



COMMITMENT

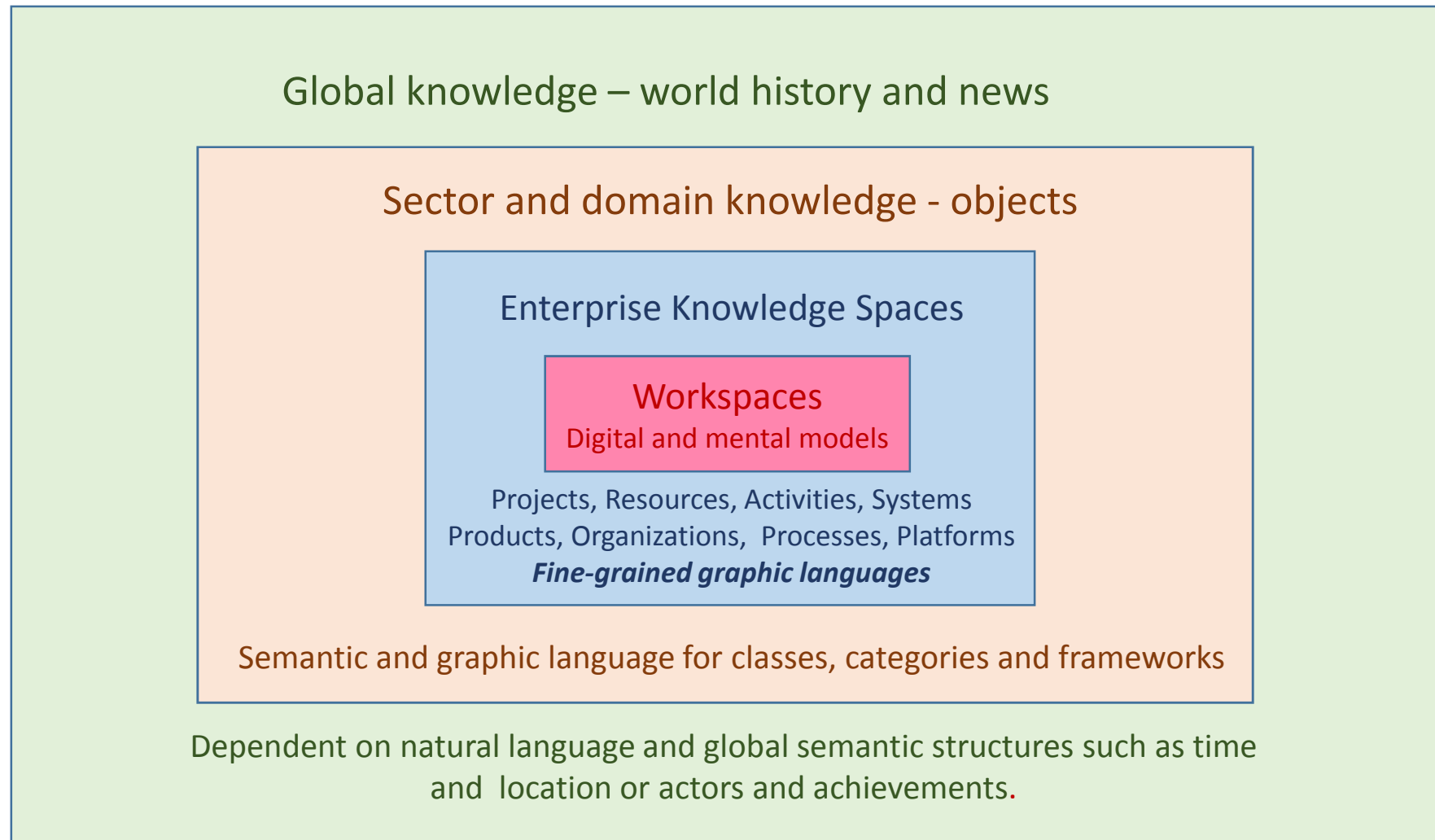
Realizing Enterprise Knowledge Management

Knowledge categories, Visual Modelling, Active Knowledge Architecture

Frank Lillehagen, Commitment AS

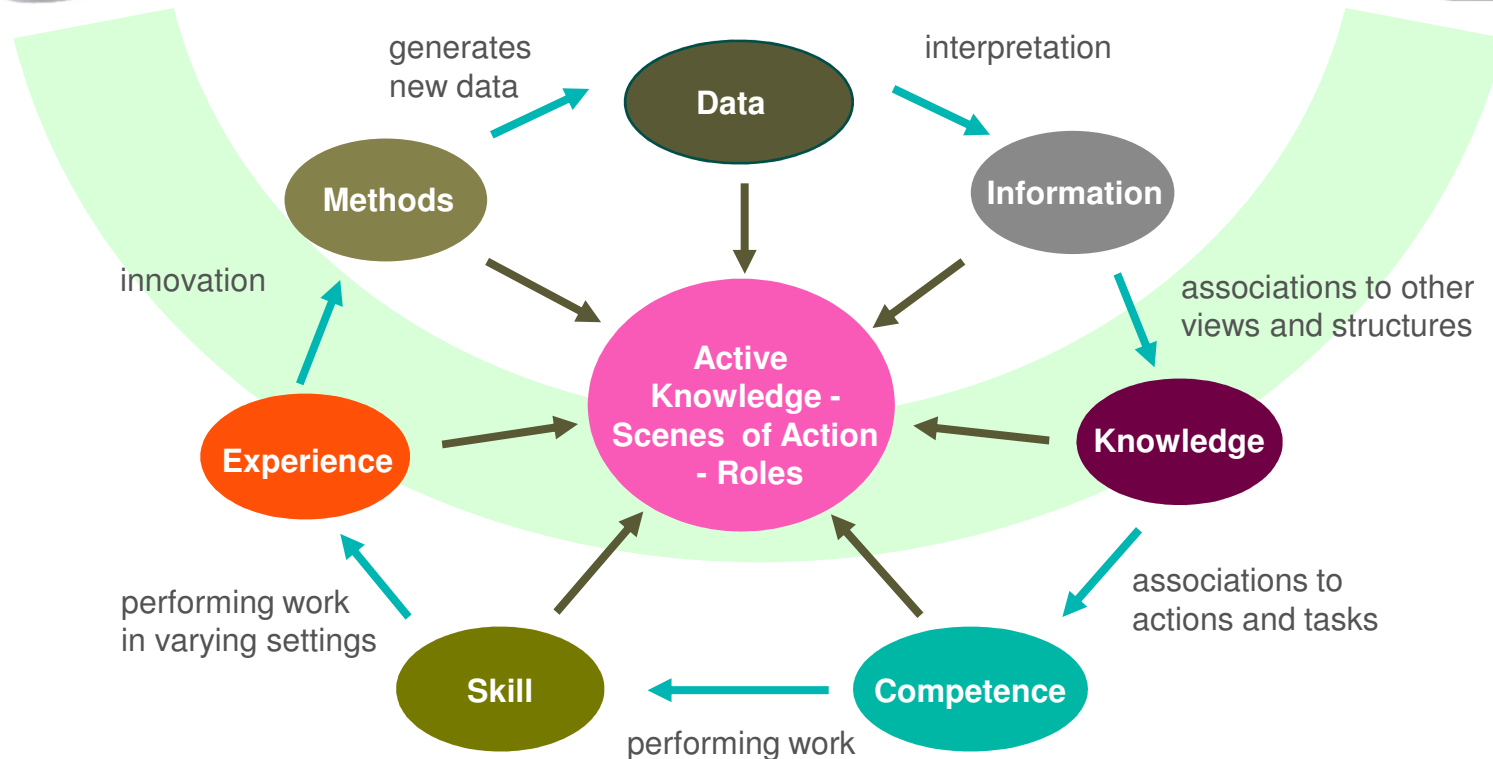
Presentation at KSEE 2015, HBV, Kongsberg, Norway, June 4th, 2015

State-of-innovation in Knowledge Management



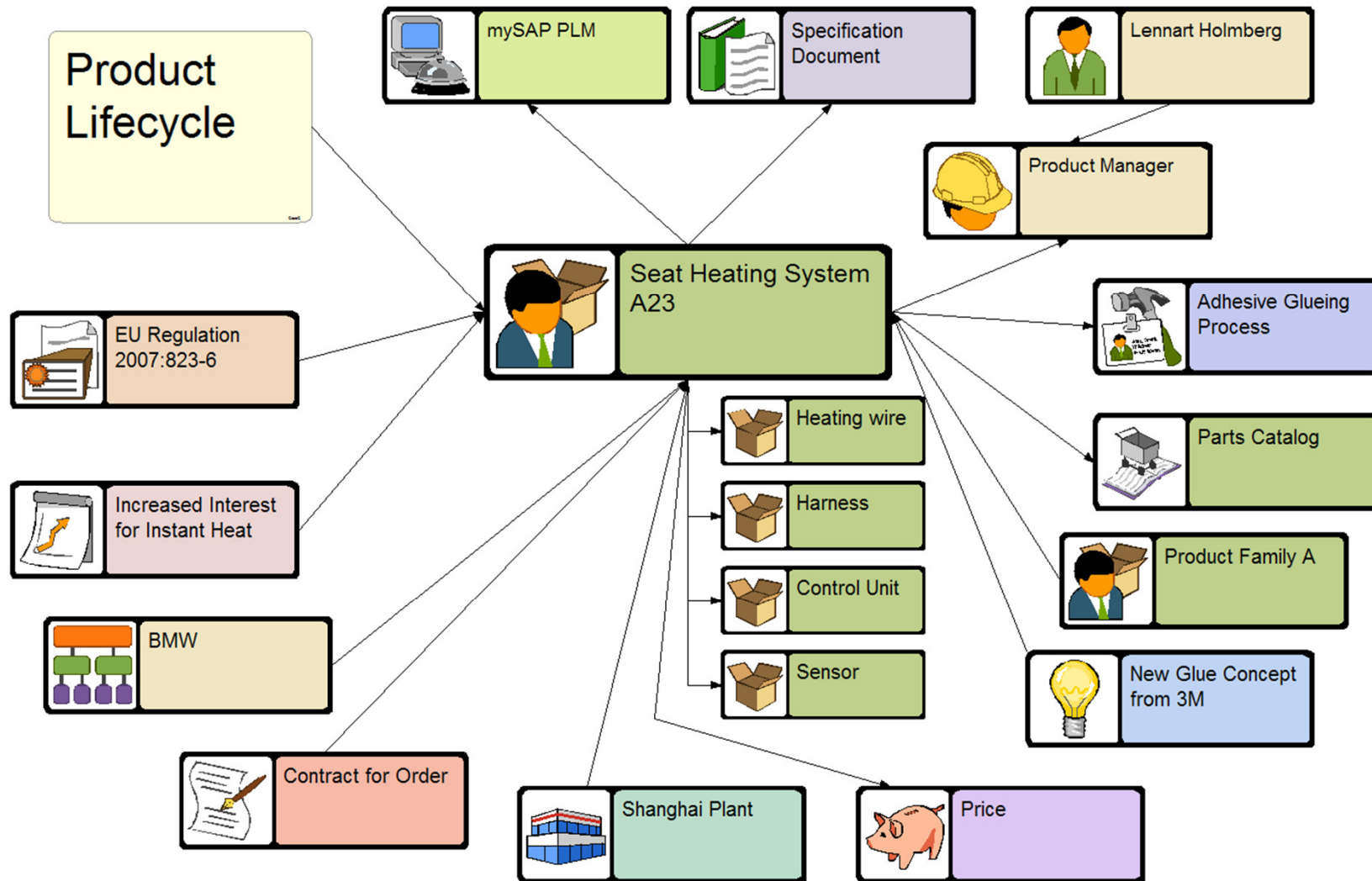
Active Knowledge Modeling – foundations

Closing and activating the Pragmatic Learning Process
 Creating value through knowledge sharing and collaboration
 Digital networks used as multi-media enabled by software.

