Multi-disciplinary Collaborative Working: Roadmapping into the future, educating clients, professionals and the government

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Collaborative working, what is it?

Rules and regulations
- Plan and building law
- Regulations

Knowledge databases
- Byggforskeren
- Company knowledge db's

Funct. descr.
- Functions
- Calculation
- Requirements
- Constraints

Renovation etc.
- Renovation
- Demolishing
- Reconstruct

BIM software
- Drawings
- Arch, HVAC, EL, CivEng

Visualization
- 3D models

SIMULATION
- Comfort
- Air, heating
- Lifecycle costs
- Light and sound
- Insulation
- Use
- Fire
- Environmental impact
- Life expectancy

Description
- Beskrivelsesstekster
- NS 3420,
- BOM
- Cost estimates

Sourcing
- Product databases
- Price databases

4D
- Schedule
- Logistics

FM
- Renting, sale and use
- Maintenance
- Warranty

Pictures from: Selvaagbygg, DDS, Byggforsk, NBLN University of California, CIFE Stanford, Pythagoras and Olof Granlund Yo.
What are the changes?

- Past, present $\rightarrow$ Future
- Verbal communication $\rightarrow$ data changes (e.g. Room sizes)
- Personal interpretation $\rightarrow$ automatic propagation of changes
- “Off the head” $\rightarrow$ predefined data integration
- Experience $\rightarrow$ methodological
- Ad hoc $\rightarrow$ standards
- Lumped consideration $\rightarrow$ levels of details separated
- Paper $\rightarrow$ digital
Where are the problems?

- Sharing of data requires sharing of infrastructure, who pays for it?
- What wants it (the sharing)?
- Who can offer it? (short term capability)
- Culture change from risk shedding to risk sharing (long term understanding).
- Legal issues.
- Scalarability (reinventing the wheel, piecemeal.)
Characteristics of problems

• Spread over the whole supply chain.
• Innovation as well as education.
• Market economy vs common good.
• Collaboration vs competition.
• Individual vs group/industry.
• Simple (in principal) vs complex (the devil is in the detail).
The “whole of industry” problems...

• Requires whole of industry (coordinated) solutions..

• Roadmapping method:
  – Identify stakeholder relationships (for coordination)
  – What is the change in the horizon?
  – What are the impediments for change?
  – How to bring about changes (short term, medium term and long term)
  – Implement the roadmap
    • Industry vs firms
Framework (relationships)

Government technology policy
Business relevance

• ICT enables international competitiveness.
• Evidence: Growth Competitiveness Index
  – Technology component 50% (innovation index 25%, ICT component 25%)
  – Public institution component 25%
  – Macroeconomic component 25%
• ICT innovation types
  – Product, process, organisation
Expected process and organisational changes via ICT innovation

• Improving supply chain relationship between firms:
  – Architect, builder, client, engineer exchange ideas and data.
  – Design turn-around time is expected to be days.
  – Design changes are made in minutes not days.
  – More design options.
Strategic direction to make it happen

<table>
<thead>
<tr>
<th>Well documented issues</th>
<th>Strategic response</th>
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<tbody>
<tr>
<td>Projects driven by (lowest) costs – risk shedding</td>
<td>Cost driven by values – working together to offer values to the client.</td>
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<td>Incompatibility of software.</td>
<td>Adopting industrial / international data standards (IFC /XML etc.)</td>
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<td>Paper based regulatory requirements.</td>
<td>Government-industry collaboration on digital solutions (automatic compliance checkers.)</td>
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<td>Shortage of rightly mixed skills.</td>
<td>Facilitating knowledge accumulation over long time.</td>
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Technology cluster development programme for construction industry

• Common themes of the programme
  – Government leadership.
  – Firm participations (voluntary or being pushed.)
  – Development of supply chain relationships and frameworks
  – Targeted focus (standards - IFC, ICT based >50%).
  – Educational intent (case studies, documentations.)
• Duration: 5, 10 years or longer.
• Number of companies receiving funds: Many.
• Examples
  – Finland’s VERA and SARA Programmes (30-40 million euros in 5 years.)
  – Singapore’s CORENet programme.
  – Norwegian initiatives (government, industry corporations.)
Critical success factors – a coordination matrix

• Stakeholder coordination.
  – Clients who receive the benefits.
  – Firms that form supply chains.
  – The government that looks out for international competitiveness.
  – Industry associations that offer industry frameworks for multi-disciplinary collaboration.

• What to look out
  – Key roles.
  – Impediments.
  – What to research.
  – What to educate.
Conclusions

- The IAI Australasia Chapter uses the above framework to develop funding support.
- Still early days.
- Building Commission (Victoria), Queensland Department of Public Works, RAIA (Canberra) join the IAI chapter board.
- Victoria rolls out BIM pilot projects under the joint sponsorship of IAI and Building Commission.
NB: Two types of competition programme

Two types of programmes

• Early technology programmes
  – Commercialisation focused.
  – Firm based.
  – Shorter time frame.

• National industry programmes
  – Industry infrastructure development.
  – Industry based.
  – Structured development.
  – Longer time frame (5-10 years or more.)

• Balancing the two types of funding (always difficult.)
Difficult balancing act for the government when the industry has this …

"It's the perfect screen-saver for our department."
Before

The International Alliance for Interoperability’s mission is:

• to integrate the AEC/FM industry by specifying a universal language.
• to improve communication, productivity, delivery time, cost, and quality.
• to integrate the design, construction, operation and maintenance life cycle of buildings.
After

1. Develop and advocate the use of standardised building information models (BIM+IFC) to improve supply chain communication (resulting in shorter turnaround time, more quality choices for clients, fewer errors, better co-ordination, for example.)
2. Develop and evaluate industry wide collaborative frameworks to support process change in the industry adoption of BIM.
3. Prepare for and demonstrate the uptake of BIM technology in the building, construction, engineering and FM industries.