

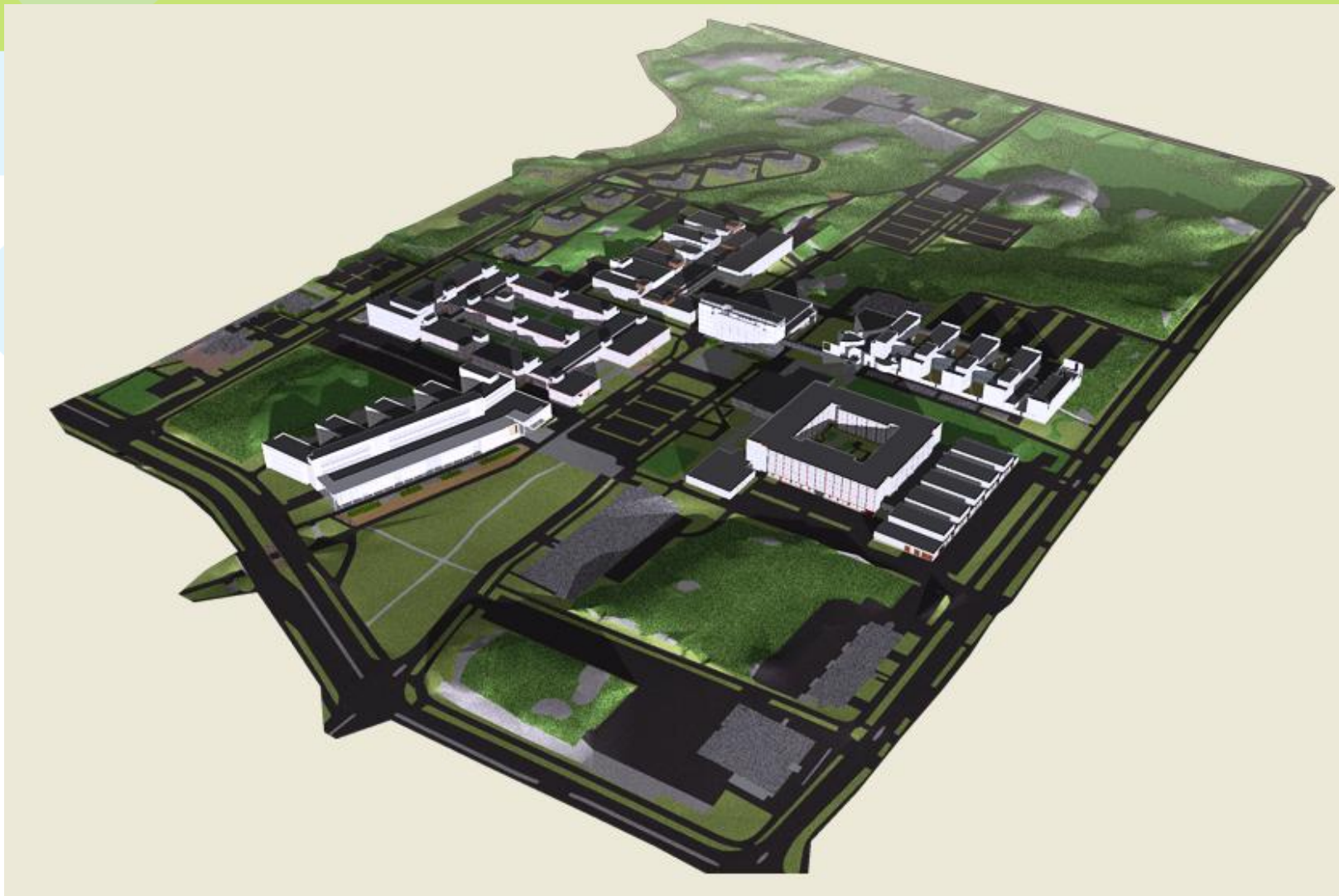
BIM FINLAND

Development of BIM in Finland

BIM AARHUS, 20.09.2012
Prof. Jarmo Laitinen



Virtual Campus



Reality soon



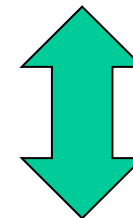
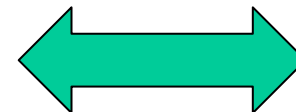
Context

- BIM & ICT
- Lean Construction
- Infra modeling
- Research projects

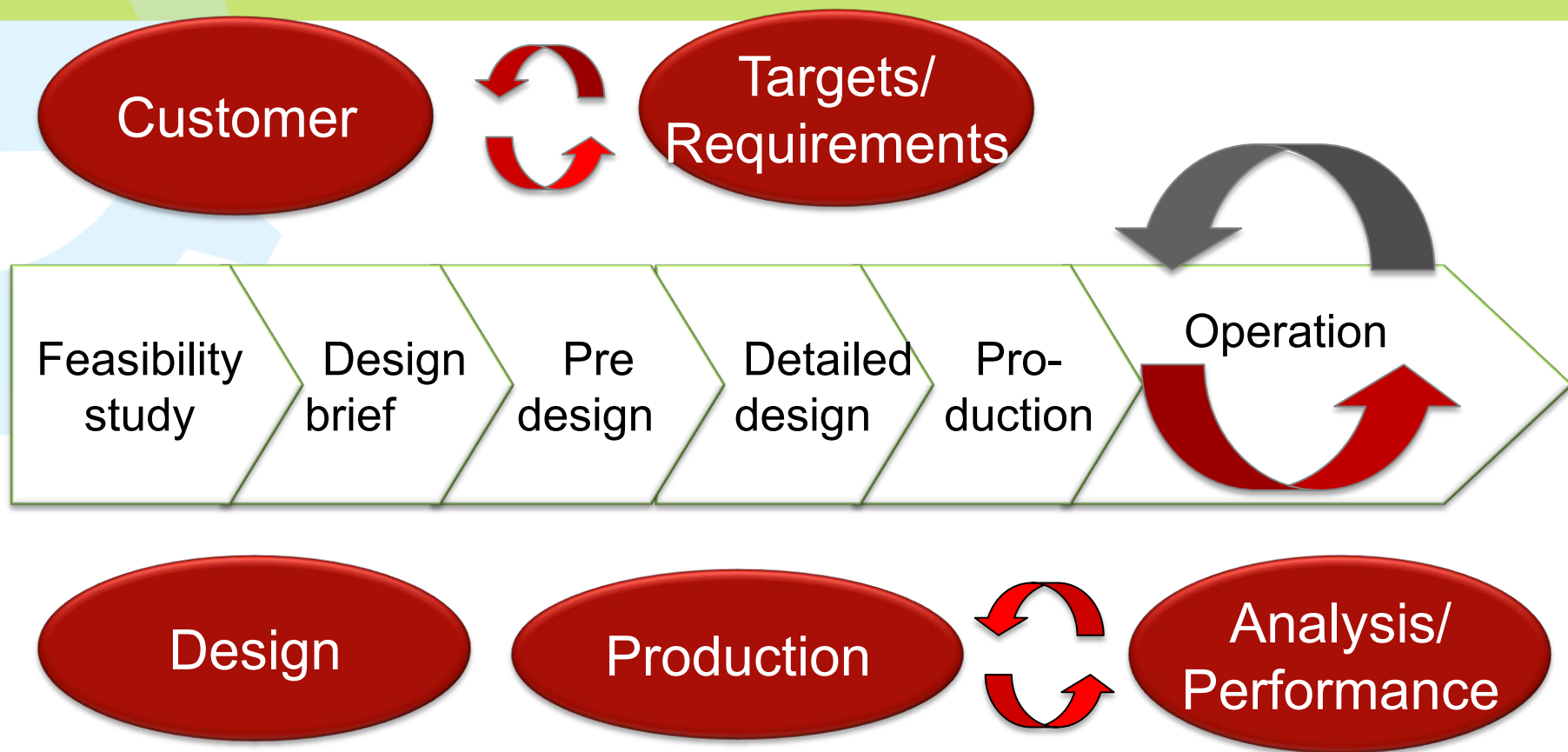


BIM and ICT

- In Finland BIM usage is rapidly widening
- Should we divide ICT:
 - IT, Information technology
 - CT, Communication Technology



Construction process value chain



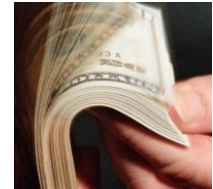
Computer interpretation ↔ Analysis

What BIM enables?

