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

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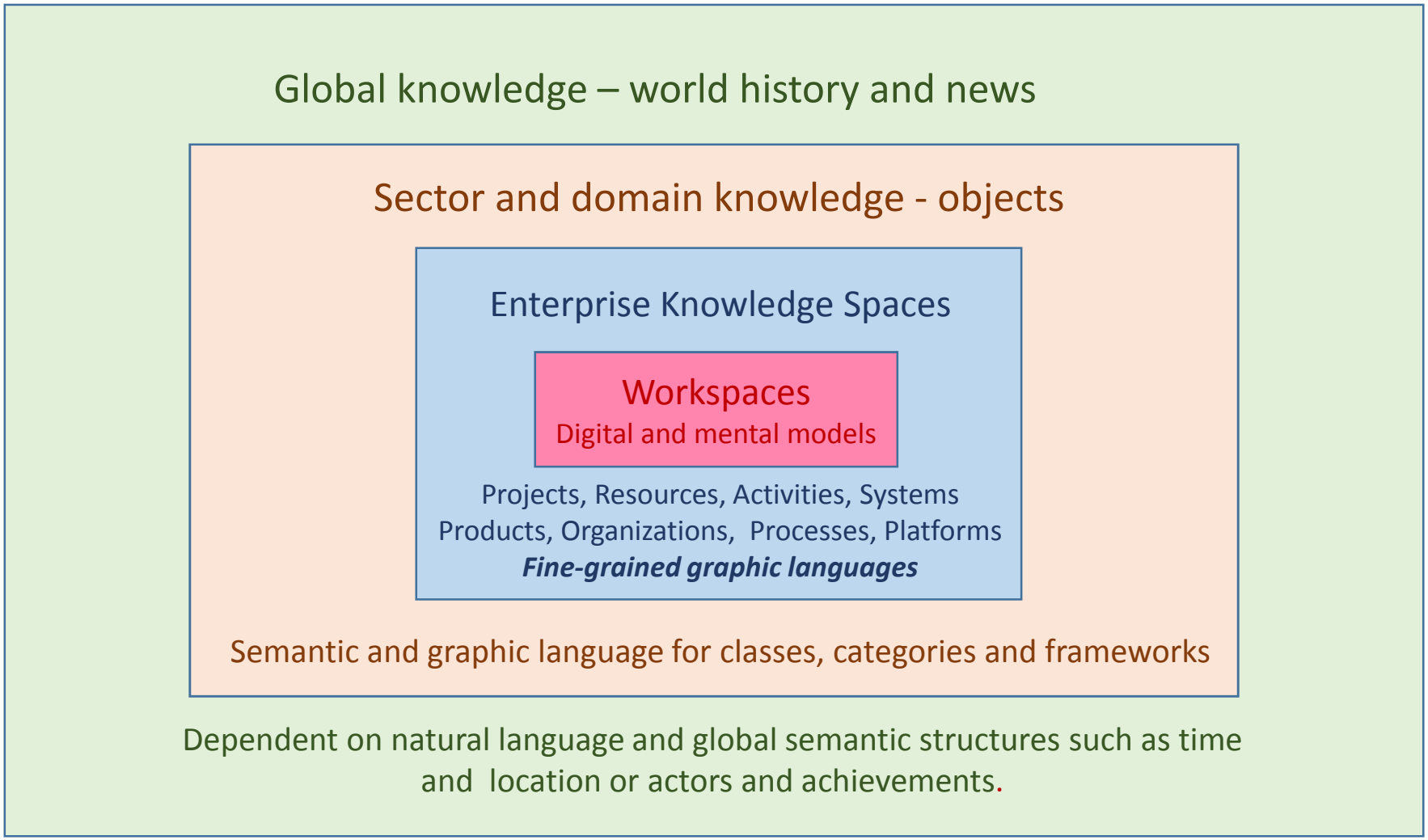
State-of-innovation in Knowledge Management



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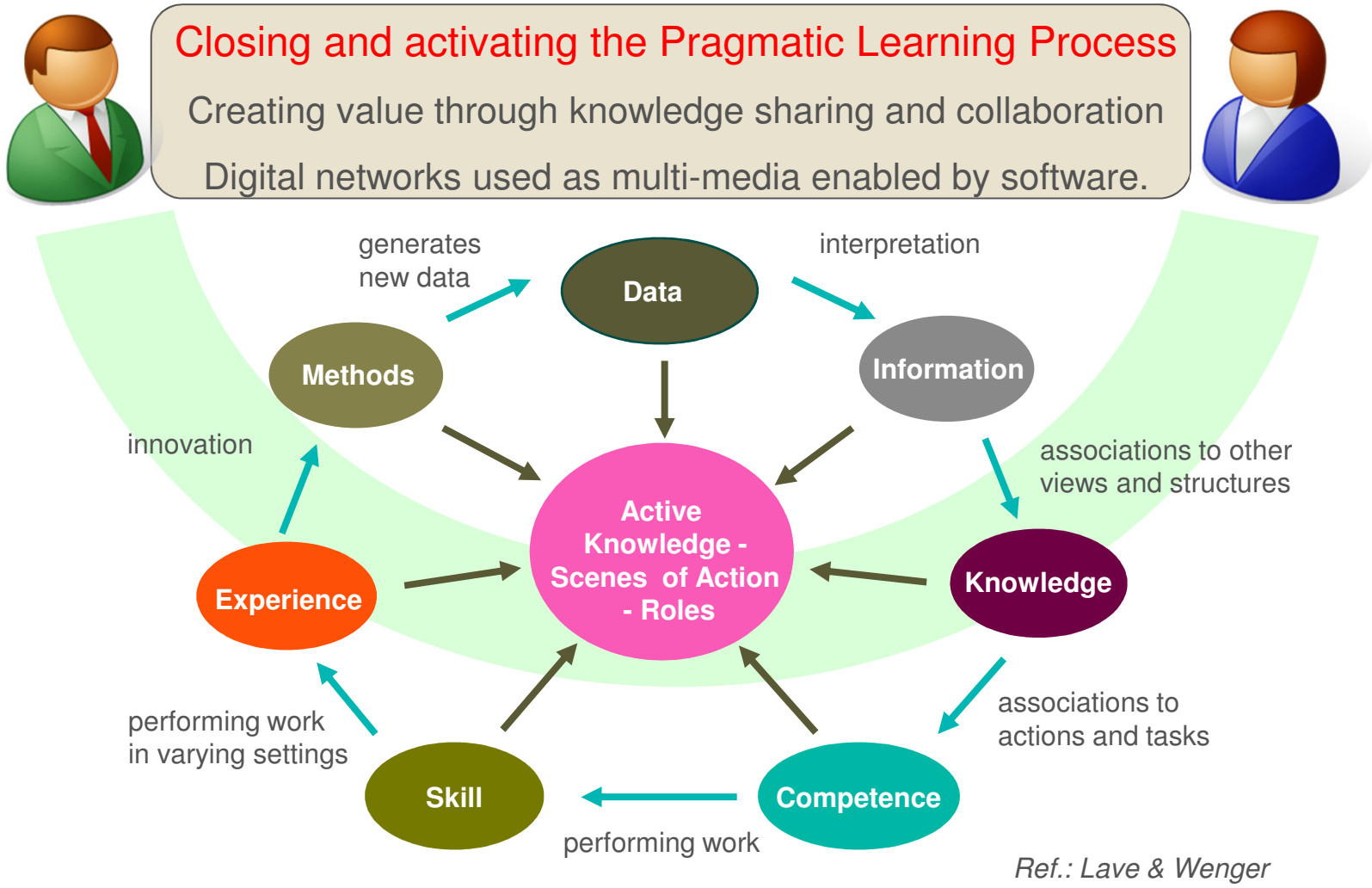
Active Knowledge Modeling – foundations



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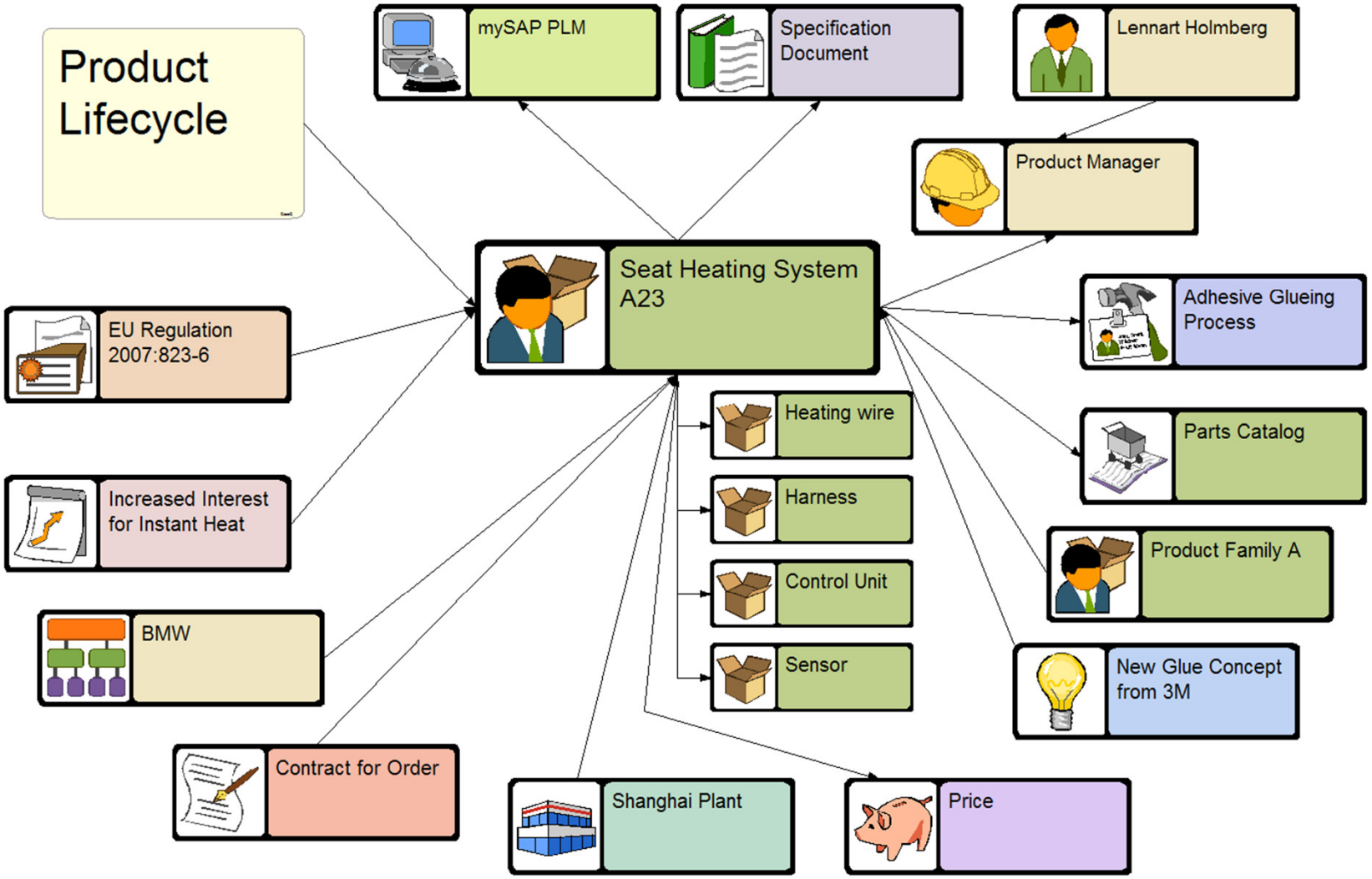
Practical example – Seat-heating design



