



# Industry/Government Partnership: Finland's Competitive Edge

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## Main Functions of Tekes



Framing and preparation of national technology policy



Preparing, financing and coordination of national technology programmes



Financing applied technical research and risk-intensive industrial R&D projects



Financing and coordination of international technological cooperation

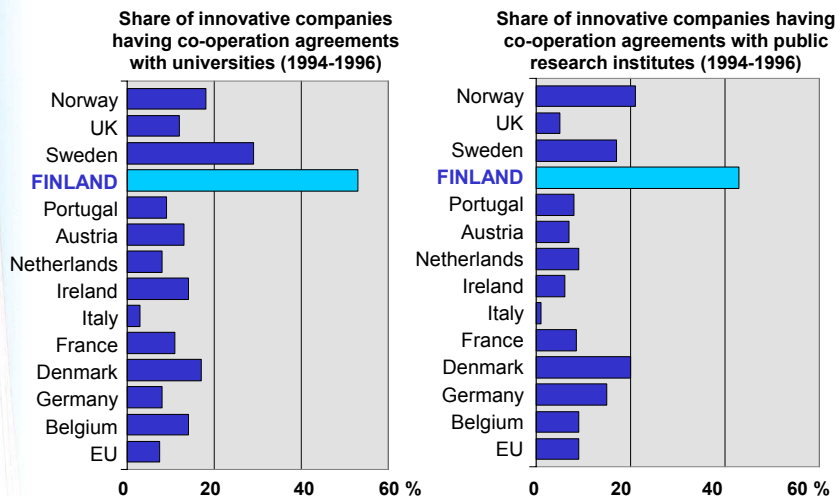


SME advisory services in technology transfer and exploitation

# Technology Programmes

- Technology programmes are means of creating new technological know-how through the co-operation of companies, research institutes and universities
- The programmes promote technological development of a specific field of technology and/or industry
- Funding comes partly (usually 40-45%) from Tekes (the National Technology Agency of Finland) and partly (60-55%) from the industry
- All projects are public on the headline level (*name, subject, main partners*), but the results of industrial projects are proprietary

## Co-operation between companies, universities and research institutes



Source: Eurostat, Enterprise DG, 2nd Community Innovation Survey

# Competitiveness Scoreboard 1996-2000

International Institute for Management Development

	Total Ranking				
	1996	1997	1998	1999	2000
USA	1	1	1	1	1
Singapore	2	2	2	2	2
<b>FINLAND</b>	<b>15</b>	<b>4</b>	<b>5</b>	<b>3</b>	<b>3</b>
Netherlands	7	6	4	5	4
Switzerland	9	7	7	6	5
Ireland	22	15	11	11	7
Germany	10	14	14	9	8
Sweden	14	16	17	14	9
Canada	12	10	10	10	11
Denmark	5	8	8	9	12
Japan	4	9	18	16	17
France	20	19	21	21	19

Source: IMD (International Institute for Management Development), The World Competitiveness Yearbook 2000. The table contains top ranking and some interesting countries from Finland's point of view.

## Vera - Information Networking in the Construction Process

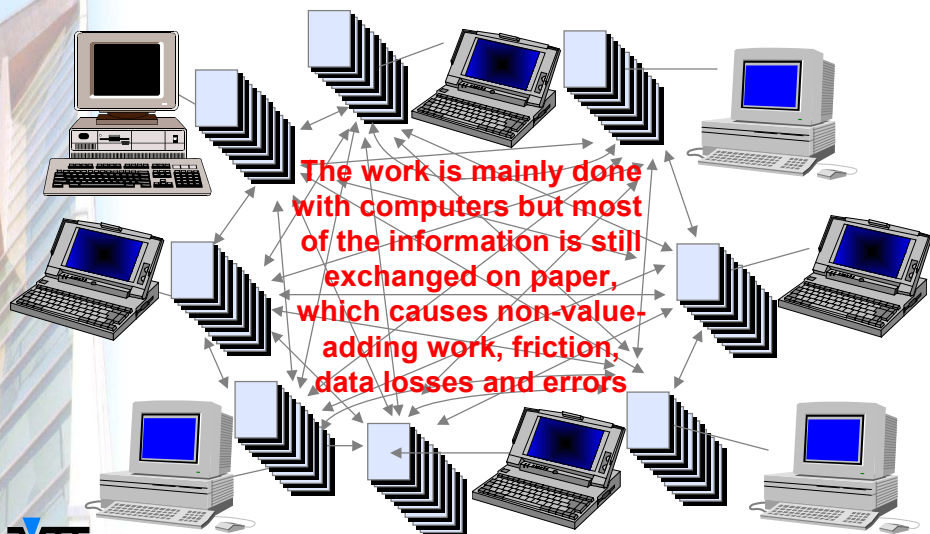
Finnish National Construction IT Programme 1997-2002



