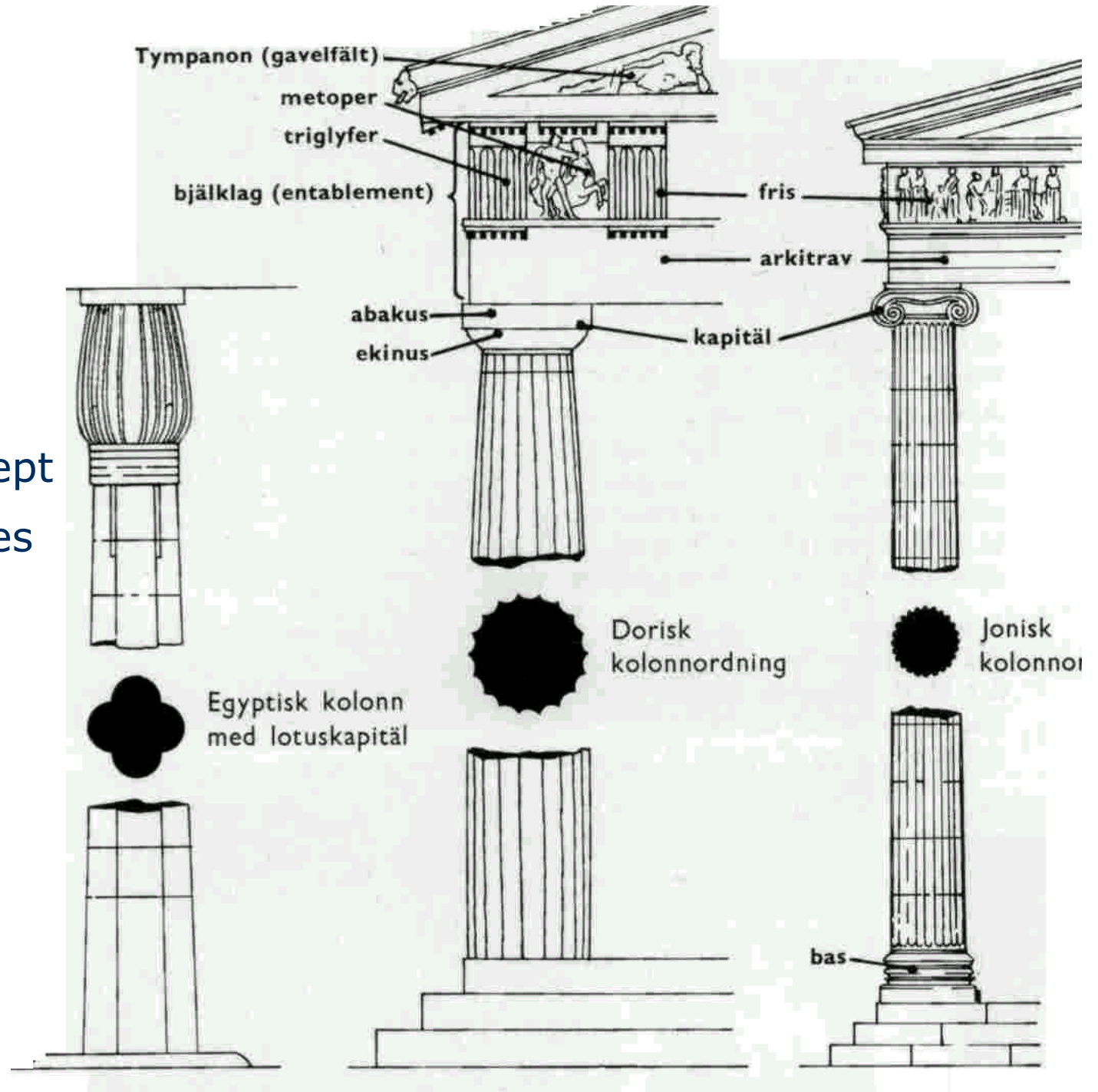# An Outlook on Patterns as an Aid for Business and IT Alignment with Capabilities

