Towards a Holistic Approach to Retrofitting

Stina Rask Jensen
PhD student, M.Sc. ENG
Department of Engineering, Aarhus University, Denmark
E-mail: srj@eng.au.dk
Phone: +45 93508768

Poul Henning Kirkegaard, Professor, Aarhus University
Aliakbar Kamari, PhD Student, Aarhus University and University of Palermo
Anders Strange, partner AART architects
Towards a Holistic Approach to Retrofitting

Agenda

• Background
• Hypothesis
• Objective
• Methodology
• Findings/conclusion
• Further studies
Background

- The building sector accounts for up to 40% of the total energy consumption in the EU.
- The majority of the existing building mass will still be in operation by 2050.
- ➞ a considerable potential in renovation of existing buildings. Especially in the domain of social housing.
Background

- Renovation projects make up highly complex systems with many stakeholders.
- Development of a number of assessment methodologies to assist the decision-making processes.
Hypothesis

A. That the methodologies assign weight to different ‘sustainability indicators’ and, as such, represent different views on sustainability.

B. That there is a gap in the existing tools, when it comes to addressing the implications of technical interventions on socio-cultural themes (perceived spatial quality) in early design stages.
Objective

• Qualitative analysis of 7 state-of-the-art methodologies for sustainable renovation.
Methodology

• Allocating the themes of the methodologies to the traditional 3-pillar understanding of sustainability.
Findings

• AktivHus (ActiveHouse)
  • From 2015, based on the international ActiveHouse principles.
  • Design strategy and certification tool.
  • Focus on environmental indicators and indoor climate.
Findings

• SAVE
  • Late 1980’s.
  • Administered by Kulturstyrelsen (Danish Agency for Culture).
  • Asses preservation value of existing buildings.
  • Preservation tool => Focus on culture-historical aspects.
Findings – A

Guideline/process-oriented
(open guideline for articulating themes for retrofitting)

Holistic approach
(considers social, economic and environmental aspects from a life circle perspective)

Certification system
(clearly defined scoring system for evaluation of building performance)

Delimited focus
(specified focus)

Total value model

Arkitektur, Energi, renovering
Evaluering af kvalitet i boligbyggeri

Active house

SAVE

DK-GBC

RENO-EVALUE

Figure 7
Graphical positioning of the studied methodologies for sustainable retrofitting
Findings – B

B. We see a general challenge in the methodologies when it comes to addressing the spatial consequences of technical initiatives in the early phases of a renovation process.

- Represents a **lost opportunity to increase the inhabitant’s receptiveness** (Acre & Wyckman, 2015).
- The ‘soft’ character of spatial quality is difficult to quantify and ‘operationalize’.

**Qualitative aspects**
Culture-social aspects (e.g. spatial quality)

**Quantitative aspects**
Measurable aspects (e.g. economy, energy, indoor climate)
Further studies
– architectural transformation

• Further studies into the consequences of energy optimization initiatives on the perceived spatial quality
Further studies – architectural transformation

• Further studies into the consequences of energy optimization initiatives on the perceived spatial quality

• Case: social housing renovation in Aarhus, Denmark.

Image: Toveshøj, Denmark.
Further studies – architectural transformation

- Interviews with inhabitants
- Literature studies
- RtD among practicing architects

Image: Tøveshøj, Denmark.
Thank you

WSBE17 | 5-7 June 2017 | Hong Kong

Stina Rask Jensen
PhD student, M.Sc. ENG
Department of Engineering, Aarhus University, Denmark
E-mail: srj@eng.au.dk
Phone: +45 93508768