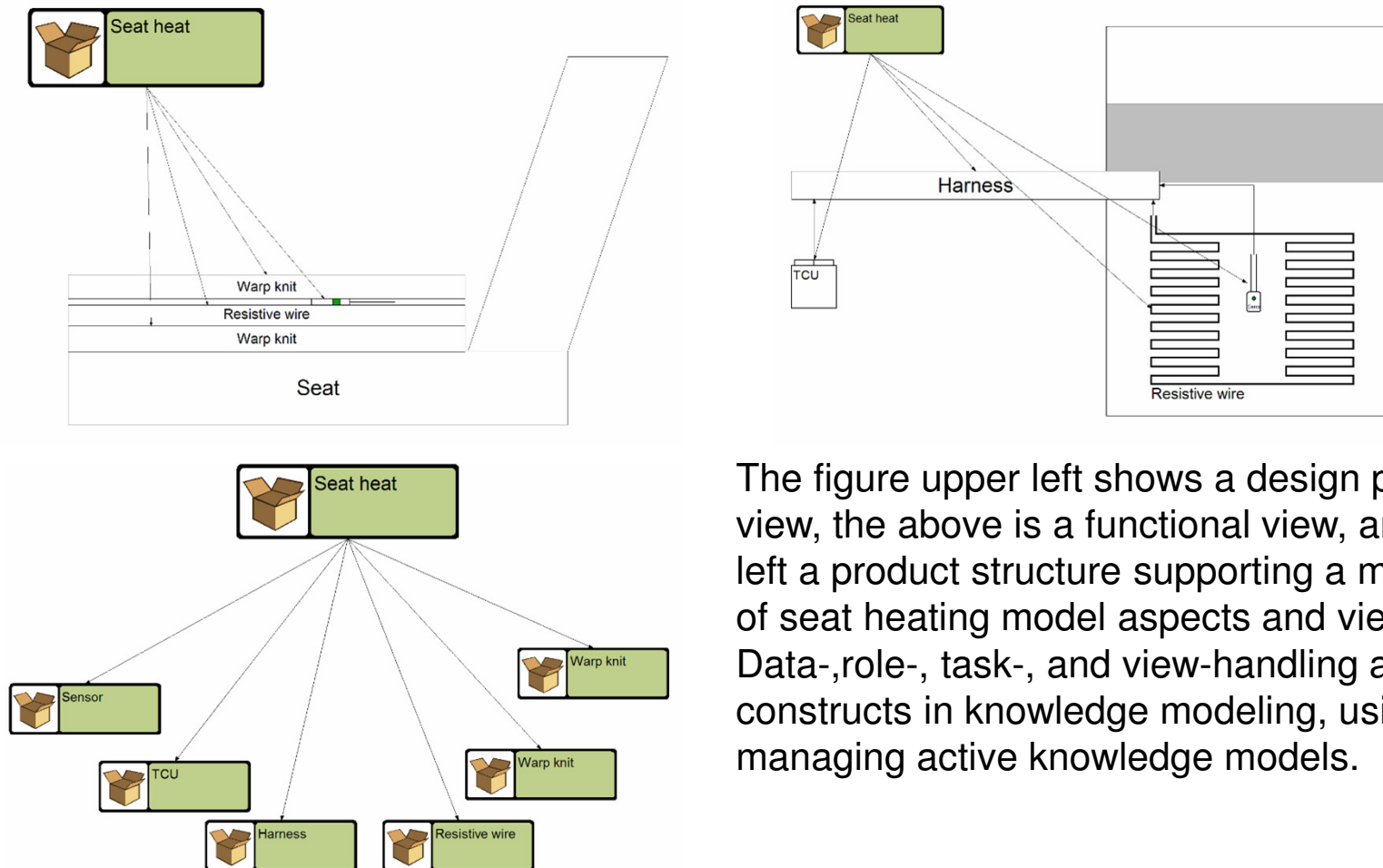


Ref.: Lave & Wenger

Practical example – Seat-heating design

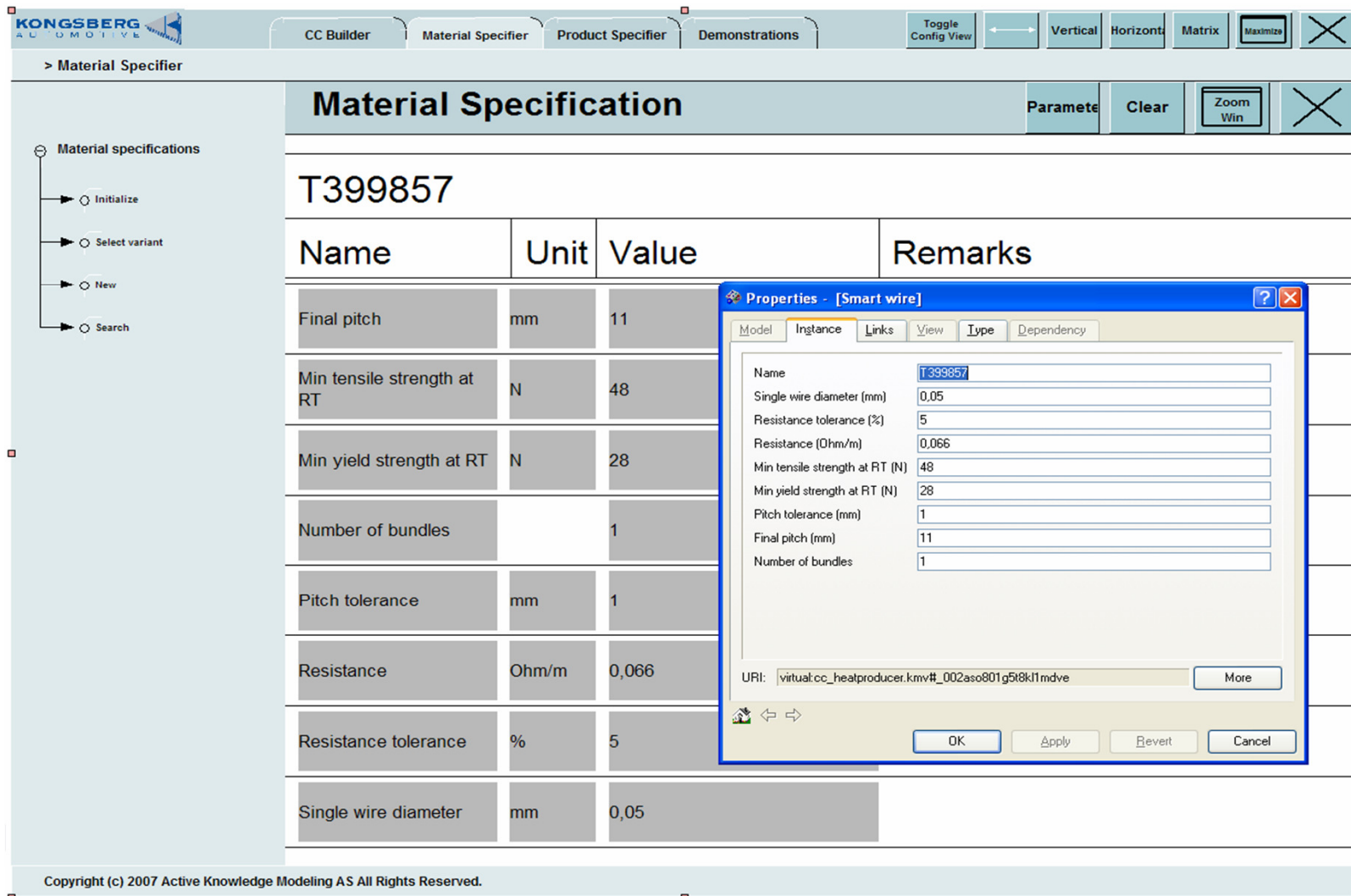


Seat-heating Design – Product Views



The figure upper left shows a design principle view, the above is a functional view, and the left a product structure supporting a multitude of seat heating model aspects and views. Data-, role-, task-, and view-handling are core constructs in knowledge modeling, using and managing active knowledge models.

Workplaces for Material Specification



The screenshot shows the 'Material Specifier' workspace in the Kongsberg ALU DROTTVE software. The main area displays a table for material specification 'T399857' with columns for Name, Unit, Value, and Remarks. A 'Properties - [Smart wire]' dialog box is open, showing a list of parameters and their values for the selected material.