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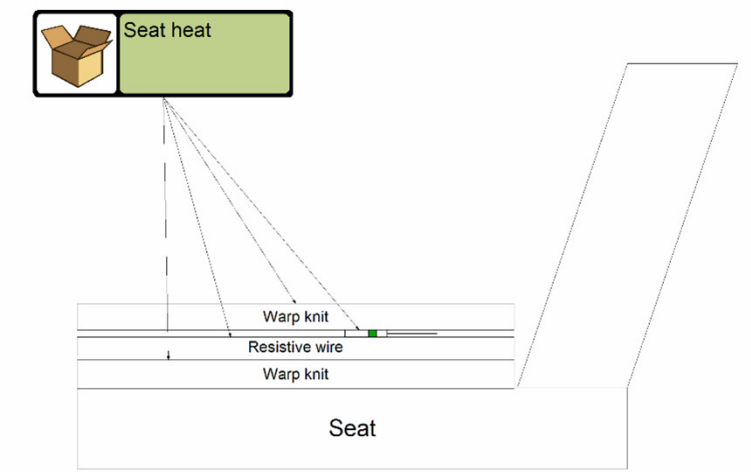
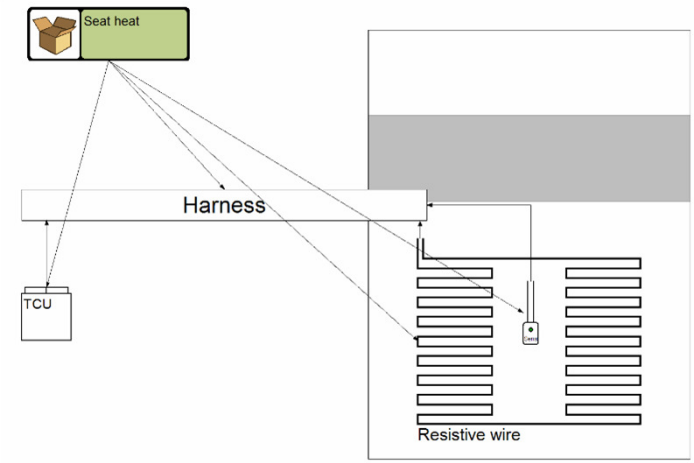
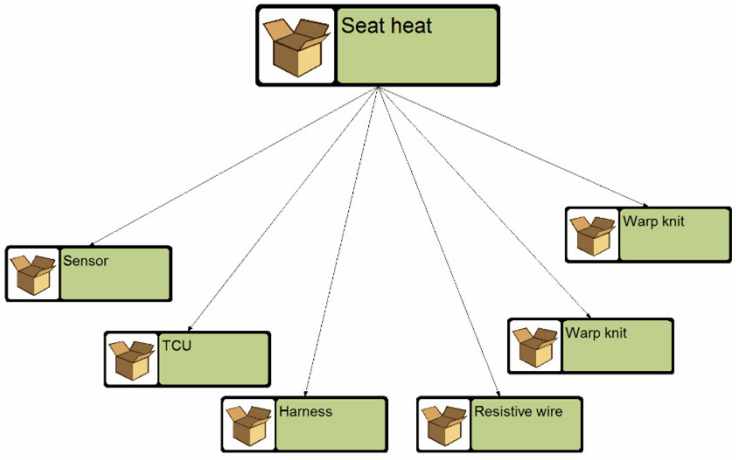
Seat-heating Design – Product Views







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.

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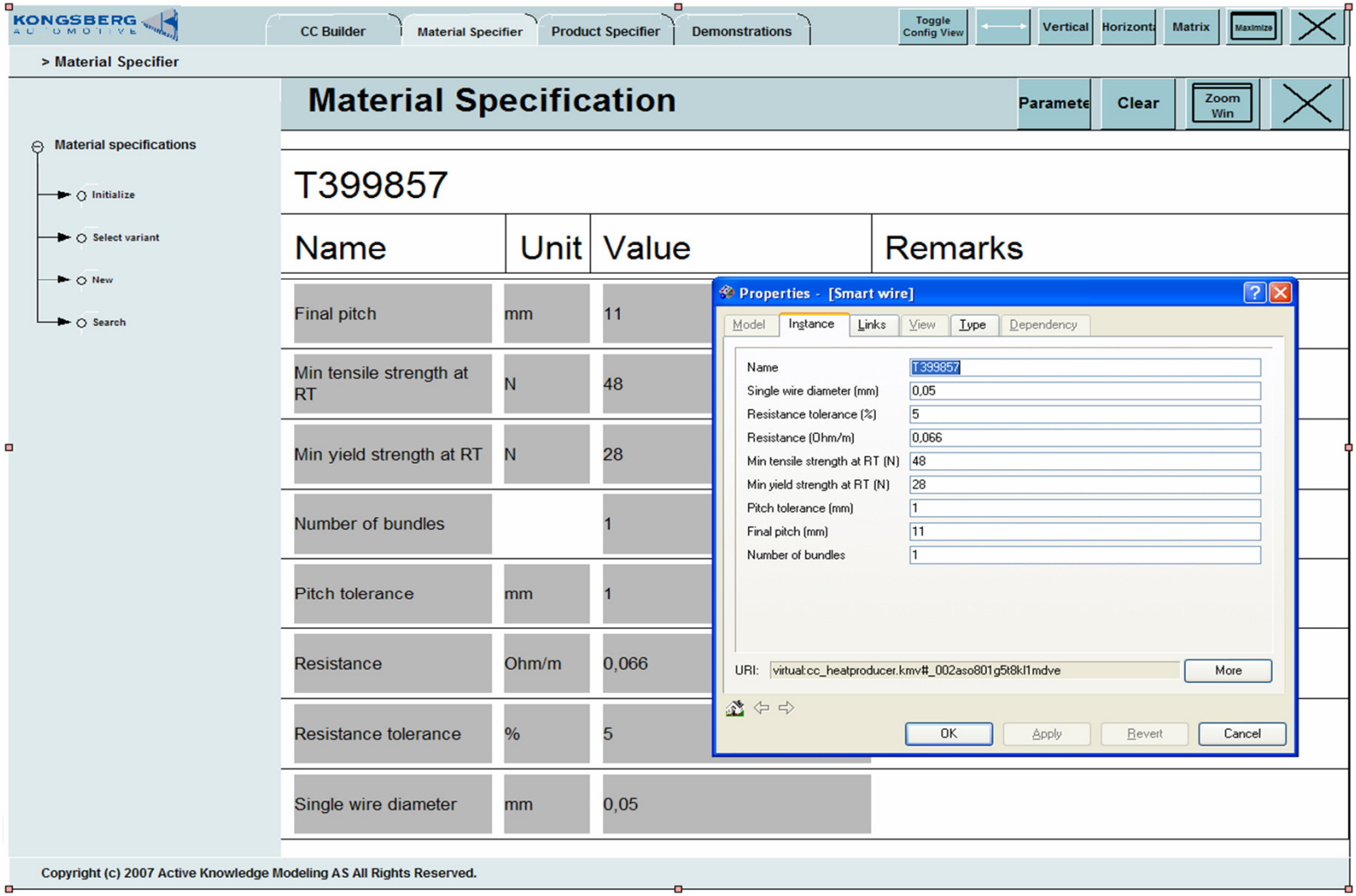
Workplaces for Material Specification



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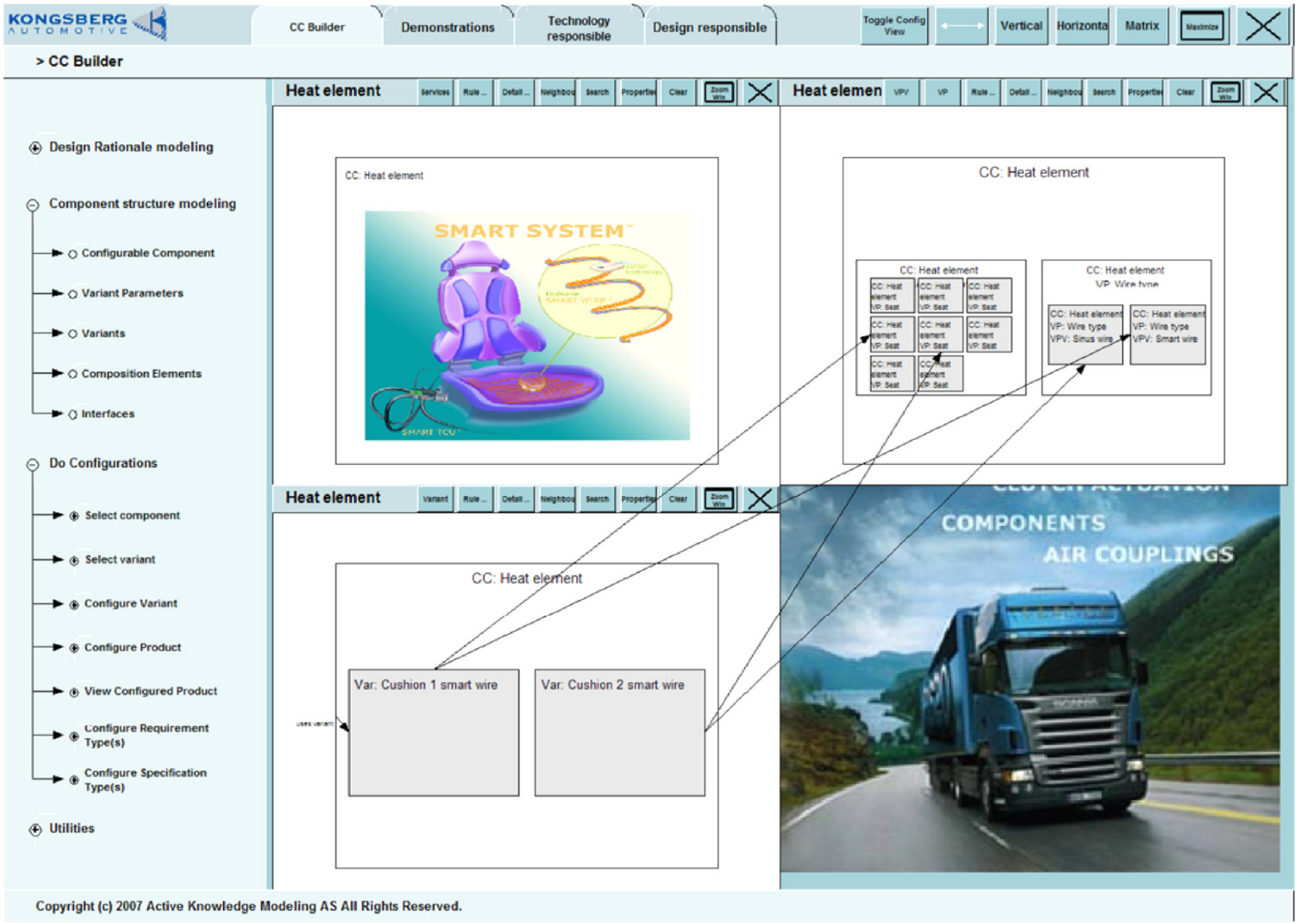
Seat Heating Designer Workplace



