

# Information Networking in the Construction Process

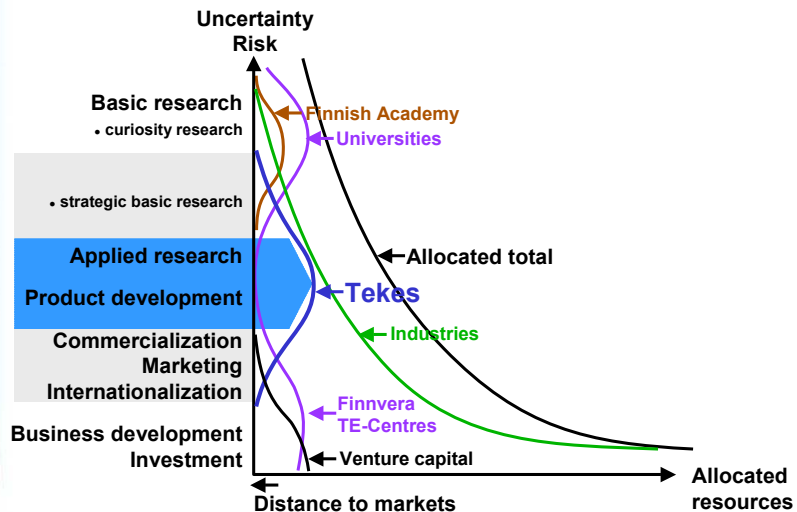
National Construction IT R&D Programme 1997-2002



# Vera

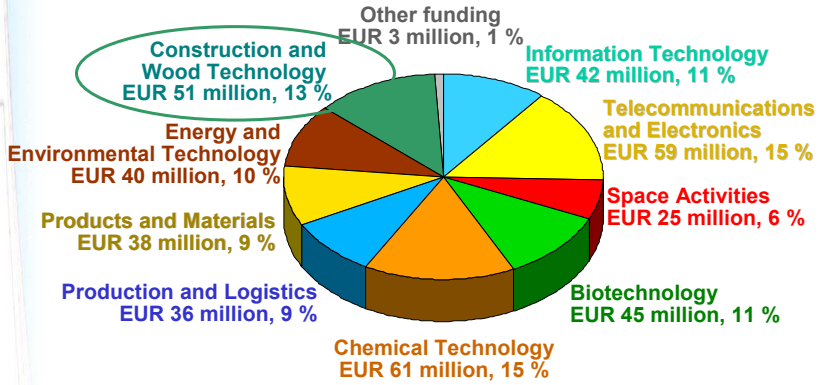
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# Allocation of R&D resources

