaches.** Aalto University, Helsinki / Pine & Gilmore (2011). **The Experience Economy.** Harvard Business Review Press

Design for disassembly

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
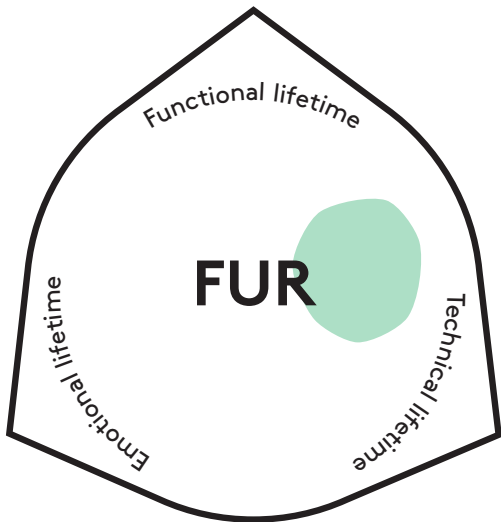
Design for disassembly

Also known as DfD

WHAT?
Working with materials in a manner that allows for material separation once product is discarded or in need of repair.

WHY?
Design for Diassembly can ease and support re-use of materials.

CHALLENGES
May challenge intended design expression and/or economic considerations.

EXAMPLES
– Design that makes it **easy to remove and replace** product elements that wear out first, as often seen with i.e. linings in fur coats, but can also be collars, sleeves or other exposed parts.
– Design that makes it easy for the user to **disassemble the product** and replace the exact broken part such as the Fairphone (www.fairphone.com)
– Design where materials can be separated and therefore re-used after the product is fully discarded by the user, by avoiding e.g. glues and mixed fibre materials.

THIS CARD LINKS TO
/ Modularity / Mono material / Upcycling / *Technical lifetime*

FURTHER READING
Bakker et al. (2014). **Products That Last – Product design for circular business models.** TU Delft, Delft, pp.104-109 / Bogue (2007). **"Design for disassembly: a critical twenty-first century discipline"**, Assembly Automation, 27 (4), pp. 285-289 / Vezzoli & Manzini (2010). **Design for Environmental Sustainability, Chapter 9: FacilitatingDisassembly.** Springer, London, pp. 181-197.

E-shop

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
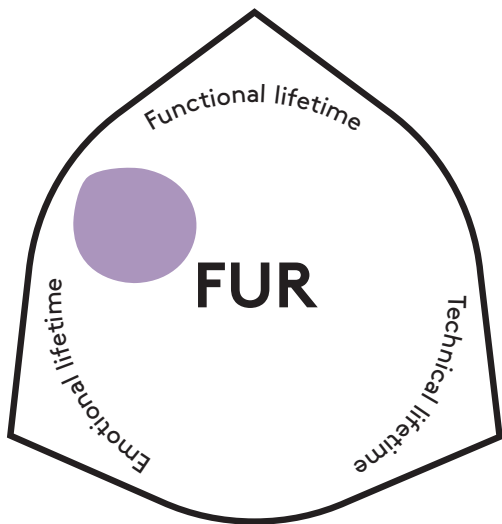
E-shop

WHAT?
Online shop and platform that allow customers to purphase products via their computers.

WHY?
An E-shop can support product transparency and economic efficiency through fewer links, increased control and direct communication with users

CHALLENGES
It can be difficult for users to test and experience the product before purchase, if they only meet the product online?

EXAMPLES
– The designer **Bruno Pieters** uses the e-shop to promote the company/product transparency as his basic approach to design (http://www.honestby.com)
– On a larger scale, **Marks and Spencer** use their e-shop to tell about their strategic sustainability goal (http://corporate. marksandspencer.com)
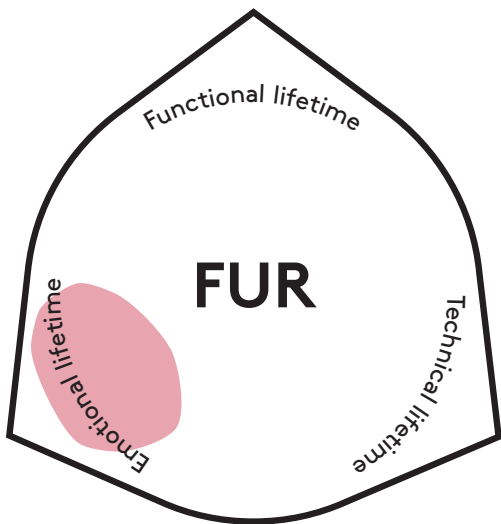
THIS CARD LINKS TO
/ Information / Production on demand / Customisation

FURTHER READING
Koumbis (2014). **Fashion Retailing, From Managing to Merchandising.** Bloomsbury / Stone (2014). **The Everything Store: Jeff Bezos and the Age of Amazon.** Back Bay Books

Embedded storytelling

Functional lifetime

Emotional lifetime

Technical lifetime

FUR

Embedded storytelling

WHAT?
Embedded stories can generate emotional value in a product through
– Stories embedded by the designer
– Stories embedded by the user via use

WHY?
Emotional value prolongs a product's overall lifespan

CHALLENGES
– Emotional value is difficult to pinpoint, predict and make tangible

EXAMPLES
– Storytelling embedded by use can be design steered as seen in e.g. the **Pandora concept** (http://www.pandora.net) Each bead represents something, a personal story, to the user. It can also be user driven, by users changing, sharing or re-using products, and thereby build and embed stories in the product over time.
– Designers generally work with some sort of embedded storytelling. This potential can be further activated by
1. **creating diverse types of stories**, for diverse user groups.
2. **implementing the story embedded in the design**, in the communication of the design to the intended user. See for example Kjetal Aas' work with Swakara fur.
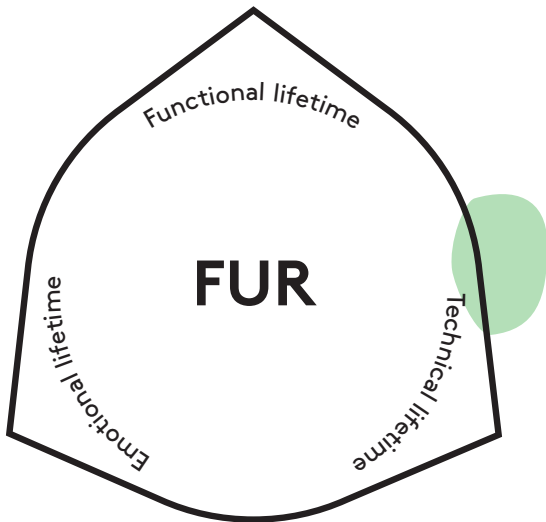
THIS CARD LINKS TO
/ Product history / User understanding / Customisation / Co-creation / *Emotional lifetime*

FURTHER READING
Clark (2008). **SLOW + FASHION—an Oxymoron—or a Promise for the Future …?** Fashion Theory, 12, pp. 427–446 / Fletcher (2016). **Craft of use.** Routledge.

Environmentally friendly materials

FUR

Functional lifetime

Emotional lifetime

Technical lifetime

Environmentally friendly materials

WHAT?
Materials and production methods that in different ways consider the environment in a positive way.

WHY?
Environmentral friendly materials are used to minimize pollution and use of resources in materials and production and disposal.