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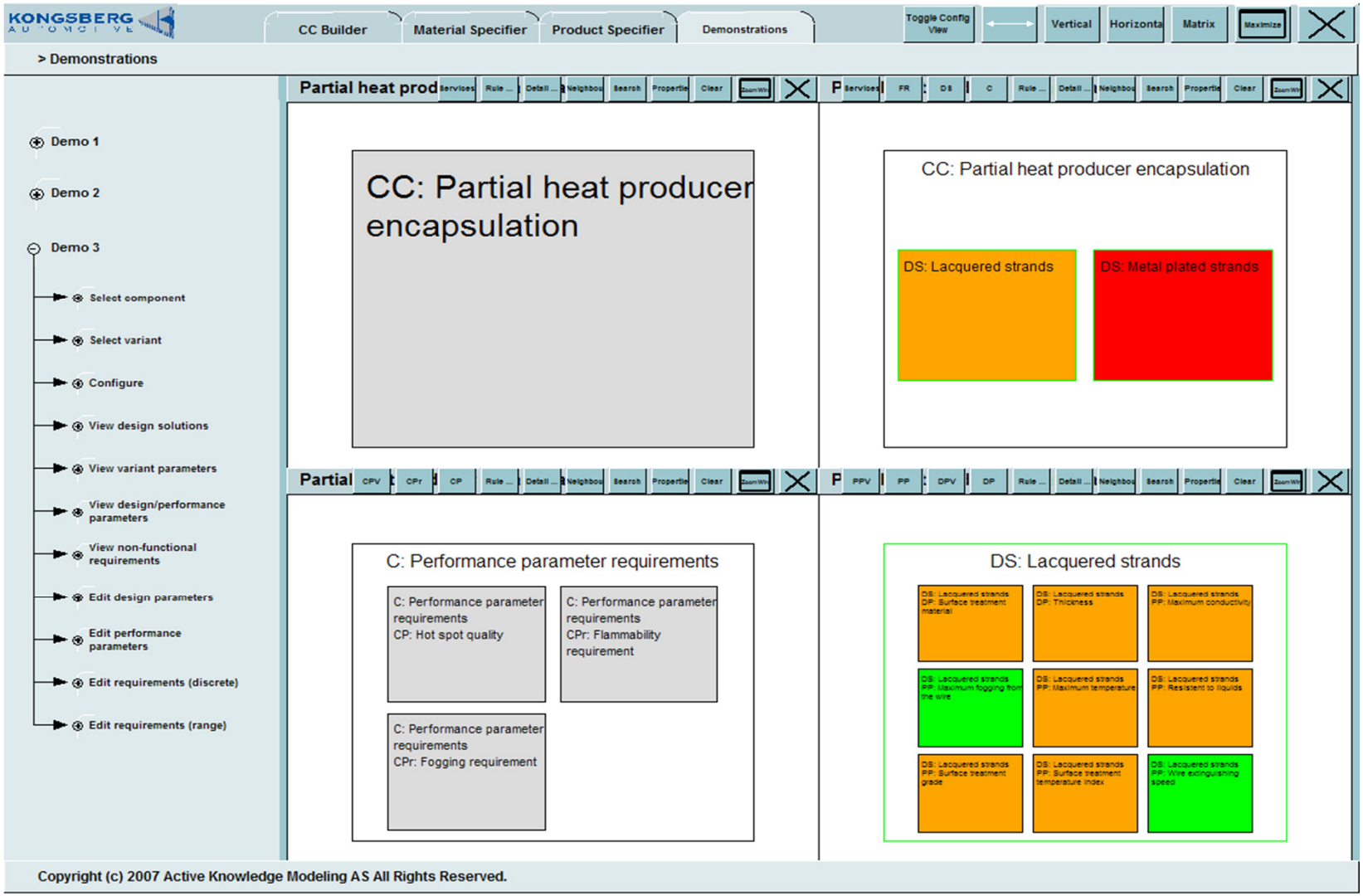
Workplace for seat-heating design



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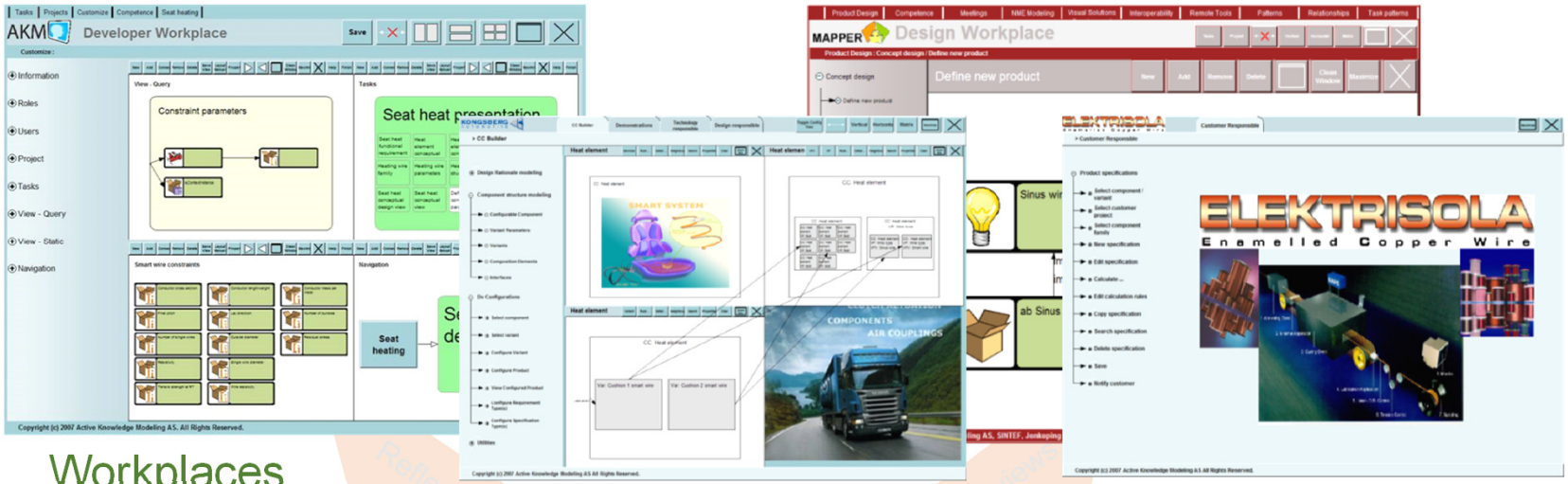
Holistic Enterprise Design Modelling



