



Barriers and Benefits (Opportunities) for Lighting in the Building process.

The Swedish background:

Peter Pertola

IEA SHC Task 50, Subtask A, Market and Policies

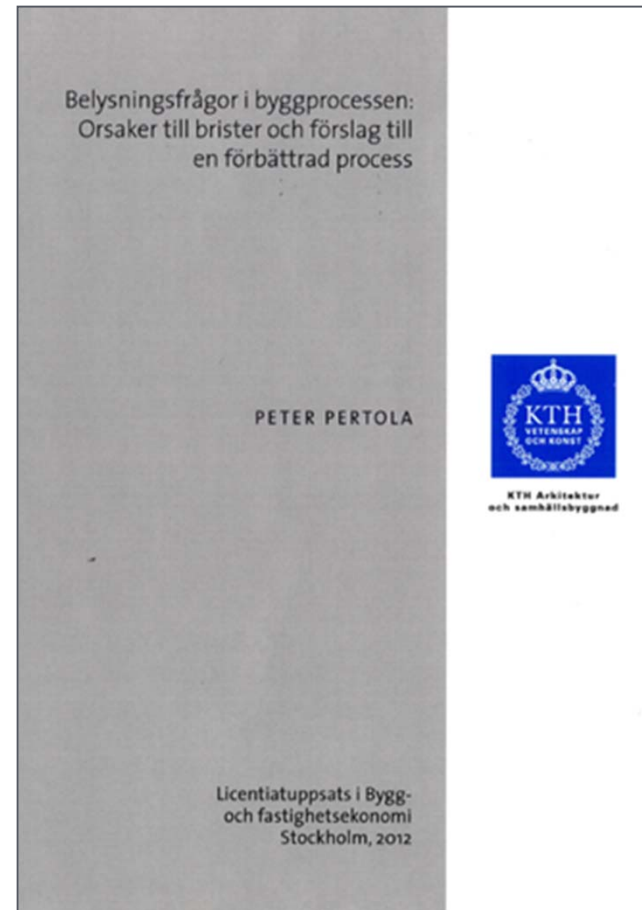
UNITED
BY OUR
DIFFERENCE



Barriers and Opportunities

- A story about why we don't invest in new and energy efficient lighting systems in existing buildings

“Lighting issues in the construction process: Reasons for shortcomings and proposals on how to improve the process.”



Sustainable Municipality

2009 – 2014, Phase 2 and 3

Energy Efficient and Sustainable
Lighting in Municipalities

**Licentiate thesis is one of
three parts of the project**

Sustainable Municipality, 2009 – 2011, Phase 2



- **The Issue**

What efforts in the lighting field is required for faster energy efficiency and better lighting?

- **The Purpose**

To carry out a number of good, functional and energy efficient lighting projects, as well as to study the planning process.

To study and implement new technologies (LED).

To be a client support to municipalities and develop a practical manual (Guide book), with e.g. advice on planning process, procurement and technology.

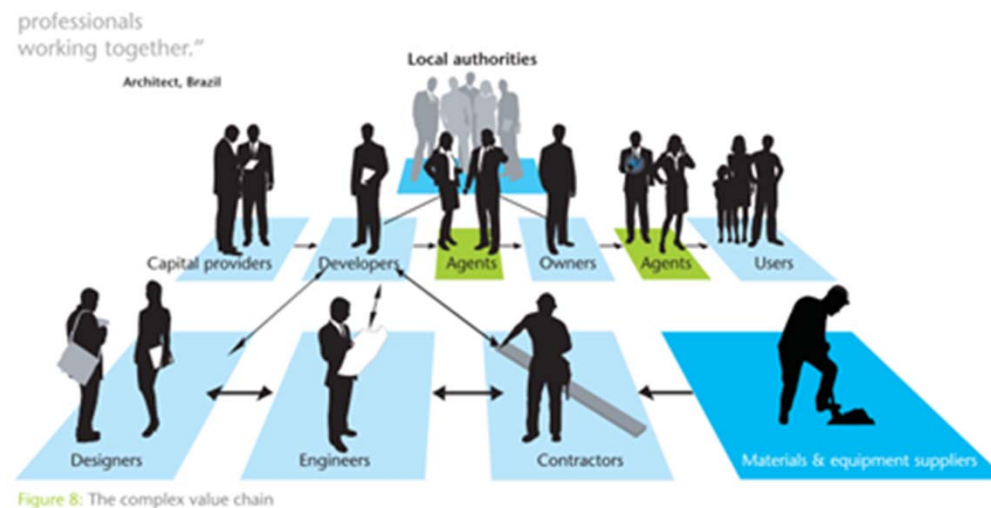
A scientific study of the processes (licentiate thesis).