It is possible to provide added value to customers

The possibility to **analyze** the proposed solution

- Building performance throughout its life-cycle
- Reliable information for decision making eg. investment- and life-cycle cost
- Risk management



What one is
not able to
analyze, he
is not able to
manage

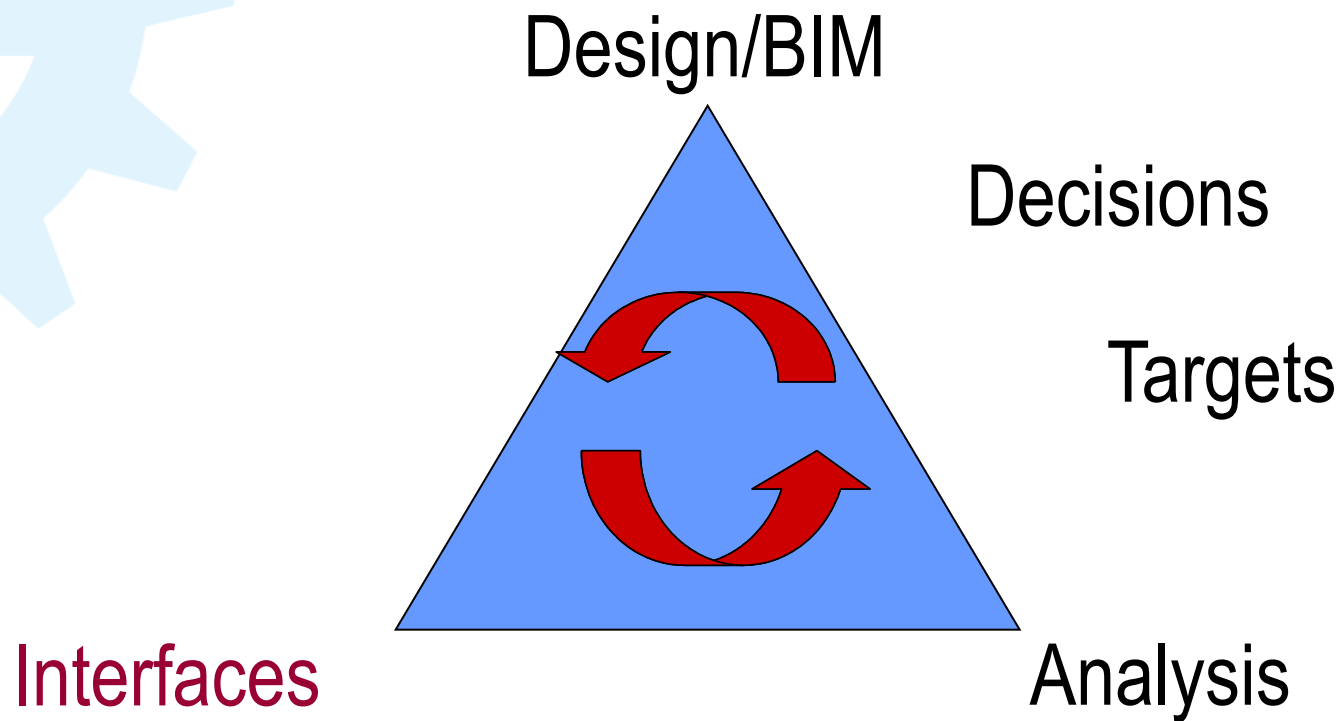


What has changed?

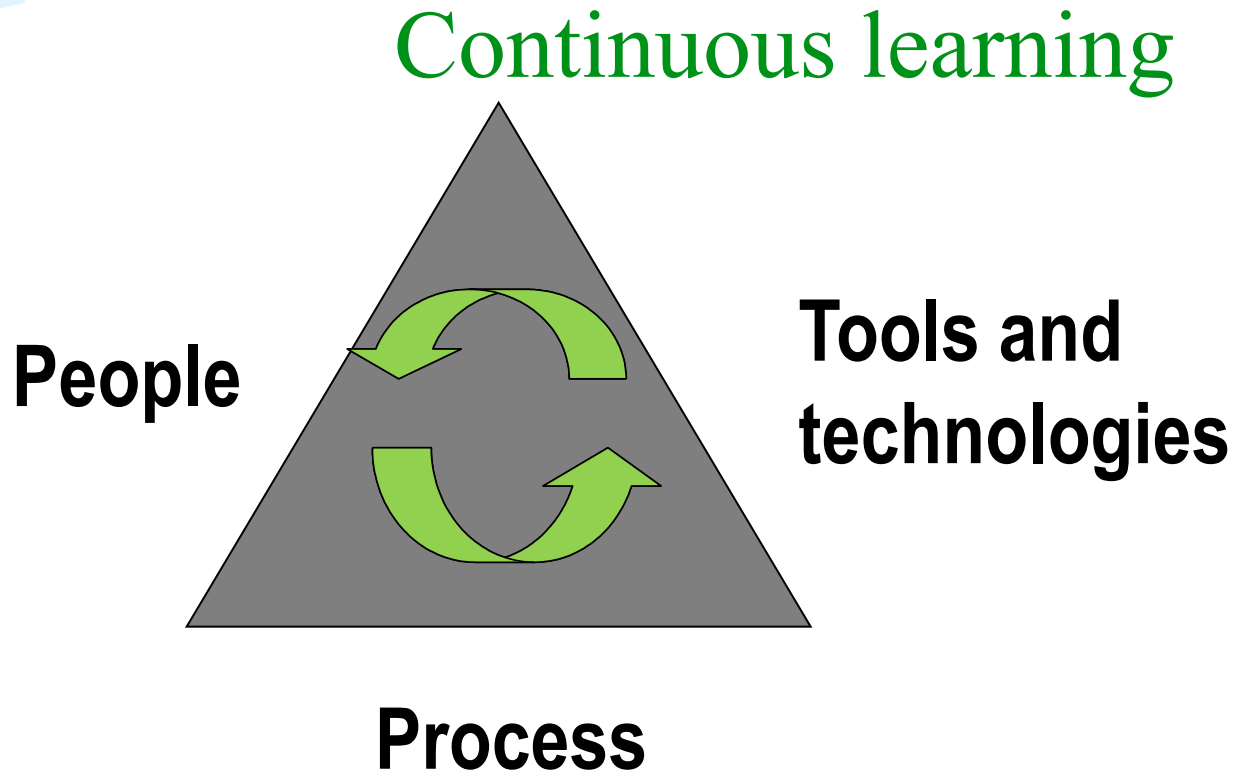
- Building Information Model (BIM) approach enables accurate analysis of the alternative design and production solutions for
 - Investment cost
 - Constructability on site
 - Life cycle costs
 - Energy consumption
 - Life cycle assessment
 - etc.



How to analyze?



Lean production approach

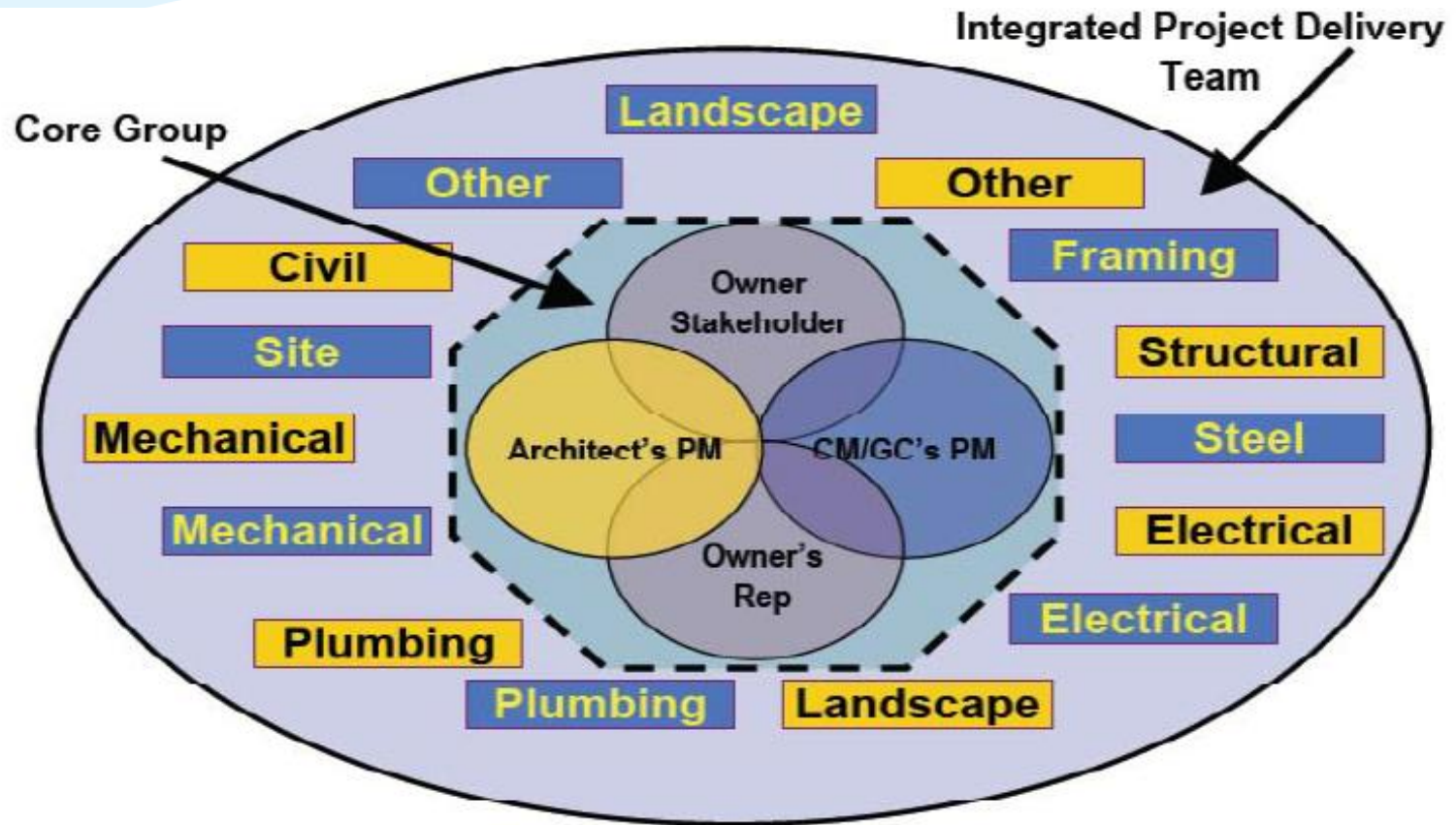


Lean Construction basics

- Customer Value
- Value Stream
- Standard Production Systems
- Integrated Teams
- Last Planner for Production Planning
- Continuous Learning



Integrated Team Concept



Last Planner

- Method for production planning and steering
 - Last Planner-Process: plan, steer, fix and learn!
 - Weekly planning; three weeks look ahead
- ↔ In Finnish Construction only about 50% of weekly planning realizes!