CHALLENGES
– Environmental friendliness in materials can be many things and it is just necessary to define, how it is environmental
– A product may not necessarily be environmental friendly even if the material is.
– Environmental friendly materials might compete with less expensive alternatives

EXAMPLES
– Use of **organic cotton** instead of conventionally grown cotton; see e.g. the Danish company **Organic Basics** (www.organicbasics.com)
– Conventional plastics (such as Polyester and Nylon) that are made by using **renewable components**; see e.g. the **Plantbottle** initiative (www.coca-colacompany.com/plantbottle-technology)

THIS CARD LINKS TO
/ Labelling / Recycling

FURTHER READING
Allwood & Cullen (2011). **Sustainable Materials – With Both Eyes Open: Future Building, Vehicles, Products and Equipment – Made Efficiently and Made with Less New Material.** UIT Cambridge / Fletcher & Grose (2012). **Fashion & Sustainability: design for change.** Laurence King Publishing, London.

Formal alternation and modification

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
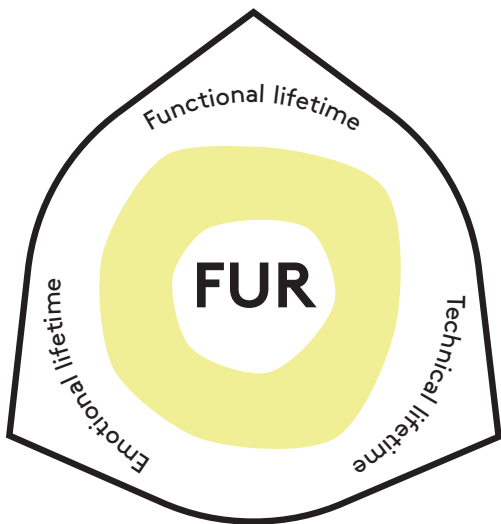
Formal alternation and modification

WHAT?
Users and to specialists to have products adjusted or modified. This can be part of a service system.

WHY?
The existing product is estimated to have a higher use potential and/or emotional value, than a new equivalent product.

CHALLENGES
– Lack of specialists and craftsmen
– How should the service system be created to support this?

EXAMPLES
– Furriers often offer traditional services to do with modification of garments; see for example **Birger Christensen** (http://www.birger-christensen.com/da/pels) or **Maison Lama** (http://www.maisonelama.com/pages/redesign)
– The American company **Runway of Dreams** has expanded on the idea, by working with modification of garments for people not applying to the 'fashion-body' norm, identified as 'different-abled' (http://runwayofdreams.org/about)

THIS CARD LINKS TO
/ Customisation / User understanding / Informal alternation and modification

FURTHER READING
Fletcher & Grose (2012). **Fashion & sustainability: design for change, Chapter 9: Adaptability.** Laurence King Publishing / Gwilt, A. & Rissanen, T. (2011). **Shaping Sustainable Fashion: Changing the way we make and use clothes, Chapter 3: Use.** Earthcan

Formal sharing and heritage

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
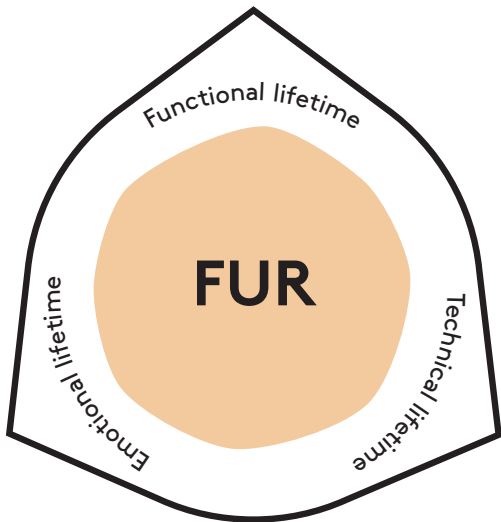
Formal sharing and heritage

WHAT?
Service design systems driven by sharing of products between actors.

WHY?
It speaks into the current sharing paradigm that serve to optimize resource use. These kinds of systems have focus on user economic and support user diversity.

CHALLENGES
– It can be difficult to identify 'how?', 'what?', 'who?' a service system is formalised.
– Formalised sharing can require larger data systems to process information on product flows or users.

EXAMPLES
– Systems may focus on optimising the **use-extent of a product**, as seen at textile rental and laundry service company **Berendsen** (www.berendsen.com/our-servicesor)
– Focus on prolonging product lifespan as i.e. the company **Re-second**, which runs on membership and is both a physical 'shop' and an online community for **sharing and swapping products** (http://resecond.com).

THIS CARD LINKS TO
/ Formal alternation and modification / Rental service / User understanding / Informal sharing and heritage

FURTHER READING
Fletcher & Grose (2012). **Fashion & sustainability: design for change.** Laurence King Publishing, London / Sundararajan (2016). **The Sharing Economy: The End of Employment and the Rise of Crowd-Based Capitalism.** The MIT Press

Informal alternation and modification

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
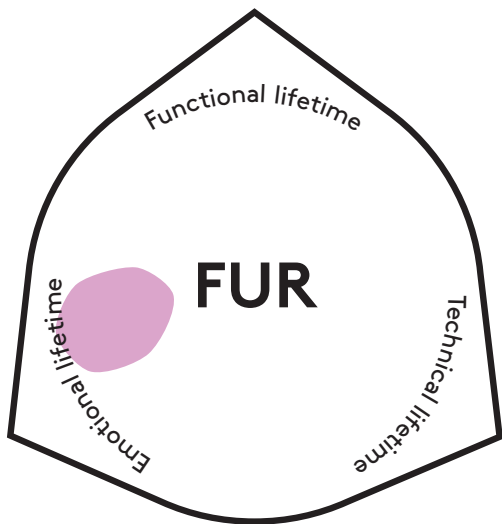
Informal alternation and modification

WHAT?
Users adjust and modify products themselves, for themselves and near relations. This isself-driven and un-systematised.

WHY?
To prolong product lifespan and to adapt a product to its own changing needs.

CHALLENGES
– It relies partly on the product's emotional value
– Many users do not have the necessary skills to make alternations and modifications

EXAMPLES
– In the project, **Local Wisdom**, British scholar, Kate Fletcher, has documented ways in which users adjust and modify garments over time (www.localwisdom.info)
– Blogging and Youtubing about DIY is a growing phenomenon (see e.g. www.stylemotivation.com/24-stylish-diy-clothing-tutorials or https://changingyourclothes.wordpress.com)
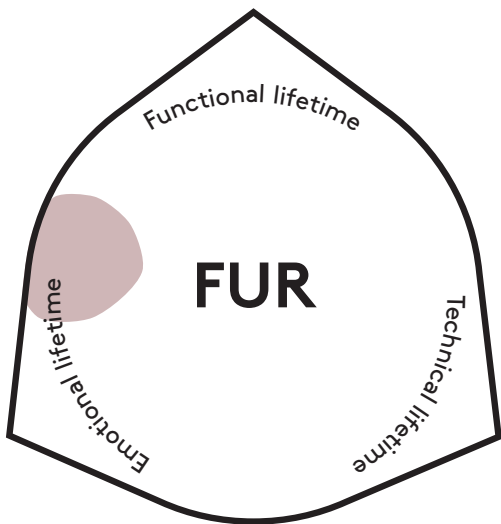
THIS CARD LINKS TO
/ Formal alternation and modification / Repair / User understanding

FURTHER READING
Fletcher (2016). **Craft of use.** Routledge / Gwilt (Ed.) (2015). **Fashion Design for Living.** Routledge.

Informal sharing and heritage

Functional lifetime

Emotional lifetime

FUR

Technical lifetime

Informal sharing and heritage

WHAT?
Users that share products in a self-driven and un-systematised manner.