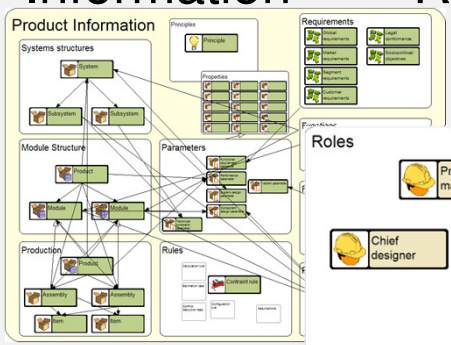
Workplaces for roles

Reflective views

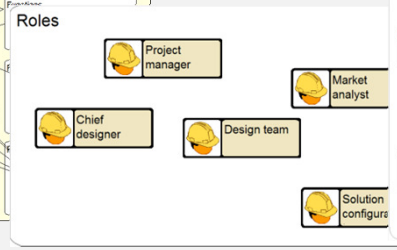
Reflective views

Active Knowledge Architecture

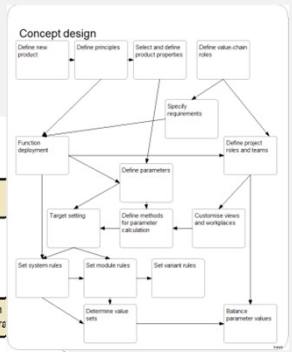
Information



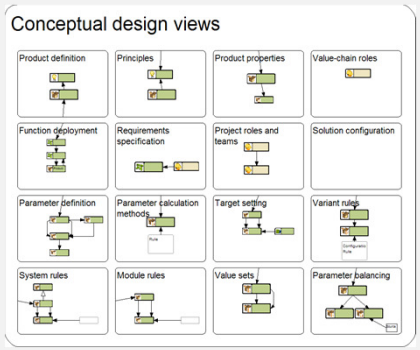
Roles



Tasks



Views



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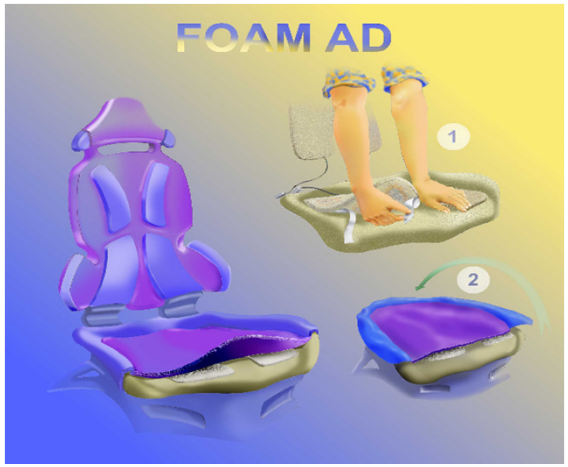
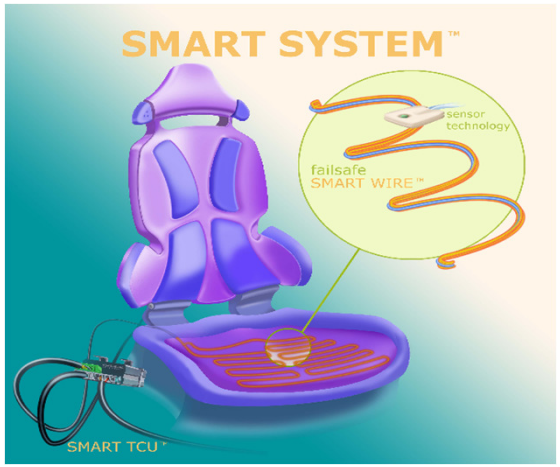
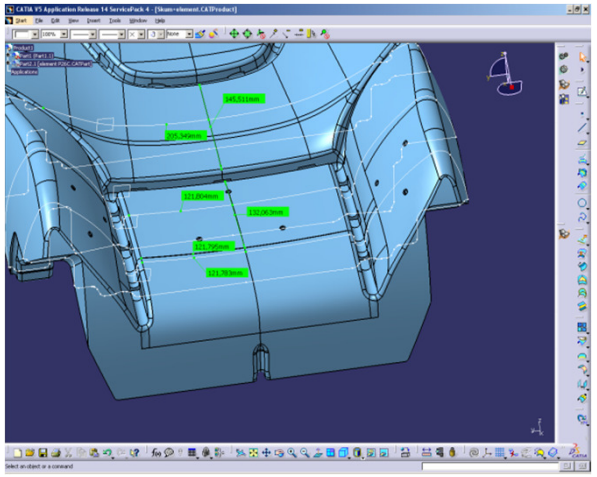
Role-based Modelling Approach



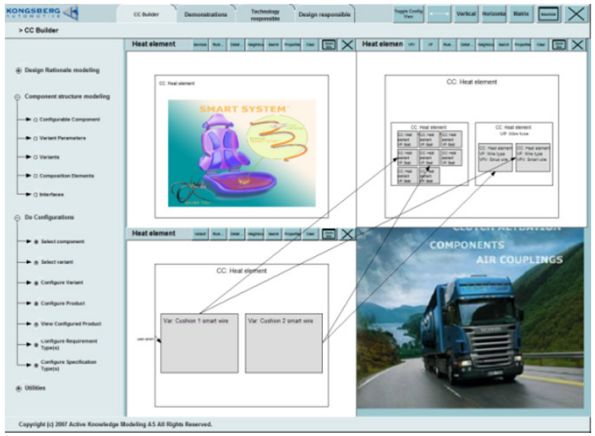
Product Manager



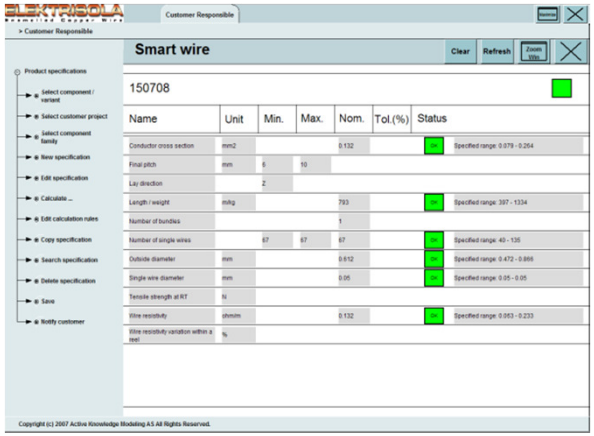
Chief designer



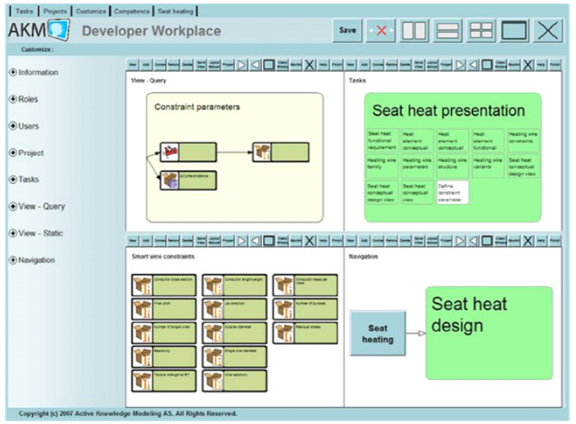
Customer Responsible



Product family designer



Supplier Responsible



Enterprise Architect

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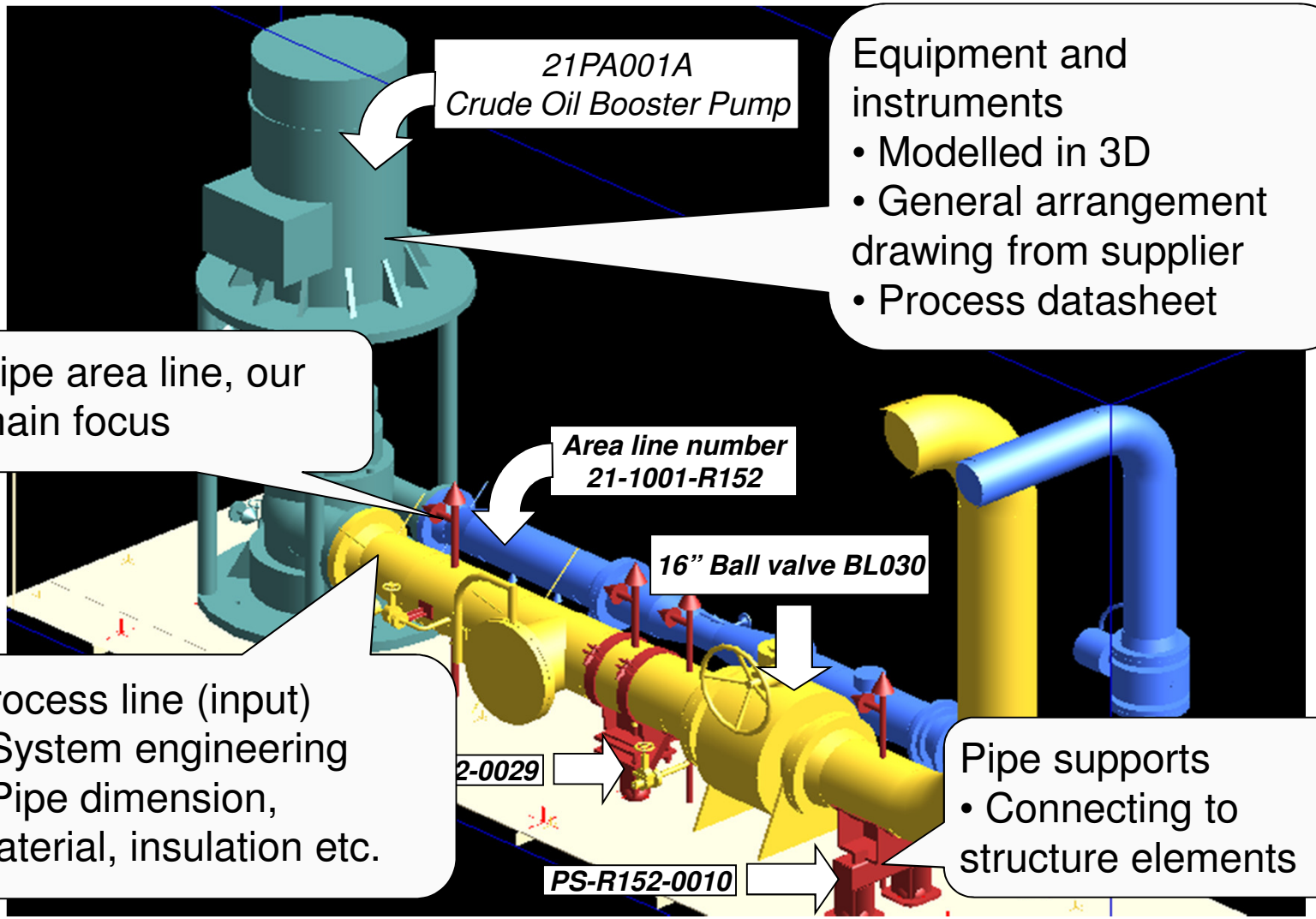
Example: Offshore project – piping systems



