Developing circular economy strategies in businesses in Denmark: approach and experiences

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Overview

- Introduction to project Sustainable Production 3.0
- Three types of re-design for integrating circular economy into a business strategy
- Some case examples

20 specific business development projects about circular economy strategy

- AAU, NBE and Gate21: 2 year cooperation with each business
- Mapping and development of action plan
- Initial mapping of each business
  - Important environmental aspects of the business and its products and services
  - Business strategy and environmental strategy
- Assessment of **potentials** and **challenges** from circular economy principles
- Development of **action plan** aiming at considering a business strategy integrating principles of circular economy
  - Proposals for further internal analyses and external dialogues
  - Proposals for experiments with changes in products and services and business model

Business characteristics	Status in relation to circular economy
New small clothing manufacturer	Product take-back, reverse logistics, market communication
New small manufacturer of jackets from recycled materials	Business model based on product take-back with discount on next product
Mattresses and pillows of foam	Cascading use of mattresses Developing business models based on leasing and direct sale to consumers
Textiles for furniture	Recycling of residual textiles
Food packaging manufacturer	Already using recycled cardboard raw material. Focus on possibilities for recycling of used packaging. Collection of knowledge from sale agents about final users'practices
Food/non-food cooperative retail chain	Cooperation about development of packaging strategy combining health concerns and circularity concerns. Organising stakeholder dialogue about bioplastic as possible path
Lighting substitution to LED lighting	Business model based on ESCO light where substitution is financed through savings on electricity costs Treatment of old light bulbs in order to increase material recycling
Manufacturer of school furniture	Developing product-service system for public institutions. Hoping to try out product leasing to public schools.
Roof top windows	Dialogue about development of "circularity narrative". Focus on the impact of existing practices on 'repurposing' and 'multipurposing' of buildings.
Machines for industrial laundaries	Interest in Total Cost of Ownership, which some potential customers show interest in. Applying for innovation funding together with other companies in order to optimise a local value chain
Mobile barriers for flooding prevention	Cooperation about collection of knowledge about user practices and possibilities for prolonging life time and developing material recycling
Pump manufacturer	Product take-back of pump and product-service system for business customers

Dissemination and embedding of results and experiences among multipliers

- Has set up stakeholder based **strategy and communication** group
- **Train-the-trainer workshops** based on experiences from 'circularity innovation processes' from case studies
  - For consultants, business organisations, public authorities, business incubators, waste management companies etc.
- **Workshops for university teachers** for development of education strategies and elements
- Workshops for members of two **regional environmental business networks**

Working with three types of re-design strategies in the cooperation with the businesses

1. Re-design of products and services
   - *Considering necessary changes in roles of products, users, service, infrastructure, etc.*
2. Re-design of value chain dynamics
   - *Up-stream and down-stream*
3. Internal re-design of businesses
   - *Integrating environmental concerns in product and strategy development*

Understanding user practices as background for ideas for increased circularity

Inscription:
delegation af roles to actors, products and infrastructure

=>

(Manu)script
with inscribed actors etc.

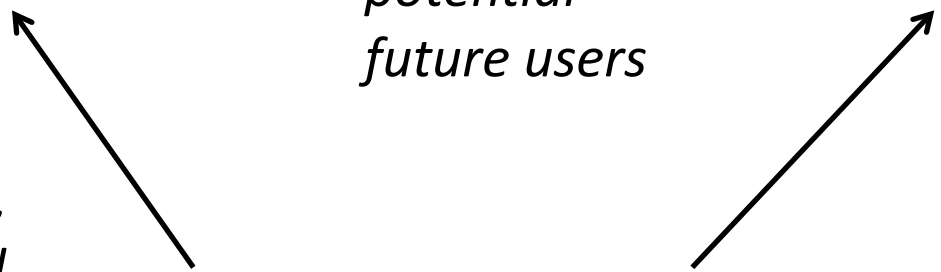
=>

Use
Accept?
Users adapting products or practices?

How to ensure sustainable use?
The roles of product design, technology and information?

Configuring potential future users

Product use as expected?
Product lifetime as expected?
Learning from user experiences?
=> Improved design?