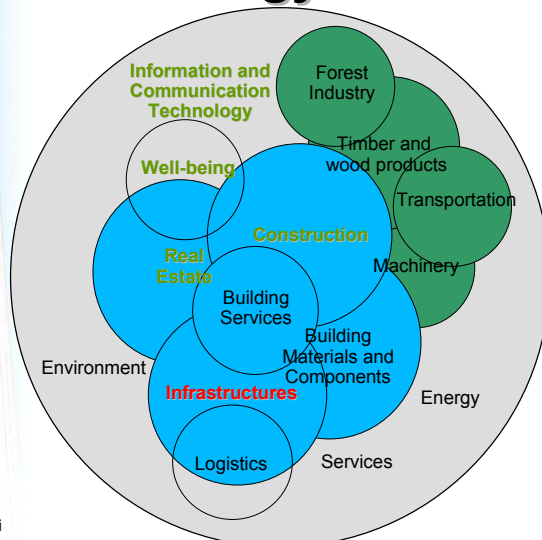


# Total Tekes R&D funding in 1999

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



# 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



# 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



# Vera Programme

- Schedule - six years; 1997 - 2002

- Volume

<i>Original budget</i>	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

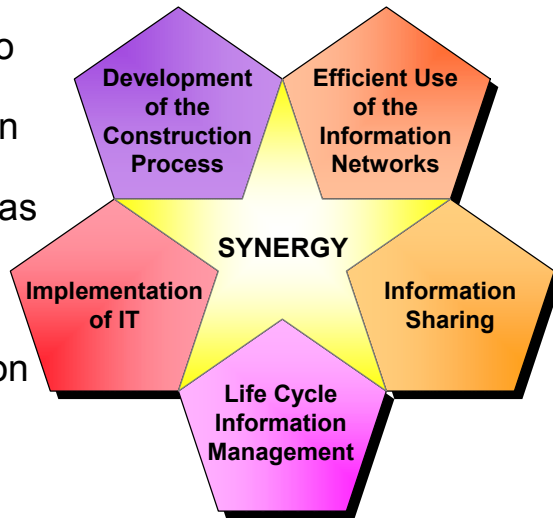
Research projects:	35 / 20 million FIM	(3.4 million €)
Industrial projects:	87 / 162 million FIM	(27.2 million €)
Total:	122 projects / 182 million FIM	(30.6 million €)

