Tekes

Information Networking in the Construction Process

National Construction IT R&D Programme 1997-2002

Vera

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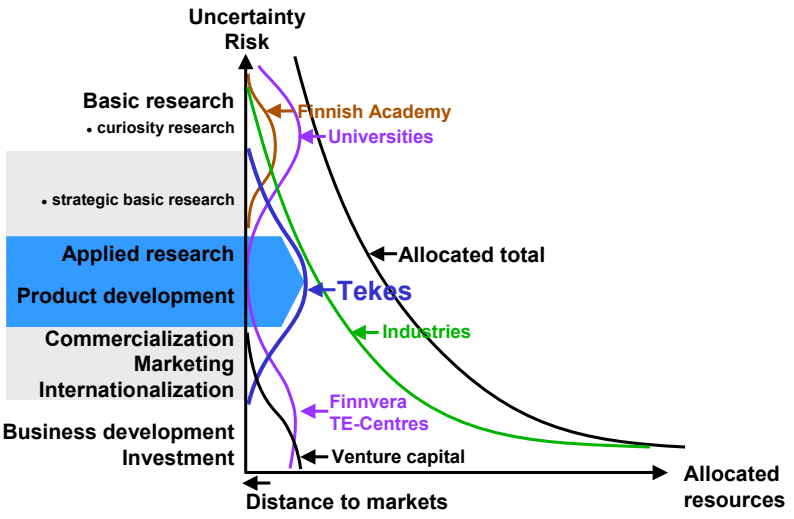
Allocation of R&D resources



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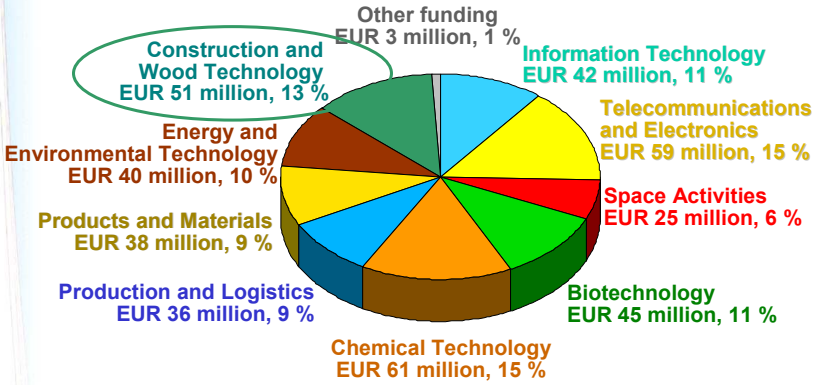
Total Tekes R&D funding in 1999

Total EUR 400 million (FIM 2.4 billion) and 2,404 financed projects



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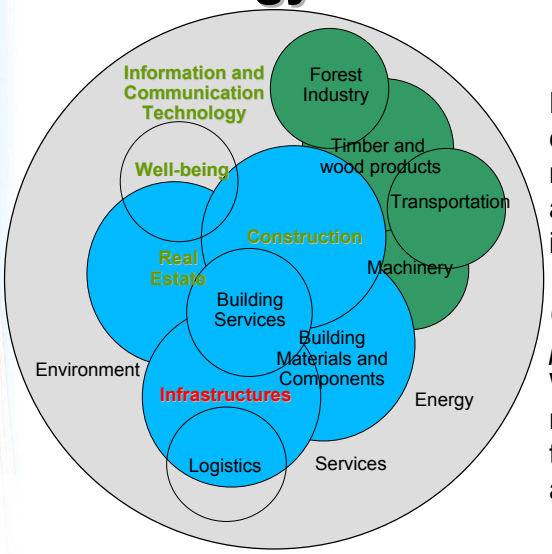
Tekes: Construction and Wood Technology Cluster



Tekes mission:
R&D must become a constant part of the normal business also in the AEC/FM industry

Change in the basic philosophy:
We must move from minimising the costs to maximising the added value