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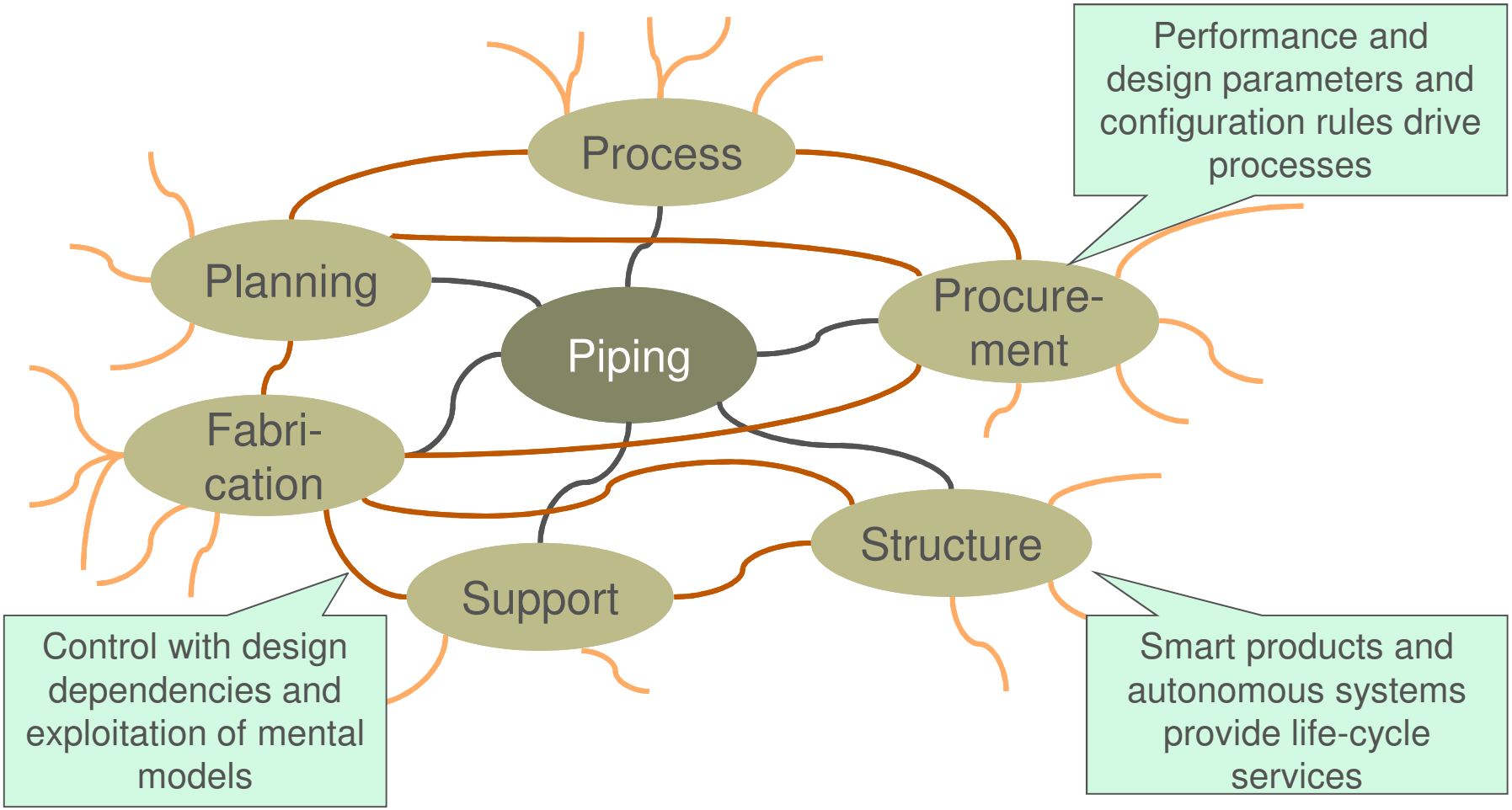
Knowledge-space & Workspace properties



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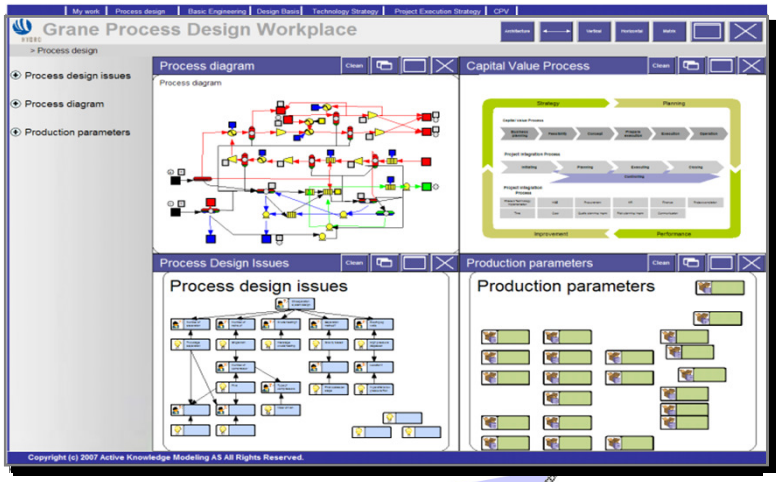
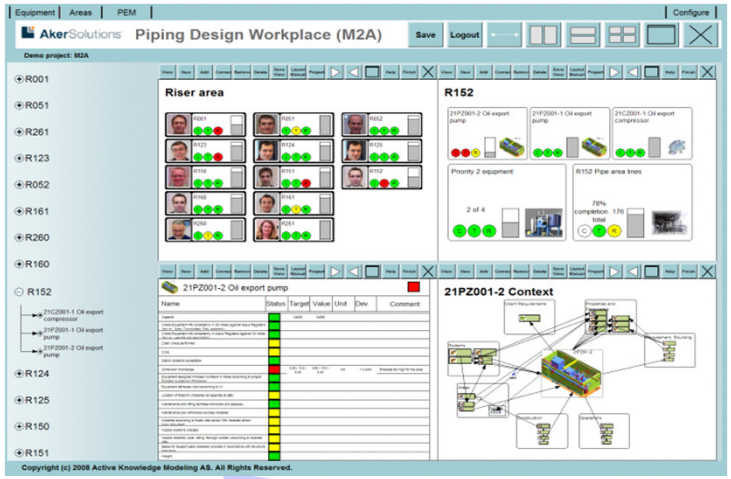
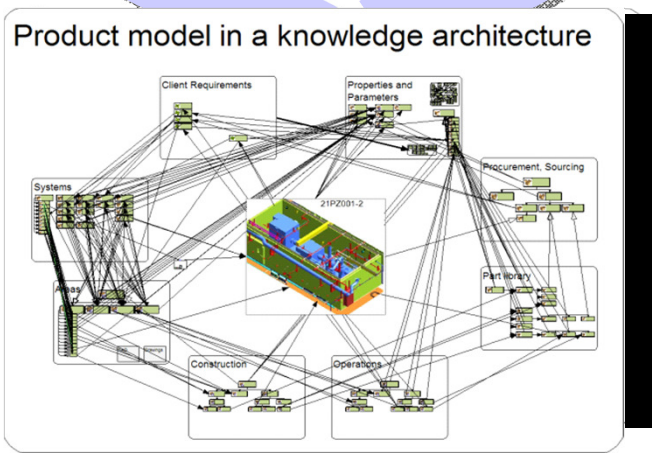
The Oil and Gas Engineering Project Pilot





Workplaces
for operational roles

Workplaces for
architects, designing
user workspaces



Knowledge
Architecture

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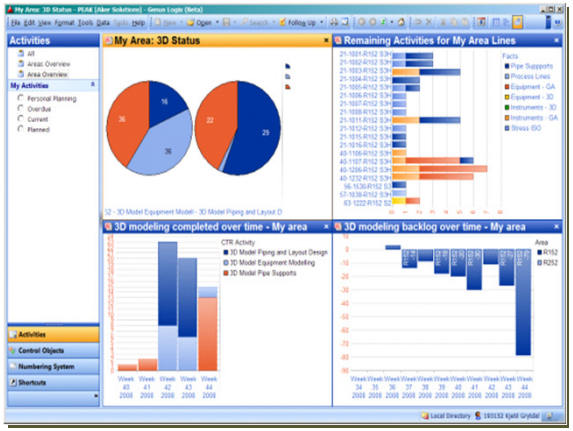
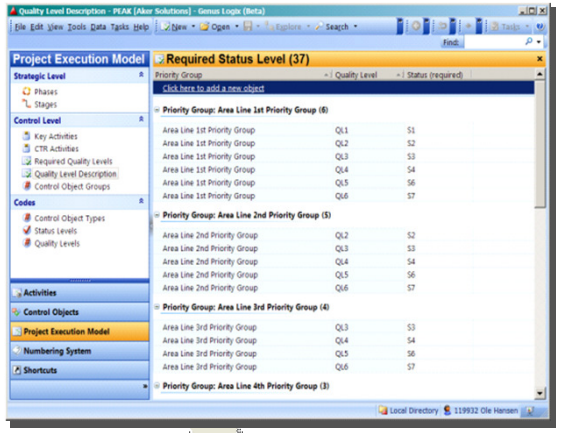
Aker Pilot – Architecture-driven Workplaces

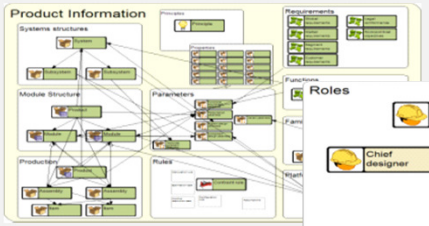




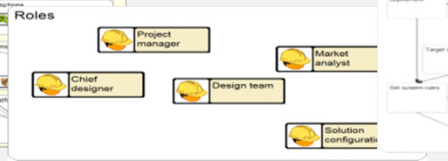
Adaptive Workplaces

Active Knowledge Architecture, extended through practice

Information

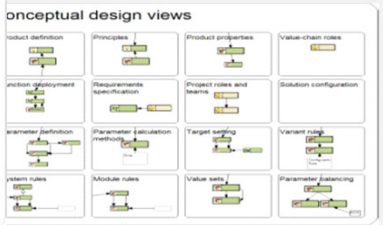


Roles



Tasks

Views



Integrating existing IT systems & components

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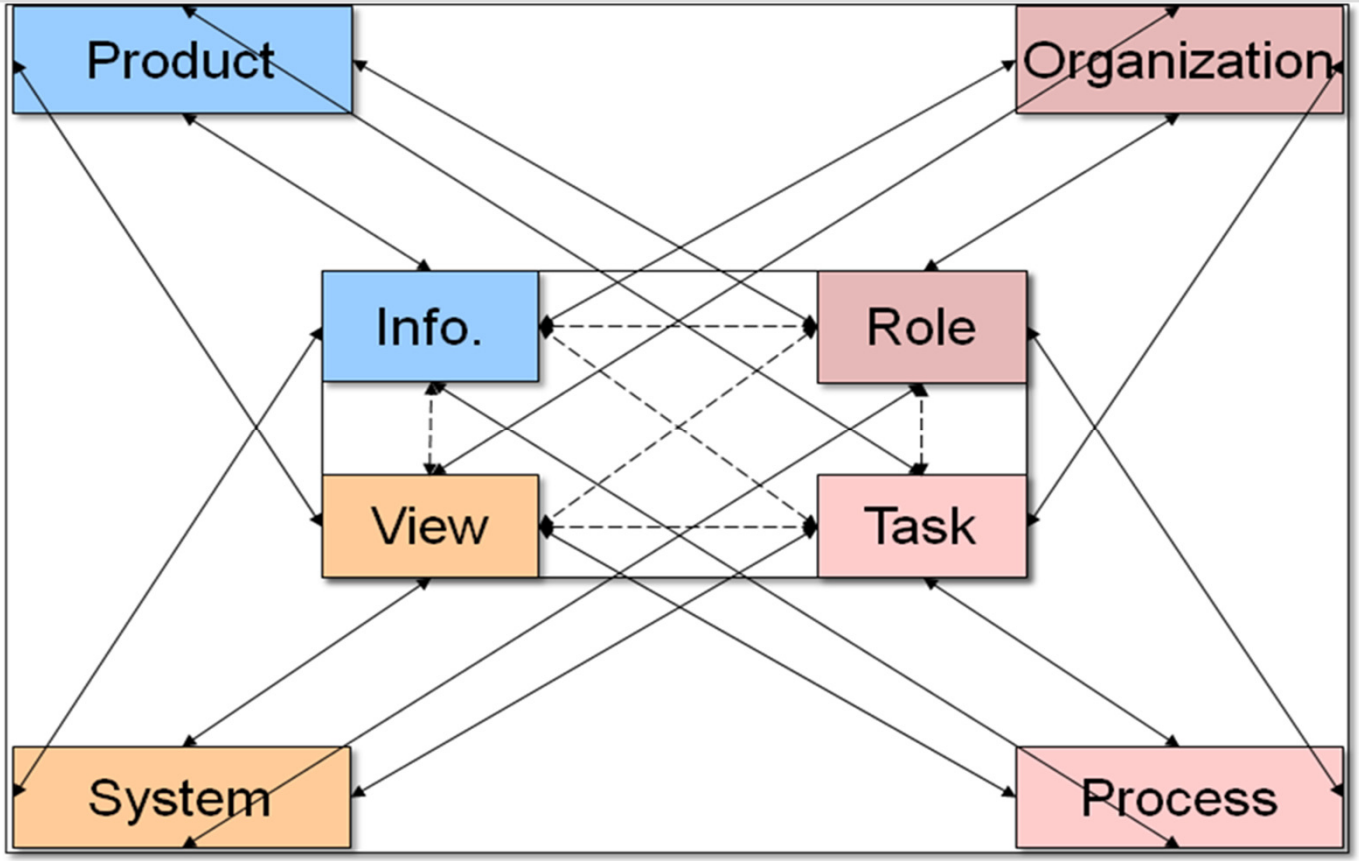
Agile enterprise design modeling