The Building Process



The used **definition** of building process is normally from idea to completed building taken into use. But in this paper we especially have to focus on the all aspects of retrofitting a building. There are often differences between the processes.

Assessment of the building design process shows that is a complex **value chain** with many different participants (decisions) in many different patterns. Who are the **Main Decision maker?**



From World Business Council for Sustainable Development, Energy Efficiency in Buildings, Facts & Trends, (WBCSD, EBB, F&T) we have the following picture:

<http://www.wbcSD.org/pages/edocument/edocumentdetails.aspx?id=13559&nosearchcontextkey=true>

The Building Process

- There are several severe barriers here and the objective is to identify them and try to find out how to change the bad ways and forces the practitioners to work in a more proper way.

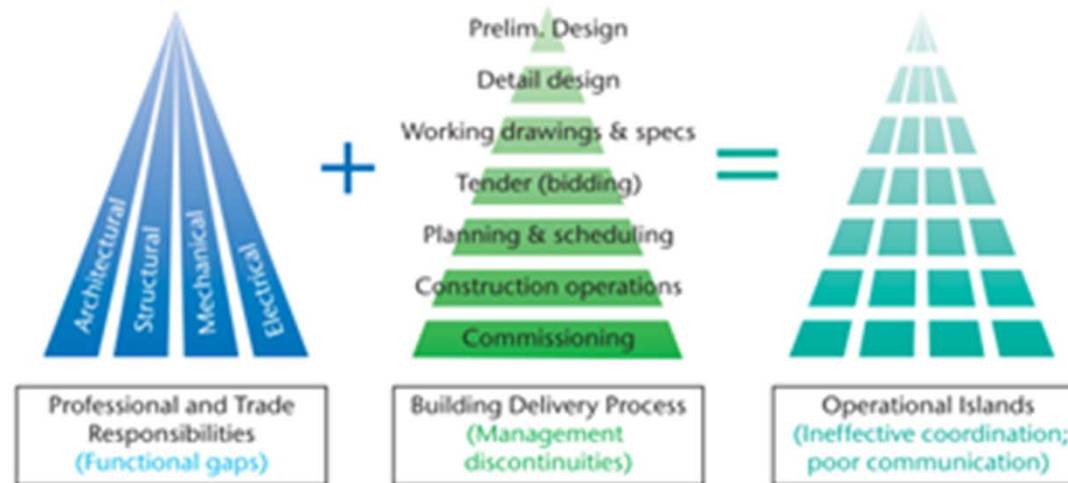
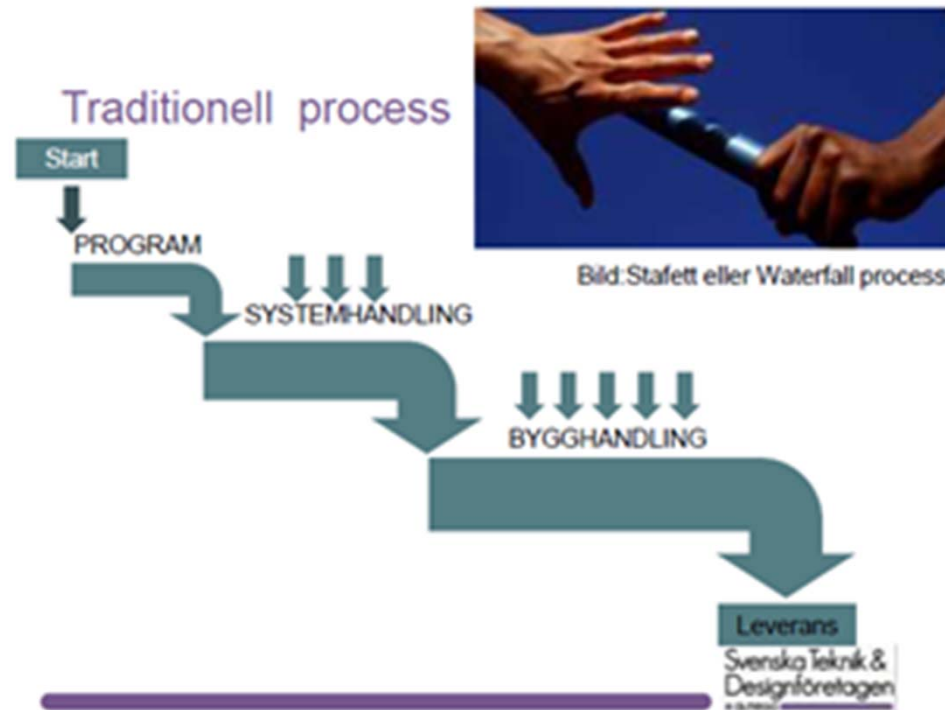