Name	Unit	Value	Remarks
Final pitch	mm	11	
Min tensile strength at RT	N	48	
Min yield strength at RT	N	28	
Number of bundles		1	
Pitch tolerance	mm	1	
Resistance	Ohm/m	0,066	
Resistance tolerance	%	5	
Single wire diameter	mm	0,05	

Parameter	Value
Name	T399857
Single wire diameter (mm)	0,05
Resistance tolerance (%)	5
Resistance (Ohm/m)	0,066
Min tensile strength at RT (N)	48
Min yield strength at RT (N)	28
Pitch tolerance (mm)	1
Final pitch (mm)	11
Number of bundles	1

URI: virtual:cc_heatproducer.kmv#_002aso801g5x8k11mdve

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Seat Heating Designer Workplace

KONSGBERG AUTOMOTIVE | CC Builder | Demonstrations | Technology responsible | Design responsible | Toggle Config View | Vertical | Horizontal | Matrix | Maximize | Close

> CC Builder

Design Rationale modeling

Component structure modeling


- Configurable Component
- Variant Parameters
- Variants
- Composition Elements
- Interfaces

Do Configurations

- Select component
- Select variant
- Configure Variant
- Configure Product
- View Configured Product
- Configure Requirement Type(s)
- Configure Specification Type(s)

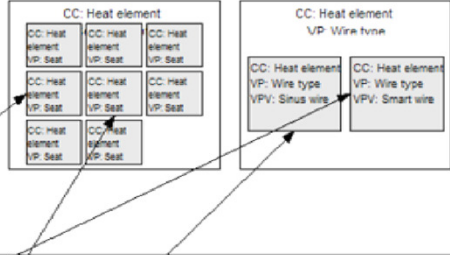
Utilities

Heat element | Services | Rule ... | Detail ... | Neighbour | Search | Properties | Clear | Zoom Win | Close



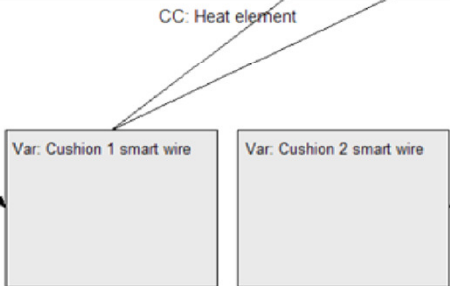
CC: Heat element

Heat elemen | VPV | VP | Rule ... | Detail ... | Neighbour | Search | Properties | Clear | Zoom Win | Close



CC: Heat element

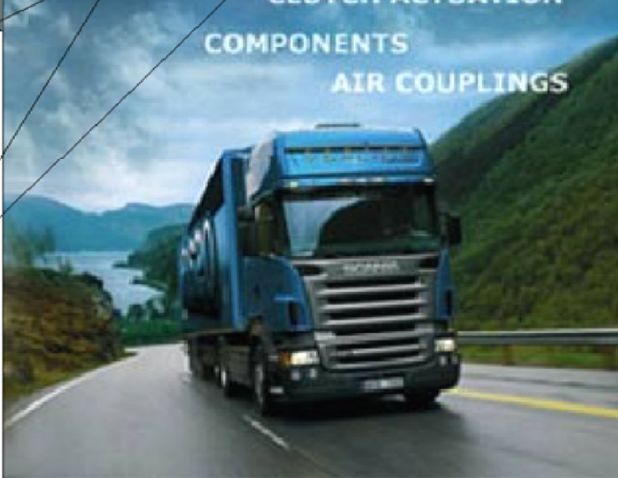
Heat element | Variant | Rule ... | Detail ... | Neighbour | Search | Properties | Clear | Zoom Win | Close



CC: Heat element

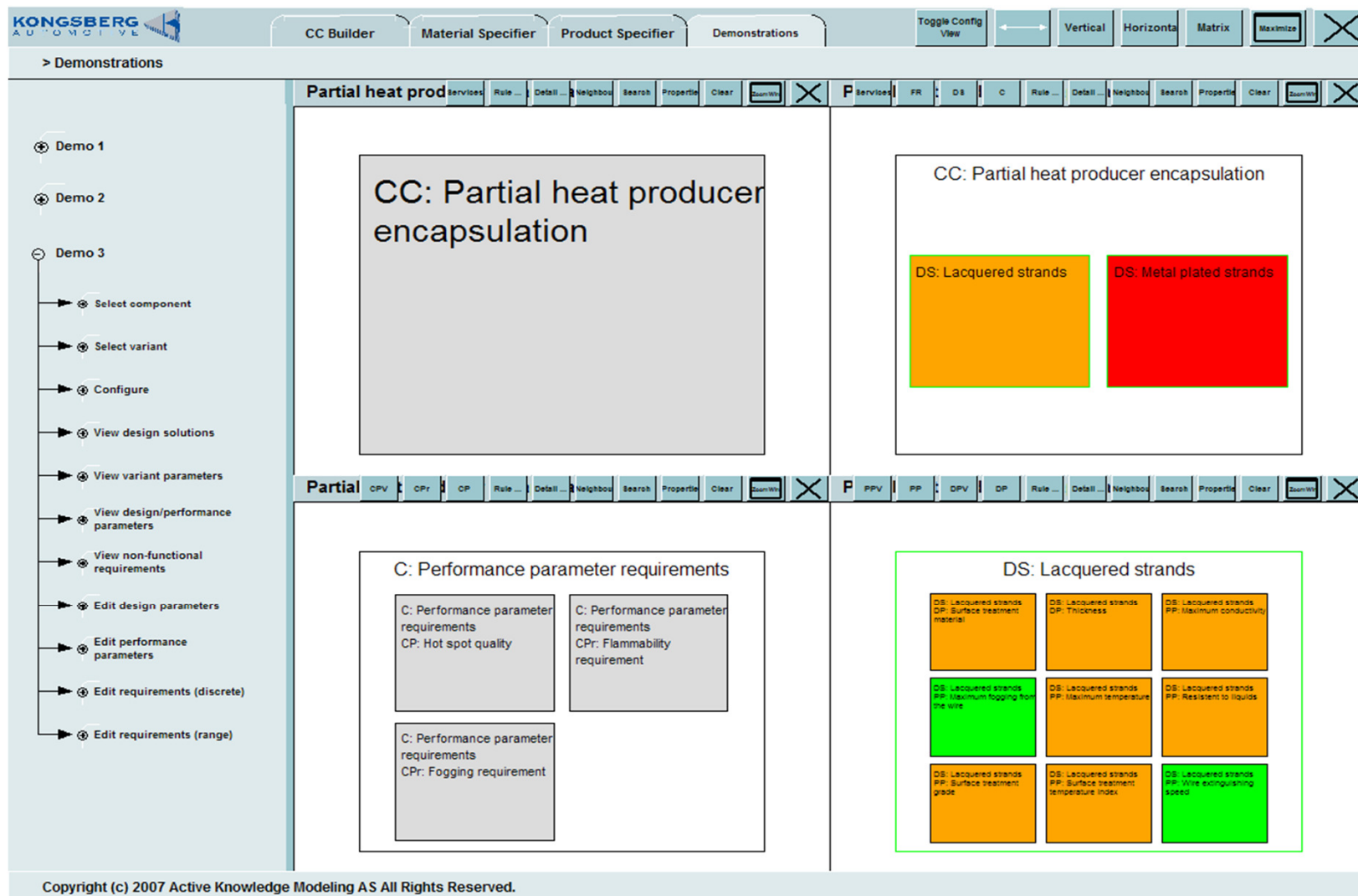
Var: Cushion 1 smart wire

Var: Cushion 2 smart wire



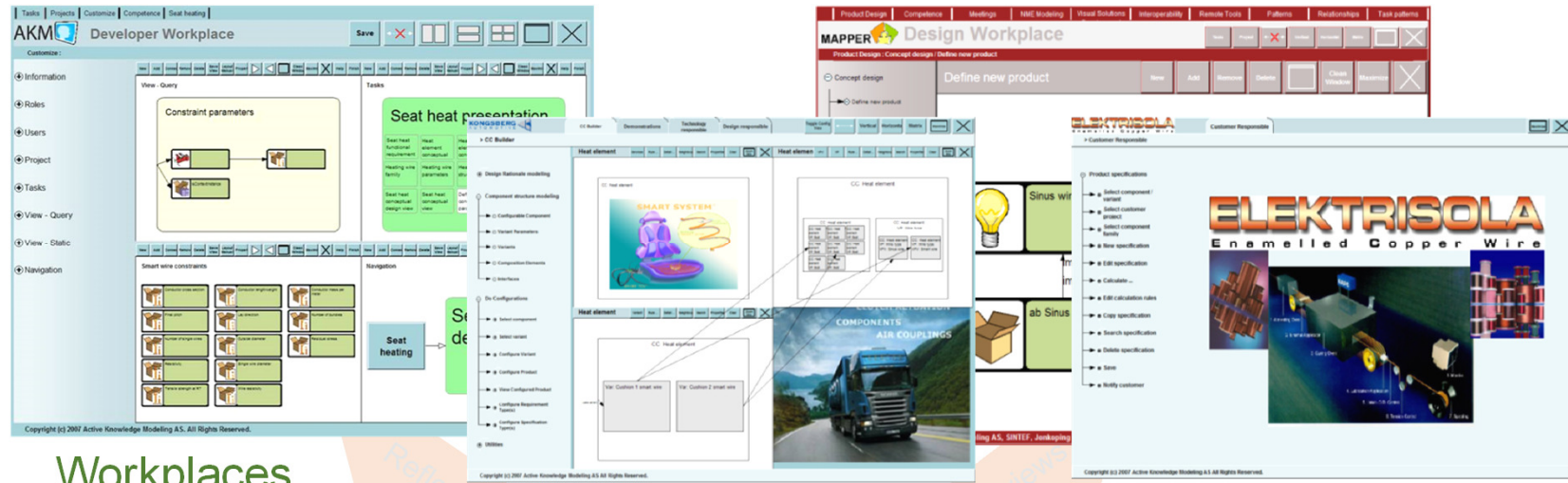
COMPLEX ACTIVATION COMPONENTS AIR COUPLINGS

Workplace for seat-heating design



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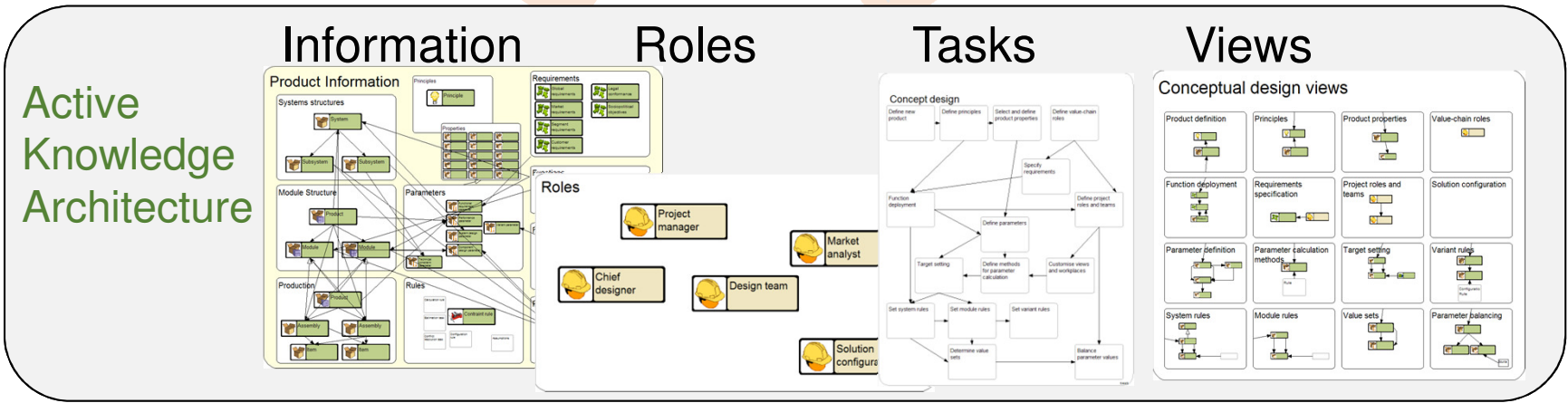
Holistic Enterprise Design Modelling