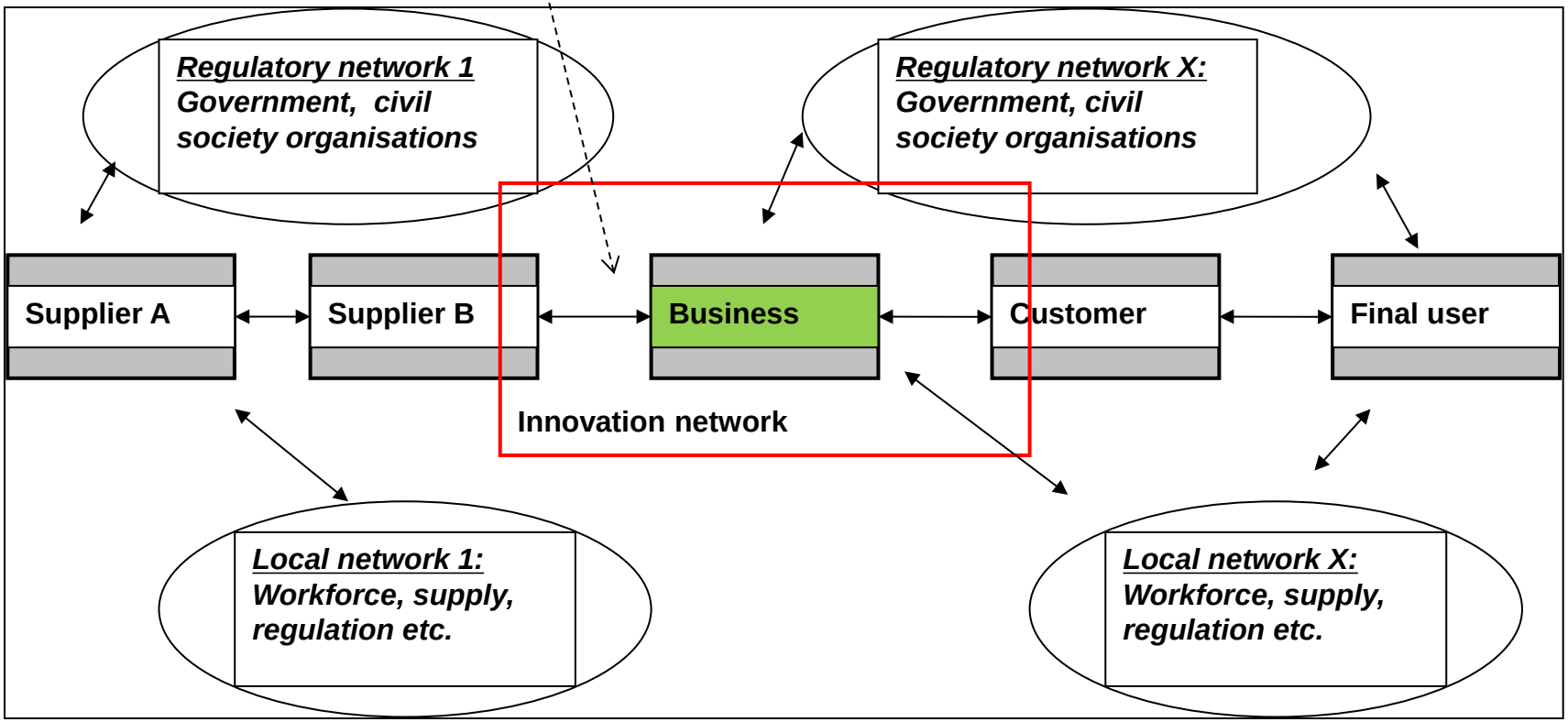


Connecting information about product use with assumptions about use and users as background for redefining products and services

Four types of network of a business:

Value chain, innovation network, regulatory networks and local networks

Value chain (product chain): Flows of materials, knowledge and capital
Learning and power relations



Organisational (re-)design for integration of circularity concerns in business innovation and operation