Figure 9: Players and practices in the building market¹⁷

“The biggest barrier is that investors have the final decision making authority on buildings and, under current circumstances, they are pursuing profit maximization. Sustainable building option conflicts with profit maximization.” (Academic, Japan.)

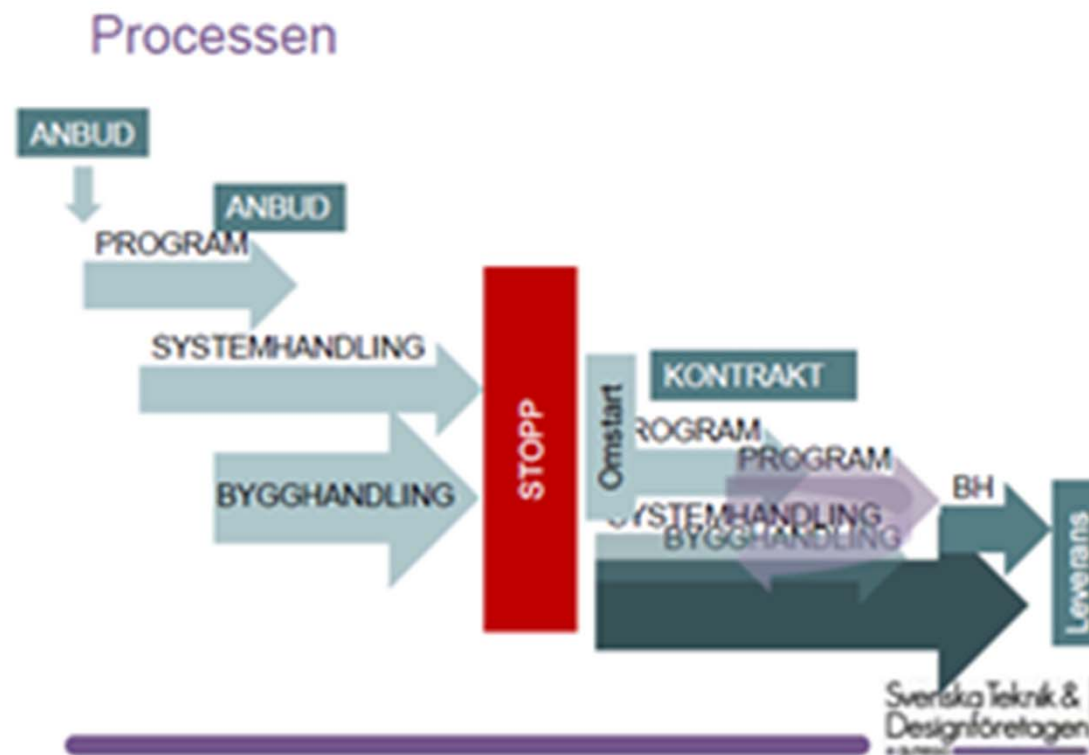
Traditional process - old

- Traditional way to look at the process



Today!

- Not a relay race – start/stop process!