WHY?
It approach peaks into the current sharing paradigm that has focus on prolonging the lifespan of a product. Sharing and heritage can be:
1. an economic advantage
2. a way of passing on/creating emotional value in a product

CHALLENGES
– Products may not fit new users
– Unwanted traces of time and use in product may occur such as i.e. smell and stains

EXAMPLES
– People tend to share products that possess value, either emotional or economic or both, as i.e. is the case with garments made of fur. But also baby clothes are frequently shared, due to the short use time and thereby lack of wear and tear. **Swapping 'parties'** are similarly seen as a growing phenomenon. See for example **Copenhagen Fashion Exchange** (www.globalfashionexchange.org).
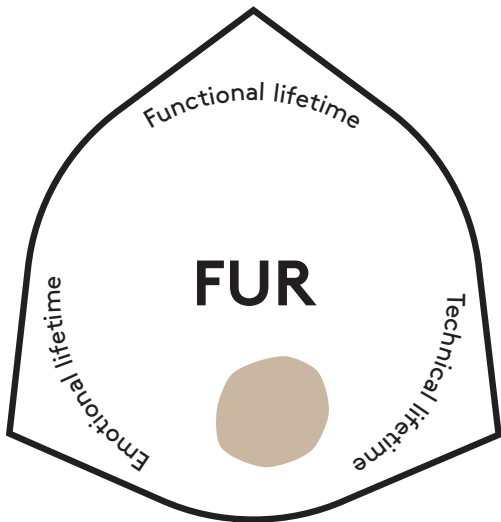
THIS CARD LINKS TO
/ Informal alternation and modification / User understanding / Formal sharing and heritage

FURTHER READING
Fletcher (2016). **Craft of use.** Routledge / Skjold & Ræbild (2016). **Fur design as mediator of sustainability.** Nordcode conference, Kolding.

Information

FUR

Functional lifetime

Emotional lifetime

Technical lifetime

Information

WHAT?
Information on active initiatives in relation to sustainable products

WHY?
Information makes knowledge visible, accessible and transparent to the user

CHALLENGES
– To make the information comprehensible, attractive and relevant to the user
– To get the necessaray information from sub-suppliers

EXAMPLES
– Material information as in the **Swakara** fur from Kopenhagen Fur (www.kopenhagenfur.com/da/pelsens-abc/pelstyper/swakara)
– Product information as from the company, **Neutral** selling B2B clothing (www.neutral.com)
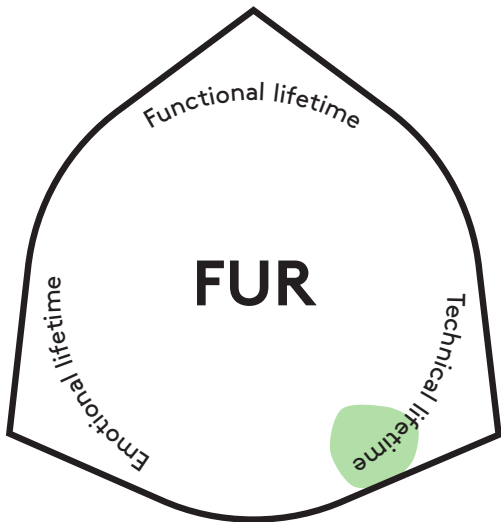– Strategic information as from the company, Patagonia (http://eu.patagonia.com/enGB/environmentalism

THIS CARD LINKS TO
/ Labelling / Product history / Tagging / Labour conditions / E-shop

FURTHER READING
HER MANGLER TEKST !!!

Labelling

FUR

Functional lifetime

Emotional lifetime

Technical lifetime

Labelling

WHAT?
Formal information provided by labelling systems. Labelling can inform on aspects such as material composition, production and mainetance.

WHY?
Labelling can represent a guaranty from the user perspective og provide guidelines for the users.

CHALLENGES
– The current labelling 'jungle' create information fatigue.
– Users do not always read the labels
– Labelling can be costly – especially if the included information is standardized.

EXAMPLES
– In the European Union, there is a regulation, **Regulation 1007/2011**, on which information that should be included on labels for textiles and clothing (https://ec.europa.eu/growth/sectors/fashion/textiles-clothing/legislation_en)
– An overview on eco labels can be found in the **Eco Label Index** (www.ecolabelindex.com/ecolabels)

THIS CARD LINKS TO
/ Tagging / Information / Environmentally friendly materials / Labour conditions / Maintenance

FURTHER READING
Aspers, P. (2008). **Labelling fashion markets.** International Journal of Consumer Studies 32, pp. 633–638. / Hyllegard et al. (2012). **Socially Responsible Labeling: The Impact of Hang Tags on Consumers' Attitudes and Patronage Intentions Toward an Apparel Brand.** Clothing and Textiles Research Journal 30, 51–66. / Krüger et al. (2013). **Guidelines II – A Handbook on Sustainability in Fashion.** Copenhagen School of Design and Technology, pp. 136-141

Labour conditions

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
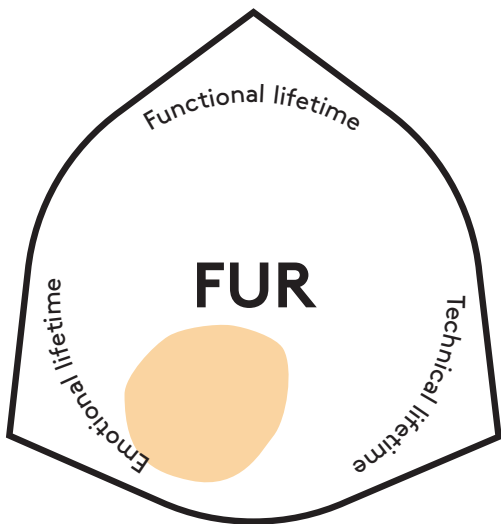
Labour conditions

WHAT?
Initiatives towards responsible labour conditions in a product's life cycle. This is often incorporated in a company's corporate social responsibility (CSR) strategy.

WHY?
Focus serves to ensure that workers involved in a product's life cycle have dignified living conditions talking into ethical concerns of the industry.

CHALLENGES
– Sub-suppliers do not always share a company's values; consequently in some places it is necessary to monitor sub-suppliers, which is time consuming and expensive.

EXAMPLES
– The **Code of Conduct** is based on International Labour Organization (ILO) standards and seeks to protect the workers in manufacturing (www.fairlabor.org/our-work/code-of-conduct)
– The organisation, **Clean Clothes Campaign**, focuses on improving working conditions in the global garment industry (www.cleanclothescampaign.org)
– The **Worldwide Responsible Accredited Production** (WRAP) **12 principles** are based international workplace standards, local laws and workplace regulations (www.wrapcompliance.org/12-principles)

THIS CARD LINKS TO
/ Local production / Information / Labelling / Product history

FURTHER READING
Crane et al. (2008). **The Oxford Handbook of Corporate Social Responsibility**. Oxford University Press / Moon (2014). **Corporate Social Responsibility: A Very Short Introduction**. Oxford University Press / Ross (2004). **Slaves to Fashion – Poverty and Abuse in the New Sweatshops**. Michigan University Press

Local production

FUR

Functional lifetime

Emotional lifetime

Technical lifetime
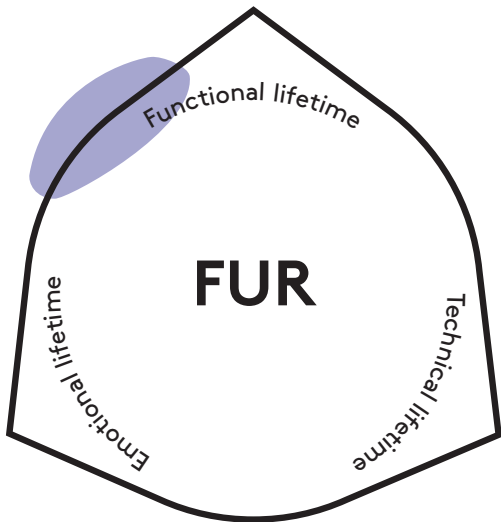
Local production

WHAT?