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Technology Programmes

- extensive programmes initiated by Tekes and consisting of numerous projects
- focused on a key technology sector
- implemented in cooperation by companies and research units
- companies can participate with their own projects or by joining in common research projects
- projects and results are partially public, but the results of industrial projects are proprietary

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Vera Programme

- Schedule - six years; 1997 - 2002
- Volume

Original budget	*170 million FIM*	*(28.5 million €)*
Current budget	250 million FIM	(42.0 million €)
45 % by Tekes	115 million FIM	(19.3 million €)
55 % by the industry	135 million FIM	(22.7 million €)

- Current project allocation

Research projects:	35 / 20 million FIM	(3.4 million €)
Industrial projects:	87 / 162 million FIM	(27.2 million €)
Total:	122 projects / 182 million FIM	(30.6 million €)

- Short project presentations in the web http://cic.vtt.fi/vera/english.htm

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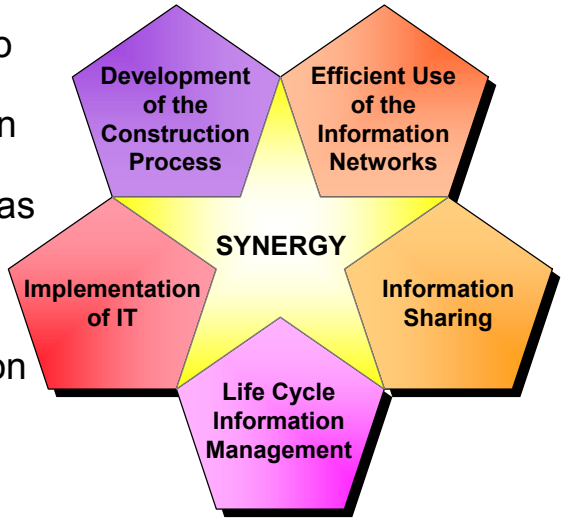
Vera Programme Components

The target is to promote the implementation and use of IT and networks as the enabling technologies to re-engineer the construction process



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National level impacts	Well being in society	Increased productivity	Increased national competitiveness	
	Better build environment		Increased export in AEC/FM software	Increased export in building industry
	Environmental impacts of construction			
AEC/FM branch impacts	Better profit for building property		Increased AEC/FM competitiveness	
	Increased mass of real estates in productive use		Improvement of quality and productivity	
Vision	**Management of information through the entire life cycle of building**			
Goals	Integrated information management	Efficient use of information networks	Utilisation of IT in the AEC/FM processes	Re-engineered processes
Outputs	Modelling of existing buildings	New services based on information technology	Interoperable software products	Business models based on IT competitiveness
Activities	• Advanced clients must take the leading role • Business alliances and strategic co-operation in AEC/FM industry • R&D activities based on business views • Tools and services to model the existing buildings • Improvement of quality in IT use		• International R&D co-operation • Active participation in IFC definition work • Internationally accepted data models for buildings will create software market potential • Wide range of commercial software products • Improvement of IT knowledge and skills	

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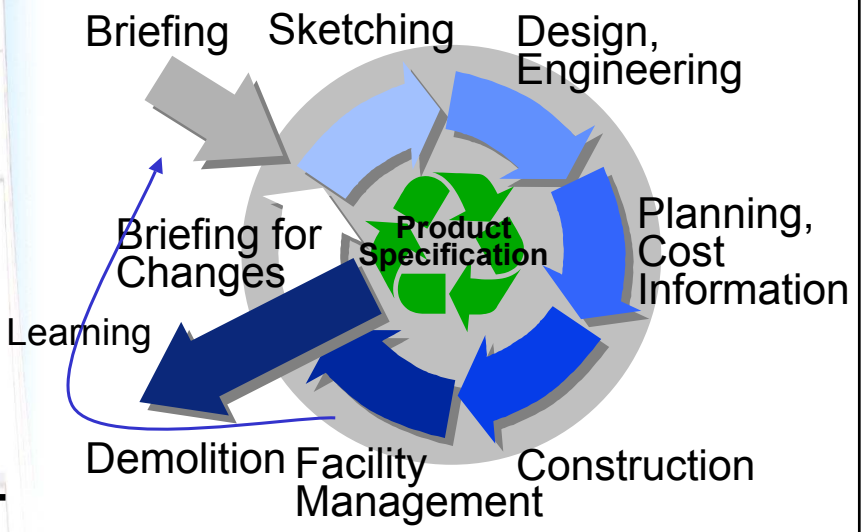
Information Lifecycle