Lean tools, BIM support

- Standard production systems ↔ product structures/libraries
- Visual steering ↔ 3-5D
- Last Planner ↔ Quantity management



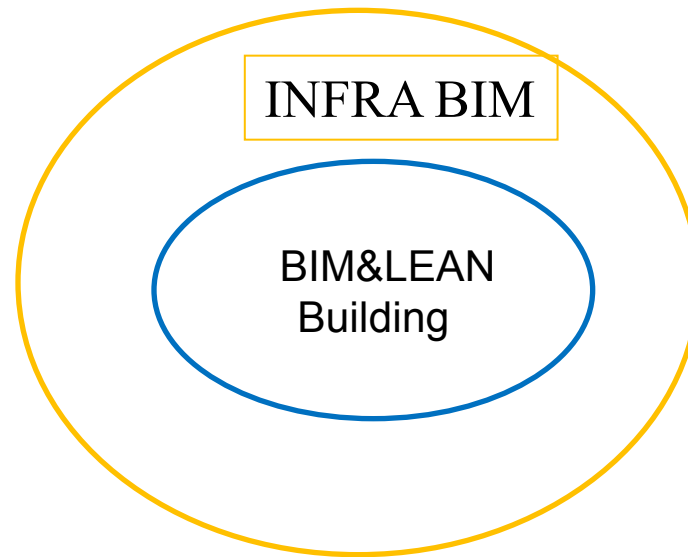
Conclusion BIM & Lean

My opinion is:

**BIM is an Enabler for Lean
Construction!**



Next step for BIM & ICT



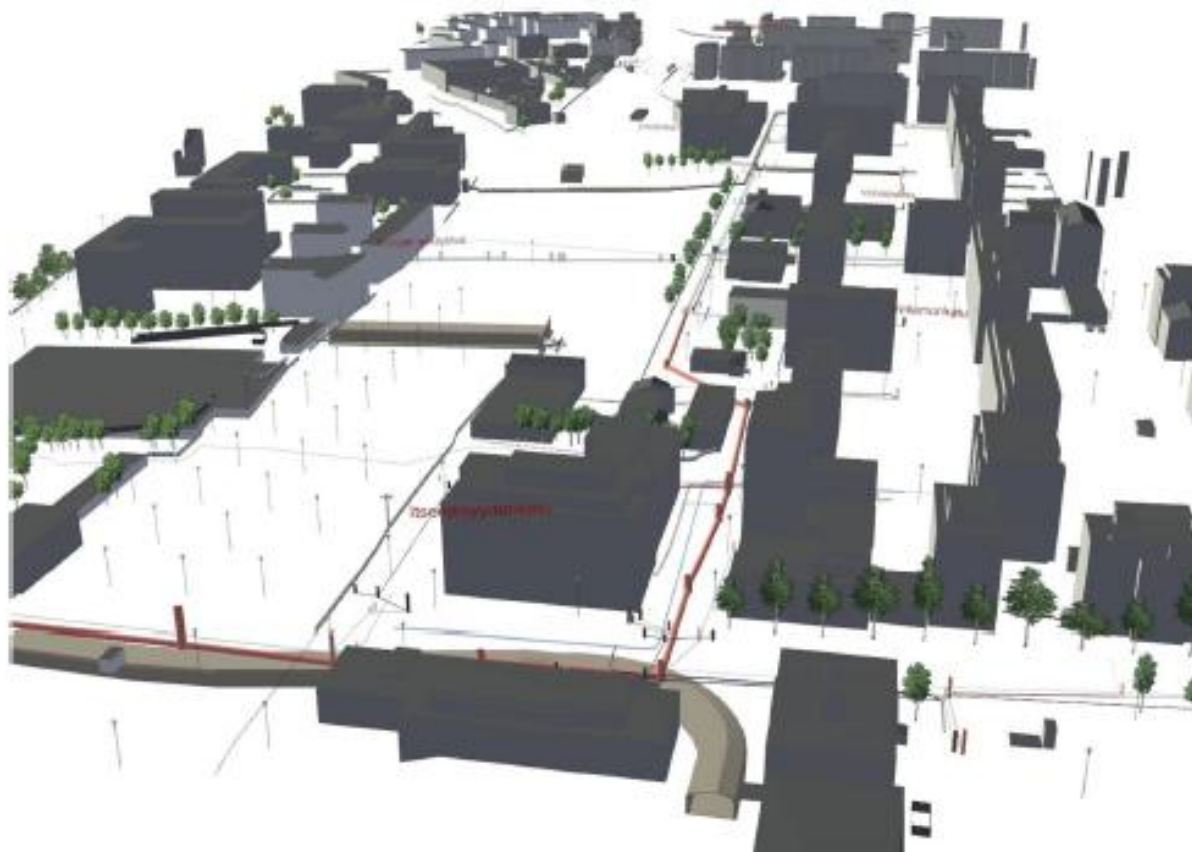
Challenge is the interface:
IFC/LandXML



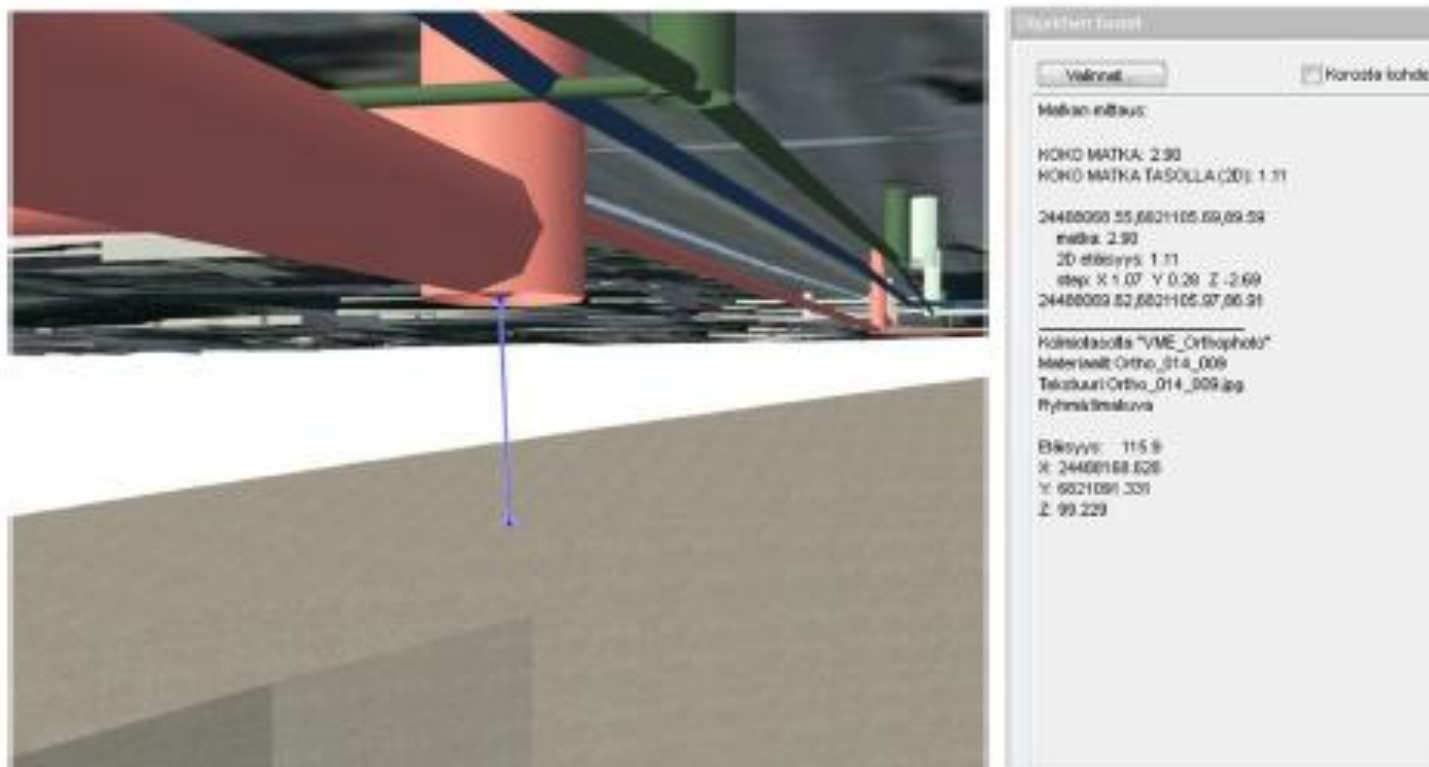
Infra Modeling



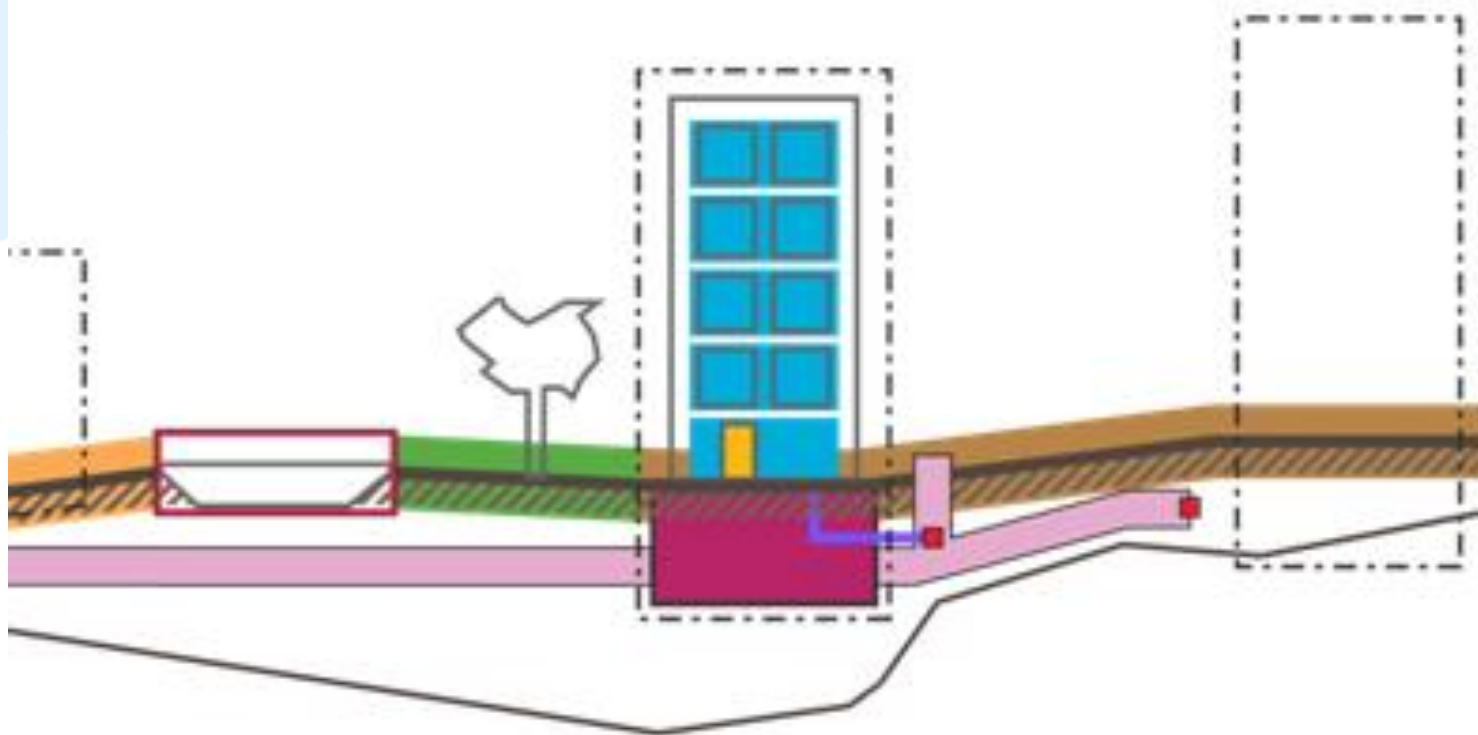
Infra Modeling



Infra Modeling



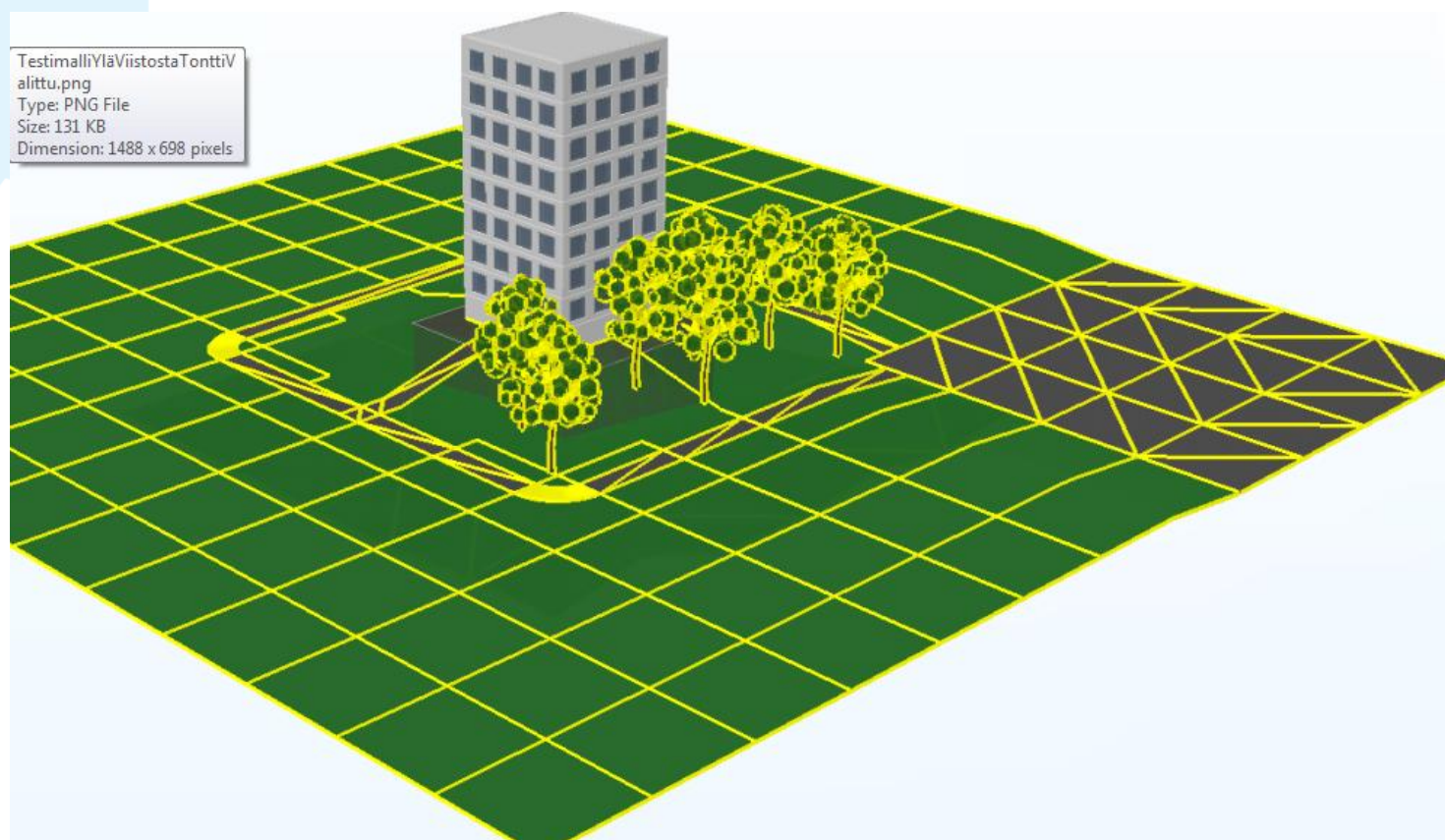
Coordination model for land use



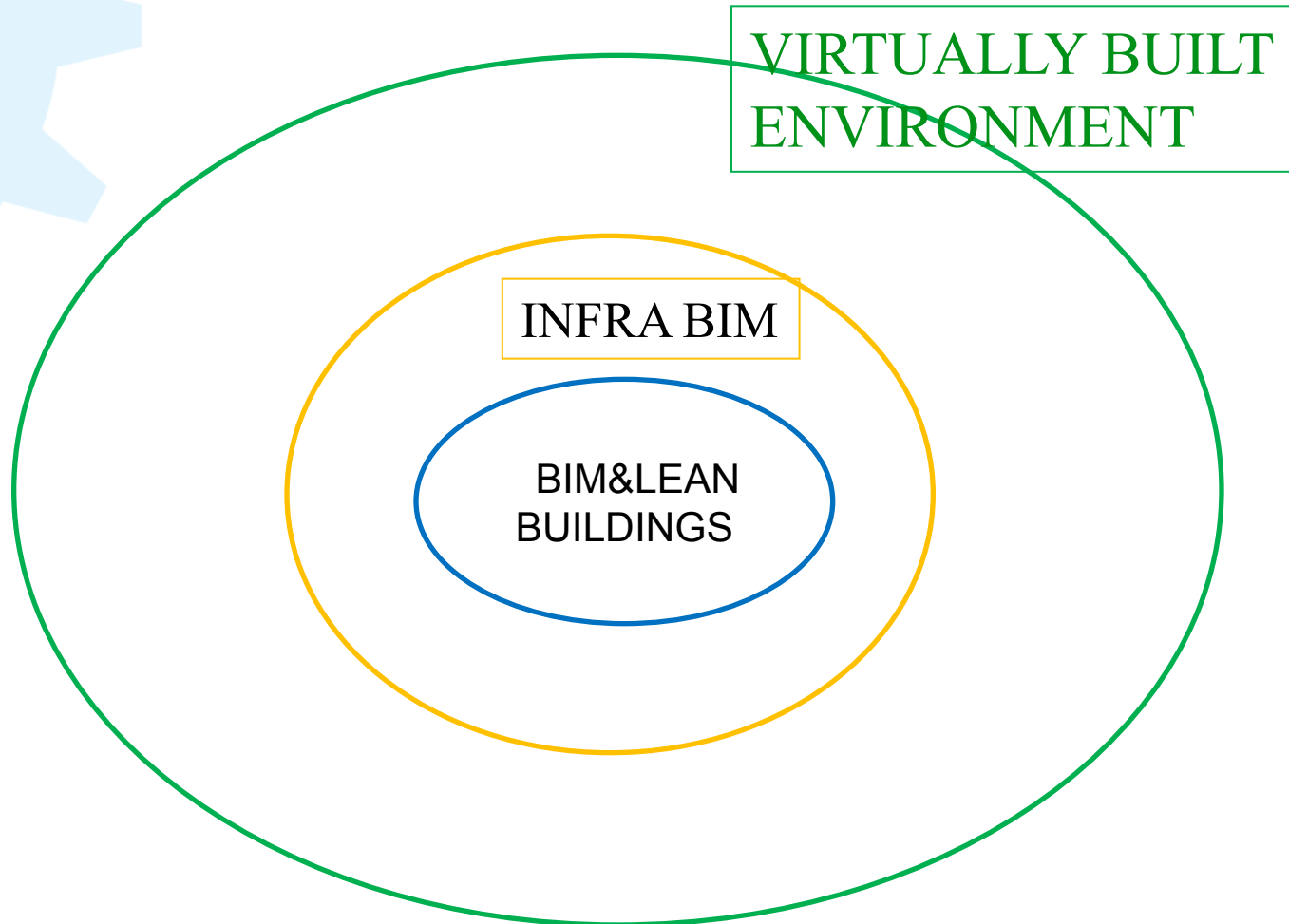
Test model



Test model



Vision



Research

- Pre
- BIMCity
- Ifra FinnBim
- Approach

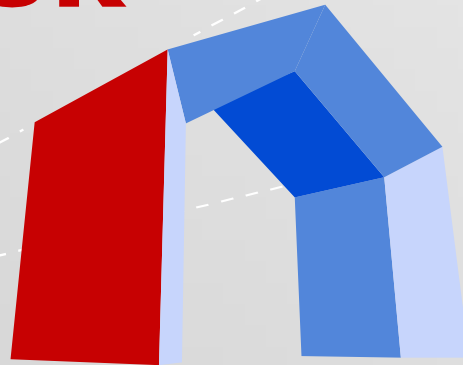


**RAKENNETUN YMPÄRISTÖN
STRATEGISEN HUIPPUOSAAMISEN KESKITTÄMÄ**

RYM-SHOK

**(Strategic Center of Excellence of Built
Environment)**

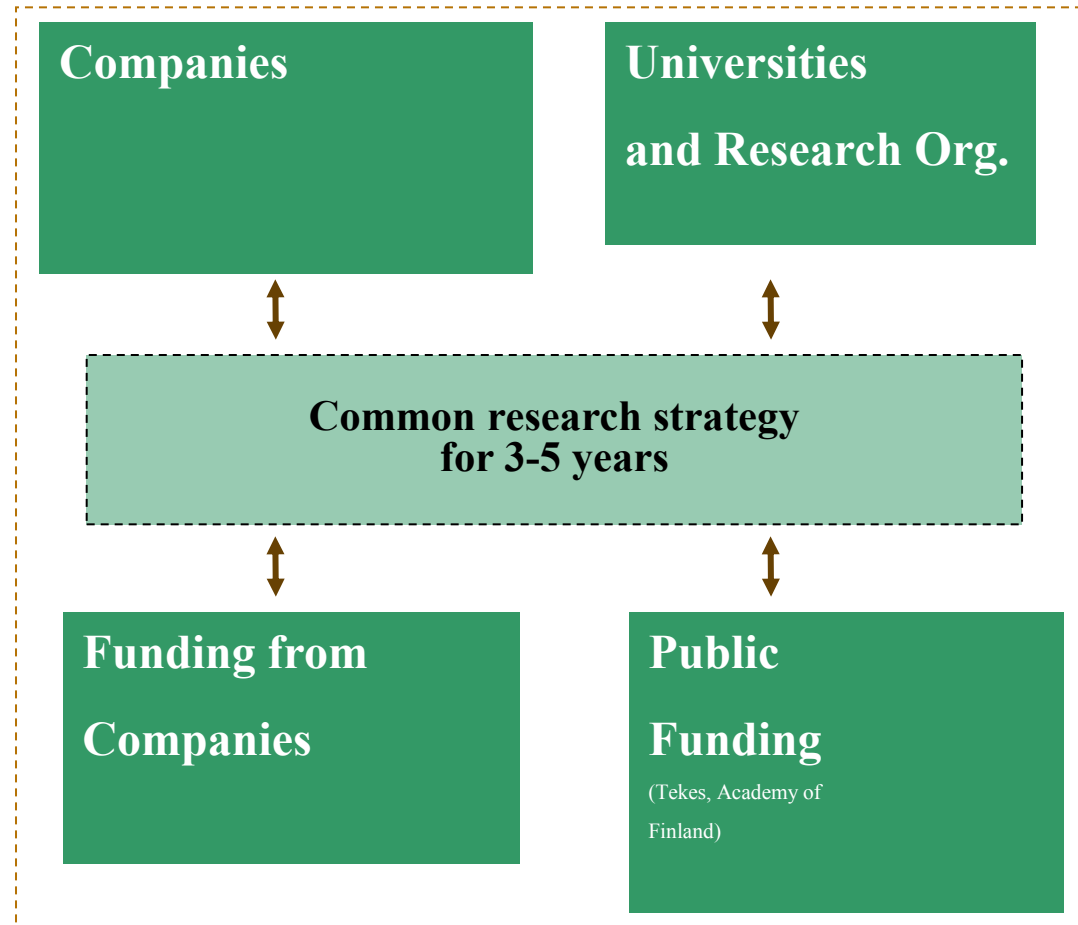
SHOK



Rakennetun ympäristön/Built Environment
Strategisen/Strategic
Huippu-/Top
Osaamisen-/Skill (Expert Knowledge)
Keskittymä/Center

What is Strategic Center of Excellence?

**INTERACTIVE • APPLICATION CENTRIC • MULTIDISCIPLINARY
INTERNATIONAL • CONTINUOUSLY RENEWABLE**