Production of product placed locally to either development, material production and/or retail.

WHY?

Local production can:
– minimize use of resources i.e. transport costs, CO_2 emission and logistics
– enable design innovation in collaboration with manufacturers within production
– support transparency of production process

CHALLENGES

Lack of locally situated manufactures in Denmark, Scandinavia and Western Europe, due to the general outsourcing.

EXAMPLES

– High-end United Kingdom textiles company **Wallace & Sewell**, use their choice of local production as part of the **product history build-up** (www.wallacesewell.com/about)
– Local Production can be used to promote and invigorate a specific geographical area through a **joint platform**, see for example MINYC (http://madeinnyc.org)

THIS CARD LINKS TO

/ Labour conditions / Production on demand / Customisation / Product history

FURTHER READING

http://ldcluster.com/wp-content/uploads/2016/01/Masterclass-produktion-i-danmark.pdf / Clark (2008). **SLOW + FASHION—an Oxymoron—or a Promise for the Future ...?** Fashion Theory, 12, pp. 427–446.

Maintenance

Functional lifetime

Emotional lifetime

FUR

Technical lifetime
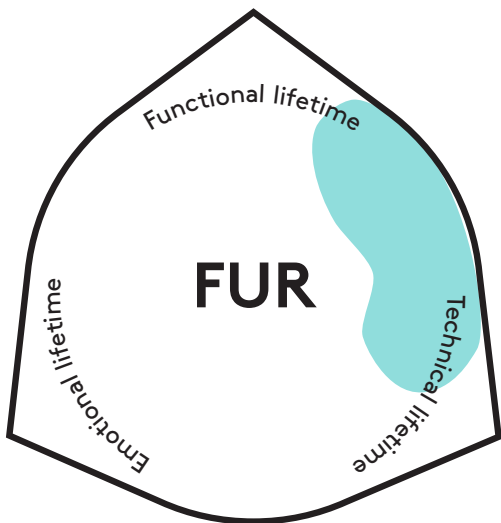
Maintenance

WHAT?
Motivate users to maintain products with a low level of energy consumption through:
1. Information and guidelines; low wash temperature, zero tumbling, airing
2. Choice of material

WHY?
– The energy consumption in the use/maintenance processes can be minimized with the right handling
– The product lifespan can be prolonged through considered handling

CHALLENGES
– Users may not read labels and are habit driven
– Users on average have limited knowledge on materials and maintenance

EXAMPLES
– Japanese brand **Konaka** has developed a 'shower clean business suit' (www.youtube.com/watch?v=9PUyCqiKKzk). Fur does not need to be washed or ironed, bto last, it needs to be stored cool in the summer, which can be energy consuming.

THIS CARD LINKS TO
/ Tagging / Labelling / Rental service / Repair / Technical durability

FURTHER READING
Laitala, Boks, & Klepp (2015). **Making clothing last: A design approach for reducing the environmental impacts.** International Journal of Design, 9(2), pp. 93-107 / Skjold & Ræbild (2016). **Investigating fur as mediator of sustainability.** Nordcode Conference 2016, Kolding (Accepted) / Jack (2013). **Fashion Use: A polemic to provoke pro-environmental garment maintenance**, in: Gardetti & Torres (Eds.), Sustainability in Fashion and Textiles: Values, Design, Production and Consumption. Greenleaf Publishing, pp. 125–133.

Modularity

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
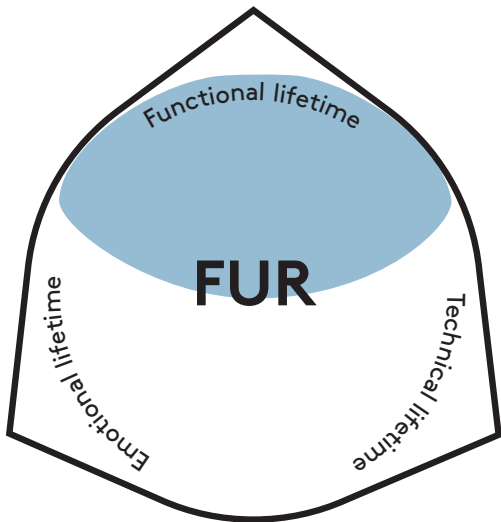
Modularity

WHAT?
Design that is based on a modular approach.
– A product contains several separable pieces that can be assembled in different ways by the user or a series of individual products that may be purchased and used alone, or collected and assembled in different ways over time by the user.

WHY?
Modularity can support the functional lifespan and overall product longevity.
Users can choose to buy products according to individual resources (economy) and users can build up their own selection in their own time. Components can be shared and swapped with others as well be changed to new ones if defect or broken (flexibility).

CHALLENGES
– Users may find modularity challenging and complicated in use
– Product continuity is needed to secure user satisfaction.

EXAMPLES
– Modularity understood as bits to be built together by the user requires a number of modules to work. See garment experiment by **Berber Soepboer** (http://en.refinity.eu/fragment-textiles.html)
– Modularity understood as items that can be used alone or together: a coat may consist of a vest, a cape, a hood/hat, cuffs etc. for different expressions and functions. See for example the **Fishing jacket.**

THIS CARD LINKS TO
/ Customisation / *Functional lifetime* / *Technical lifetime* / Rental service / Design for disassembly / Production on demand / Modularity

FURTHER READING
Niinimäki (ed.) (2013). **Sustainable Fashion: new approaches.** Aalto University, Helsinki / Ribeiro et al. (2014). **Mass customization: modularity in development of fashion products,** International Journal of Management Cases 16 (2), pp. 41-45.

Mono material

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
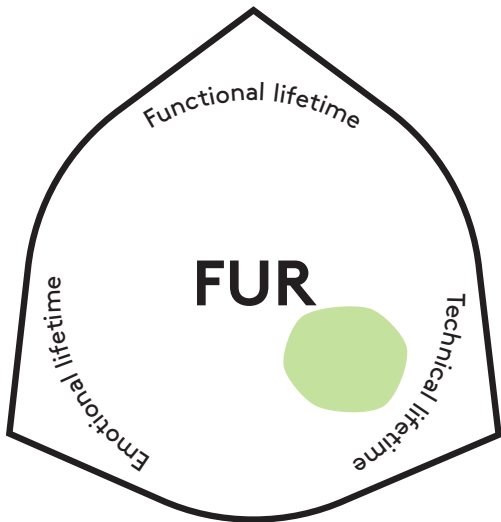
Mono material

WHAT?
A product that is composed of one and only one type of material or a product that is composed on component of only material each that can be split apart

WHY?
Mono-materials can ease material re-use and recycling of a product.

