

Educating engineering designers for a multidisciplinary future

Mattias Bergström

Åsa Ericson


Luleå University of Technology (LTU)
Division of Functional Product Development

Detlef Matzen

Adrian Tan

Technical University of Denmark (DTU)
Department of Mechanical Engineering
Section of Engineering Design and Product Development



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1

Functional Product Development (FPD) and Product Service Systems (PSS)

■ Different names...

» Similar intentions!

- A product development view
- Support engineering designers and teams
 - Knowledge
 - Process
 - Methods
 - Tools

» Integrating a service perspective

- For the purpose to
 - Develop FPD/PSS offerings
 - Life cycle perspective/life cycle commitment
 - Need fulfillment drives the development process
 - Take additional aspects into early phases, e.g., environmental

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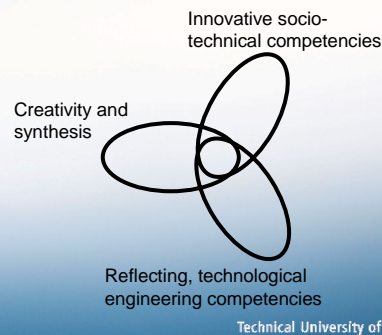
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2

What? Why? How?

- Education of engineering designers
- FPD/PSS trigger a new role
 - » Extended responsibilities
- An engineering design curriculum which integrates the domains of
 - » Socio-technological analysis
 - » Synthesis
 - » Technical skills



Requirements on future engineering designers

- Growing importance of
 - » Information technology in supporting the life cycle performance of products
 - » Worldwide collaboration
 - In enterprises and *between* enterprises/actors in
 - Development
 - Manufacturing
 - Delivery
 - Services & Support
- The engineering designer as a coordinator and integrator
 - » Guiding communication between different professions
 - » Extracting/analyzing and drawing conclusions on user needs and offering potentials
 - » Driving business development by synthesis of PSS offers

A deep dive, an example...

■ Lego exercise

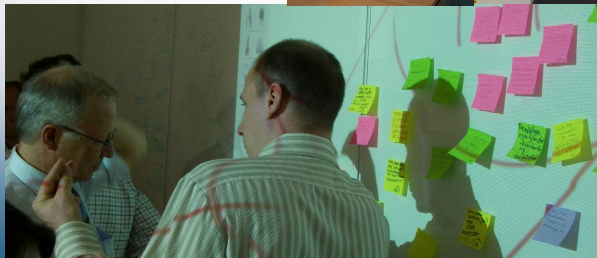
- » To experience what can be problematic
 - Lecturing is one thing, make things happen another
- » Go from needs to product very fast, approx 10 min exercise
 - Task – what is at hand?
 - Shared vision
 - Roles – who is going to do what?
 - Assign a team
 - Collaboration – do what with whom?
 - Team competences
 - Communication – from one point of view to another
 - Tacit knowledge
 - Complicated
- » = a bit more prepared for the project part
 - Have a sense of what will be

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Lecture course @ LTU

- 'Live as we learn'
- Education
- Industry



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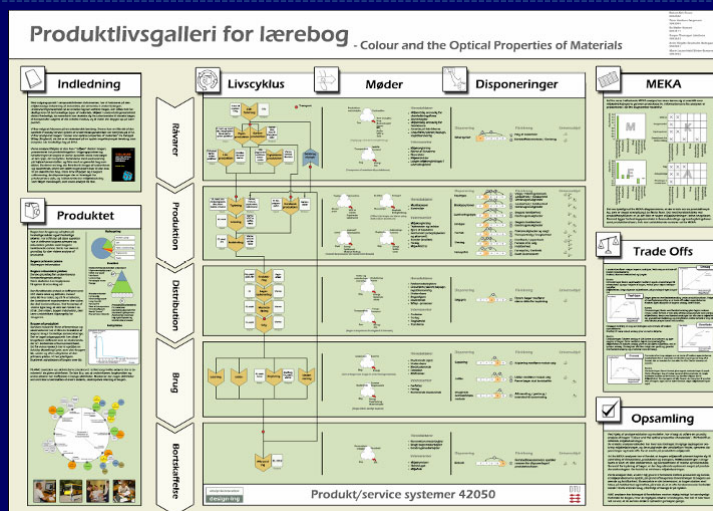