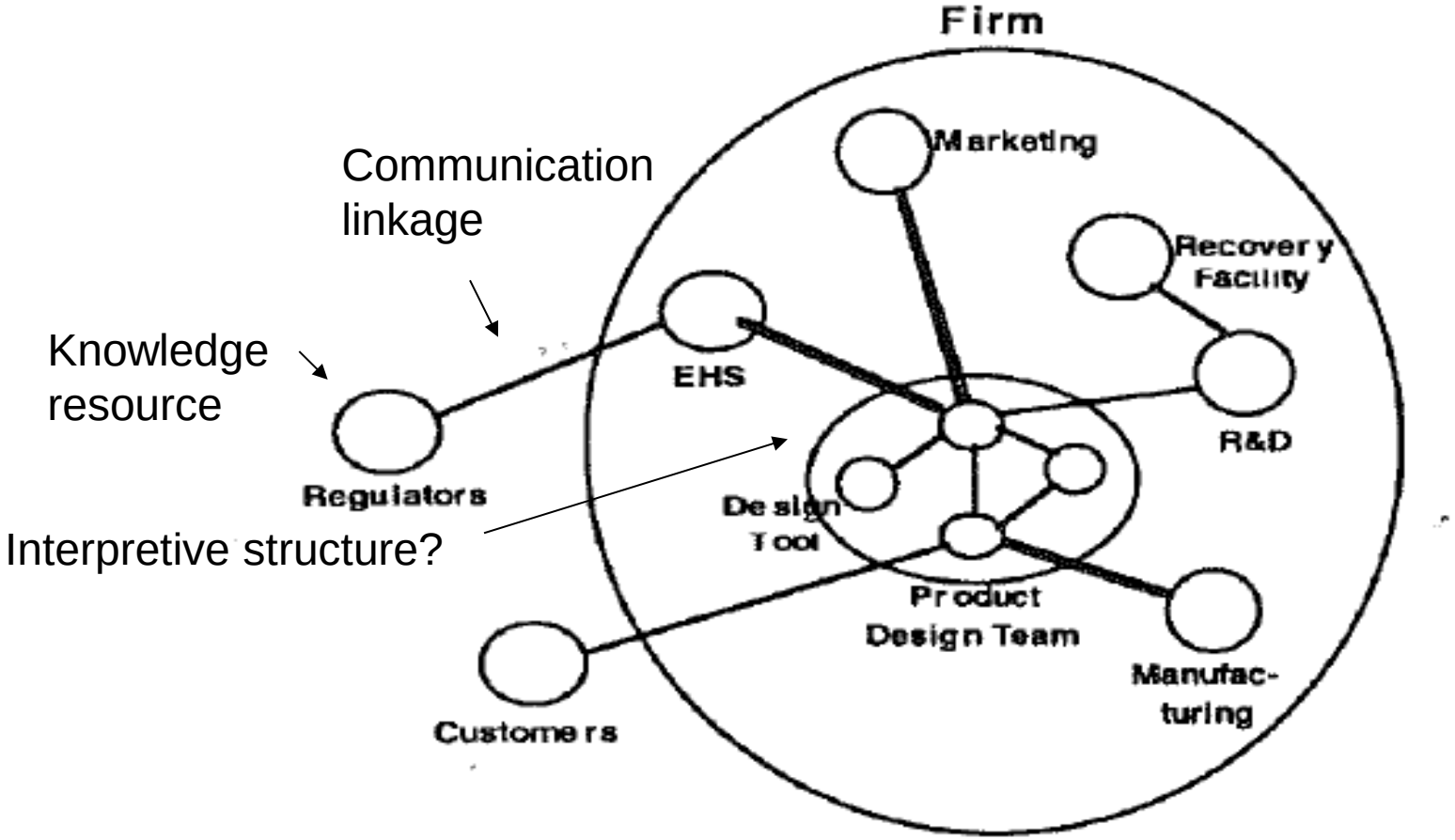
