Eco-design principles in a business network: A case study on the work of designers in developing a large-made-to-order product

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Introduction: business networks

• Products developed increasingly in business networks (Ford et al. 2011; Möller et al. 2004; Jarillo 1993)

• Optimal combination between vertical integration and outsourcing
  – Focus on core competence & collaborate to produce complete offerings
  – Individual actors cannot control everything in the network
Introduction: eco-design

- Eco-design often suggested to require wide and early application already in concept design (e.g. ISO 2011; Lewis et al. 2001; Blizzard & Klotz 2012)
  - Similar to consistency and strategic use of design as in design management (Cooper and Press 1995; Stevens and Moultrie 2011)

- Individual actors should ideally be able to control their partners and supply chain
Eco-design in business networks?

1. How do eco-design principles stand out in business networks?

2. What is the role of designers in realising eco-design in business networks?
Method

• Case study (work in progress)
  – 17 interviews with product developers working in a project
    • 10 designers, 5 managers, 2 coordinators
  – Process documents and public documents used as supportive material

• Large-made-to-order (LMTO) metal product
  – E.g. power plants, offshore equipment, ships (see Stoyell et al. 2001)
  – Collaboration and networked development with multiple different specialists
  – Major sustainability improvements targeted and achieved in the project (mostly energy-related)

• "Dyad-network perspective" (as in Halinen & Törnroos 1998)
  – Focus on manufacturer and client
Legend:

Network location/organisation
MO = Manufacturing Organisation
CO = Client Organisation
CC = Client Consultant

Role/profession
D = Designer
M = Manager
C = Coordinator

MOD1 = Manufacturing Organisation Designer 1
Method

• Interviews fully transcribed, analysed and coded:
  – When did the designers/developers work in the project?
  – What tasks and roles they performed?
  – How the environmental targets influenced their work?
Results
Results

Roles and tasks in different stages compared

- Phase 1 focus on sales and a wide range of concepts
  - Style, function, service, technology, sustainability...
  - Generic focus on sustainability, i.e. "suggestions"
- Phases 2 and 3 more focused on realisation

“...we try to lure the client with good ideas and pictures right from the start”

“...it’s a long journey and there’s many processes in between. But if you’re lucky and make a good suggestion or idea [...] it can go all the way to the end.”
Results

• However, no linear sequence between Phases 1, 2 and 3
  – Designers coming in at later phases start again with their own concepts (with cost level determined and feasibility expected)
  – Contractual reasons and work ownership

"I go through them [concepts from P1] and I met the designer also […] but we didn’t go about realising them in any way, it was not feasible”

“One consultant made this kind of a proposal and we started negotiating from that […] about what it should then actually be like, so that we can manufacture it”
Results

Influence of environmental targets to design

- Designers aware and interested in sustainability issues of the product but detached from eco-design and sustainability improvements
  - Focus on core design competences, i.e. appearance and function (as in e.g. Ulrich and Eppinger, 2000)
  - Safety constrains as a barrier to more sustainable material selection
- In comparison engineers heavily influenced by the targets

“so the reality is quite, it's like there's so many safety issues before that [sustainability] you have to think about”.

“[the sustainability focus of the project] did not really, in terms of the environment, bring anything to the design, so that we would have somehow emphasized environmental friendliness in it”
Conclusions

• Principles of wide and early eco-design application difficult in business networks
  – Early design concepts not decisive in the studied case (translatability more relevant)
  – No linear progression from P1 to P2 to P3 (instead multiple different concept design phases)

• In the studied case, designers did not play a key role in eco-design
  – Focus on core competence in business networks
  – Design work mostly untouched by energy-related issues

• Yet, significant environmental improvements achieved
  – The collaborative nature of business networks as a key success factor in sustainability improvements?
    • Client problems become manufacturer problems
Implications

• Design managers must develop sensibility towards who specifically to manage in eco-design and when?
  – Translation of ideas to practice a key moment, not the earliest possible concepts
  – Some product developes more influential in eco-design

• Focused environmental improvements that can survive from idea to execution should be targeted
  – Design managers should aid to bridge the gap between early vision concepts and production concepts
Limitations

- LMTO-products are unique
  - Different industries and product types developed in business networks need to be studied to draw wider conclusions

- Interviews as reflections on events rather than factual accounts of events (Silverman 2011)
  - Ethnographic studies may reveal deeper insights
  - Interviewees in different project stages during the time of interview due to long lead time
Thank you!