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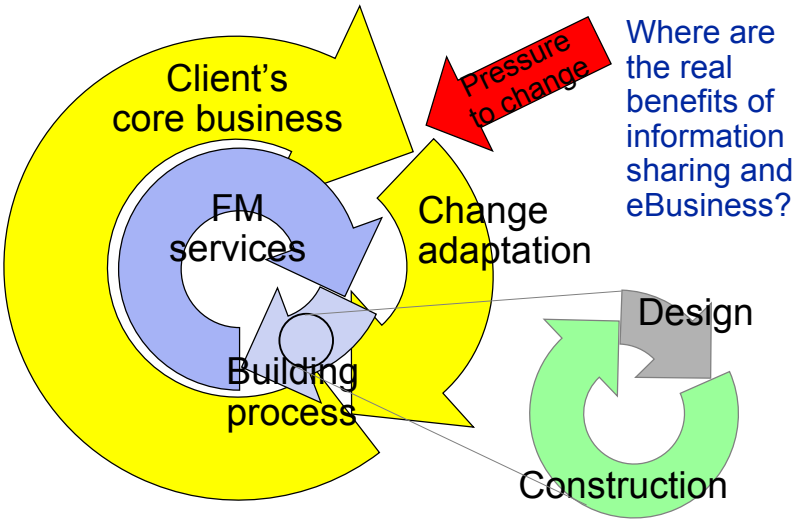
Real Life Cycle View ?



Where are the real benefits of information sharing and eBusiness?

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Common Information "Language"

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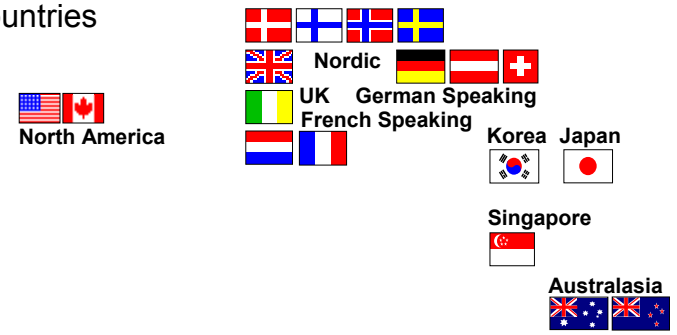
IAI - International Alliance for Interoperability

- Defining IFC (Industry Foundation Classes) - an industrial product data model describing buildings
- First commercial IFC implementations available
- 9 Chapters, more than 650 member organisations in 20 countries



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Why are we supporting IFCs ?

- One of the key elements for Vera programme is the information sharing
  - urgent need for a global ”language” for AEC/FM software products
  - almost half of the Vera projects have a connection to IFCs
- IAI started at the right time for us
  - incremental development enables immediate implementation
  - IAI is the most active area on the data definition for the construction industry
  - same modelling language with STEP ⇨ some areas can possibly expand to ISO work in the future