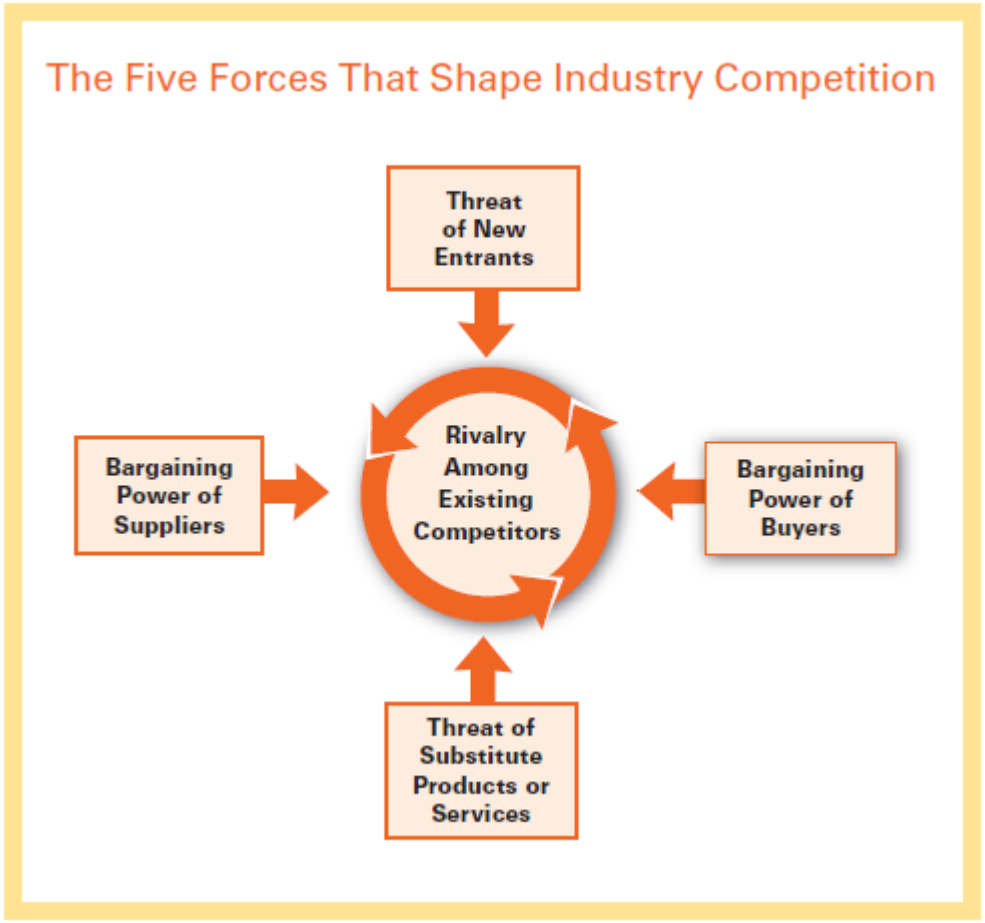