Participation to SHOK-Corporation

Three Categories in Built Environment

Category A

- Share Capital 100 000€, annual 10 000€
- Number of Companies 10

Category B

- Share Capital 50 000€, annual 5 000€
- Number of Companies 9

Category C

- Share Capital 25 000€, annual 2 500€
- Number Companies 33

Summary:

- 52 Companies
- Turnover together 15 billion Euros!





Built Environment Process Re-engineering (PRE) –research program



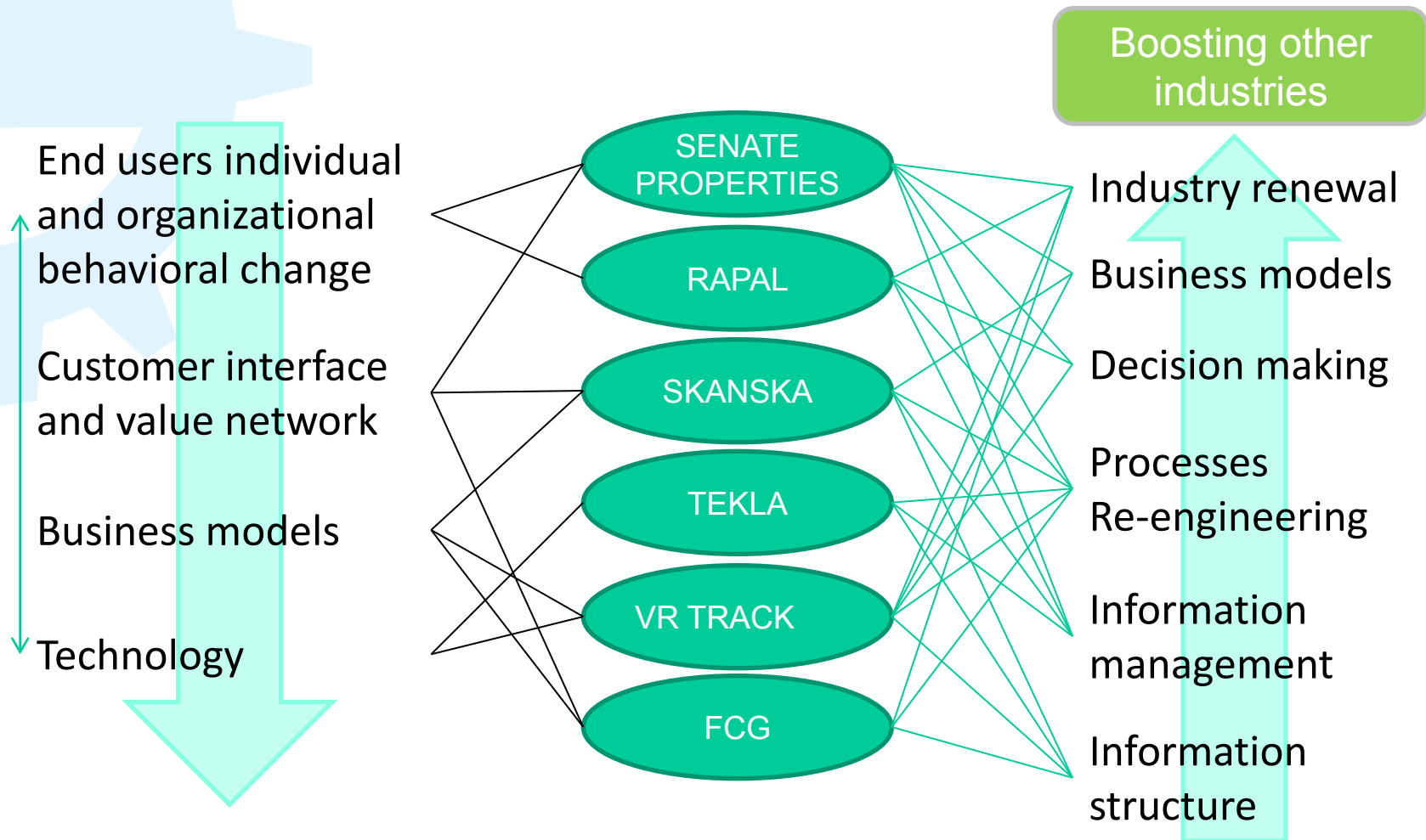
What is PRE?

PRE—research programme seeks the answer to question **how built environment can enhance the growth and development by providing solutions** to manage, support and speed up the change faced up by the end users?

1. What is the behavioural change of end users (human/organisation)?
2. What is the resulting systemic change in customer interface and value network?
3. What is the chance of the business models of Built Environment?
4. How the latest technology foster the change of whole branch's business paradigm?