CHALLENGES
– There are limited possibilities for re-utilisation due to lack of facilities that process into new high value materials
– Compromises on e.g. functionality and quality of the product may be necessary

EXAMPLES
– Mono material can be a creative constraint and concept, see for example **Pleats Please** (100% polyester) by Issey Miyake (www.isseymiyake.com/en/brands/pleats_please.html)
– Clothing designed without fusing and lining, such as fur coats

THIS CARD LINKS TO
/ Re-use / Design for disassembly / Up-cycling / Modularity

FURTHER READING
Gwilt (2014). **A Practical Guide to Sustainable Fashion**. A&C Black / Kappelgaard, M. et al. (2011). **Living Lightly – Sustainable Fashion.** Design School Kolding, Kolding, pp. 51-63 / Vezzoli, C. & Manzini, E. (2010). **Design for Environmental Sustainability, Chapter 8: Extending the Lifespan of Materials.** Springer, pp. 171-180

Multi-functionality

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
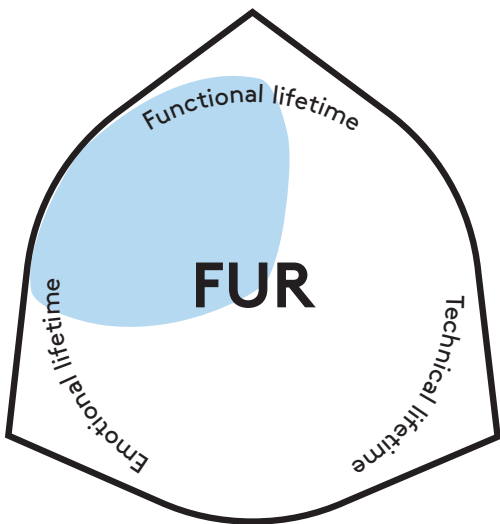
Multi-functionality

WHAT?
Product that can serve multiple functions for one or for several users:
1. Transformation of function
2. Transformation of function to context
3. Transformation to body-type

WHY?
Multi-functionality can minimise use of resources by optimizing product use-ability

CHALLENGES
– It demands user friendly design
– It creates a risk of low product functionality overall

EXAMPLES
– Multi-gender, as **Weekday's S(HE)** product line (http://shop.weekday.com/dk/Weekday_i_d/News/mtwtfss_he) or the garment subscription service **Good Practice** (http://goodxpractice.com).
– Multiple wearing options, such as **Donna Karan's infinity dress** or the **Twelve Way dress** (http://twelveways.com)

THIS CARD LINKS TO
/ *Functional lifetime* / User-understanding / Repair

FURTHER READING
Fletcher & Grose (2012). **Fashion & Sustainability: design for change.** Laurence King Publishing, London / Kunha & Broega (2009). **Designing Multifunctional Textile Fashion Products.** Proceedings of the AUTEX 2009 World Textile Conference, Izmir, Turkey

Product history

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
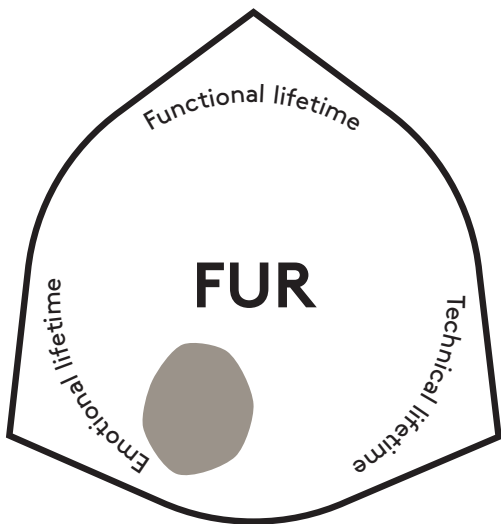
Product history

WHAT?
Articulation to create transparency on product history regarding development, production and potential former use.

WHY?
Visible and transparent product history support emotional attachment between product and user.

CHALLENGES
– Information must be sorted and selected and who decides what is relevant?
– Credibility can be challenged on how to avoid, or inform on, information biases

EXAMPLES
– Production: High-end United Kingdom textiles company **Wallace & Sewell**, use their choice of local production as part of the **product history build-up** (www.wallacesewell.com/about)
– Material origin: **The Wild Concept** as the story of fur design based on hunted fur bought of local hunters made by **Marita Huurinainen** (http://maritahuurinainen.com/about.html#wild) or the company, **Petits Morts Fur** that tells the story of fur sourced from roadkill accidents (http://petitemortfur.com/about/)

THIS CARD LINKS TO
/ Embedded storytelling / Information / Labour conditions / Local production / Tagging

FURTHER READING
Niinimäki (2013). **Ethical design.** In: Niinimäki, K. (ed.) Sustainable Fashion: new approaches. Aalto University, Helsinki, pp. 44-45 / Clark (2008). **SLOW + FASHION—an Oxymoron—or a Promise for the Future ...?** Fashion Theory 12, pp. 427–446.

Production on demand

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
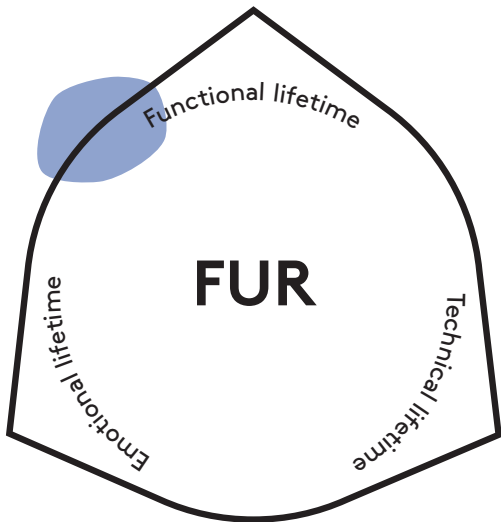
Production on demand

WHAT?
Production of product only takes place after a user has placed an order. The concept is also called Manufacturing on Demand (MoD) and Demand-driven Manufacturing (DdM).

WHY?
Less over-production can reduce overall resource wastage

CHALLENGES
– How does the user meet the product in the first place?
– Users must be patient due to increased time between purchase and possession for user

EXAMPLES
– The Danish Company, **EE12,** produces garments to order and have minimal stock (www.ee12.dk/sustainability)
– The British company **Unmade,** produces production on demand knitwear (www.unmade.com)
– **Fur garments** are often produced on demand, due to the high cost level and subsequently relative few potential users

THIS CARD LINKS TO
/ Local production / Customisation / Modularity

FURTHER READING
Smith & Smith (2013). **Demand Driven Performance.** McGraw-Hill Education / Walter, Kartsounis & Carosio (2009). **Transforming clothing production into a demand-driven, knowledge-based, high-tech industry: The leapfrog paradigm.** Springer London.

Rental service

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
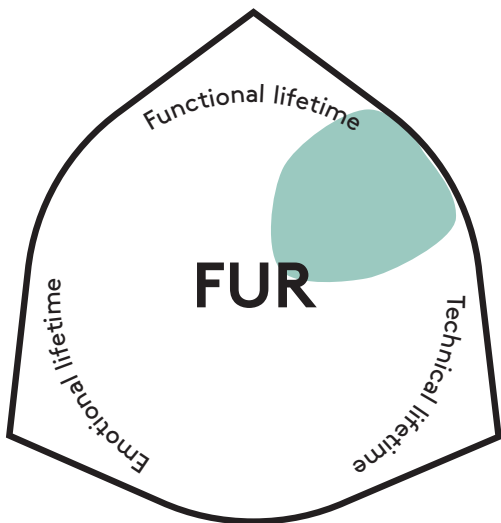
Rental service

WHAT?
Re-use of products through rental services such as subscription services and leasing. Rental services as a concept is par the a sharing economy societal paradigm.