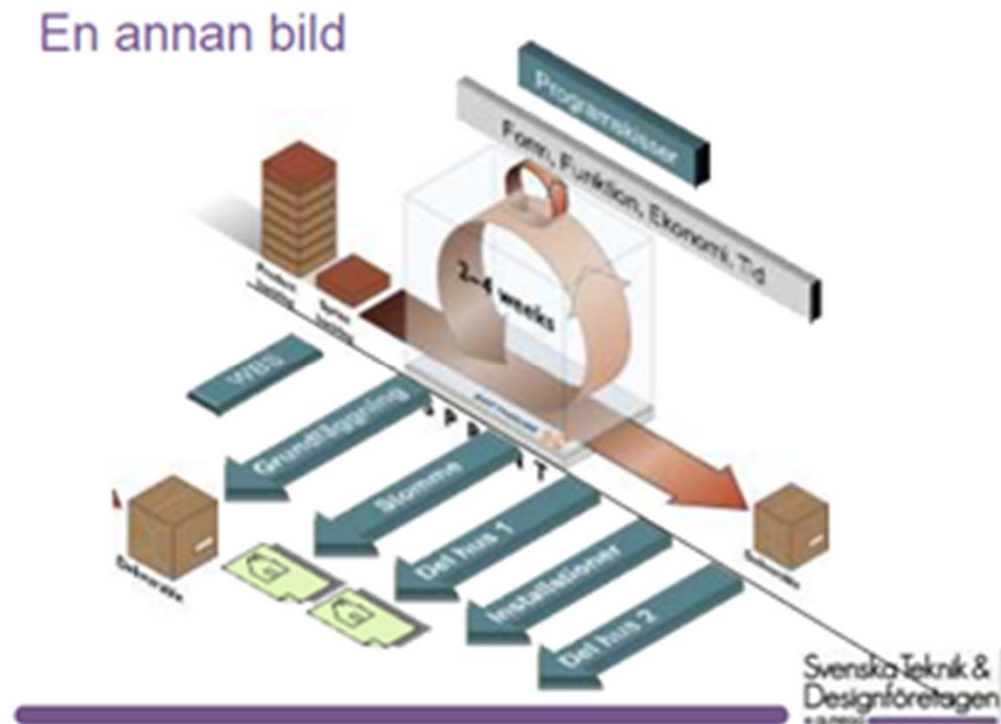
Another presentation

- Conceptual questions (PH)
- Preliminary design, Detailed design (SH)
- Construction Drawings (BH)



Agile Process

- Another picture (Agile process – an iterative process)



Licentiate thesis

With support from the Swedish Energy Agency through Technology School of Engineering in Jönköping, has the Licentiate thesis been completed at KTH Royal Institute of Technology in Stockholm.

Department: Building and Real Estate Management.

Supervisor: Hans Lind



Belysningsfrågor i byggprocessen:
Orsaker till brister och förslag till
en förbättrad process

PETER PERTOLA



KTH Arkitektur
och samhällsbyggnad

Licentiatuppsats i Bygg-
och fastighetsekonomi
Stockholm, 2012

Licentiate thesis



- Heading: Lighting Issues in the Building process:
Causes of mistakes and suggestions for an improved process.

 - Progress after 8 interviews, 2010:
The most common sources of errors according to the interviewed owners:
 - Not enough knowledge in the organization
 - Not enough resources in the organization
 - Time pressure, depended on to optimistic time schedules
 - Lack of adequate knowledge and commitment of the experts appointed.
 - Contractors type of contracts, documents and knowledge not often in phase.
 - Electrical contractors own profit maximization, often due to the replacement of fixtures.
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The theoretical framework