Case course @ DTU

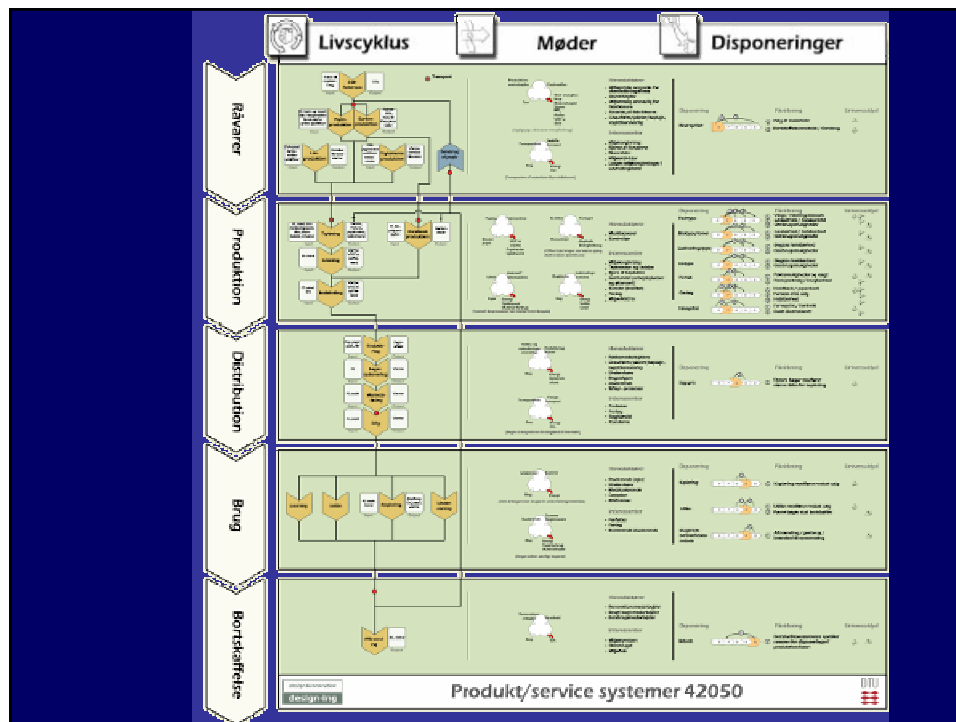
- The student teams are first guided through an analysis of the initial product's product life cycle, yielding insights into four aspects of product design:
 - » identification of current environmental impacts,
 - » life phase systems the product encounters,
 - » activities that involve the human actor (i.e. customer) and the product,
 - » actor-network that support and supply these activities throughout the product's life.
- Based on the analysis, goals are set for the improved solution and concepts are developed for a new product/service-system.
- This way the students are lead through
 - » engineering and
 - » socio-technical analysis tasks and thereby laying the foundation for their
 - » synthesis work
 in the concept development phase of the project



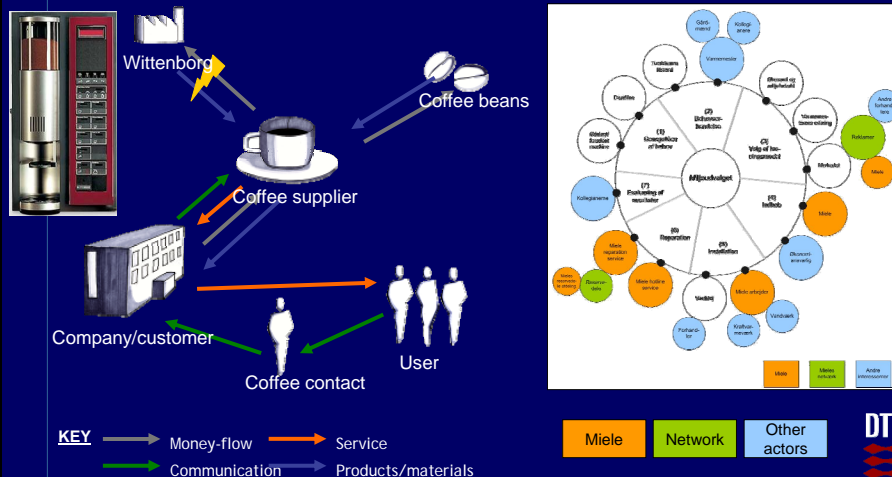
Product life gallery



[design.ing student project, 2006]

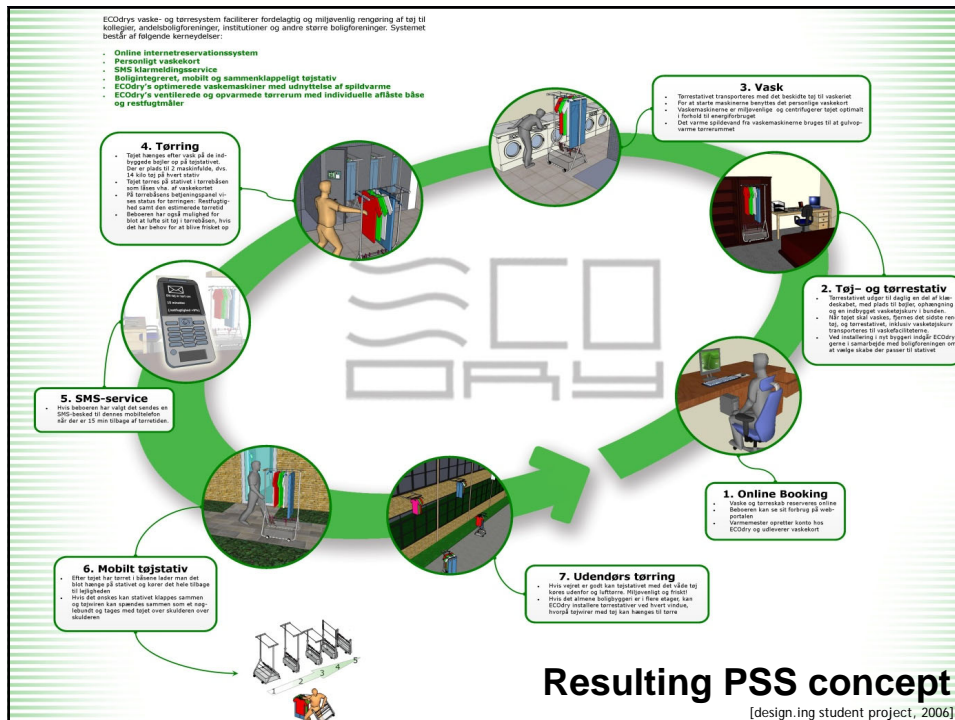


Actor-networks and Actors activity cycles



[design.ing student project, 2004]

[design.ing student project, 2006]



Our message...

- FPD/PSS an interest in industry today
 - » Importance of socio technical competences in future education of engineering designers
- Challenge traditional engineering design curriculum
 - » Not only problem-solving, also problem definition
 - » More tacit aspects into concept phase
 - » Extended responsibilities for engineering designers
- A new role in real product development projects