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



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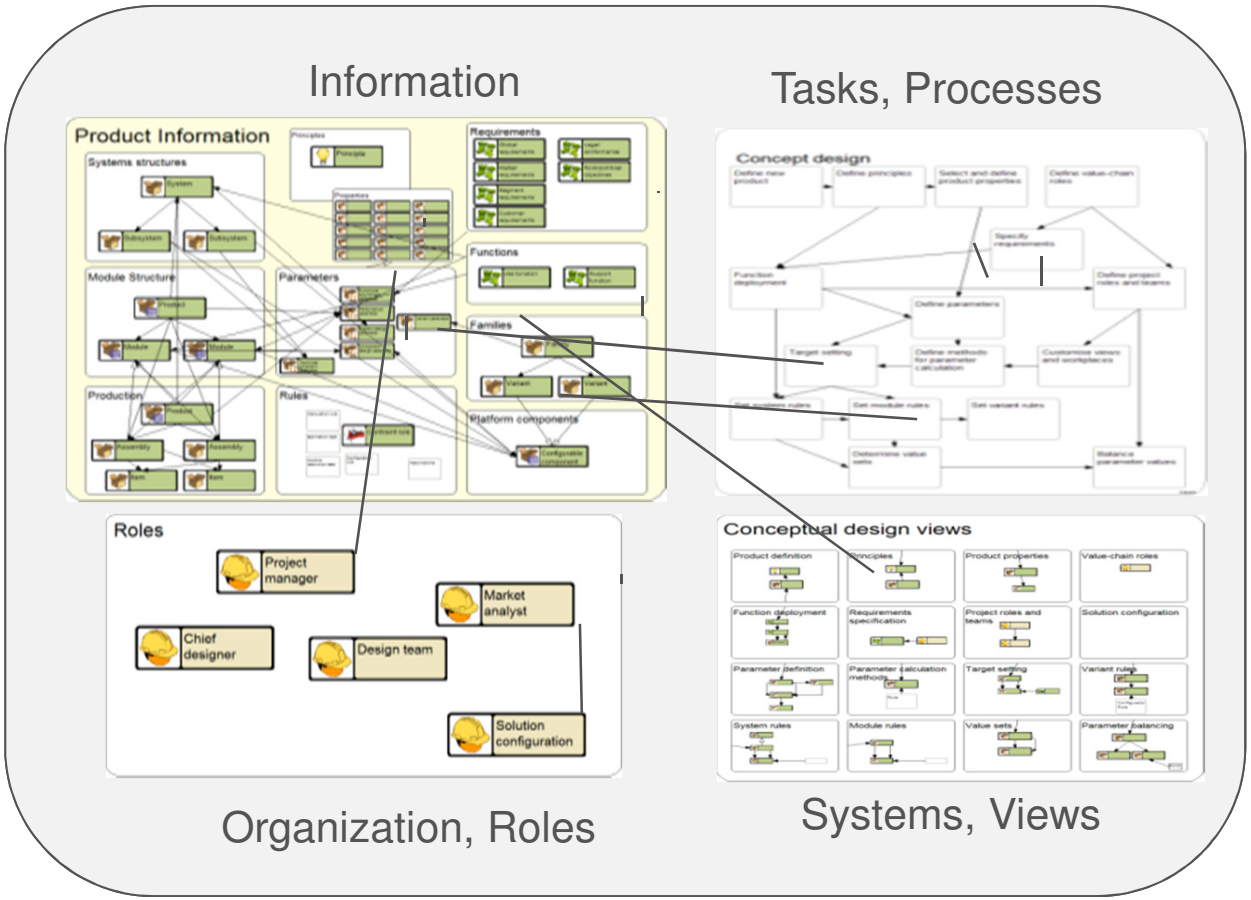
Modelling Principles - Enterprise Knowledge

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



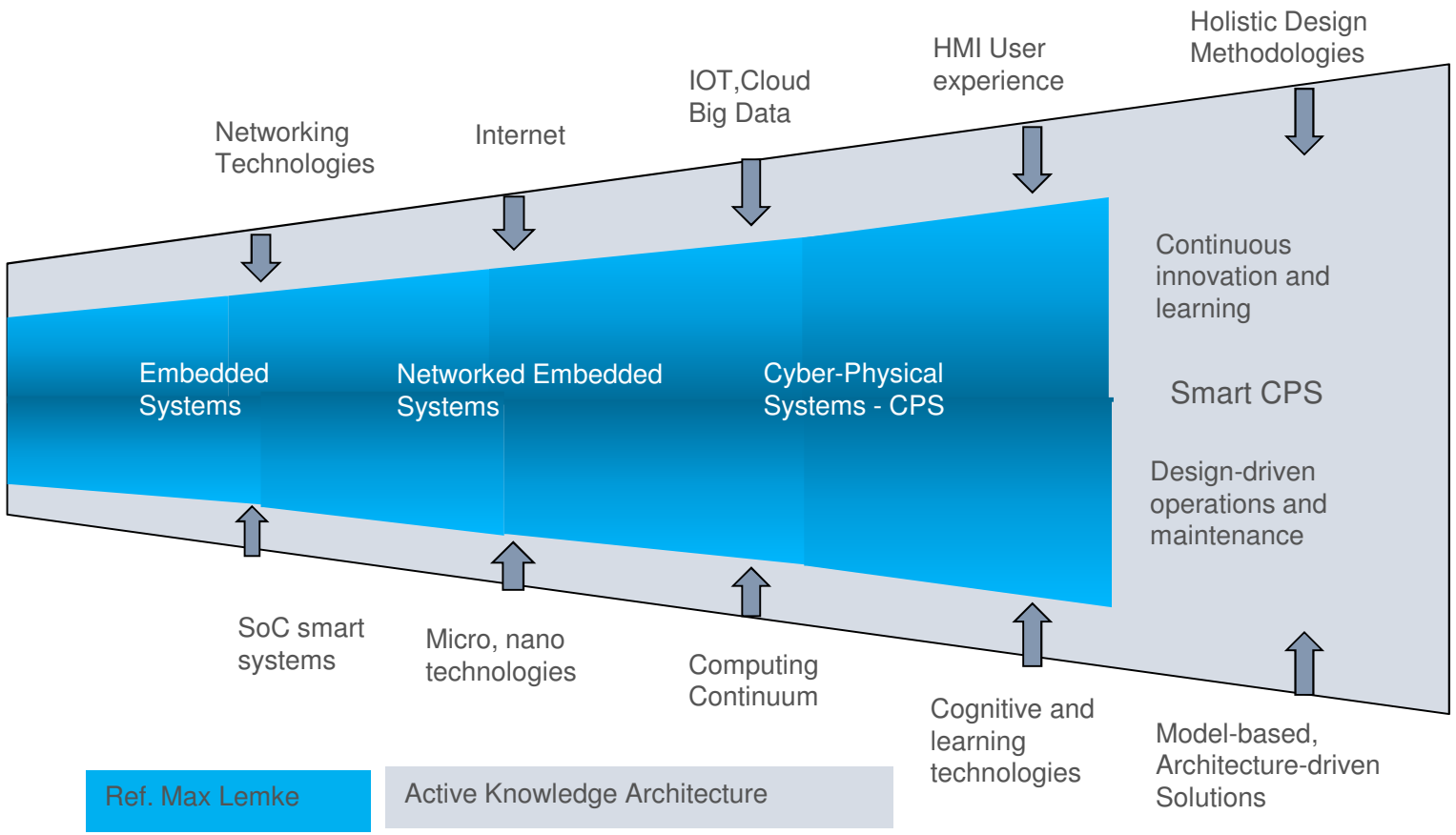
Given action

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/ .