Figure 1. An example information network

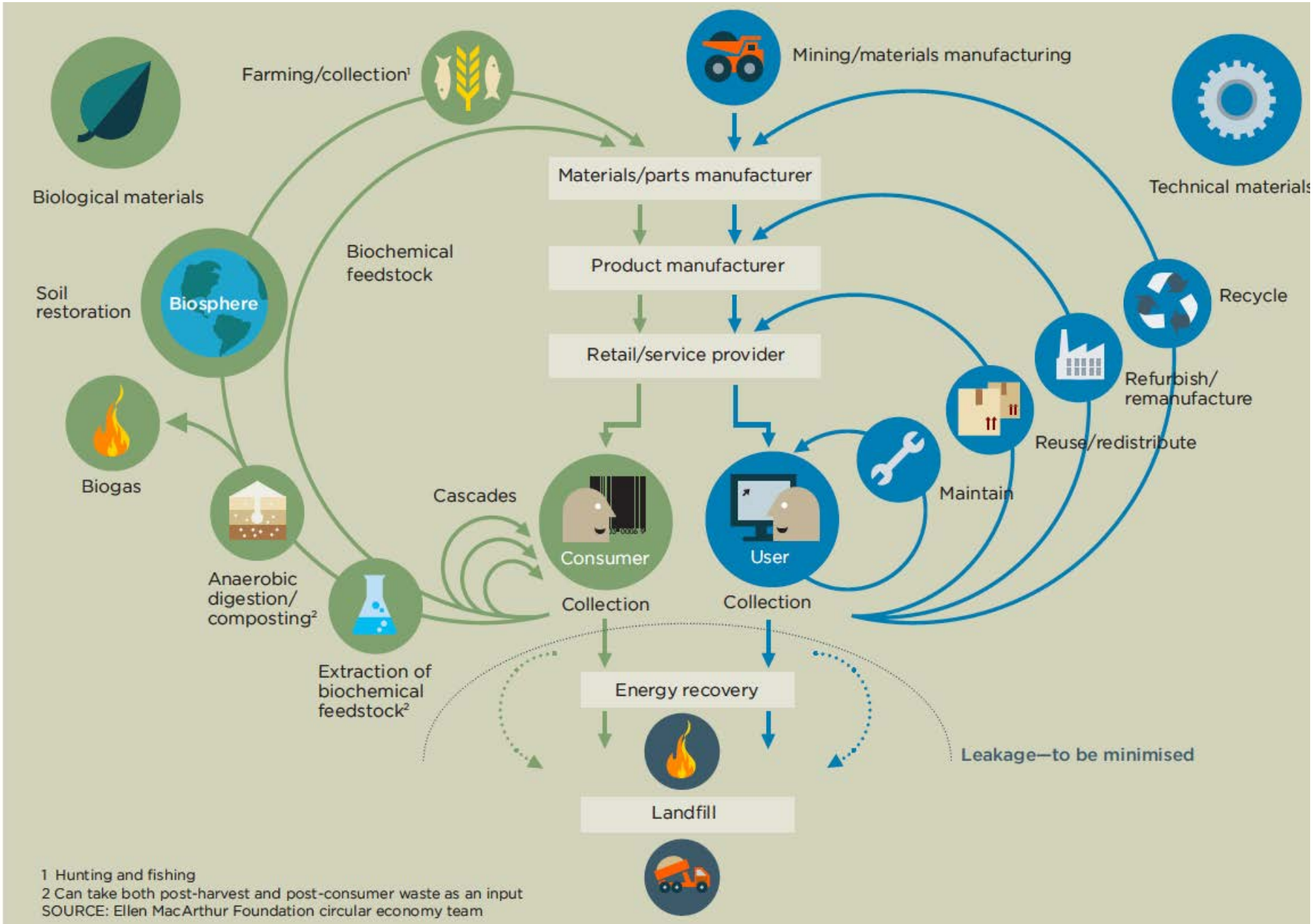
Source: Lenox & Ehrenfeld 1997: Environmental Design Capability

On the table during initial cooperation with the businesses: **Forces shaping the competitive position of a company**