Janis Stirna, Stockholm University
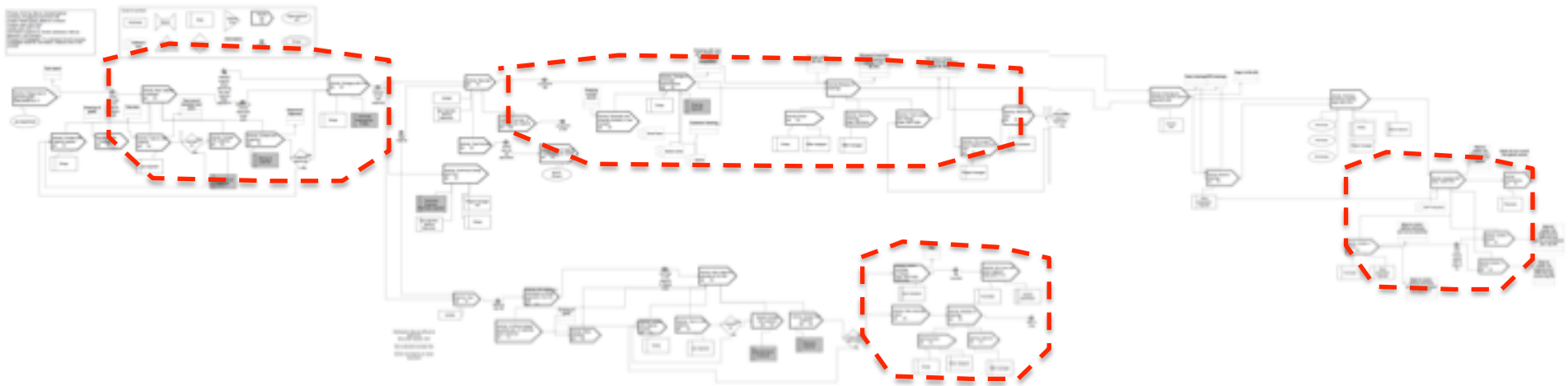
Kurt Sandkuhl, University of Rostock

Outline

- The need
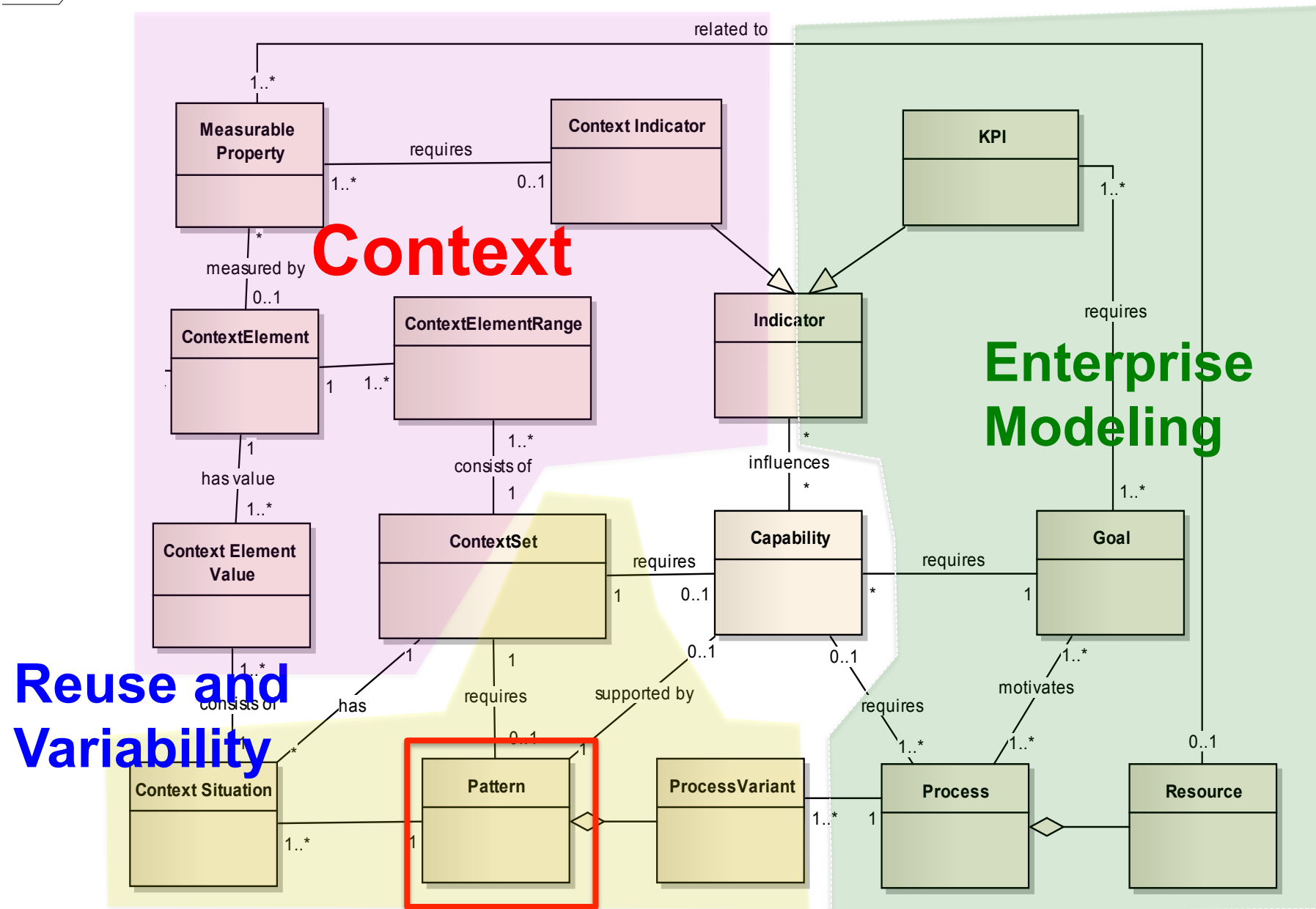- Capability
- Pattern concept
- Example cases
- Challenges