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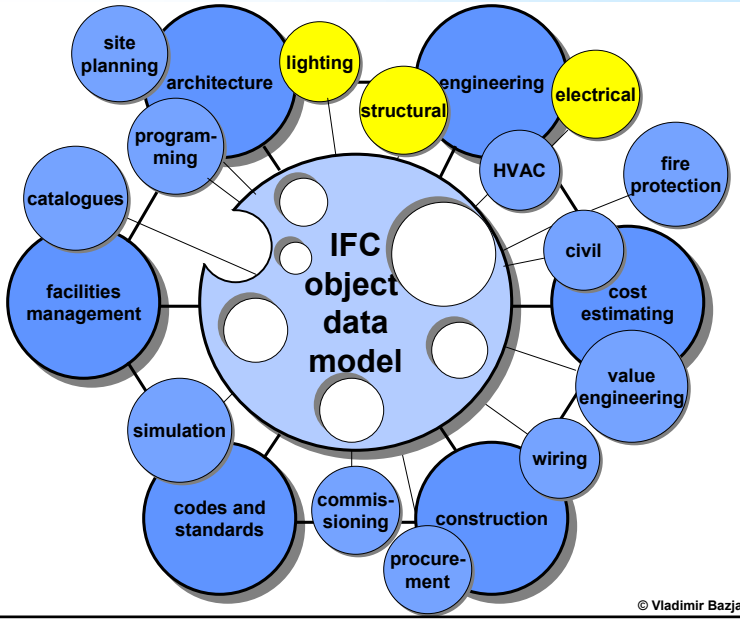
Current Status of IFCs



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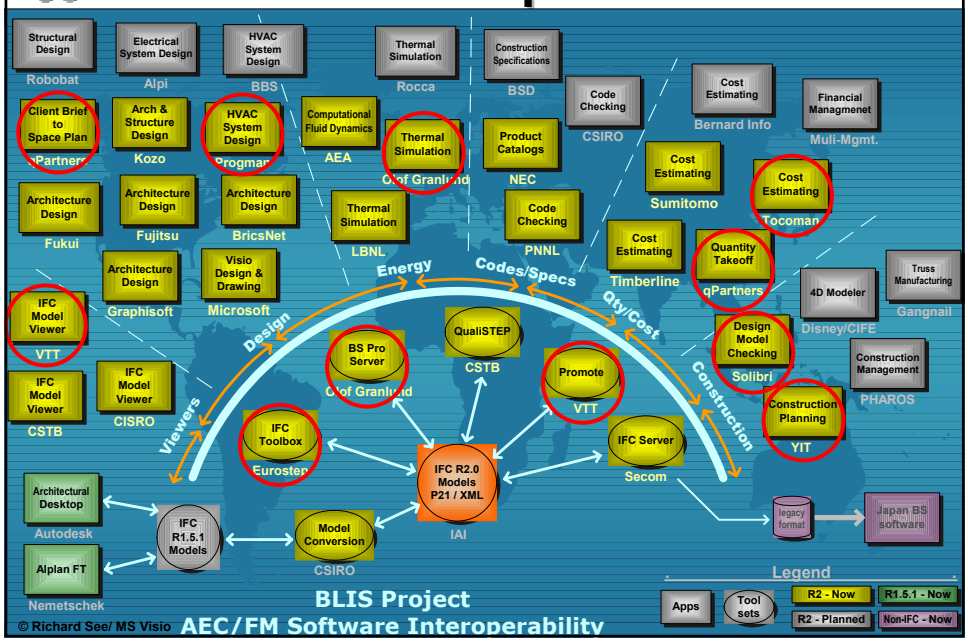
Current IFC Implementations



IFC capabilities and usage

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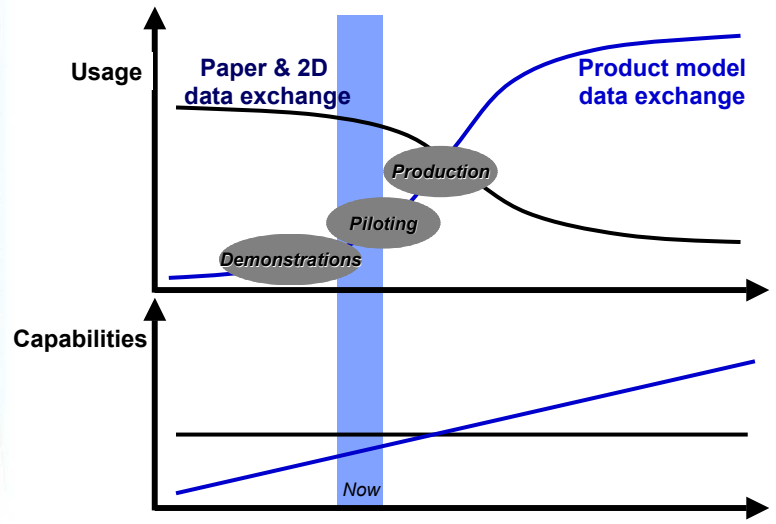