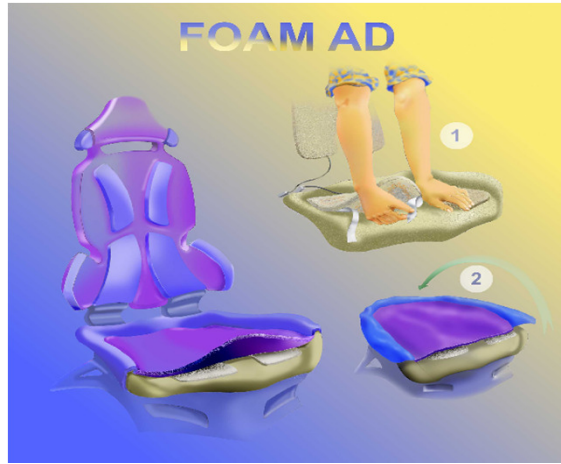
Workplaces for roles

Reflective views

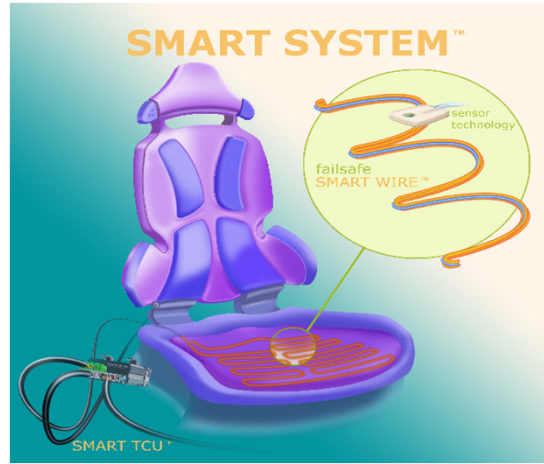
Reflective views



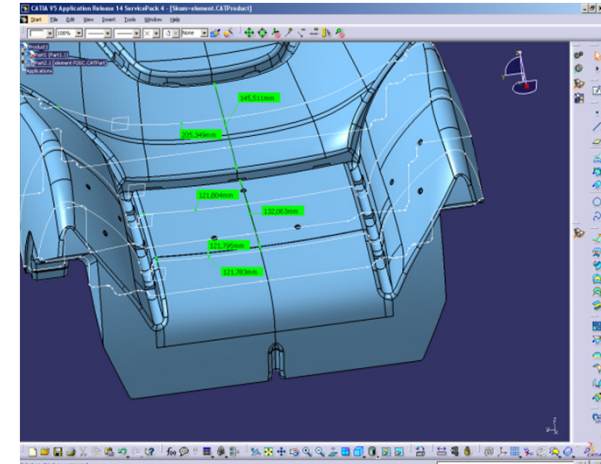
Role-based Modelling Approach



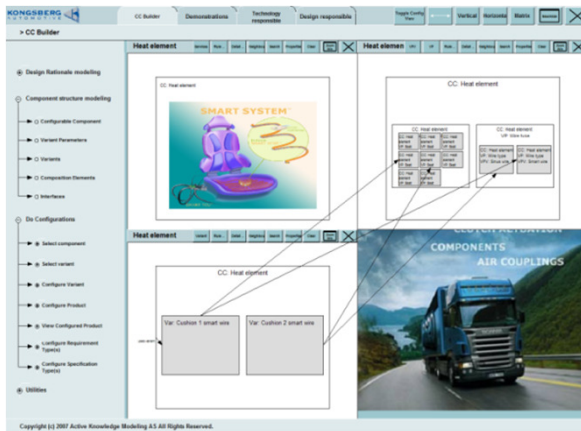
Product Manager



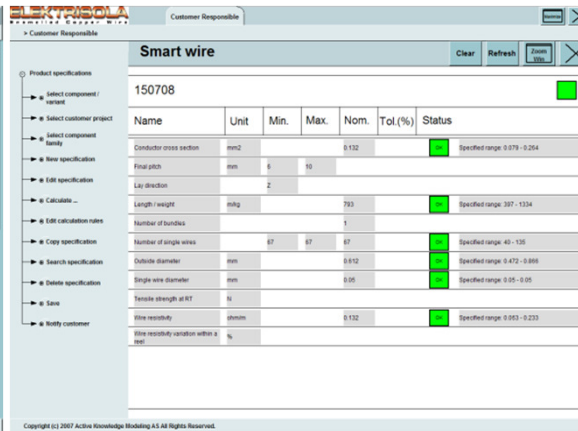
Chief designer



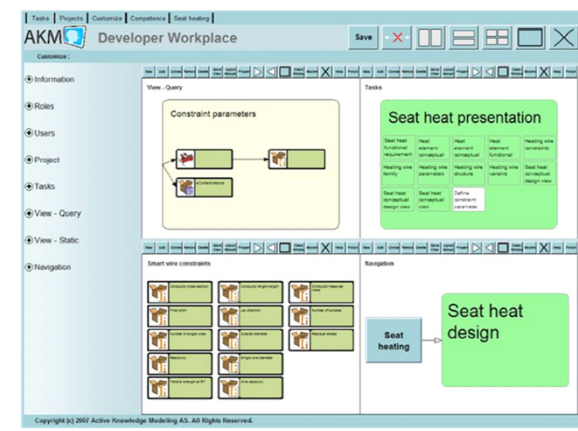
Customer Responsible



Product family designer

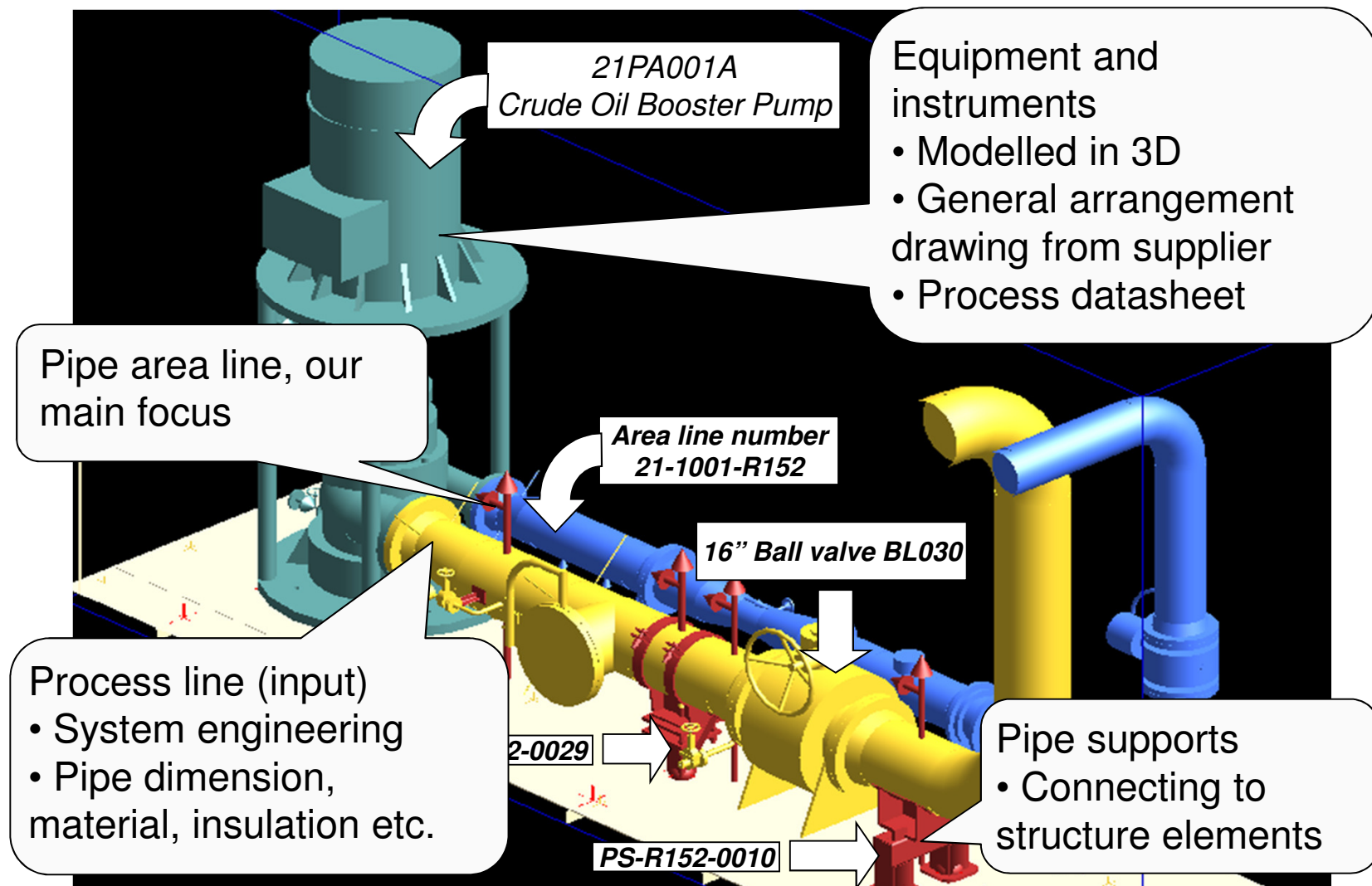