Problem: Enterprise models have a lot of reusable knowledge....

How to identify?
How to capture?
How to represent?
How to share and apply?

… a solution –

use patterns

A meta-model for capability design

The pattern concept

- In architecture
  - "A problem which occurs over an over again in our environment and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing the same twice" *Alexander, 1977*

- In O-O design
  - "An object-oriented pattern is an abstraction of a doublet, triplet or other small grouping of classes that is likely to be helpful again and again in object-oriented development" *Coad, 1992*
  - "A design pattern is a description of communicating objects and classes that are customised to solve a general problem in a particular context" *Gamma, 1994*

- In business analysis
  - "An idea that has been useful in one practical context and will probably be useful in others" *Fowler, 1997*
  - "Generic and abstract organisational design proposals that can be easily adapted and reused in different organisational situations" *Bubenko, Persson, and Stirna, 2001*
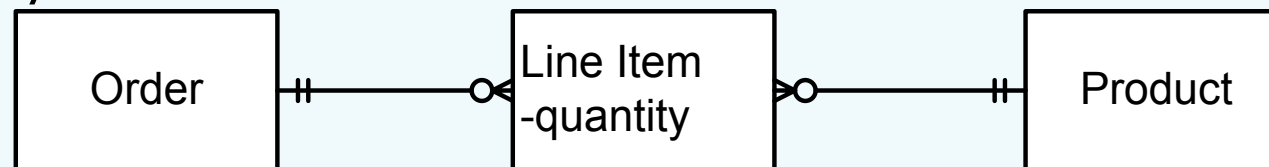
Example of the state of the art

Concept 58 E-Shop customer —places— Concept 59 Customer order —for— Concept 6 Product
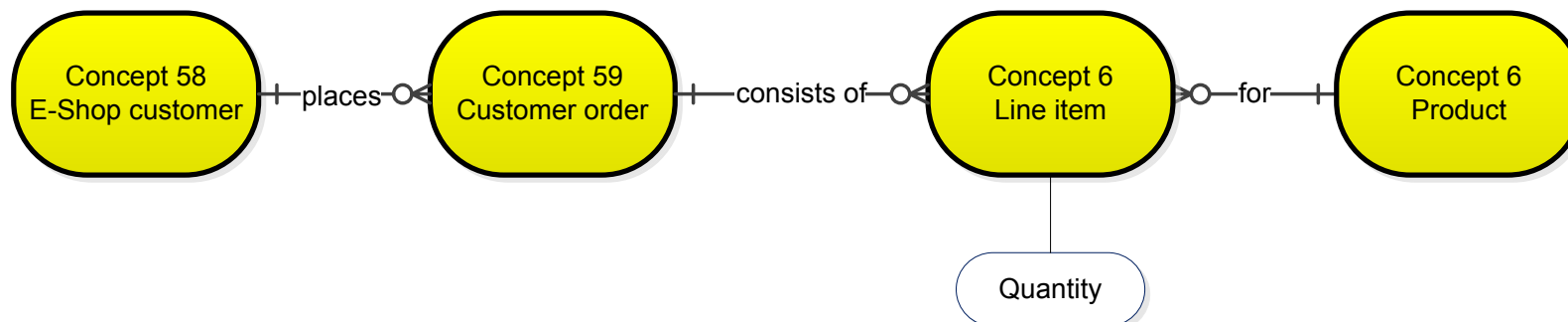
Pattern:

- Problem: How to model a customer order and different product quantities?