- Short project presentations in the web

<http://cic.vtt.fi/vera/english.htm>

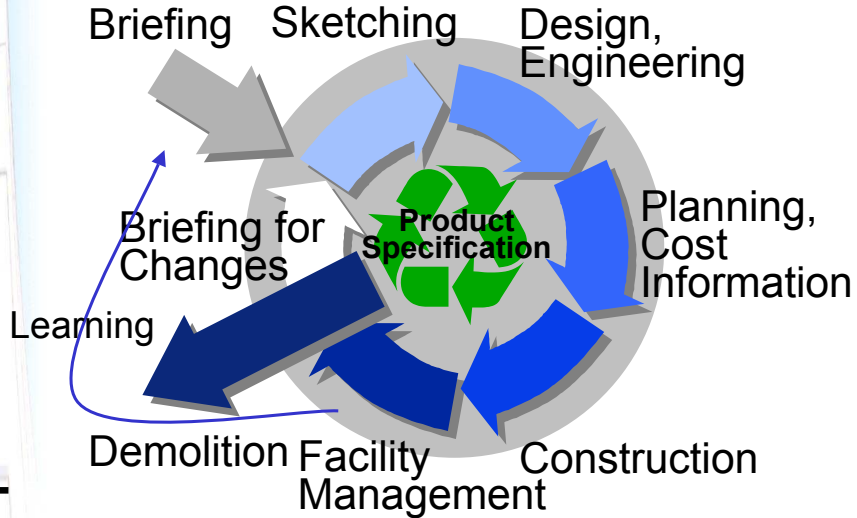
# Vera Programme Components

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

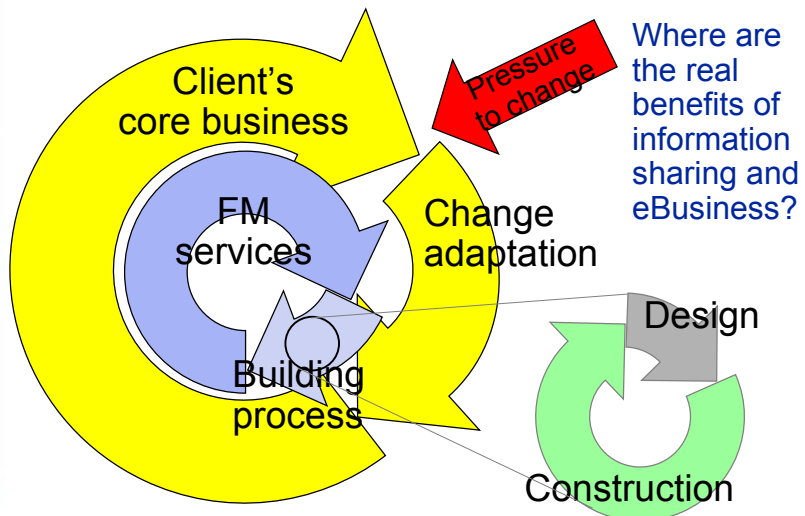


	Well being in society	Increased productivity	Increased national competitiveness	
<b>National level impacts</b>	Better build environment		Increased export in AEC/FM software	Increased export in building industry
<b>AEC/FM branch impacts</b>	Better profit for building property		Environmental impacts of construction	
	Increased mass of real estates in productive use		Increased AEC/FM competitiveness	
<b>Vision</b>	Management of information through the entire life cycle of building			
<b>Goals</b>	Integrated information management	Efficient use of information networks	Utilisation of IT in the AEC/FM processes	Re-engineered processes
<b>Outputs</b>	Modelling of existing buildings	New services based on information technology	Interoperable software products	Business models based on IT competitiveness
<b>Activities</b>	<ul style="list-style-type: none"> <li>Advanced clients must take the leading role</li> <li>Business alliances and strategic co-operation in AEC/FM industry</li> <li>R&amp;D activities based on business views</li> <li>Tools and services to model the existing buildings</li> <li>Improvement of quality in IT use</li> </ul>		<ul style="list-style-type: none"> <li>International R&amp;D co-operation</li> <li>Active participation in IFC definition work</li> <li>Internationally accepted data models for buildings will create software market potential</li> <li>Wide range of commercial software products</li> <li>Improvement of IT knowledge and skills</li> </ul>	

# Information Lifecycle



# Real Life Cycle View ?

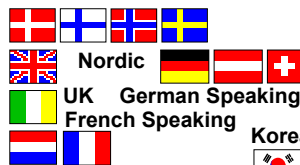


# Common Information “Language”



## IAI - International Alliance for Interoperability

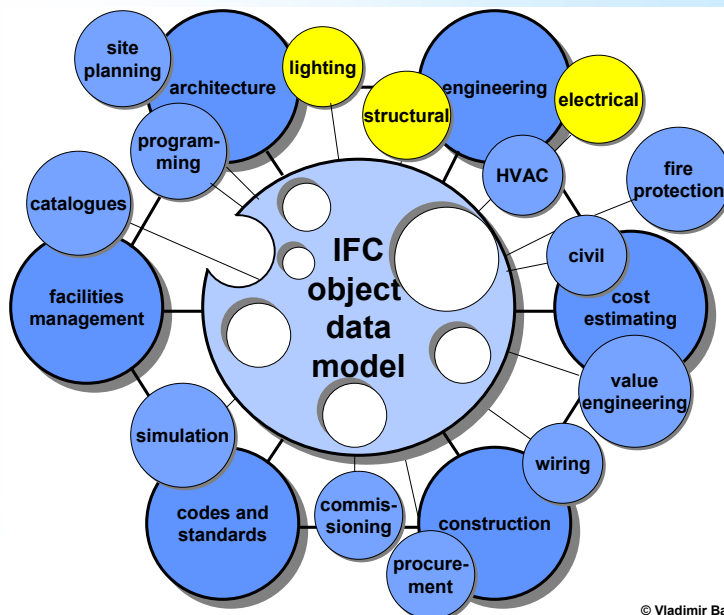
- Defining IFC (Industry Foundation Classes) - an industrial product data model describing buildings
- First commercial IFC implementations available
- 9 Chapters, more than 650 member organisations in 20 countries



# Why are we supporting IFCs ?

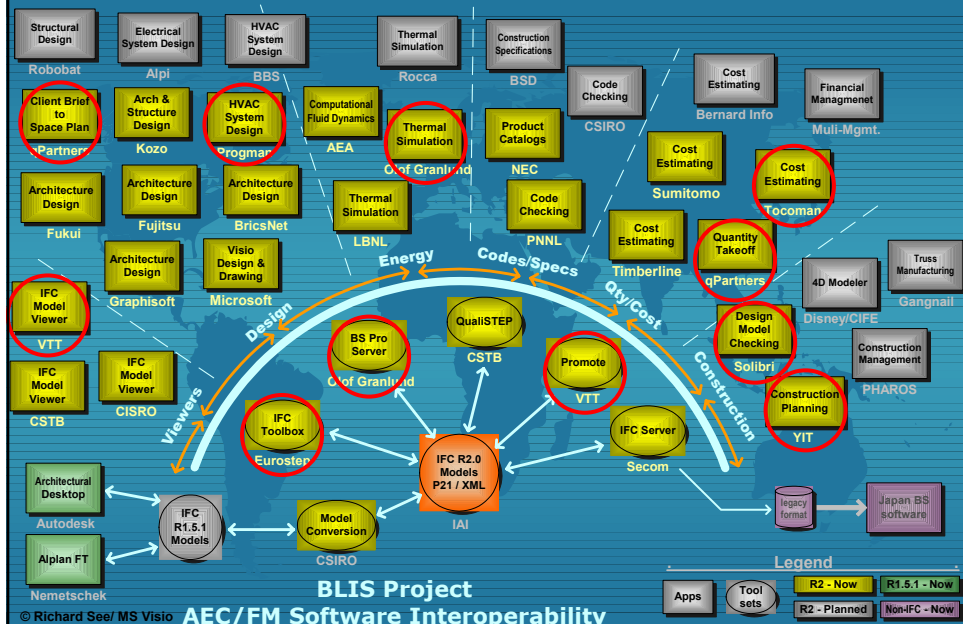
- One of the key elements for Vera programme is the information sharing
  - urgent need for a global "language" for AEC/FM software products
  - almost half of the Vera projects have a connection to IFCs
- IAI started at the right time for us
  - incremental development enables immediate implementation
  - 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

