Identifying New Construction
Demands – A Stakeholder
Requirement Analysis

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Overview of Presentation

• Introduction
• Stakeholders’ Classification & Identification
• The Requirement Elicitation Process
• Voice of the Stakeholder
• Requirement Verification
• Requirement Consolidation
• Conclusions
• Questions
Introduction

• The construction industry in the EU
• Change to a demand-driven, innovative, sustainable and competitive industry
• Key drivers for change and improvement
  • Revolutionary construction and production technologies and processes
  • Flexible and adaptable building space with lower resources consumption
  • Optimum environment for occupants improving their quality of life and productivity
Stakeholder’s Classification & Identification (I)

- Form a network for the input body for collecting & structuring the requirements
- Develop a list of stakeholders and their categories
- Provide good coverage of all stakeholder types
Stakeholder’s Classification & Identification (II)

• Client
• Professional team
• Constructors
• Occupants
• Occupant support services
• Regulatory bodies
• Infrastructure
Requirement Elicitation Process (I)

- Methodology & procedure
- Requirement collection
- Requirement analysis
- Requirement validation
- Requirement consolidation
Requirement Elicitation Process (II)

- Stakeholder expectation
  - Capture
    - Interview summaries
  - Trends in EU countries
    - Analyze
      - Background information on trends
  - State-of-the-art USA and Canada
    - Verify
  - Hamburger model
    - Consolidate
      - Assessment criteria
Requirement Elicitation Process (III)
Voice of Stakeholder

• Importance of factors
• Importance of trends
• Main findings from open questions
Importance of Factors

- Building lifecycle economy & building performance
- Capital cost of construction
- Cost efficiency/reduction during construction
- Sustainability (in its broadest context)
- Energy reduction (during operation of the building)
- Construction methods (i.e. on-site or prefabrication)
- (Range in) quality of construction (material, etc.)
- Construction time
- Work productivity/comfort and wellness (end users)
- Flexibility (e.g., adaptability in terms of easily modifiable buildings)
- Safety
- Durability
- Other (not stated above): ….
Importance of Trends (I)

- Focus on Life Cycle Costing: 53%
- Focus on Energy Management: 40%
- Focus on Facility Management Issues: 33%
- Focus on Total cost of ownership: 33%
- PFI: encourage long-term responsibilities: 19%
- Increase flexibility and reduce costs: 33%
- Building as commodity to financial community: 12%
- Short term vs. long term occupancy: 9%
- Variation in life-span: interior - construction: 2%
- Other (not stated above): 5%

Economic/financial
Importance of Trends (II)

Technological/building process

- Applying ICT in construction process: 18%
- Industrialised construction: 22%
- Increasing automatisation (e.g. 'intelligent buildings'): 27%
- Innovative housing - domotica: 4%
- Increasing high-rise - central management system: 2%
- Increasing high-rise - improving safety & security: 9%
- Move to modular housing - low cost units & higher quality: 20%
- Refurbishment: 13%
- Reconstruction, modernisation of old buildings: 31%
- Design - high quality materials: 20%
- Design - combination of materials: 4%
- Design - large windows, a lot of light: 0%
- Design - Simple, clear, puristic style: 11%
- New contract models (PPP): 36%
- New building processes (procurement): 31%
Importance of Trends (III)

Building functionality

- Other (not stated above):
  - Increasing demand for reconfigurable office space: 24%
  - Increasing refurbishment: 19%
  - Flexible buildings-adapt to changes of use: 45%
  - Res. compl. - earthquake-proof construction: 10%
  - Res. compl. - security services: 7%
  - Res. compl. - quality & functional design (Trends plus): 10%
  - Res. compl. - at a distance from the city centre: 7%
  - Res. compl. - combination luxury villas & middle scale: 5%
  - Res. compl. - incl. shopping, entertainment & recreational: 26%
  - New solutions to existing building stock: 38%
  - Multi-Purpose / Multi-use: 36%
  - Impact of flexible working on housing and office facilities: 29%

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Importance of Trends (IV)

- Low-energy buildings: 36%
- Generation of energy close to where it is used: 10%
- Regulatory & repr. organisations as stakeholders: 10%
- More use of brownfield sites: 14%
- Research and products (deal with varied temperatures): 17%
- Move to nuclear generated energy: 12%
- Expectations for thermal comfort and changes in climate: 14%
- Water mgt. / water supply - re-use of rain water: 19%
- Water mgt. / water supply - grey water: 2%
- Other (not stated above): 7%

Ecological
Importance of Trends (V)

Social

- Social added value: focus on demands & desires in society (69%)
- Increasing sense of insecurity and increasing risk aversion (21%)
- Improved knowledge infrastructure (31%)
- Increasing life span of population - housing requirements (31%)
- Increase smaller / single dwellings, small affordable family units (40%)
- 24-hours economy (31%)
- Retail - out of town centres vs. increase in small town/city centre units (14%)
- Increasing 'care in the community' rather than large institutions (14%)

Other (not stated above): 5%
Importance of Trends (VI)

- Regulations
  - EU essential requirements - The Energy Performance Building Directive: 71%
  - EU essential requirements - Indoor Air Quality (IAQ): 31%
  - EU essential requirements - Fire legislation, safety aspects: 17%
  - Quality standards & Certificates: 52%
  - Specific regulations for educating buildings: 29%
  - Other (not stated above): 5%
  - Litigious society - impact on design and management of buildings: 33%

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Main Finding from Open Questions

• Industrialisation
• Integration
• Intelligent buildings
• Main problems
• Market chances
Requirement Verification

- Requirements from European region
- Requirements from USA
- Requirements from Canada
- Comparisons conducted between them
Requirement Consolidation

• Requirement priorities
• Translating stakeholder expectations to requirements
• Linking requirements to technical tasks
# Requirement Priorities

<table>
<thead>
<tr>
<th>Requirements</th>
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<tbody>
<tr>
<td><strong>A Economic/financial</strong></td>
<td><strong>D Ecological</strong></td>
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<tr>
<td>1 Focus on life cycle costing</td>
<td>1 Low-energy buildings</td>
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<tr>
<td>2 Focus on energy costs</td>
<td>2 Focus on climate changes</td>
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<td>3 Focus on energy management</td>
<td>3 Increasing focus on energy efficiency</td>
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<td>4 Increasing life-span of population–implications for housing requirements</td>
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<td>5 Specific regulations for educational buildings</td>
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Translating stakeholder expectations to requirements

The Hamburger Model
## Linking Requirements to Technical Tasks

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### Table Notes:
- X: Requirement exists
- A: Requirement absent
- Other: per country (if applicable)

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Future Work & Suggestions

• Focus on using new metrics generated from these findings to further guide the ongoing RTD work in the I3CON project
Conclusions

- State-of-the-art stakeholders’ requirements from European countries
- A requirement development process
- Key areas identifications
- Linkage between the main findings and all technical tasks
Questions?

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This research work is from the I3CON Integrated Project, partially funded by the EC under its Sixth Framework Programme (FP6). The authors gratefully acknowledge the support of the EC and the contributions of all the partners.