- Solution: Introduce order line with attribute quantity shown below

  Order —— Line Item -quantity —— Product

- When applied

Concept 58 E-Shop customer —places— Concept 59 Customer order —consists of— Concept 6 Line item —for— Concept 6 Product
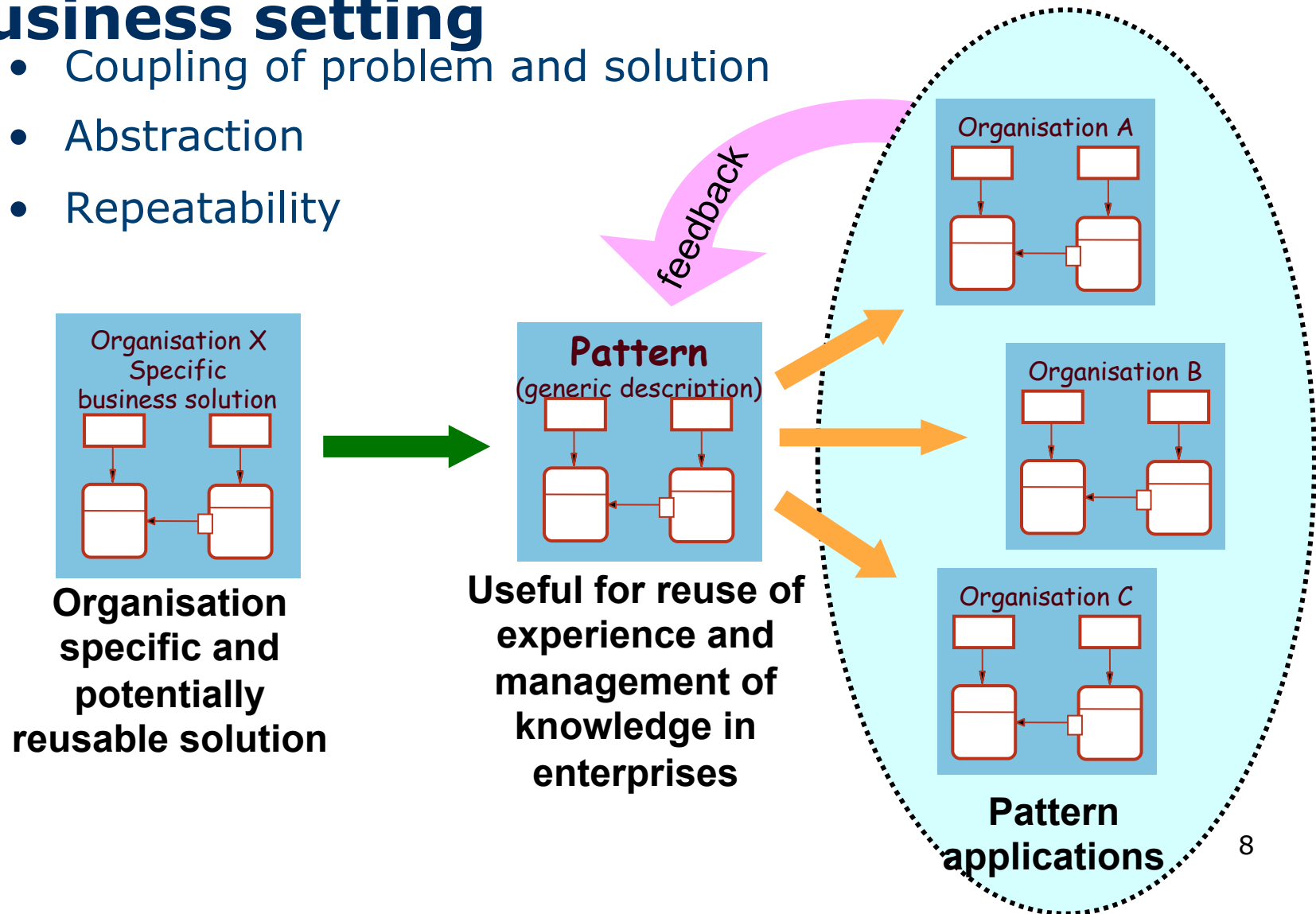
Quantity

Pattern description

- A pattern is a **self-contained logical system** that is capable of stating:
  - that a given **problem** exists within a stated range of contexts, and
  - that in the given context, a given **solution** solves the given problem.
- Typically described according to a template:
  - Problem - describes the issues that the pattern wishes to address within the given context and forces
  - Context - describes the preconditions under which the problem and its solution seem to occur
  - Forces - describe the relevant forces and constraints and how they interact/conflict with one another and with goals we wish to achieve
  - Solution - describes how to achieve the desired result, in terms of the work needed. It can be expressed in natural language, enterprise models, drawings, multimedia, etc.