WHY?
Rental service models can minimise use of resources by potentially extending the product lifespan.

CHALLENGES
– Products should be designed for extensive use, which can be a design challenge
– Users may not want to pay for used products

EXAMPLES
– Rental services can offer complete solutions, like the subscription based baby clothing company **Vigga** (www.vigga.us)
– Rental services may provide single items such as designer bags from **rentabag.dk** (www.rentabag.dk)
– Belgian company **Mud Jeans** leases jeans for a monthly fee. Organic and recycled cotton (www.mudjeans.eu)

THIS CARD LINKS TO
/ *Functional lifetime* / Formal alternation and modification

FURTHER READING
Fletcher & Grose (2012). **Fashion & sustainability: design for change.** Laurence King Publishing, London / Petersen & Riisberg (XXXX). **Cultivating User-ship? Developing a circular system for the acquisition and use of baby clothing.** Fashion Practice./ Schor & Fitzmaurice (2015). **Collaborating and connecting: the emergence of the sharing economy.** In: Reisch & Thøgersen (eds.). Handbook of Research on Sustainable Consumption, Edward Elgar Publishing. pp. 410-425.

Repair

Functional lifetime

FUR

Emotional lifetime

Technical lifetime
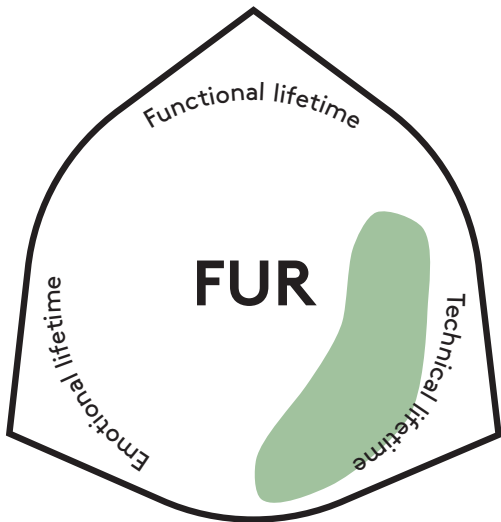
Repair

WHAT?
Self-driven product repair carried out by users can be supported via the product.

WHY?
Repairs can prolong the product lifespan. This can be motivated by user economy, ideology and/or emotional attachment to a product

CHALLENGES
– User needs skills might be limited
– It be difficult to get hold of spare parts
– Users might experience lack of motivation

EXAMPLES
– **Online communities** for all types of repair is a growing phenomenon such as ifixit.com (www.ifixit.com/)
– Websites where users share very **basic craft skills** for repairing clothes, such as on **Lifehacker** (http://lifehacker.com)
– **Youtube tutorials** on for example how to repair a fur coat yourself (www.youtube.com/watch?v=-VO3J5UOKb0)

THIS CARD LINKS TO
/ *Emotional lifetime* / *Functional lifetime* / Information / Maintenance / *Technical lifetime* / Information alternation and modification

FURTHER READING
Barnatt (2012). **Seven ways to fix the world.** CreateSpace Independent Publishing Platform / Fletcher & Tham (ed.) (2015). **Routledge book of sustainable fashion and textiles.** Routledge / Fletcher (2016). **Craft of use.** Routledge / Gwilt,(2014). **Fashion and sustainability: repairing the clothes we wear.** In: Gwilt (ed.) Fashion design for living. Routledge.

Re-use

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
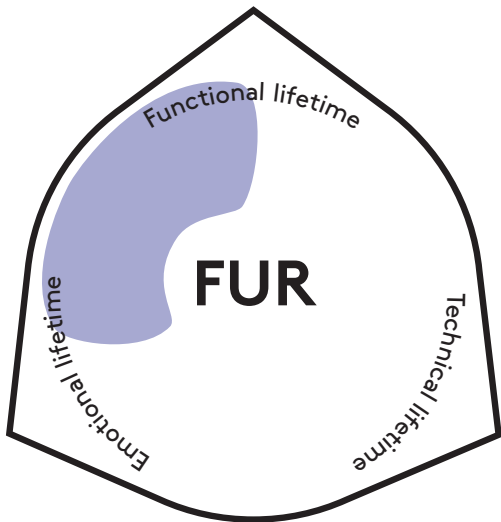
Re-use (deposit)

WHAT?
Re-use of products and materials based on a deposit (pant) system.

WHY?
Re-use can minimize use of resources as they will be used again instead of becoming waste. Re-use can also prolong a product lifespan.

CHALLENGES
– It requires systems that are easy to engage with for users in everyday life

EXAMPLES
– **Re-use of a product in its original form**, as seen in the Danish bottle deposit system, **Dansk Retursystem** (www.dansk-retursystem.dk)
– **Re-use of a product material**, as seen at **H&M** in collaboration with **I:CO:Systems** bring a bag of clothes to the store and get money off (http://about.hm.com/en/About/sustainability/commitments/reduce-waste/garment-collecting.html and http://www.ico-spirit.com)

THIS CARD LINKS TO
/ *Functional lifetime* / User understanding

FURTHER READING
Niinimäki, K. (ed.) (2013). **Sustainable Fashion: new approaches.** Aalto University, Helsinki / Palm et al. (2014). **Towards a Nordic textile strategy: Collection, sorting, reuse and recycling of textiles.** Nordic Council of Ministers

Tagging

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
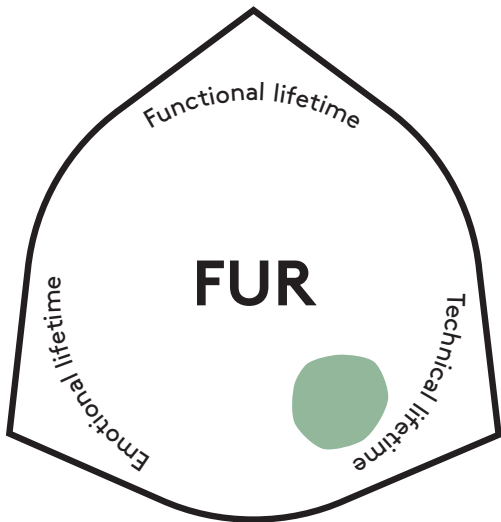
Tagging

WHAT?
Information on product attached to product – possibility using QR-code or link to webpage.

WHY?
Tagging provides easily accessible information on the product, on for example how it has been produced, how it should be handled post-use.

CHALLENGES
– It can be diffiult to find the right place to put the tag in order to reach user
– Tagging requires limited amount of information
– Tagging demands credibility

EXAMPLES
– The **IOU Project** uses smartphone app to connect user with garment journey (www.iouproject.com)
– **Burberry** use tags which, when scanned by use of smartphones, prompt a short film that shows how that item was made (www.burberry.com)
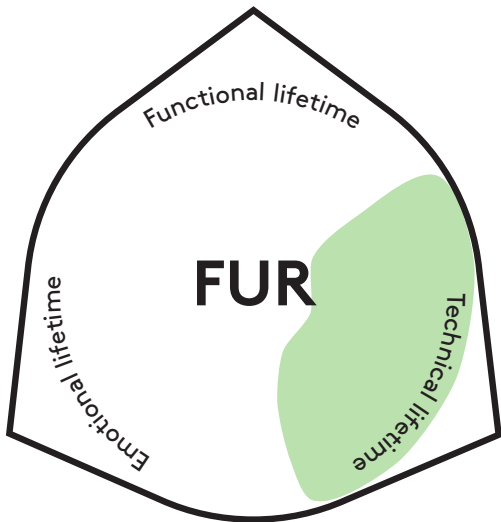
THIS CARD LINKS TO
/ Information / Labelling / Maintenance / Product history

FURTHER READING
Cofino, J. (2014). **Can barcodes make fashion more transparent – and will consumers care?.** The Guardian – Guardian Sustainable Business (5 March, 2014) /

Technical durability

FUR

Functional lifetime

Emotional lifetime

Technical lifetime

Technical durability

WHAT?