Built Environment Process Re-engineering (PRE)



Program overview

- Duration 3 years 2 months (11/2010-2013)
- Total volume 21 M€
- Funding:
 - 60 % Tekes – the Finnish Funding Agency for Technology and Innovation, research organisations, The Finnish Transport Agency, 6 cities
 - 40 % industrial partners
- Consortium: 43 participants
 - 36 companies
 - The Finnish Transport Agency
 - 5 universities
 - 1 research institute



Program partners and budget by WP

WORK PACKAGE	LEADER	No of partners (industry/research)	TOTAL BUDGET, kEUROS
MODEL NOVA	Senate Properties	9/2	5 195
NewWoW	Rapal	4/2	2 641
BIMCON	Skanska	5/2	3 785
DRUM	Tekla	6/1	1 835
InfraFINBIM	VR Track	15/3	6 188
BIMCity	FCG	6/3	1 743
TOTAL			21 387



Consortium, industrial partners and their role in the program

IT service and software providers

AX Consulting Oy
Logica Suomi Oy
Micro Aided Design Oy
Progman Oy
Solibri Oy
Tekla Oyj
Terramare Oy
Tietoa Finland Oy

Service providers

Building Information
ISS Palvelut Oy
Rapol Oy
Senate Properties

Designers

- Arkkitehtitoimisto Perko Oy
- FCG Finnish Consulting Group Ltd
- Finnmap Consulting Oy
- Olof Granlund Oy
- Pöyry CM Oy

Product providers

- Consolis Technology Oy Ab
- Parma Oy
- Rautaruukki Oyj
- Saint-Gobain Weber Oy Ab

Infra sector

- Destia Ltd
- Finnmap Infra Oy
- NCC Roads Oy
- Pöyry Finland Oy
- Ramboll Finland Oy
- Sito Oy
- Vianova Systems Finland Oy
- VR Track
- WSP Finland Oy

Construction companies

- Lemminkäinen Oyj
- NCC Construction
- Skanska Oy
- SRV Yhtiöt Oyj
- YIT Construction Ltd



Consortium, research and public organisations

Research organizations

Aalto University

University of Helsinki

Helsinki Metropolia University of Applied Sciences

University of Oulu

Tampere University of Technology

VTT Technical Research Centre of Finland

Public organizations

Finnish Transport Agency

6 cities: Helsinki, Espoo, Tampere, Vantaa, Turku, Oulu
(financing)



Partners involved in several workpackages

WP1	WP2	WP3	WP4	WP5	WP6	Partner
x	x					Olof Granlund Oy
x				x		Lemminkäinen Oyj
			x		x	Micro Aided Design Oy
x						NCC Construction Oy
				x		NCC Roads Oy
x						Pöyry CM Oy
				x		Pöyry Finland Oy
x	x					Senate Properties
		x	x			Skanska Oy
			x		x	Solibri Oy
		x	x	x		Tekla Oyj
				x	x	Vianova Systems Finland Oy
				x	x	WSP Finland Oy
x		x	x	x		Aalto University
	x	x		x	x	VTT Technical Research Centre of Finland
	x				x	Tampere University of Technology

WP 1: ModelNova

New business model based on process network and building information modelling (BIM)

Process and business models based on BIM and an operating culture that provide added value and promote sustainability across the value network as well as throughout the life-cycle of the built environment

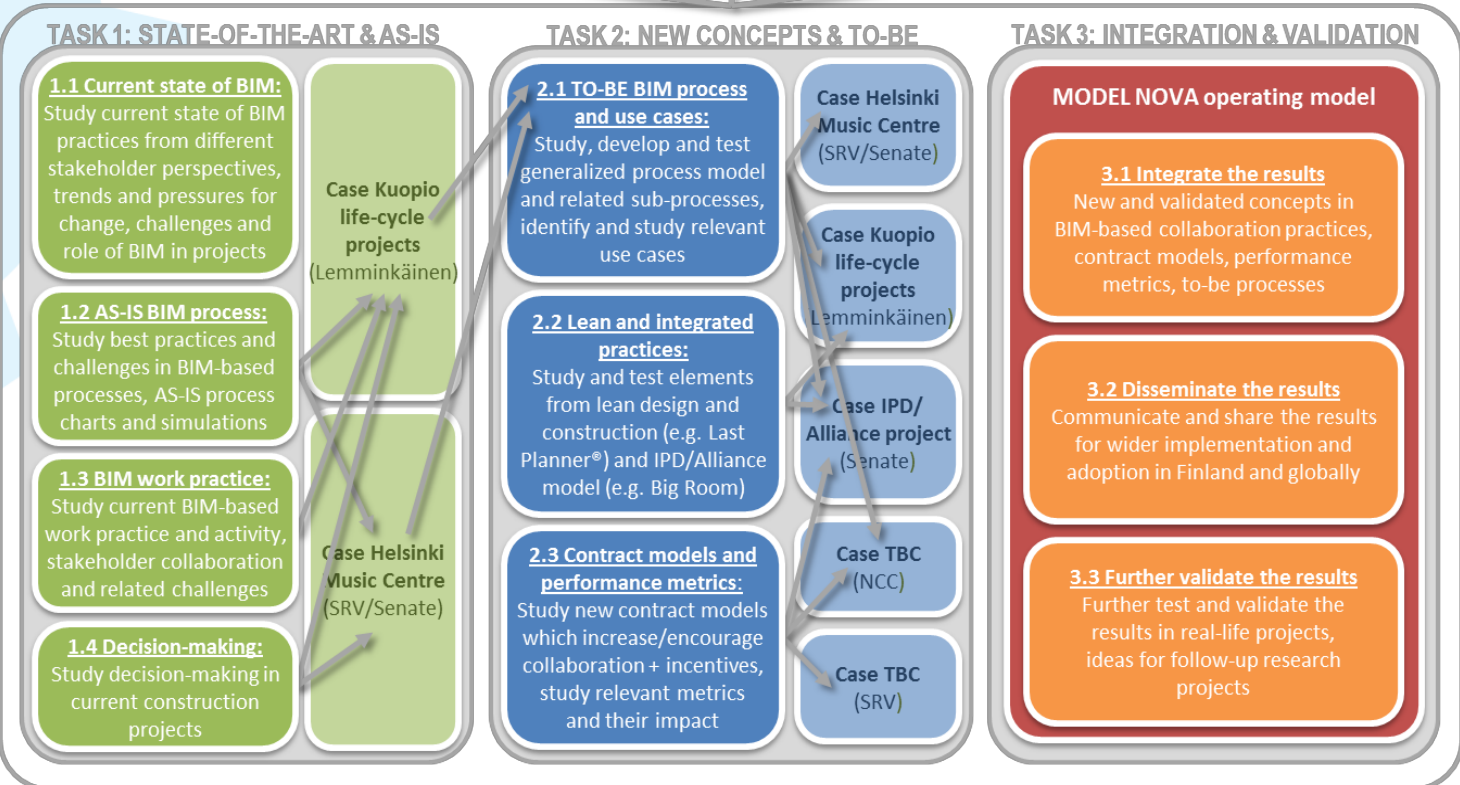
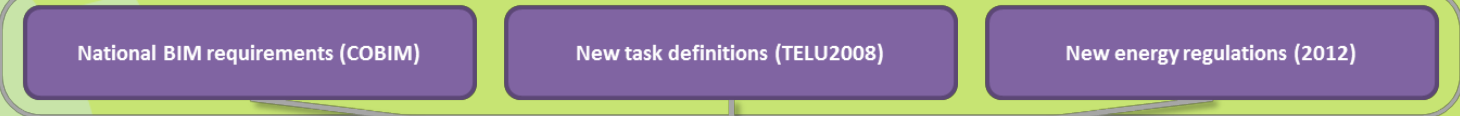
Main research themes

1 Information management	Information needs of different stakeholders in different phases Key information content of BIMs General information management process
2 Process and stakeholders	Users and sustainability as drivers BIM-based regulatory process Holistic process management
3 Decision-making and business aspects	Decision-making processes of owners, users and other stakeholders New service and business opportunities
4 Industry renewal and deployment	Monitoring and measuring the achievement of objectives Deployment and implementation of new practices New ways to promote the collaboration and innovativeness

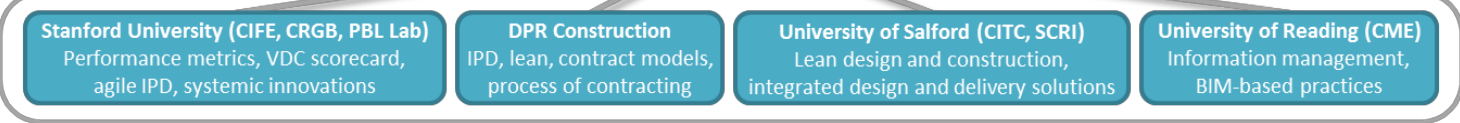


WP 1: ModelNova

RELEVANT BACKGROUND MATERIAL



INTERNATIONAL COLLABORATION



WP 2: New WoW

New Ways of Working

- Aims at **comprehensive understanding of sustainability and environmental potential of new ways of working** with the focus on spaces, knowledge work and usage of ICT solutions
- Explores **methods for space management** in the changing work environment by taking into account the end user perspective
 - Methods for the definition of work requirements and work profiles are searched
- The goal is to find **new solutions for work management** and **key indicators** that ensure high quality and sustainable development of knowledge work
- BIM is used as an enabler in the process



WP 3: BIMCON

BIM based product data management in industrialised construction supply chain

Main objective is to **develop comprehensive product data management** for the construction industry to speed up information usage in supply chains

The process aims for better management and responsiveness of the networks

Better information management is the key in improving construction productivity and profitability. It also promotes the industrialisation of the construction sector



WP 4: DRUM

Distributed Transactional BIM

Objective is to research and develop **transaction based information sharing methods and technology** enabling the practical integration of the construction management information with the building objects without roundtrip of information