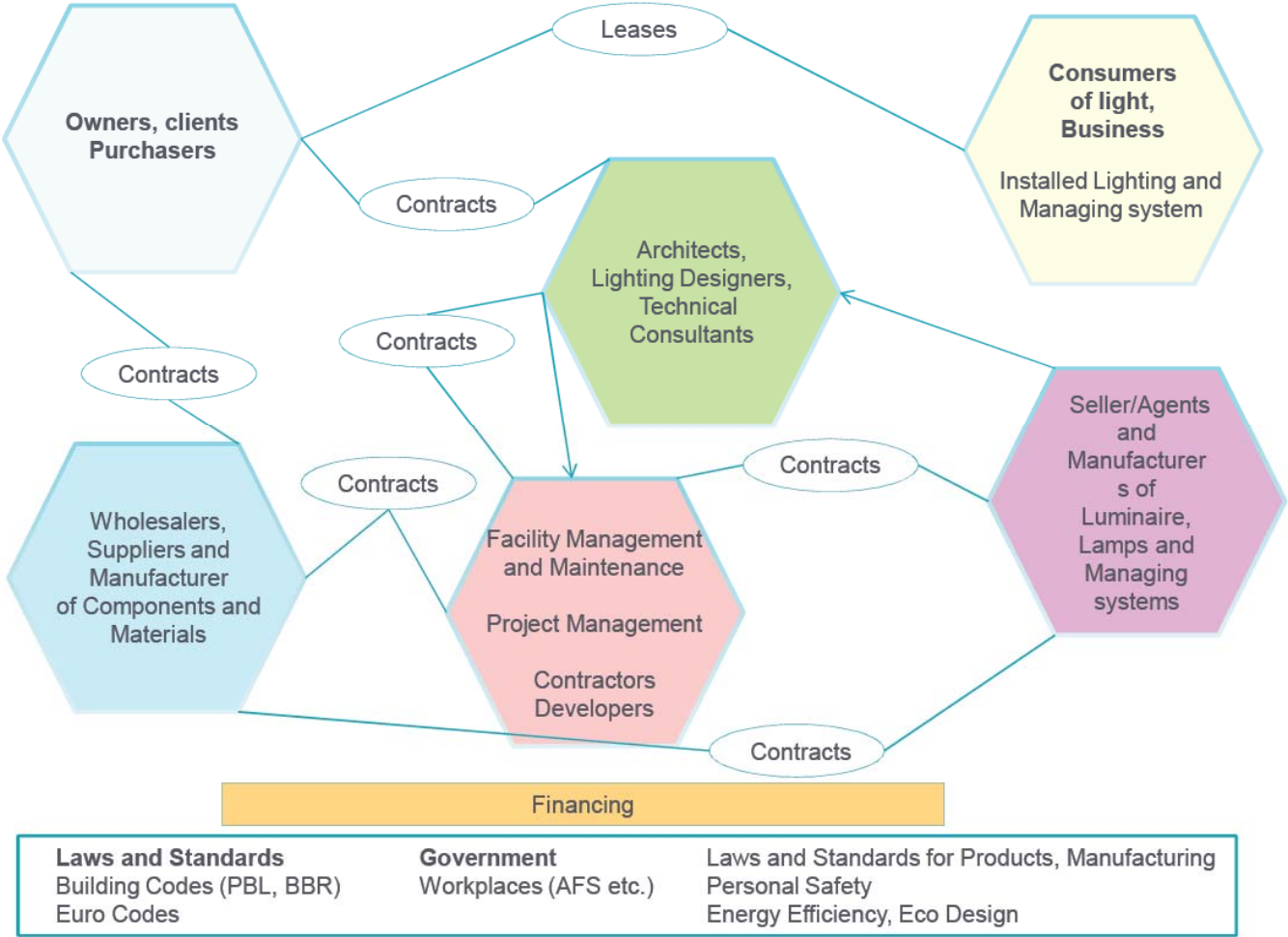
- The theoretical framework used is **Transaction Cost Analysis** where **Contract Design** and its effects is a central question.
 - It is difficult to write a complete contract that captures all important aspects and what the result will be then depends on the short- and long term **Incentives** of the actors.
 - A key question is how to create incentives for different types of contractors to do the "right" thing.
 - **Principle-Agent Theory**, with asymmetric information is also involved in the decisionmaking in the Building process.
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All contracts?



Lighting Supply Field, Contracts

Stockholm 2013-01-07 Peter Pertola



Results from the Licentiate thesis



- **Results concerning current problems can be summarized as follows:**
 - Lack of commitment, competence and knowledge among actors in different stages of the construction process.
 - Competence and knowledge may exist but are not used in the right way at the right time.
 - Decisions are made with a too short time horizon.
 - The focus on private gain overshadows ambitions to take a holistic perspective.
 - The construction process has characteristics that might it difficult to learn from earlier projects.
 - Control and follow-ups are often inadequate.
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Recommendations



The proposals that are put forward concerns three key areas - **Competence, Incentives and Resources** - and can be summarized as follows:

- More resources should be allocated to early stages of a project.
 - Design should be made in closer cooperation between client, architect and technical consultants.
 - Long-term partnering-like relations should be established between the client and especially the architect/technical consultant. This also creates room for development of competence and knowledge on both sides.
 - The project should be carried out as a Design-Bid-Build project as the possibilities to control details of the project then are higher.
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Target groups



Lighting Supply Field, Sweden Stakeholders

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