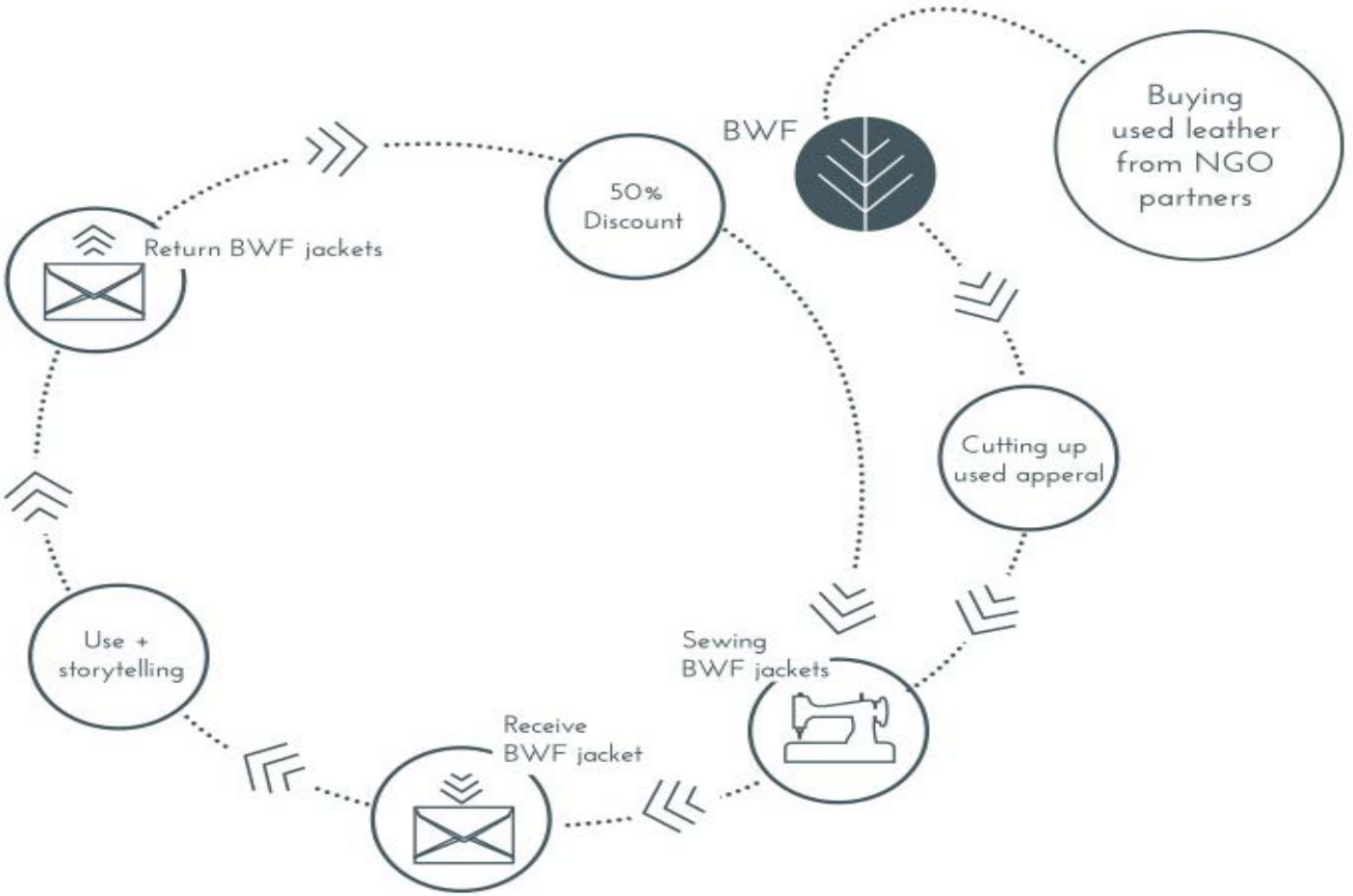
Source: Michael Porter, 2008

On the table during initial cooperation with businesses



Analysing emerging circular business model:
Leather jackets from recycled materials

Leasing or product take back of leather jackets made from used leather



Prevention of flooding: Mobile barriers made of plastic tubes

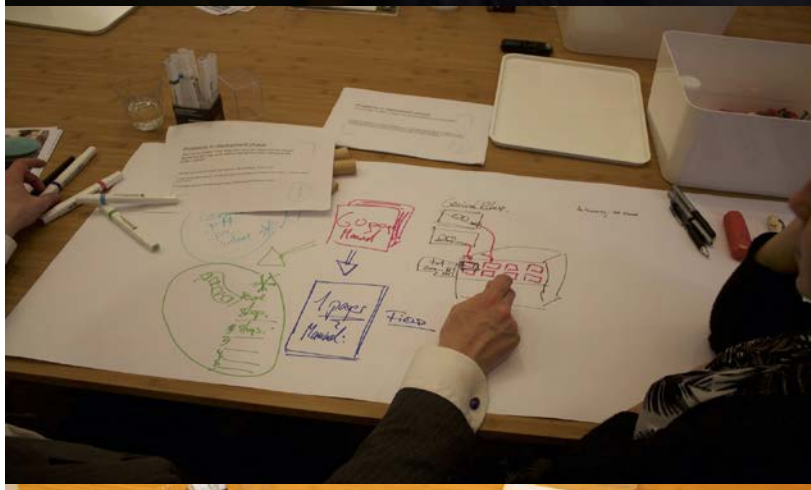
ENVIRONMENT SOLUTIONS
Preventing hydrometeorological disasters