Harmonizing the information transfer structures with the practical building process needs to ensure the easy implementation of the next generation BIM based processes (BIMCON and Infra **FINBIM**)



WP 5: Infra FINBIM

Objective is to **identify and remove barriers that hinder uptake and development of BIM** based business processes

Goal is systemic change, from traditional sub-optimization in each project phase to smart BIM based service provision in all lifecycle operations, in all disciplines and by all actors

Result: substantial productivity improvement in design, construction and maintenance, with new practices and improved collaboration and mutual understanding between stakeholders

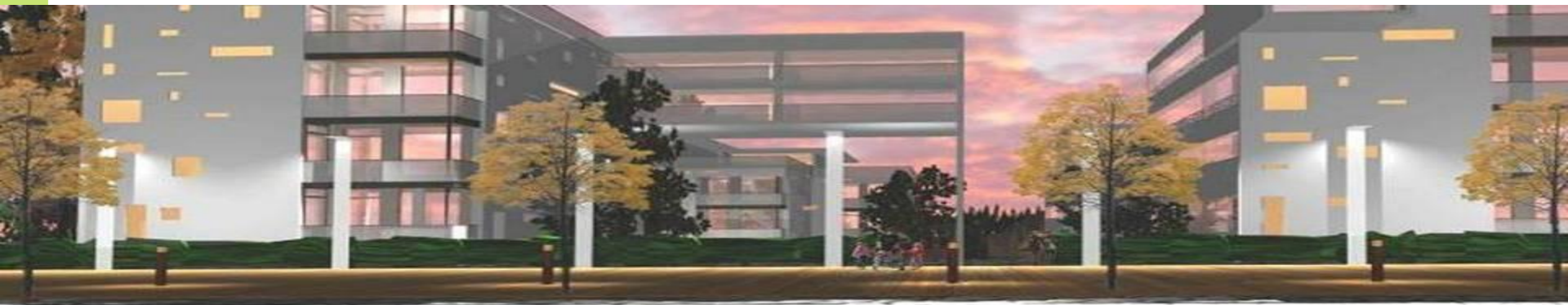


WP 6: BIMCity

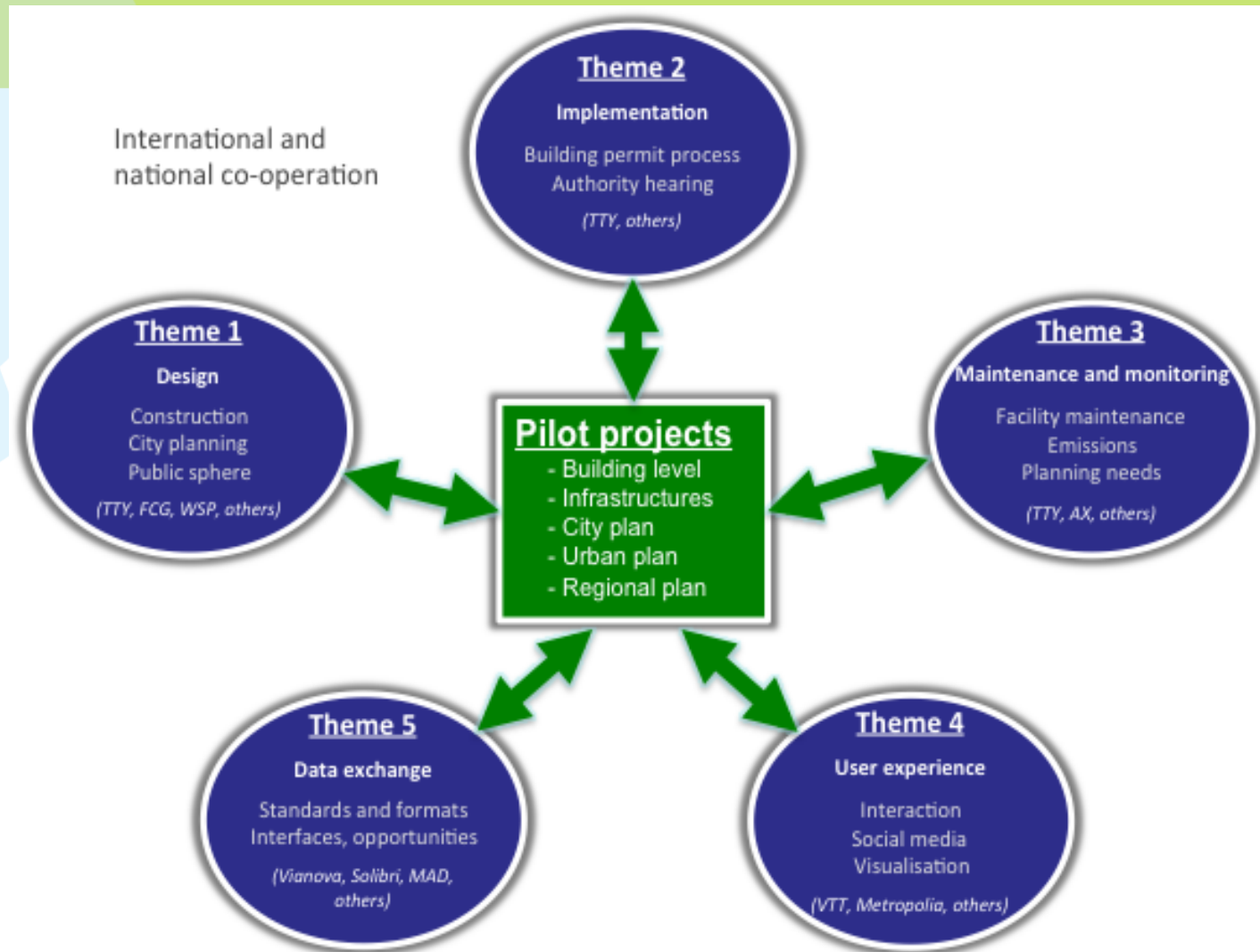
“BIMCity – Simulation platform for IFC based technologies and solutions”.

BIMCity is a simulation and testing environment for context based virtual city. Interfaces between BIM, GIS, infra data and Internet databases

- Test environment elements
 - Buildings
 - Street and roads
 - Pipes, cables
 - Town plans
 - Land registers
 - Building license
 - Climate and geographical data
 - Pedestrian and vehicle traffic information
 - Other municipal databases and registers
 - Etc.



WP 6: BIMCity



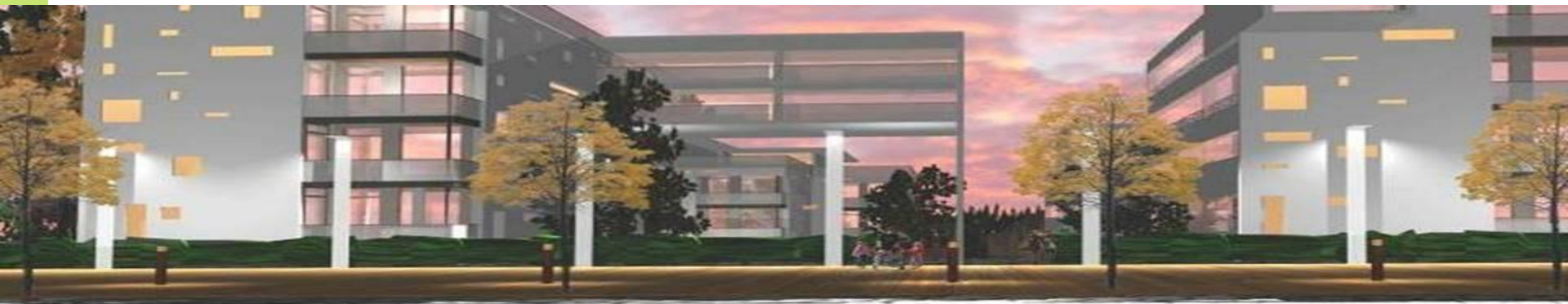


BIMCity research project



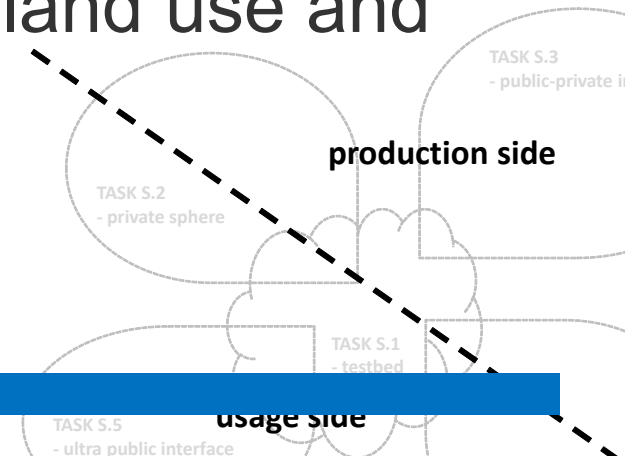
BIMCity

- BIMCity is a simulation and testing environment for context based virtual city. Interfaces between BIM, GIS, infra data and Internet databases



Target

- Common functional environment for land use and construction databases
- Establish information model to land use planning
- Improving information exchange and communication
- Open environment for business in land use and construction
- Information model visualizations



Participants

Companies

FCG Finnish Consulting Group Ltd. (Industry Leader)

WSP Finland Ltd.

Solibri Ltd.

Vianova Systems Finland Ltd.