# Current Status of IFCs



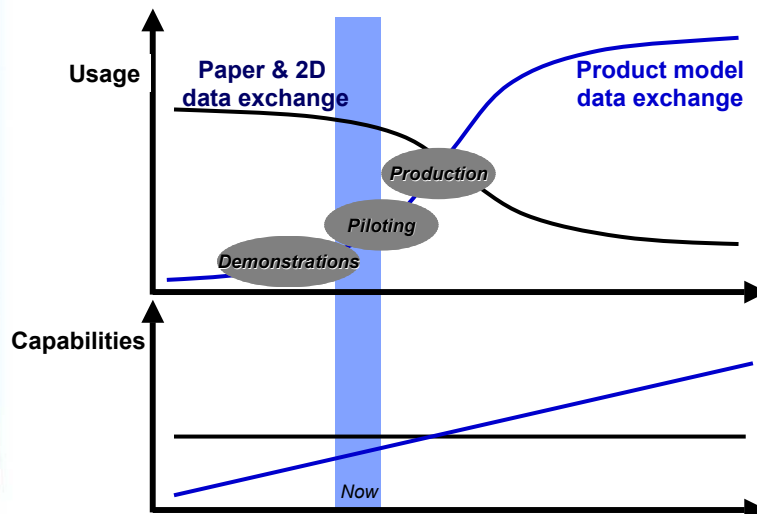


# Current IFC Implementations



Tekes

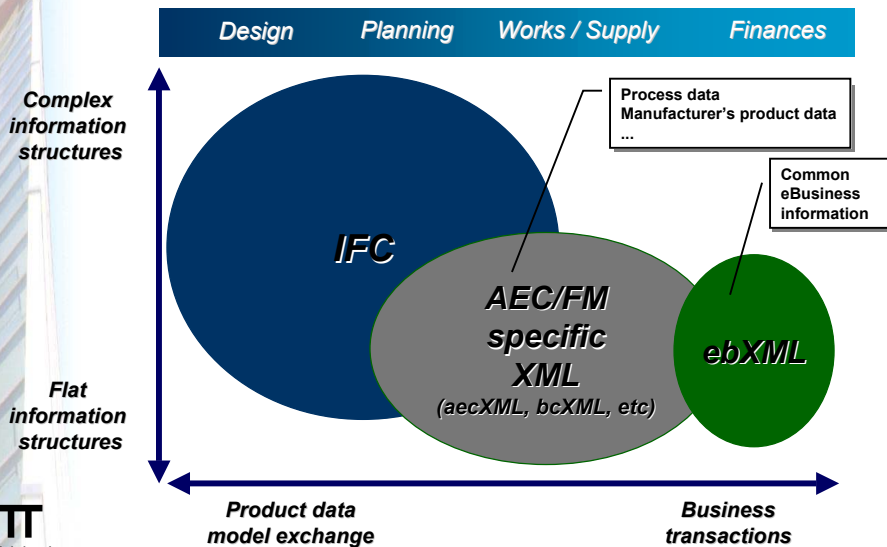
# IFC capabilities and usage



# 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 } Common ICT
  - ICT infrastructure } development
  - Enabling specifications } IAI/IFC (+ others)
  - Software applications } Software industry
  - Processes } AEC/FM industry
  - People }

# IFC and XML - One possible interpretation



## Effects to the AEC/FM Industry



## 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...

## 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

## 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

# 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