# Information Management

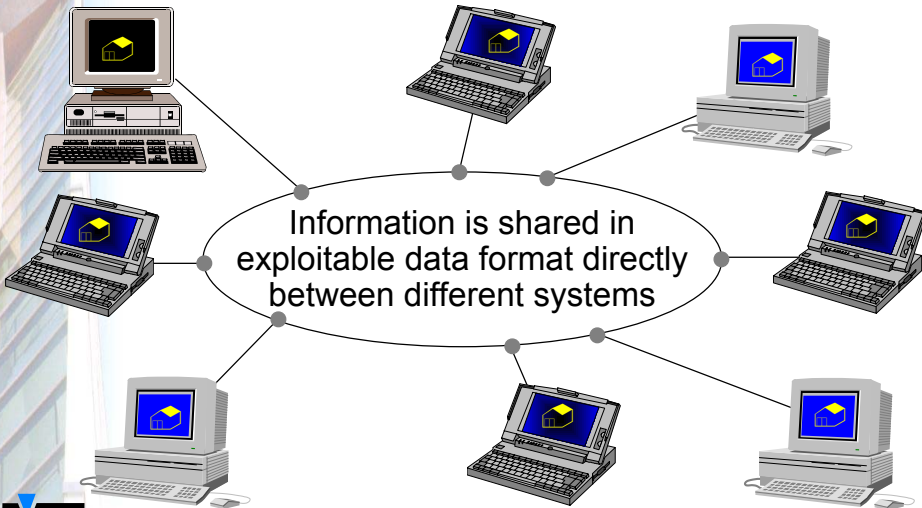
- AEC/FM industry is an information intensive branch:
  - all design and engineering activities
  - procurement and delivery control
  - call for bids, making offers and comparing alternatives
  - contract management
  - cost and utilisation degree control
  - maintenance planning and budgeting
  - technical and security system control in buildings...
- According to NIST 95% of activities in our industry are information based