Supplier Responsible

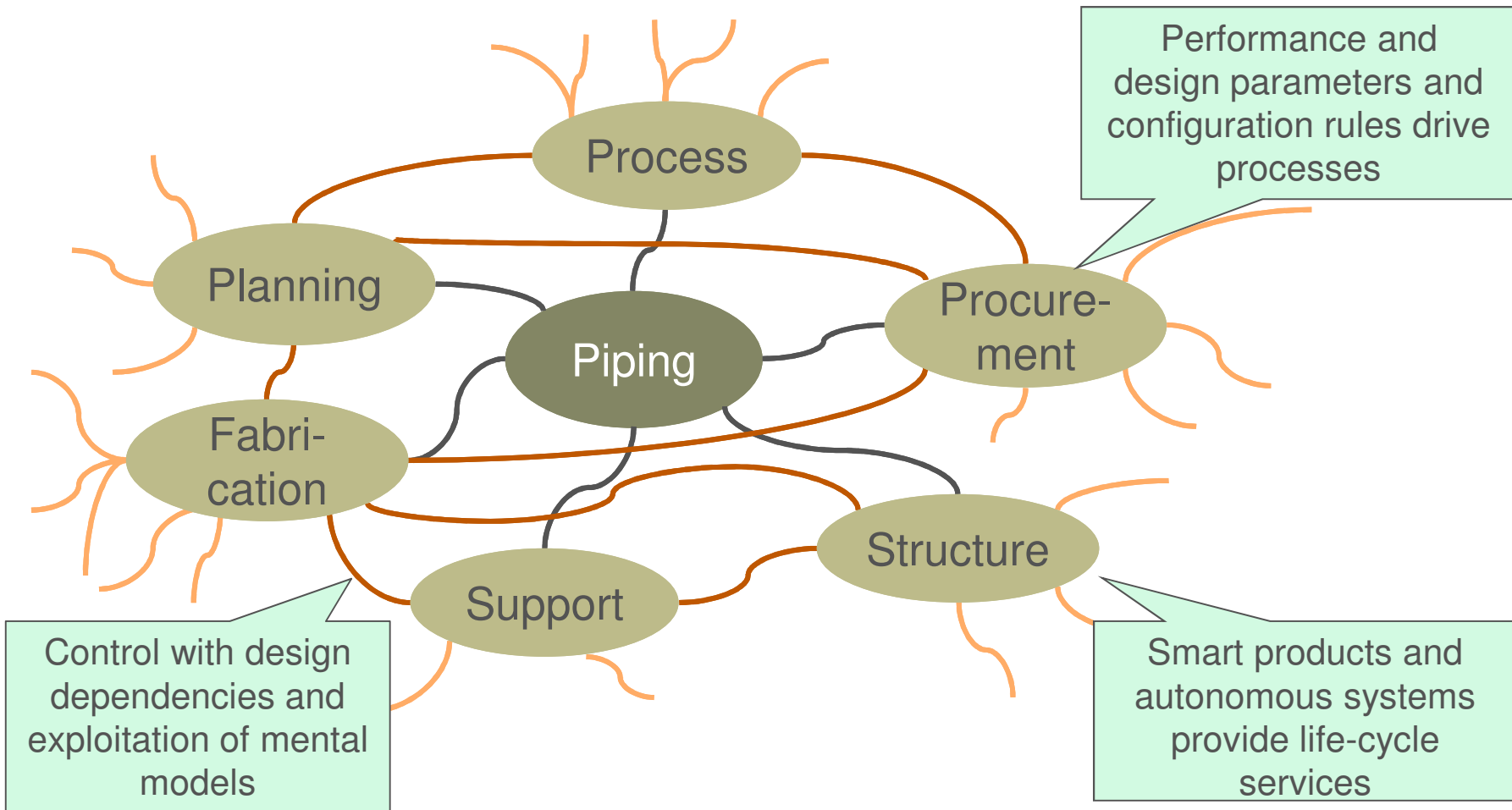


Enterprise Architect

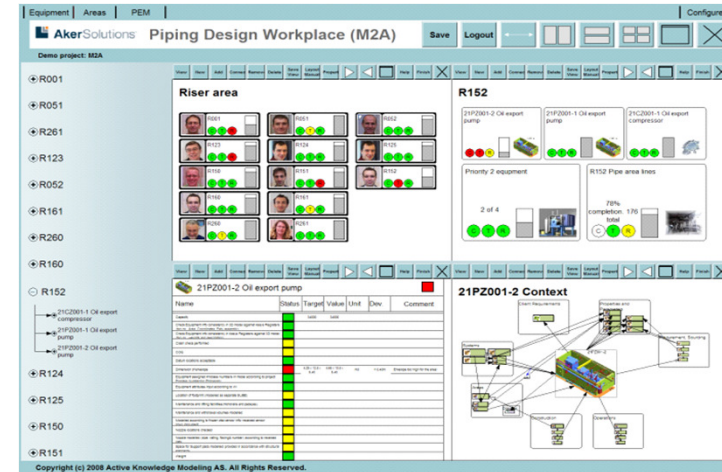
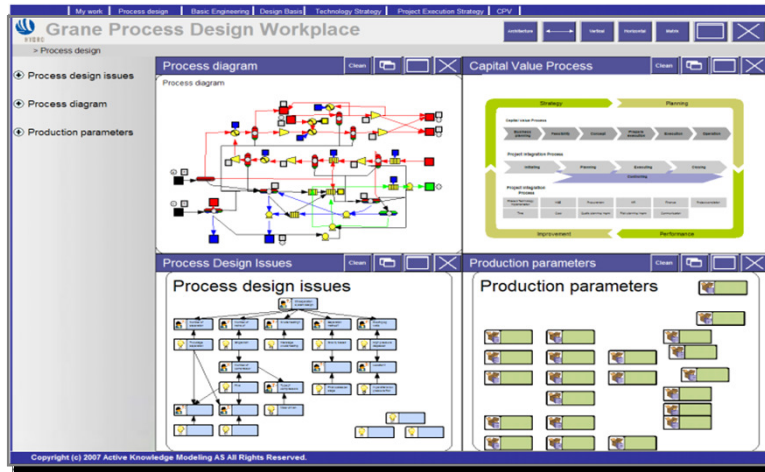
Example: Offshore project – piping systems



Knowledge-space & Workspace properties



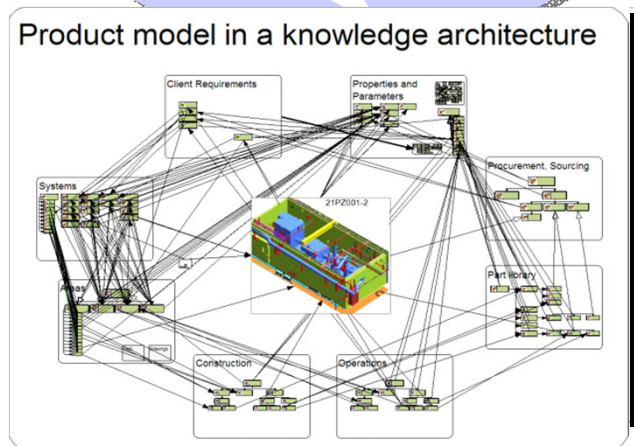
The Oil and Gas Engineering Project Pilot



Workplaces
for operational roles

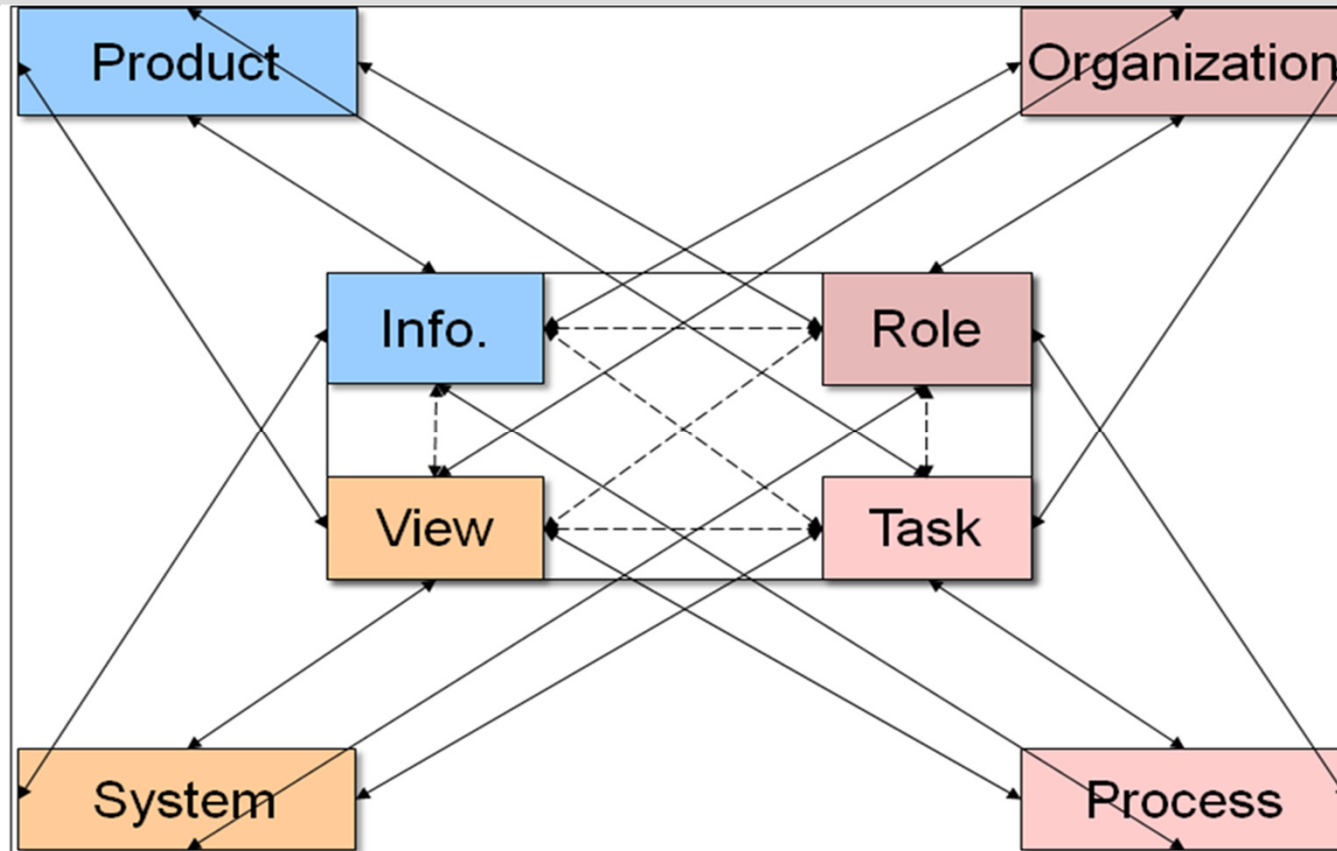
Workplaces for
architects, designing
user workspaces