To align a material's durability with the intended product lifespan with respect to functional properties such as abrasion, tearing strength and ageing.

WHY?

– To prolong the product lifespan and thus minimize use of resources and to ensure the right material choice for type of use. An example can be that for disposable products (like a paper plate) a criteria may not be long lasting but compostable.

CHALLENGES

– It can be difficult to estimate wear and tear in use contexts
– It can be costly and troublesome to perform standardised tests

EXAMPLES

– Product and material specifications that define performative properties, such as abrasion and tearing resistance, dimension stability and colour fastness (e.g. ISO 12947-1:1998 (abrasion), ISO 105-B01:2014 (colour fastness) and ISO 6330:2012 (dimension stability)).

THIS CARD LINKS TO

/ *Technical lifetime* / Maintenance

FURTHER READING

Annis, P. (2012). **Understanding and Improving the Durability of Textiles**, Elsevier / Fan & Hunters / **Engineering Apparel Fabrics and Garments.** Woodhead Publishing / Hatch, K., 1993. **Textile Science.** West Group / Saville, B.P., 1999. **Physical Testing of Textiles.** Woodhead Publishing.

Up-cycling

Functional lifetime

Emotional lifetime

FUR

Technical lifetime
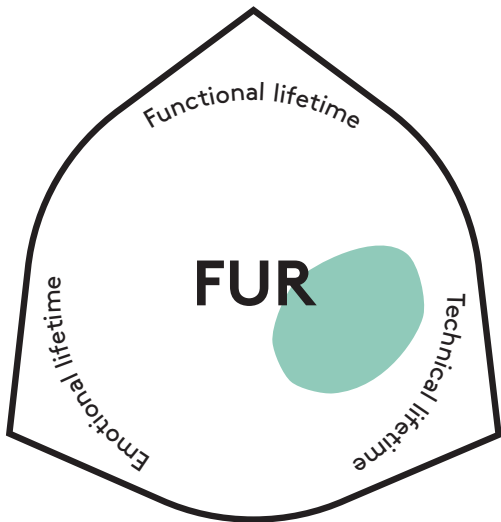
Up-cycling

WHAT?
To inject new and higher value to a used, and possible discarded, product through design.

WHY?
Cradle to Cradle considerations, minimize use of resources

CHALLENGES
– It can be difficult to ensure clean material fractions
– Access to and development of up-cycling supportive technology are limited
– It can be difficult to define that 'higher value' is

EXAMPLES
– **Patagonia's fleece jumpers** made of old plastic bottles (https://www.patagonia.com/recycled-polyester.html)
– A blog entry from **Danielle L. Vermeer** on fashion companies working with upcyling (http://daniellelvermeer.com/blog/upcycled-fashion-companies)
– The web platform, **Horovitz** that sells recycled furs online (http://www.horovitzonline.com)
– The material, **Newspaperwood,** from **Vij5** made out of old compressed newspapers (Mieke Meijer/Vij5)

THIS CARD LINKS TO
/ Design for disassembly / Mono material / Re-use

FURTHER READING
Cassidy & Han (2013). **Upcycling fashion for mass production**, in: Gardetti & Torres (Eds.), Sustainability in Fashion and Textiles: Values, Design, Production and Consumption. Greenleaf Publishing, pp. 148–163 / McDonough & Braungart (2013). **The Upcycle: Beyond Sustainability—Designing for Abundance**, North Point Press

User understanding

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
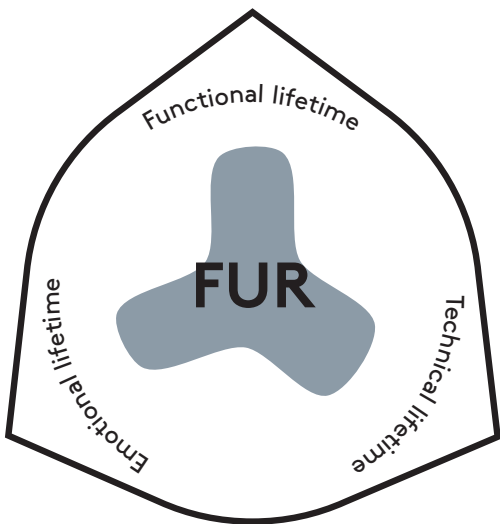
User understanding

WHAT?
To understand intended and/or a potential user regarding:
– Values, economic resources, physique (age and body shape) and or practical life/product use context.

WHY?
Understanding the user can prolong product lifespan through:
– Enhanced product/user match
– Meeting diverse user needs

CHALLENGES
– It can be a challenge to incorporate users and user understanding into design processes

EXAMPLES
– Employ User-centred design methods before, during and after design development (https://www.usability.gov)
– Danish baby clothing company **Vigga** base their business model on in-depth user understanding and community building (www.vigga.us)

THIS CARD LINKS TO
/ *Functional lifetime* / *Emotional lifetime* / *Technical lifetime* / Customisation / Co-creation / Multi-functionality / Embedded storytelling / Formal alternation and modification / Informal alternation and modification / Informal sharing and heritage / Formal sharing and heritage / Re-use

FURTHER READING
Gwilt (Ed.) (2015). **Fashion Design for Living**. Routledge; Laitala, Boks & Klepp (2015). **Making clothing last: A design approach for reducing the environmental impacts**. International Journal of Design, 9(2), pp. 93-107 / Lamb & Kallal (1992). **A Conceptual Framework for Apparel Design**. Clothing and Textiles Research Journal, 10(2), pp. 42-47 (The FEA model)

Zero waste

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
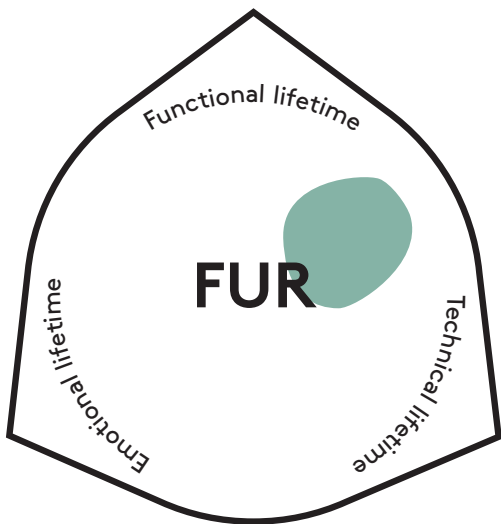
Zero waste

WHAT?
To optimize use of material in production and use. In the apparel industry this can correlate to ptimizing material usage through pattern construction
1. Placing of pattern construction on fabric
2. Full use of own or others material scraps for other purposes

WHY?
– Working with a zero-waste approach can minimize material waste

CHALLENGES
– It may demand aesthetic compromises
– It can be difficult to get access to material 'left overs'

EXAMPLES
– Fashion designer and researcher, **Timo Rissanen** investigates the concept on his blog (http://zerofabricwastefashion. blogspot.com)
– Fur is a material that motivates zero-waste usage, due to: **high material price-level** and a **material strength** that allow even minor parts to be sewn together.
– From a user perspective, zero-waste can be identified by the **5 R's** defined by Bea Johnson: Refuse, Reduce, Reuse, Recycle and Rot

THIS CARD LINKS TO
/ Re-use / Mono material / Modularity / Multi-functionality

FURTHER READING
Johnson (2016). **Zero Waste Home: The Ultimate Guide to Simplifying Your Life**. Penguin Books; McDonough & Braungart (2002). **Cradle to Cradle: Remaking the Way We Make Things**. North Point Press; Rissanen & McQuillan (2016). **Zero waste fashion design**. London: Bloomsbury.