AX Konsultit

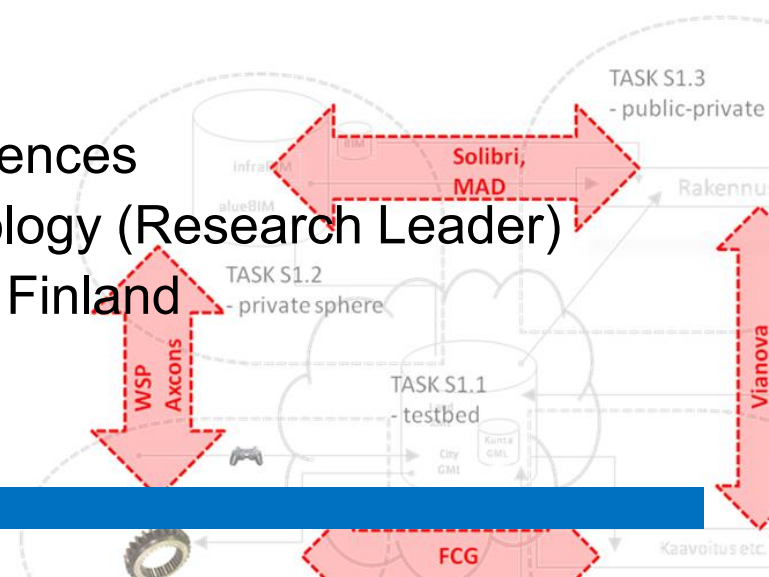
M.A.D.

Research partners

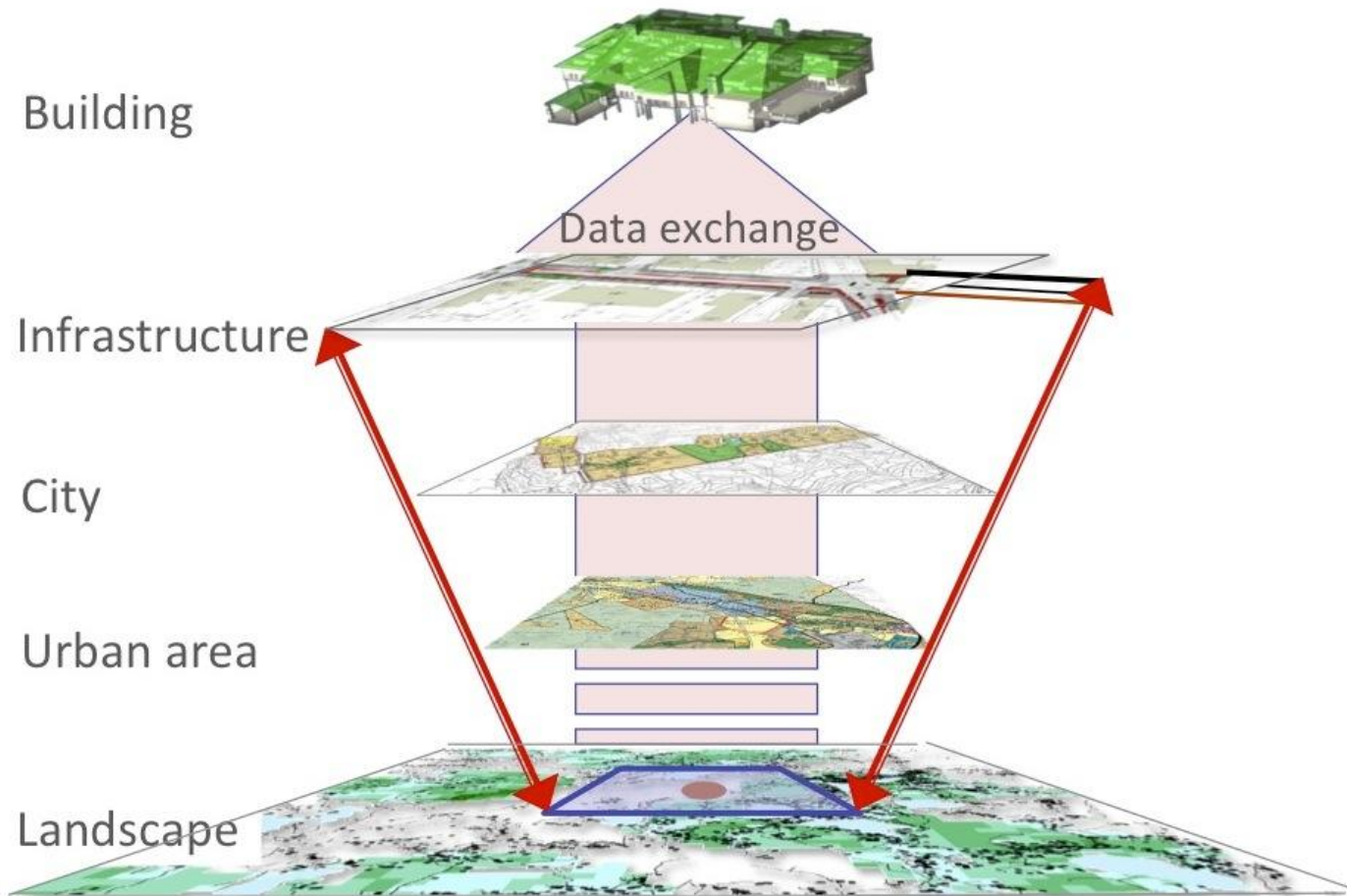
Metropolia University of Applied Sciences

TUT, Tampere University of Technology (Research Leader)

VTT, Technical Research Centre of Finland



Implementation in pilots at different planning levels





Built Environment Process Reengineering (PRE): Infra FINBIM



Infra FINBIM – the main Objective

In 2014, major infra-sector clients procure only BIM based services, in all project phases from early planning and design to maintenance and operation

Members of Infra FINBIM
Year 2010



Team Working



Machine Automation, Measuring, Software

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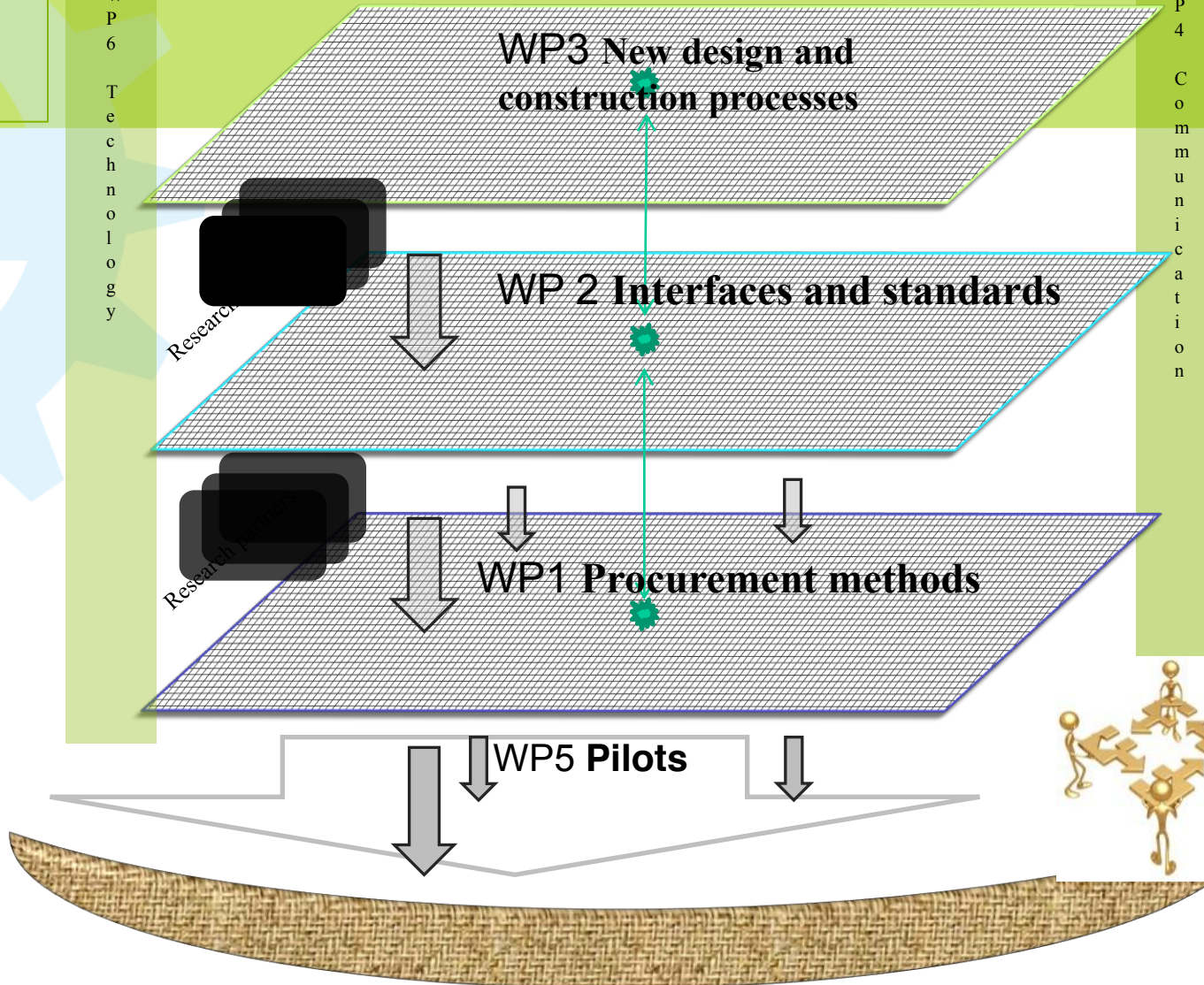
Research

Research

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Infra TM
PRE workpackages
RIL
BuildingSmart Nordic
Universities
5Dsilta3



Conclusion INFRA

- A large R&D Program is active in Finland
- The key is in collaborative research and development, i.e., how to make the systemic change
- Infra FINBIM has gathered a strong development group in Finland
- InfraFINBIM is looking for strong international collaboration with especially Northern Countries
- **The Northern Countries could together** have the best practices and be BIM leaders in the World.



We still have some work to do 😊