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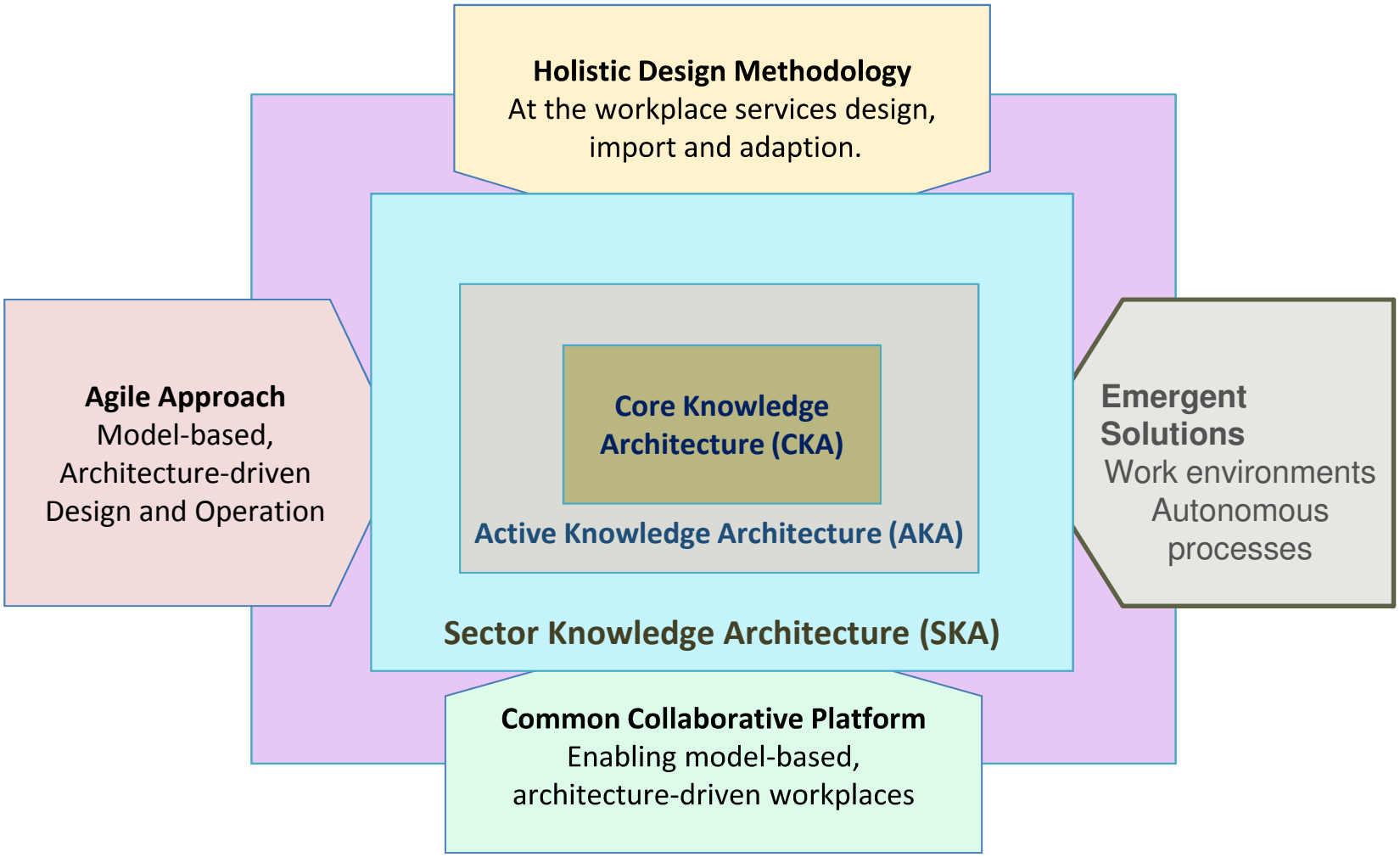
Enterprise Knowledge Modelling and Execution



Exploiting Enterprise Knowledge Spaces and Workspaces

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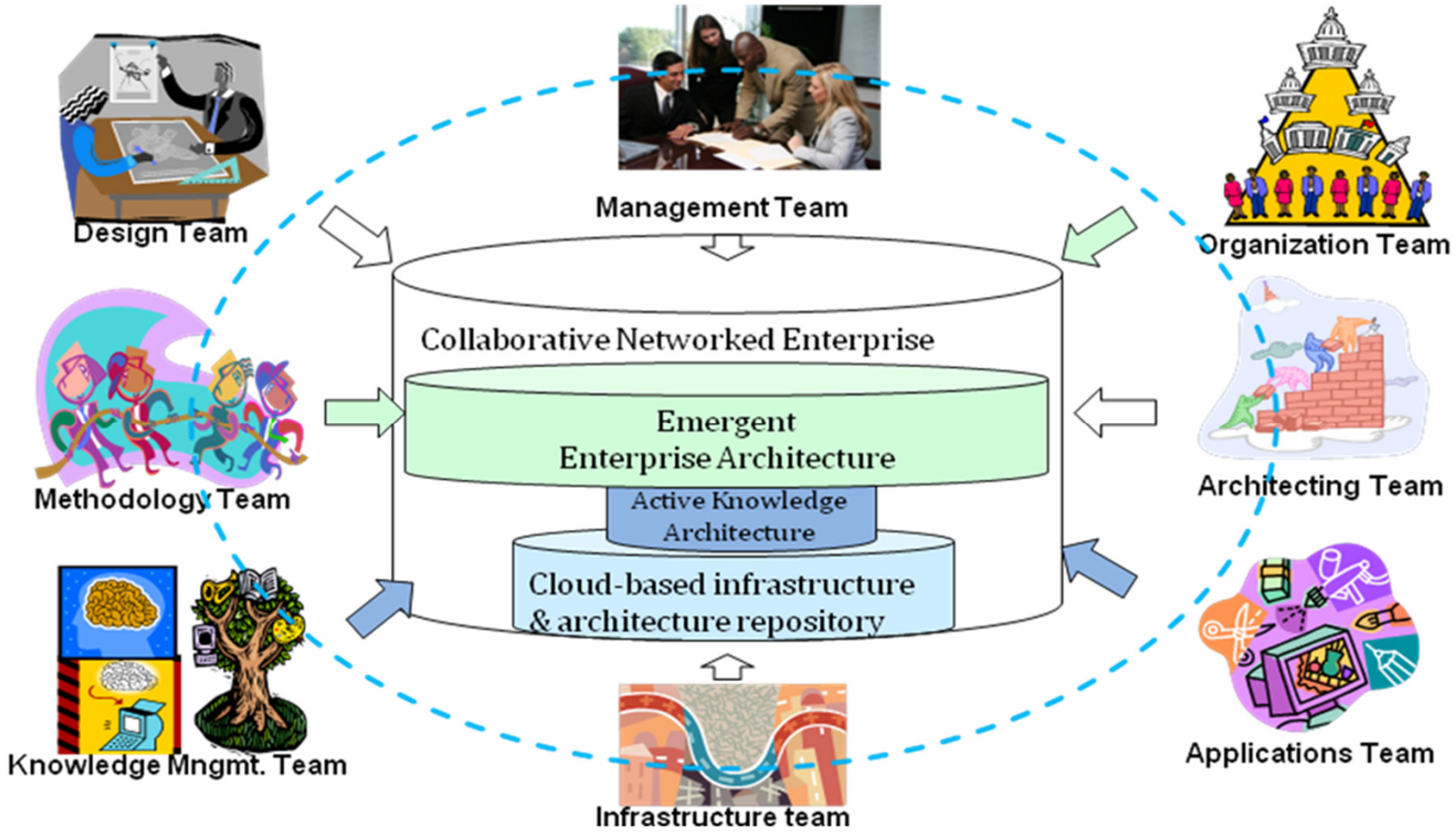
Complimenting project stages & layers



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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

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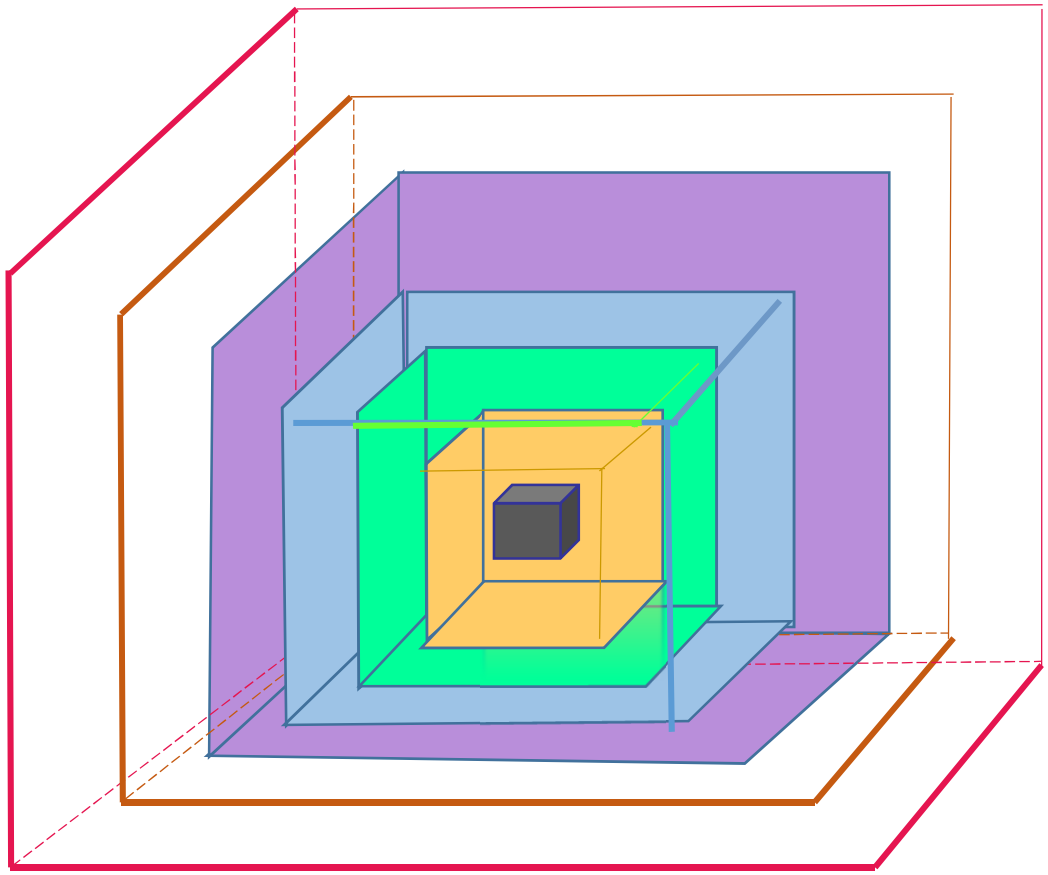
Enterprise knowledge spaces & perspectives



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.