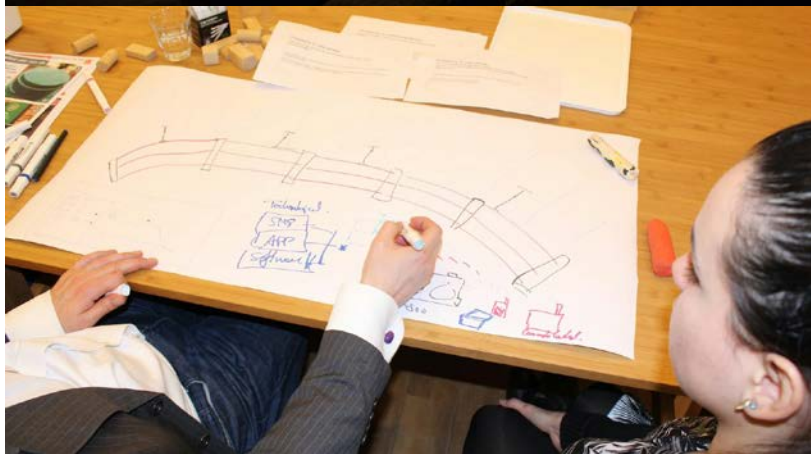
"Flood barrier – fighting water with water"

Focus:
How to prolong life time of the mobile barriers and enable recycling of the used materials?

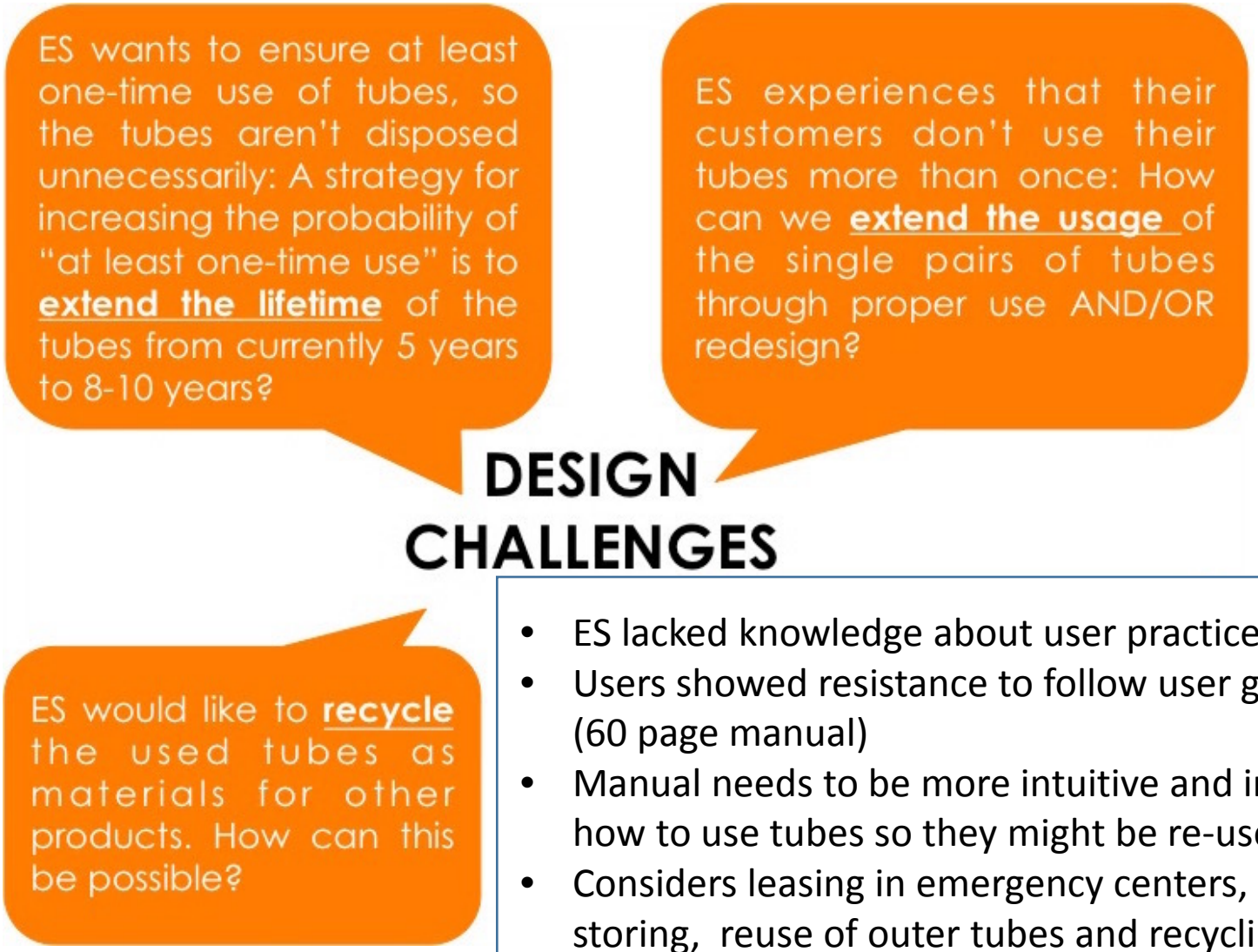
Understanding user practices as background for development of ideas for increased circularity