Knowledge
Architecture



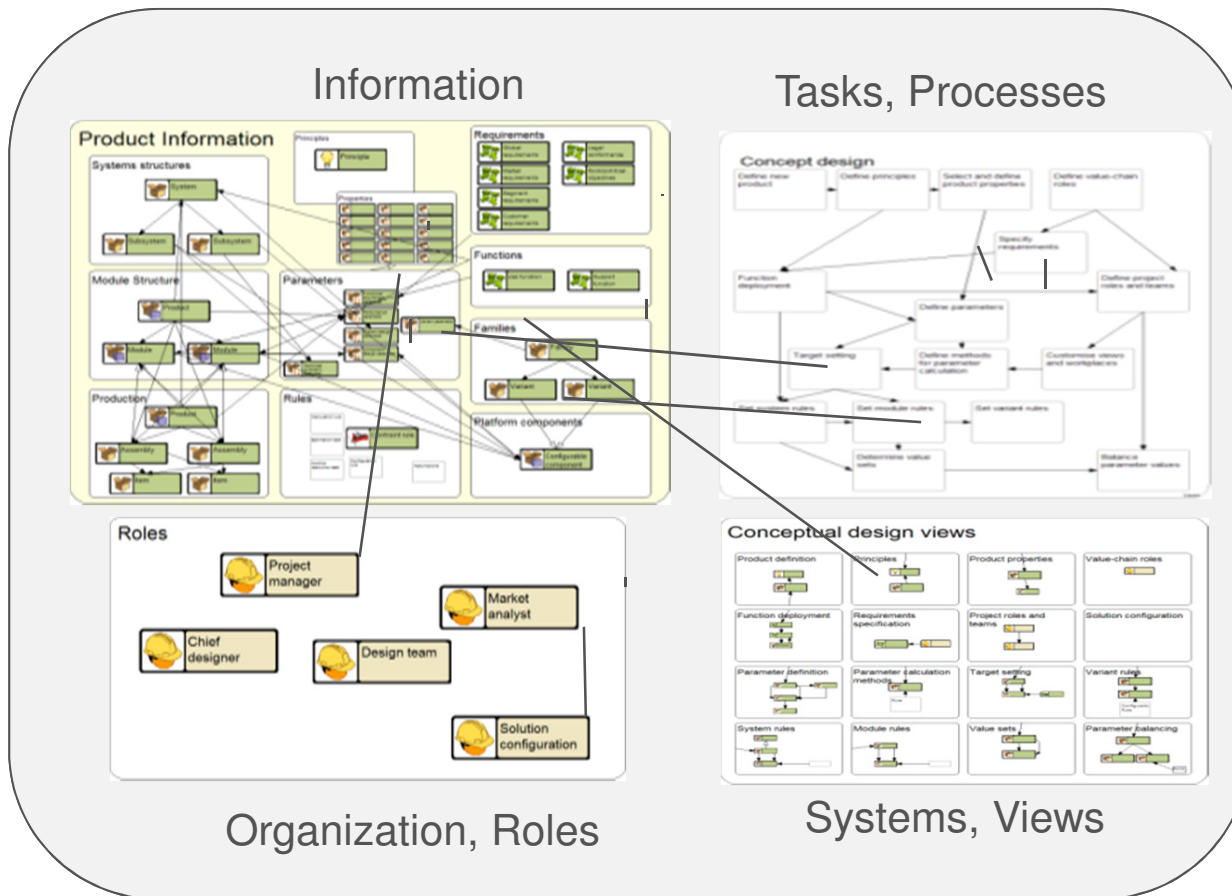
Agile enterprise design modeling

Holistic design of models, using visual IRTV language, realizing innovative principles.



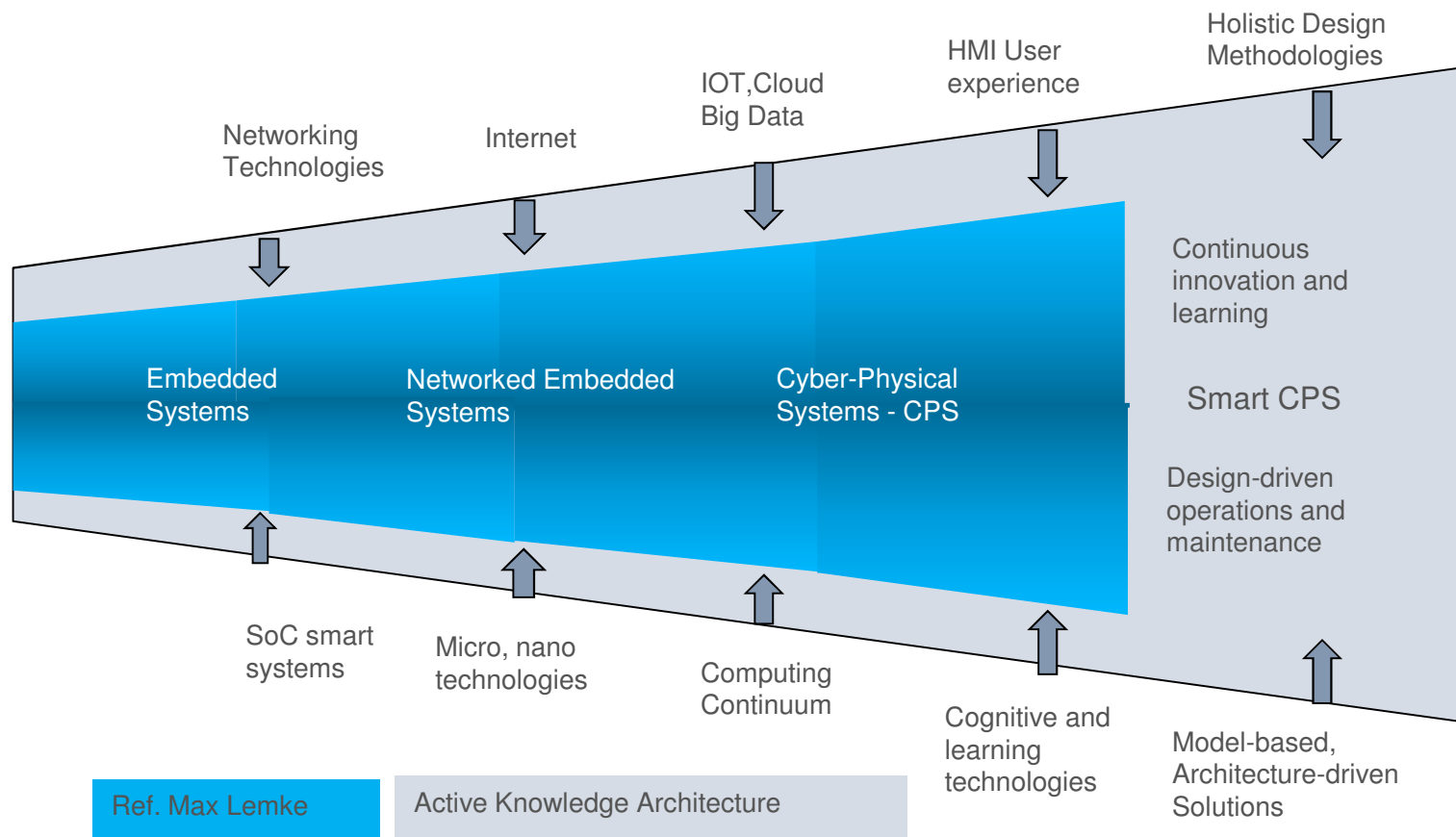
Modelling Principles - Enterprise Knowledge

Visual modeling of multi-dimensional enterprise knowledge spaces & role-specific workspaces replaces / complements software programming



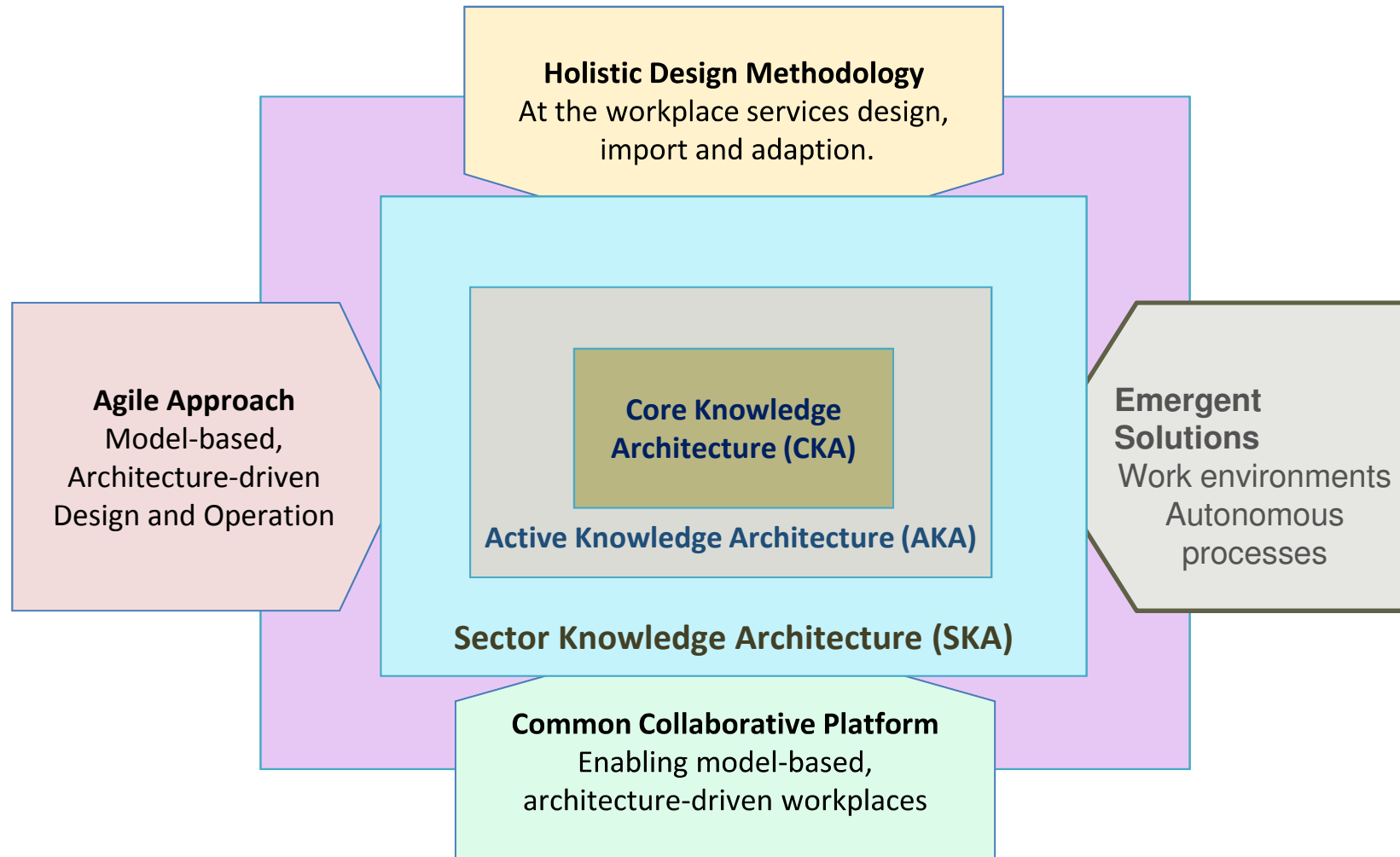
Given action
 By known person
 In known place and time
 With desired outcome and effect