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IFC is only a part of the solution

- IFC is only an enabling specification; a component for solution development and implementation
- Solution components:
  - Enabling technologies
  - ICT infrastructure
  - Enabling specifications
  - Software applications
  - Processes
  - People

Enabling technologies, ICT infrastructure: Common ICT development

Enabling specifications: IAI/IFC (+ others)

Software applications: Software industry

Processes, People: AEC/FM industry

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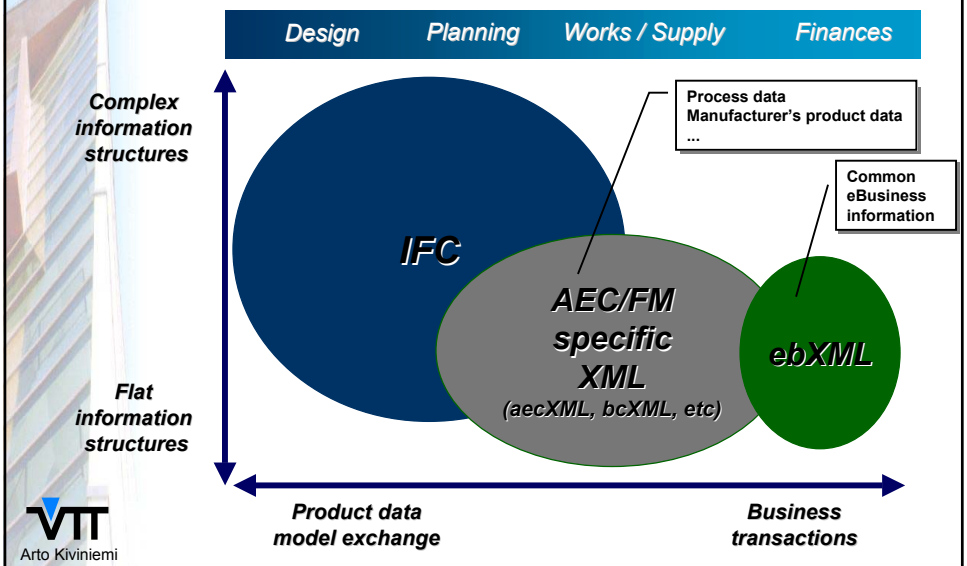
IFC and XML - One possible interpretation



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Effects to the AEC/FM Industry

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Design and Engineering Processes

- Models can contain complex rules for behaviour and relations between objects
  - (semi)automated design integration and code checking
  - easy and cost efficient evaluation and simulation at any project stage
    - thermal, lighting and performance simulation
    - more accurate cost estimation
- New service areas for designers/engineers
  - LCA/LCC services
  - information maintenance
  - FM services...

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Design and Engineering Processes

- ”Drafting" ⇨ information management
  - paper document ⇨ digital information
  - traditional documents ⇨ product models
  - “document” ⇨ a view of the model from a specified angle at a specified moment
    - the actor who needs a specific view can produce it directly from the data
  - technical and juridical problems
- Information will be produced for:
  - decision making and production
  - use and maintenance of buildings

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Construction Process

- Information as a part of the product:
  - building maintenance database based on as-built information
  - product information as a part of eCommerce
  - product libraries with direct interface to design and procurement software and building data models ⇨ IFC compliant XML
- Change requires:
  - tools supporting new processes
  - real partnering
  - sharing the benefits through the AEC/FM industry

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Lifecycle Management

- Key people are the clients; building owners and facility managers.
  - they will have the most benefits
  - they can set the requirements
- Better tools for early decision making
  - LCA and LCC tools
  - maintenance simulations
- Better tools for FM/PM
  - more accurate budgeting
  - better utilisation of buildings and resources
  - better management for preventive maintenance
  - lower costs for maintenance