Materials and production

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
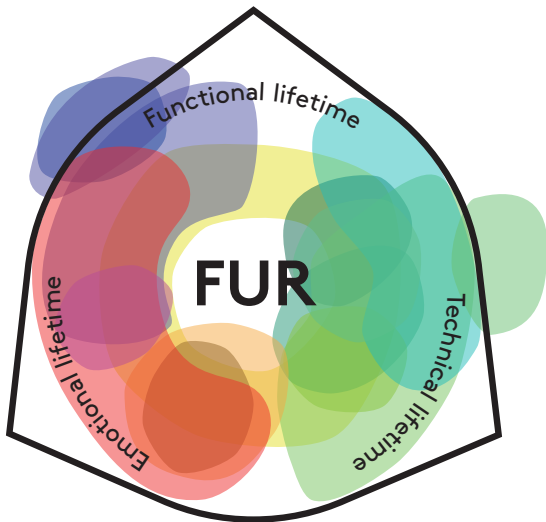
Materials and production

- Aesthetic lifetime
- Design for disassembly
- Environmentally friendly materials
- Formal adjustments and modification
- Informal adjustments and modification*
- Labour conditions
- Local production
- Maintenance
- Mono-material
- Product history
- Production on demand
- Re-use
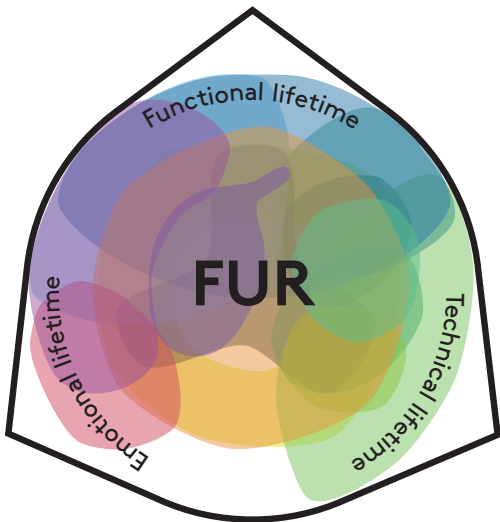- Technical durability
- Upcycling
- Zero-waste

User and practice

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
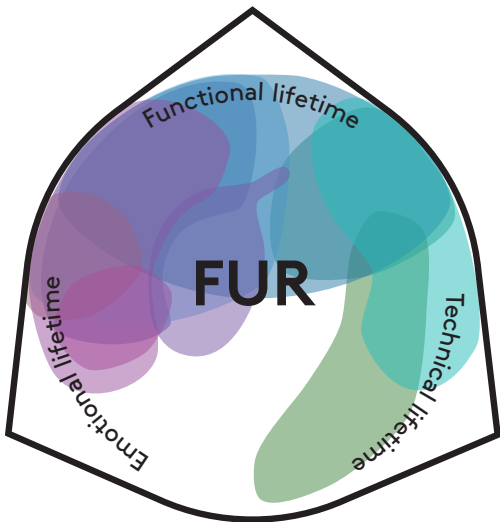
User and practice

- Co-creation
- Customization
- Informal alternations and modification
- Informal sharing and heritage
- Maintenance
- Modularity
- Multi-funtionality
- Rental service
- Repair
- Re-use

Design and concept

Functional lifetime

Emotional lifetime

Technical lifetime

FUR

Design and concept

- Co-creation
- Customization
- Design for disassembly
- Embedded storytelling
- Formal adjustments and modification
- Formal sharing and heritage
- Modularity
- Mono material
- Multi-functionality
- Rental service
- Technical durability
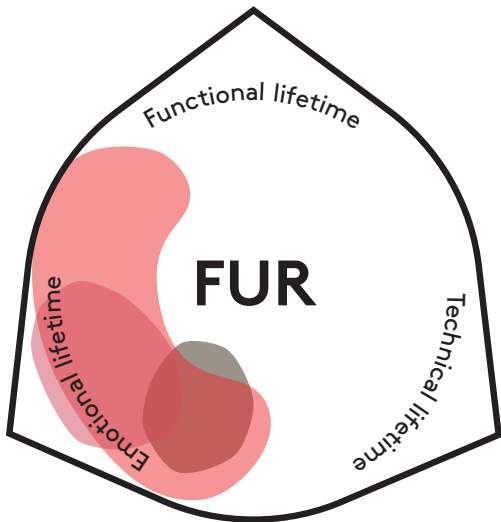- Upcycling
- User understanding
- Zero-waste

Transparency

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
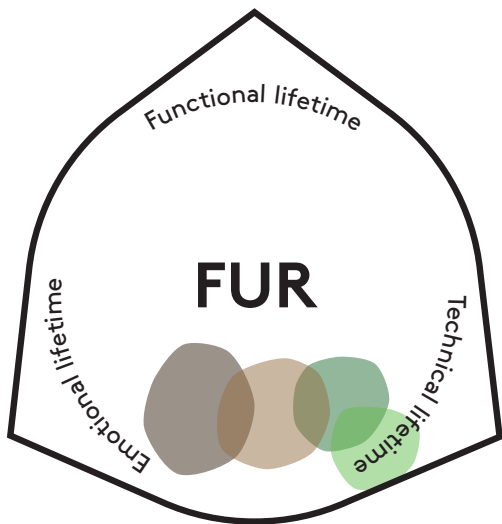
Transparency

- Information
- Labelling
- Product history
- Tagging

Emotional values

Functional lifetime

FUR

Emotional lifetime

Technical lifetime

Emotional Values

- Aesthetic lifetime
- Embedded storytelling
- Product history

Services

Functional lifetime

Emotional lifetime

Technical lifetime

FUR
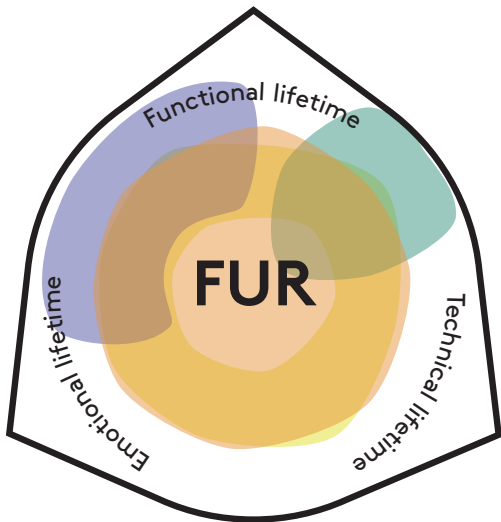
Services

- Formal alternations and modification
- Formal sharing and heritage
- Rental service
- Re-use

The collection includes 35 cards that introduce and describe selected sustainability articulations. The cards have been developed as an inspiration and methods toolkit to be used in sustainable design practice.

In this version, the content on the cards specifically addresses sustainable aspects and fur.

The cards are distributed in six categories:

Material and production

User and practice

Design and concept

Transparency

Emotional values

Services

Sustainability
Cards

Sustainability Cards

Sustainability Cards