# Current Situation

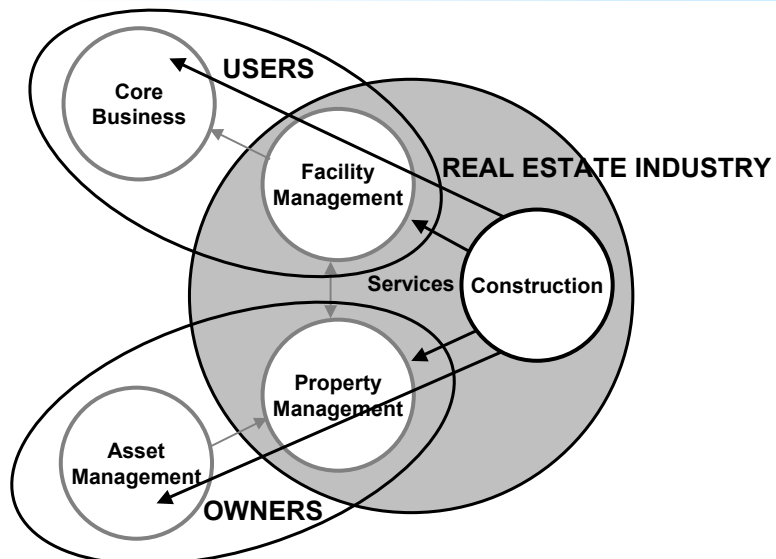




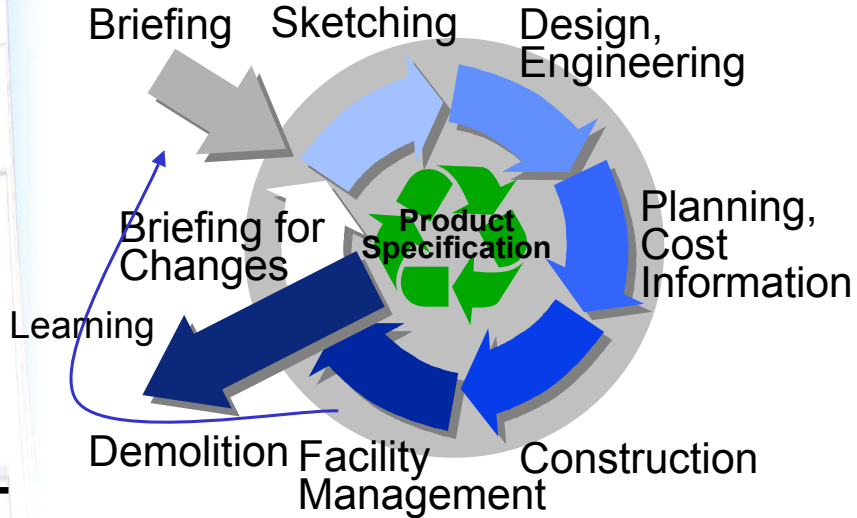
# Goal in the Future



# New View to the AEC/FM Industry

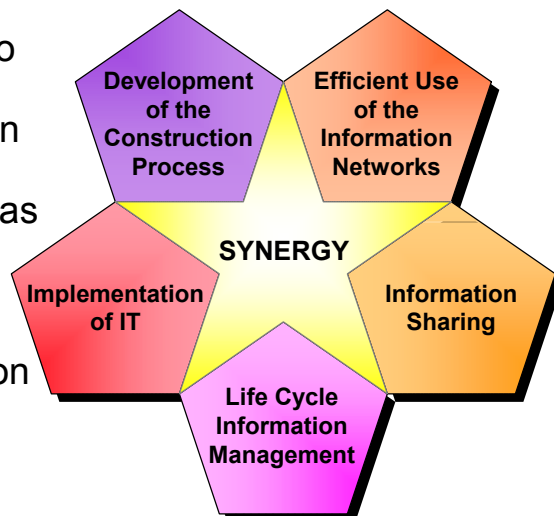


# Information Lifecycle



# 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





## Vera Programme

- Schedule - six years; 1997 - 2002
- Volume

<i>Original budget</i>	170 million FIM	(17 million GBP)
Current budget	250 million FIM	(25 million GBP)
45 % by Tekes	115 million FIM	(12 million GBP)
55 % by the industry	135 million FIM	(13 million GBP)
- Current situation

Research projects:	35 / 20 million FIM	(2 million GBP)
Industrial projects:	80 / 160 million FIM	(16 million GBP)
Total:	115 projects / 180 million FIM	(18 million GBP)
- Short project presentations in the web  
<http://cic.vtt.fi/vera/english.htm>



## 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



## Effects to the AEC/FM Industry

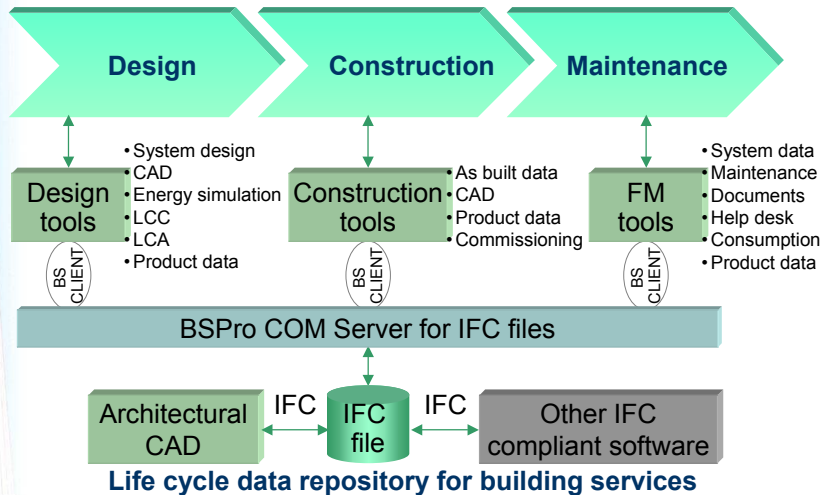


## Lifecycle Management

- 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 resources
  - better management for preventive maintenance
  - lower costs for maintenance



# BSPro COM Server / Olof Granlund



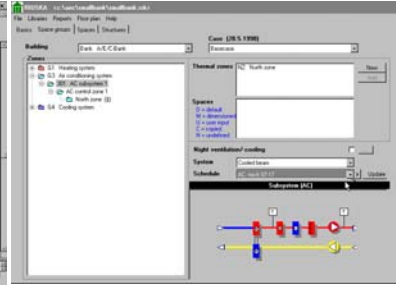
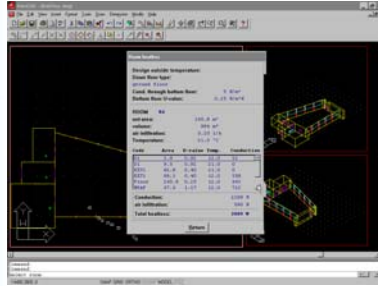
**Life cycle data repository for building services**

DOE (US Department of Energy) has taken BSPro Server as the middleware to import building geometry into their "next generation" energy simulation software: EnergyPlus

# Design and Engineering Processes

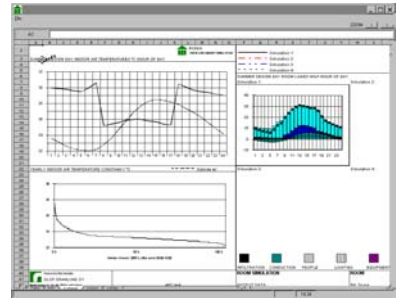
- Models can contain complex rules for behaviour and relations between objects
  - (semi)automated design integration and code checking
  - easy and cost efficient evaluation and simulation at any project stage
    - thermal, lighting and performance simulation
    - more accurate cost estimation
- New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

# New Tools for Simulation



## SMOG/Riuska

- use of IFC building objects
- based on the DOE simulation engine
- Supports both IFC R1.5.1 and R2.0 through the BPro COM Server



# 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 will be delivered as a part of the production
  - product information must be a part of the eCommerce and procurement
    - electronic 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 and share of benefits through the whole AEC/FM industry