From Embedded to Smart CPS & Beyond



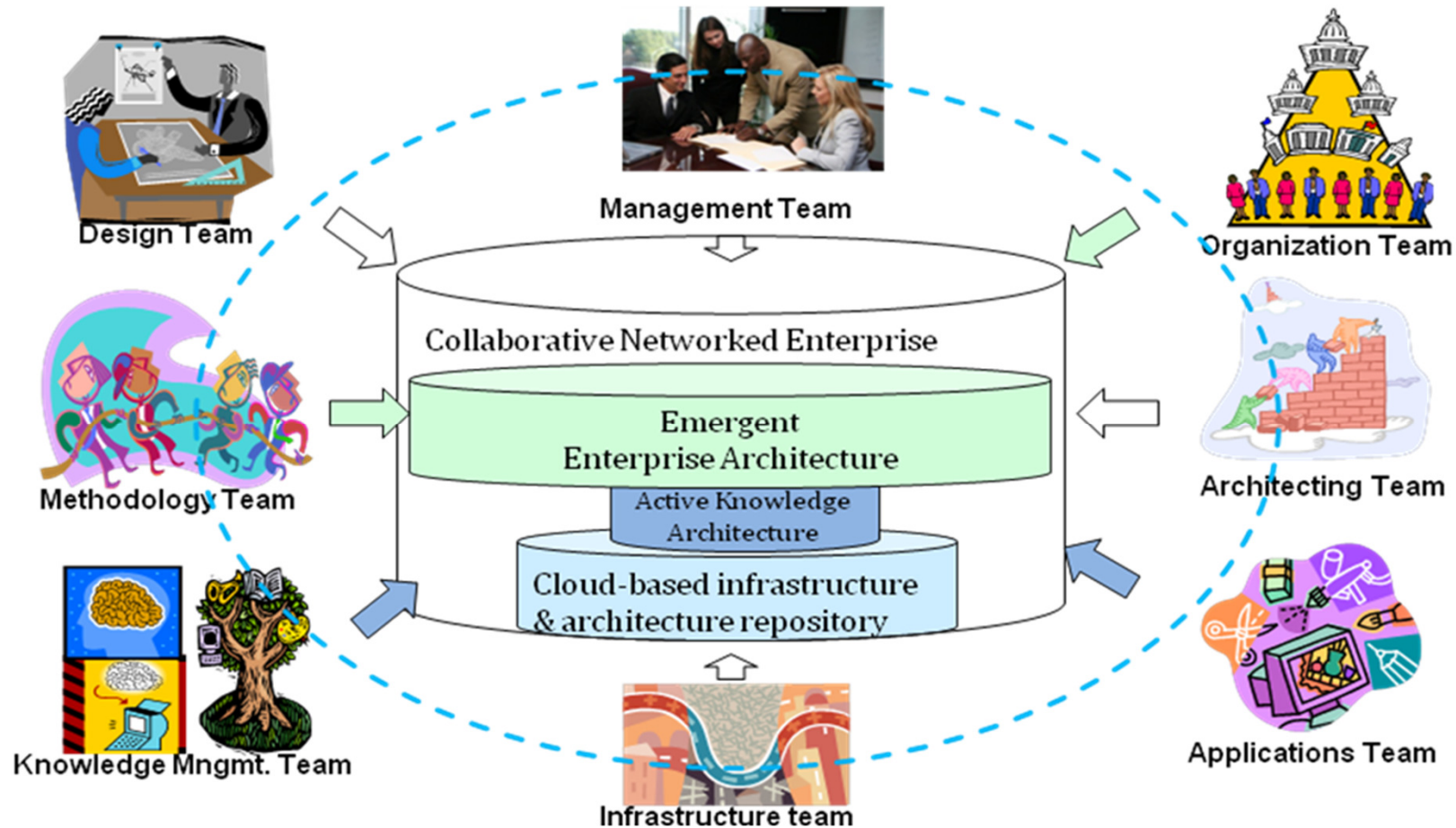
See: <http://www.eitictlabs.eu/innovation-areas/cyber-physical-systems/> .

Enterprise Knowledge Modelling and Execution



Exploiting Enterprise Knowledge Spaces and Workspaces

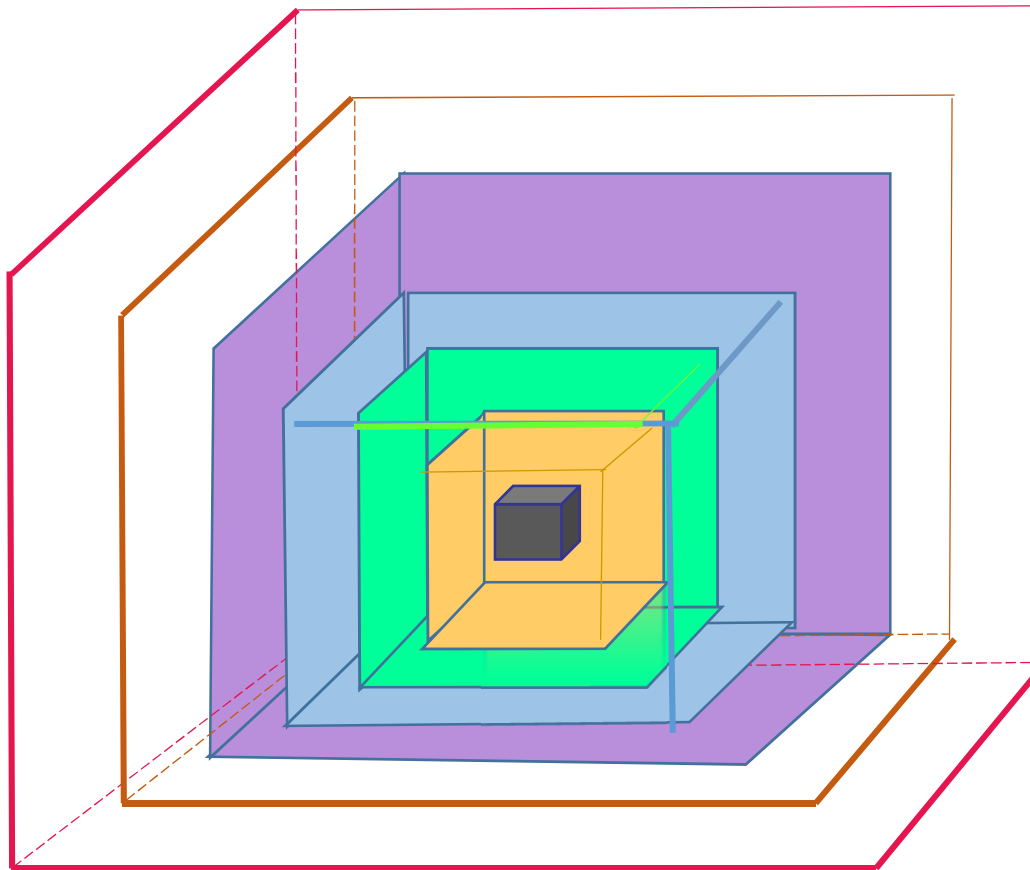
Complimenting project stages & layers



How to manage core enterprise knowledge

- How to
 - Capture - Agile approach to graphic modelling
 - Store - Build in Active Knowledge Architecture (AKA)
 - Find - Build role-oriented workspaces and views
 - Share - Model role-specific interactions and views
 - Use - Model workspace and collaborative views
 - Replicate - Build adaptive active knowledge models
 - Keep up to date - Implement sustainable life-cycle services
 - Reuse - Build rule-driven classes and categories
 - Enhance - Build digital models to enhance mental models
 - Validate - Build AKA and models for experimentation

Enterprise knowledge spaces & perspectives



Strategic Knowledge

Business Knowledge

Research and Innovation Knowledge

Program and Project Knowledge

Solution POPP Knowledge

Workspace Knowledge

EA Meta-meta Model



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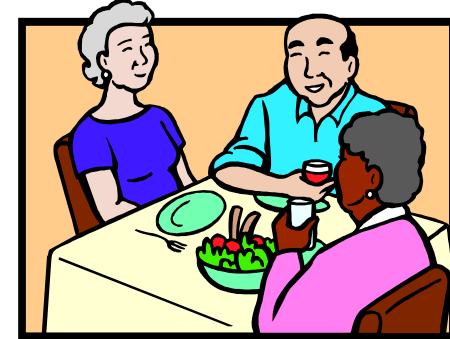
Automotive Seat-heating Design

The main challenges were to:

- Capture and correctly interpret customer requirements, material specifications, and design solutions
- Create role-specific, simple to use and re-configurable workplaces,
- Create effective shared workplace views and services for parameter balancing,
- Improve the quality of specifications and design for customers and suppliers,
- Improve communications, coordination and instant collaboration among stakeholders,
- Find a good methodology for product design, using task-patterns for automating most of the customized product design and engineering.