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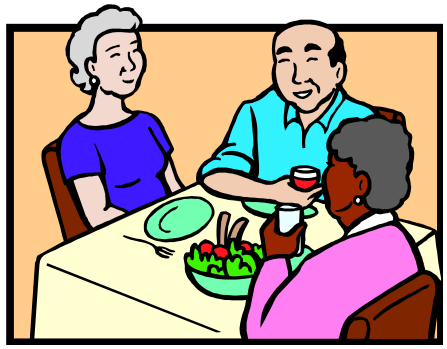
Properties of workspaces and mental models

Reflectiveness, Repetition, Replication and Reuse



Desired outcome | Work environments | Approach & Methods | Client preferences

Actions and tasks depend on the perspectives of the roles involved

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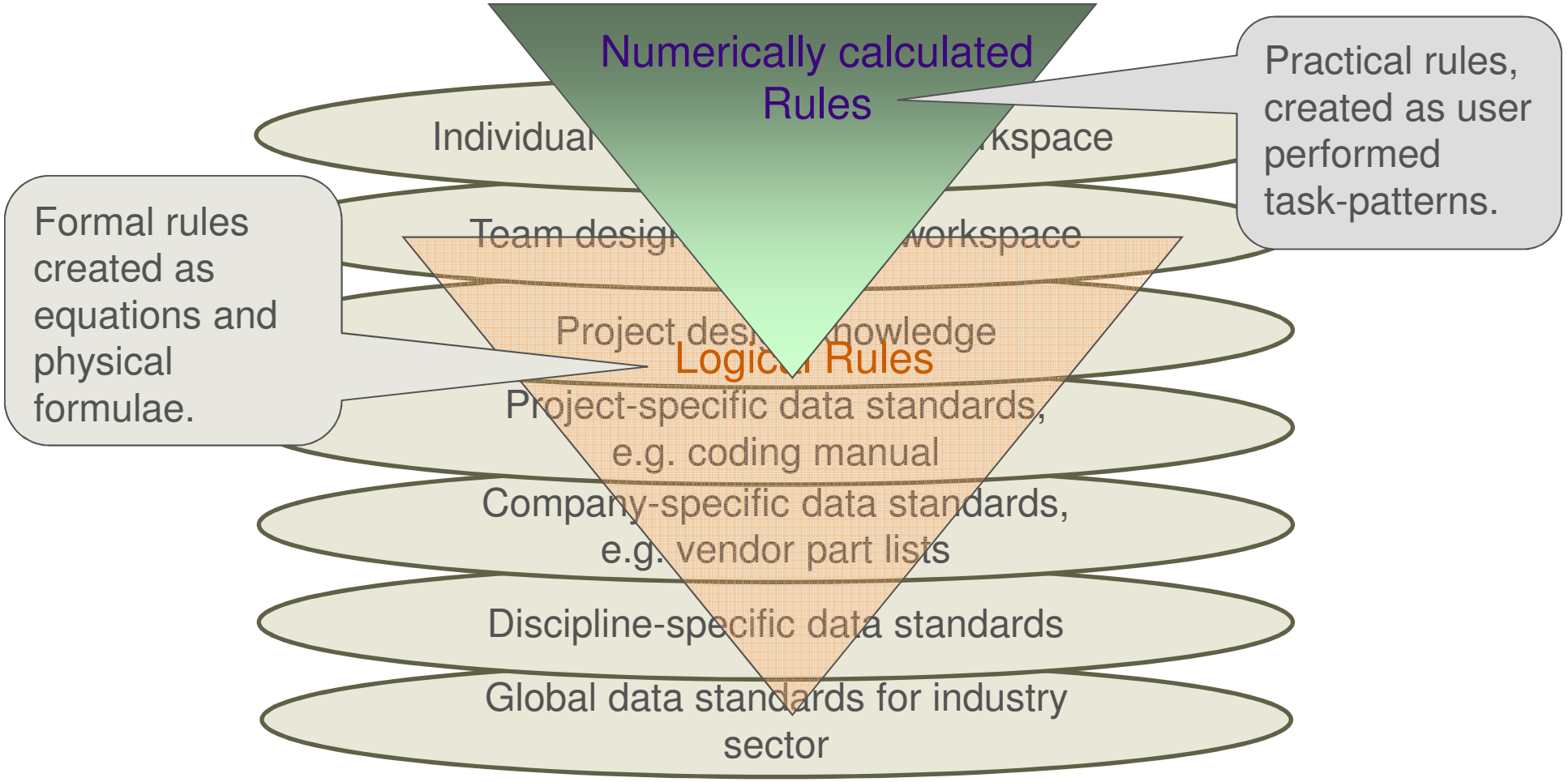
Data and Knowledge Domain Modeling



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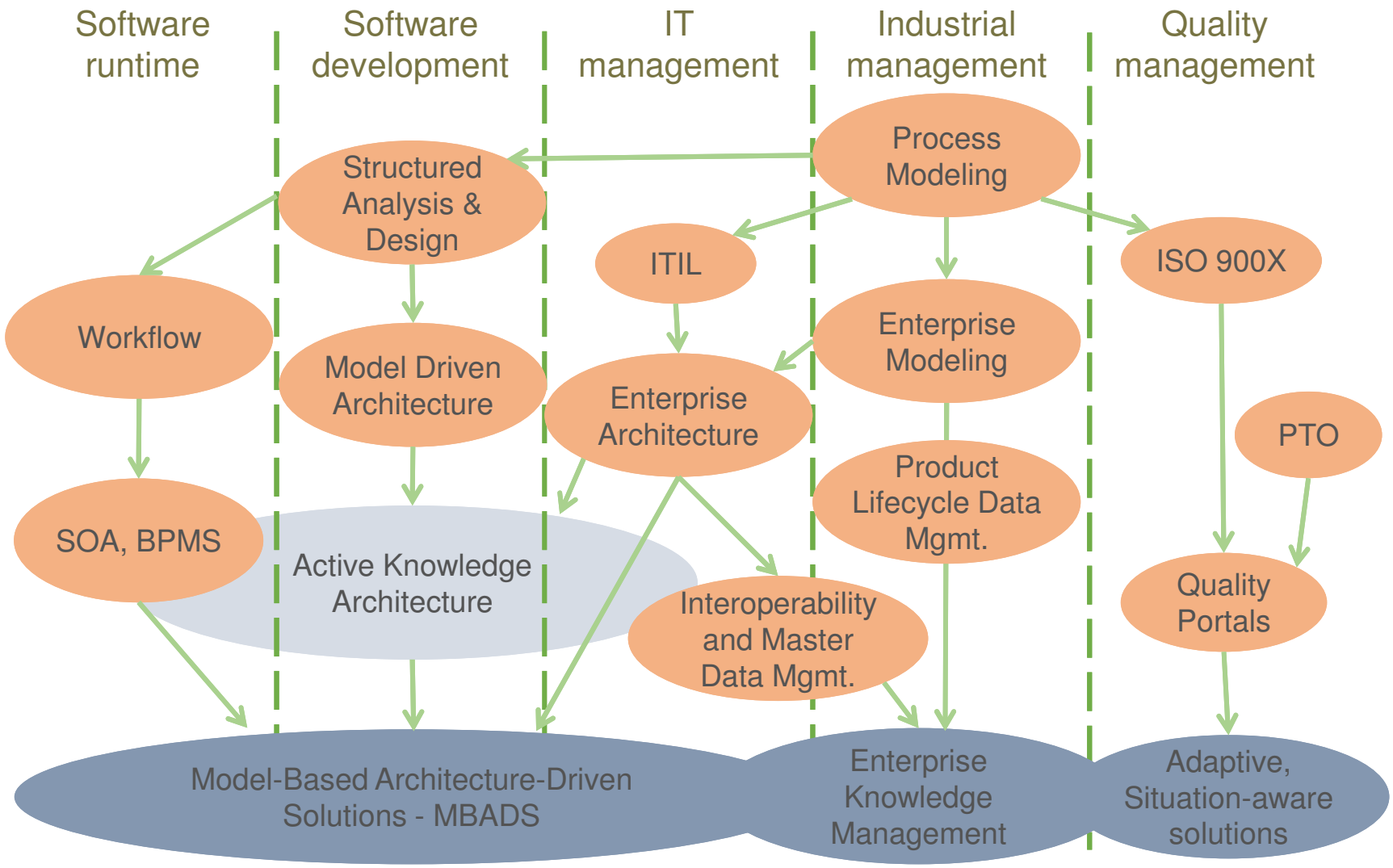
History of ICT platforms



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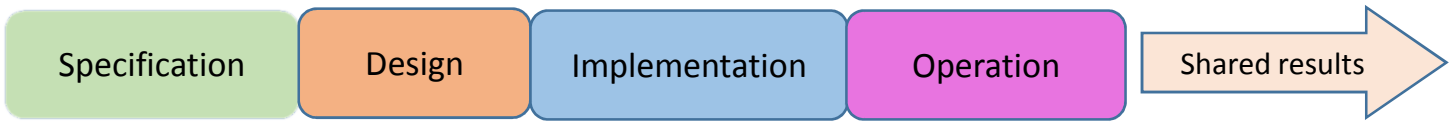
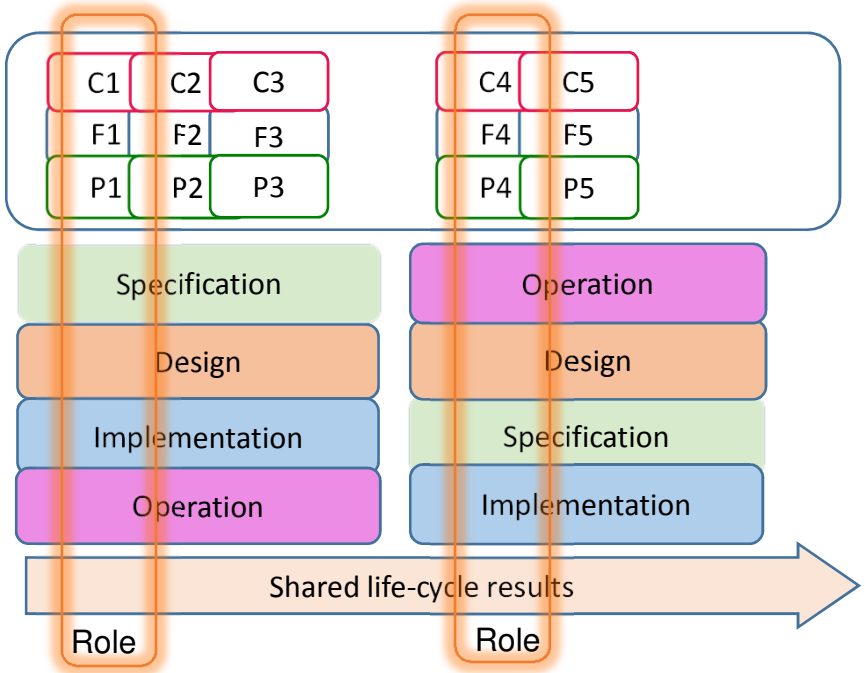
Agile Approach to Enterprise Design and Operations

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.

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Enabling new forms of collaboration

- **Synchroneous – 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