- Dialogue with manufacturing staff
- Workshop with fire department that have used the barriers





Understanding user practices as background for development of ideas for increased circularity



- ES lacked knowledge about user practices
- Users showed resistance to follow user guidelines (60 page manual)
- Manual needs to be more intuitive and inform about how to use tubes so they might be re-used
- Considers leasing in emergency centers, better storing, reuse of outer tubes and recycling of inner

From product sale to product service system:
”Rent a learning environment”
Developing circular economy as part of public procurement

http://www.hojermobler.dk/

Rent a learning environment

- New challenges in the public schools => new demands for physical frames: From furniture to learning environment
- Public procurement based on product leasing per child – possible to change and supplement furniture
- Long life time – at least 20 years
- Environmental concerns in choice of materials
- Modular design – possible to exchange parts and upgrade furniture
- Repair and maintenance as service
- Product take-back with recycling of components and materials
- Agreement with local city council about future public procurement based on renting instead buying furniture

Developing a circular economy value proposition about existing practice

Re-purposing and multi-purposing of buildings

Focus in cooperation:
***From** life time of skylight windows **to** life time and use of existing buildings.*

How can the use of daylight prolong the life time of existing buildings?

The old Aarup Town Hall would not immediately spring to mind as the setting for a modern kindergarten. The extensive buildings spread out like large flat blocks in the landscape and are witness to a building style that owed more to occupying square metres than letting in light and air.

Today, these buildings are home to 'Drømmebakken', Aarup's new kindergarten, with 125 children in the kindergarten section and 25 in the day care nursery. Should one of the old town hall employees suddenly find themselves back in their old workplace, they would have difficulty recognising it. The buildings have been opened up in eleven places with the installation of no fewer than forty-nine modular skylights.

Conclusions from Danish case studies (1)

- ”Circularity” is unique socio-material combinations of *slowing, narrowing and closing material flows*
- More circular business models already developed by some companies: *circular start-ups and existing companies*
- Companies might lack knowledge about user practices: *important for CE strategies prolonging product life time*
- Businesses can develop dialogue with public authorities about public procurement enabling increased circularity:
  - *Public willingness for ”pre-tender market dialogue”*
  - *Making existing services more circular: contract length too short?*
  - *Investment => service*

Conclusions from Danish case studies (2)

- Possible to engage businesses in assessment of circularity potentials and challenges of business strategy:
  - *Offering 500 hours of cooperation*
- Combine business' present strategic focus and circularity opportunities as possibility and constrain
  - *Total cost of ownership => optimising product flows*
  - *Redefining retailer's food packaging strategy: health + circularity. Critical scrutiny of demand for bioplastic*
- Possible contribution of research cooperation:
  - *Develop and/or document potentials and challenges to circularity*