Properties of workspaces and mental models

Reflectiveness, Repetition, Replication and Reuse



Desired outcome

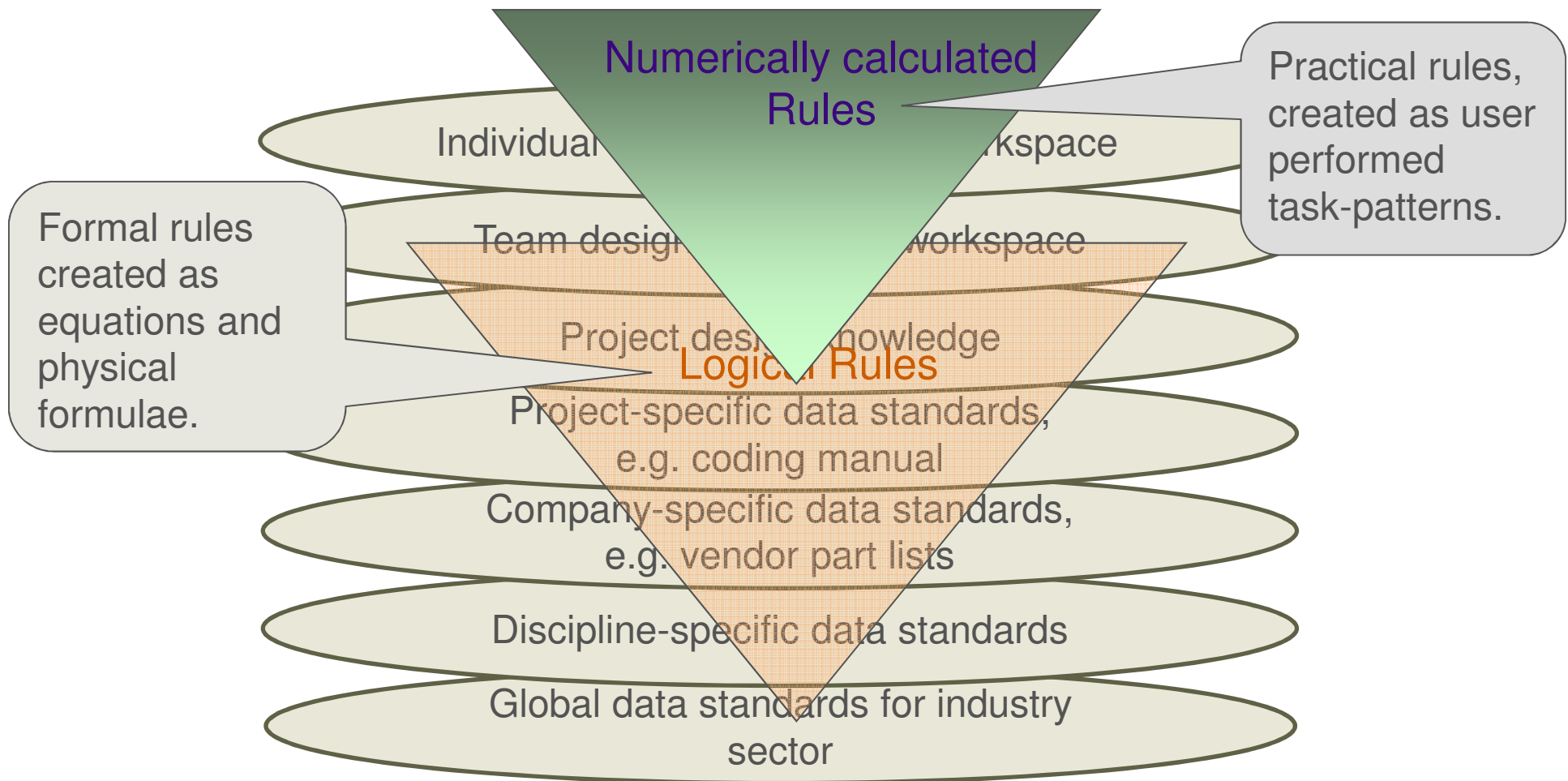
Work environments

Approach & Methods

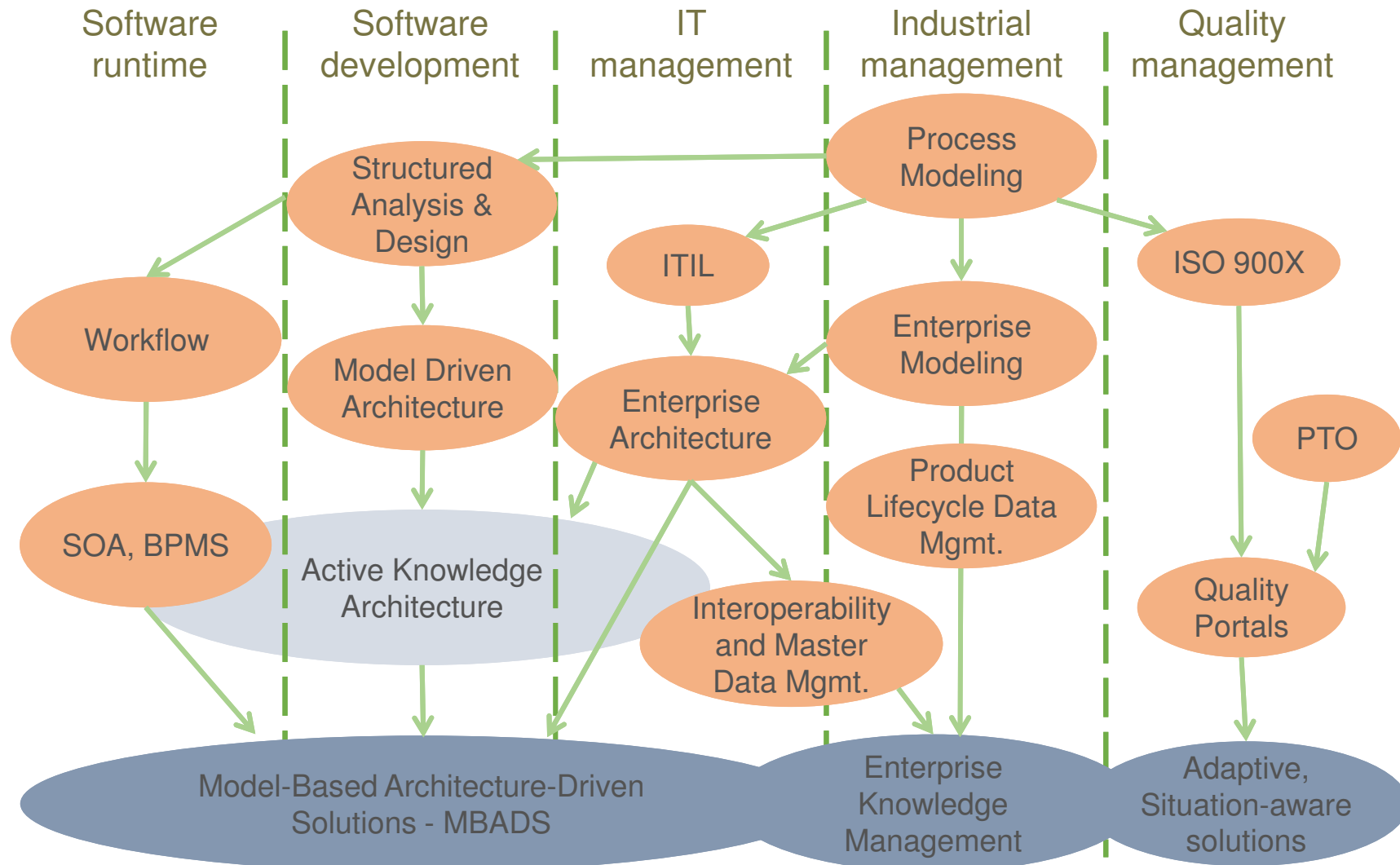
Client preferences

Actions and tasks depend on the perspectives of the roles involved

Data and Knowledge Domain Modeling

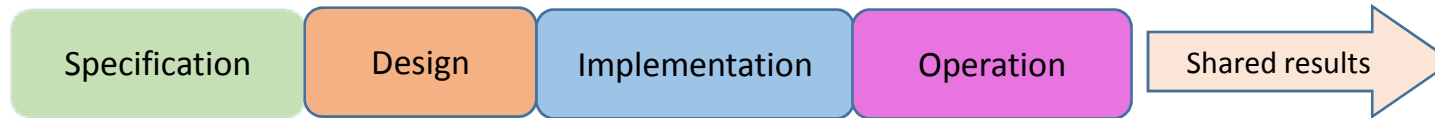


History of ICT platforms

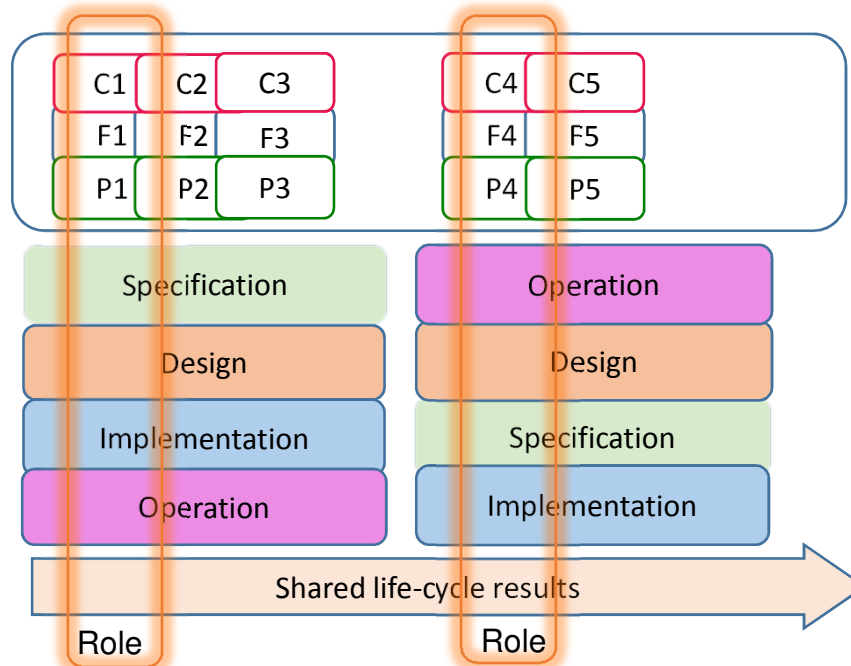


Agile Approach to Enterprise Design and Operations

Sequential Life-cycles – Information flow – Traditional System Development Life- Cycle



Agile approaches, adaptive methods, open platforms and vertical and horizontal collaboration



Focus on Capability and Feature design, and Property balancing; and both vertical and horizontal collaboration, avoiding slicing and enabling powerful viewing, knowledge sharing, and competence transfer

Holistic Design of Networked Enterprises must enable reusable agile approaches, adaptive methods, open platforms and shared knowledge and competence of achieved results.

Enabling new forms of collaboration

- **Synchronous – driven by time, tools and themes**
 - Planned collaboration has been available since late 1990s
- **Data-driven – aggregated data and trend analysis**
 - Instant collaboration tools available since approx. 2004
- **Situation-driven – unforeseen events and conditions**
 - In great demand dealing with public services
- **Role-driven – recruitment, sharing and learning**
 - Knowledge and work management and competence transfer
- **Assesment-driven – choice and decision-making**
 - New forms of non-deterministic analysis
- **Synergistic – driven by innovation and holistic design**
 - Growing needs for open innovation and learning