The need for patterns in the business setting

- Coupling of problem and solution

- Abstraction

- Repeatability

**Organisation X Specific business solution**

Organisation specific and potentially reusable solution

Pattern (generic description)

Useful for reuse of experience and management of knowledge in enterprises

feedback

Organisation A

Organisation B

Organisation C

Pattern applications

Pattern elicitation

- Pattern detection: analyze (a large number of) sources in the area under consideration (e.g. enterprise models, software designs, etc.) for recurring solutions

- Pattern derivation: use knowledge from related areas (e.g. process models, information flow diagrams, enterprise models) and derive patterns from this knowledge

- Pattern construction: use expert knowledge in the domain and construct patterns based on this knowledge

- Community-based pattern development: use communities of people with knowledge in the field (on the web, wikis, in conferences (e.g. PLoP) or associations) to develop patterns.

Example: Model supported knowledge sharing at the Riga City Council

- Patterns used for capturing best practices

- Created by experts and employees of the RCC

- Used by employees within the RCC
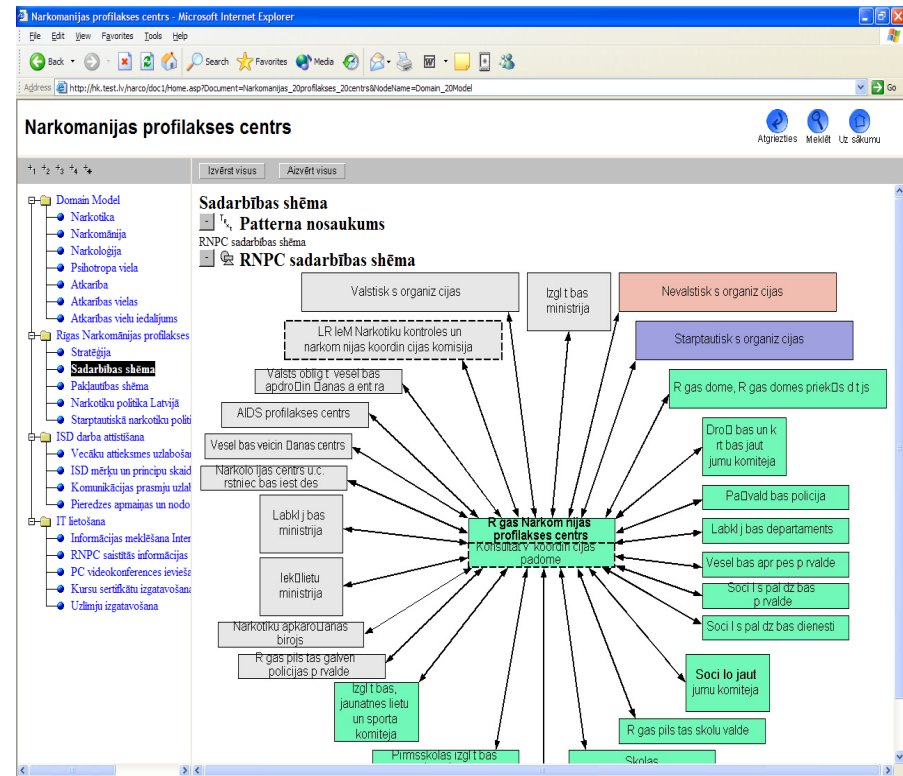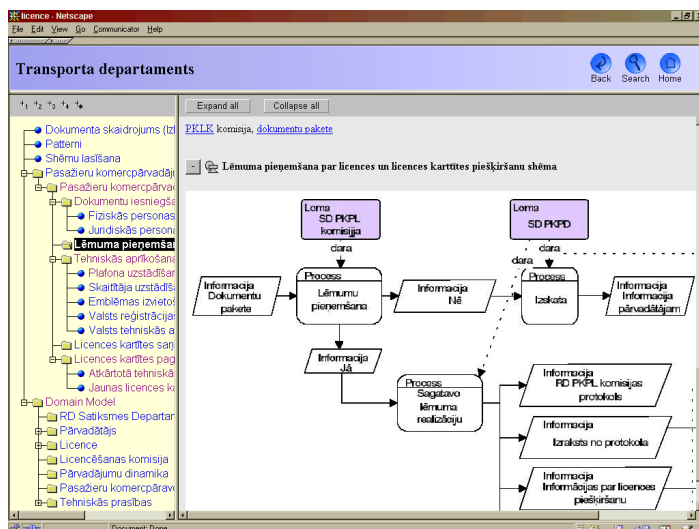
Example: Task Patterns at Kongsberg Automotive
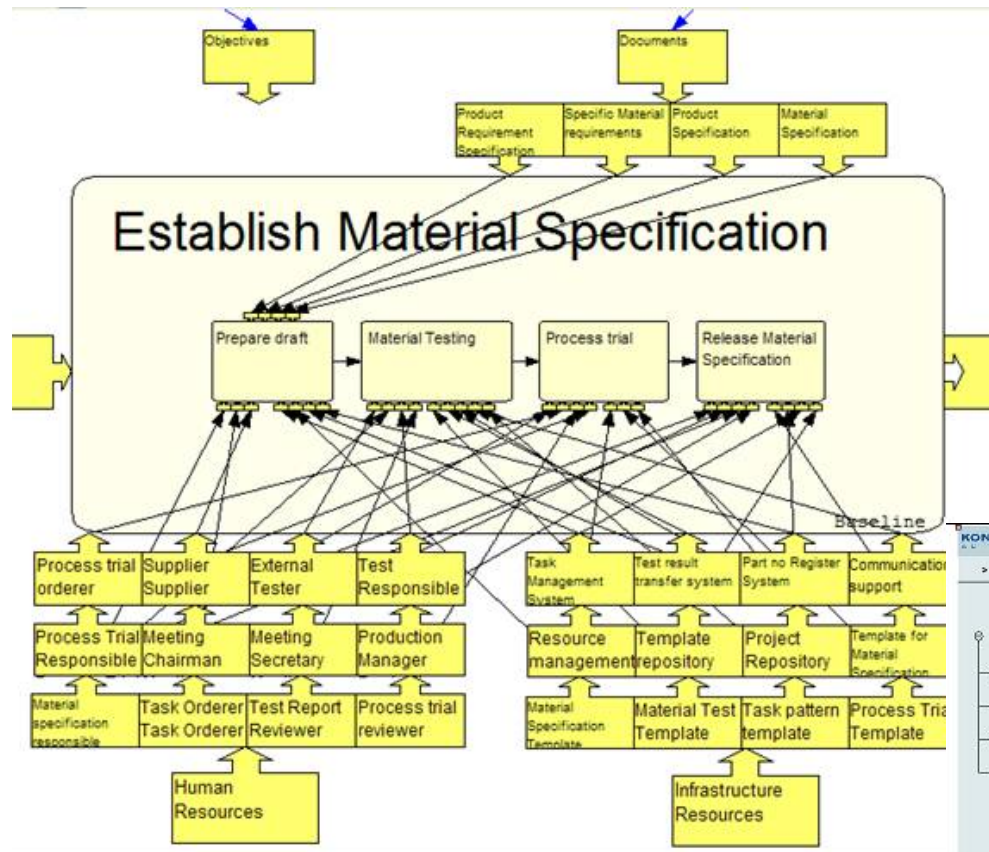
- Engineering process patterns
- Created by methodology experts
- Metis tool

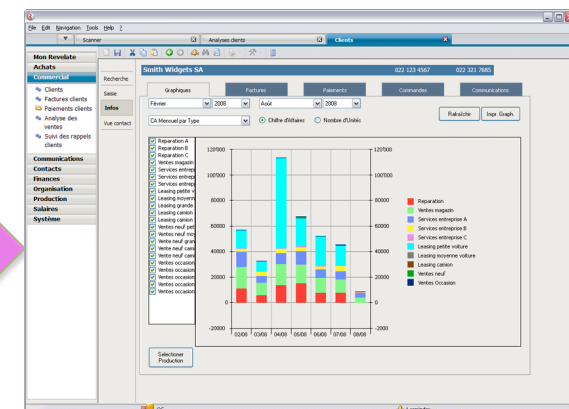- Integrated with an execution environment – the AKM platform

Example: Information Demand Patterns at Proton Engineering

- Address recurring information flow problems that arise for specific roles and work situations in an enterprise and presents a conceptual solution to it.

Challenges for Supporting Capability Delivery
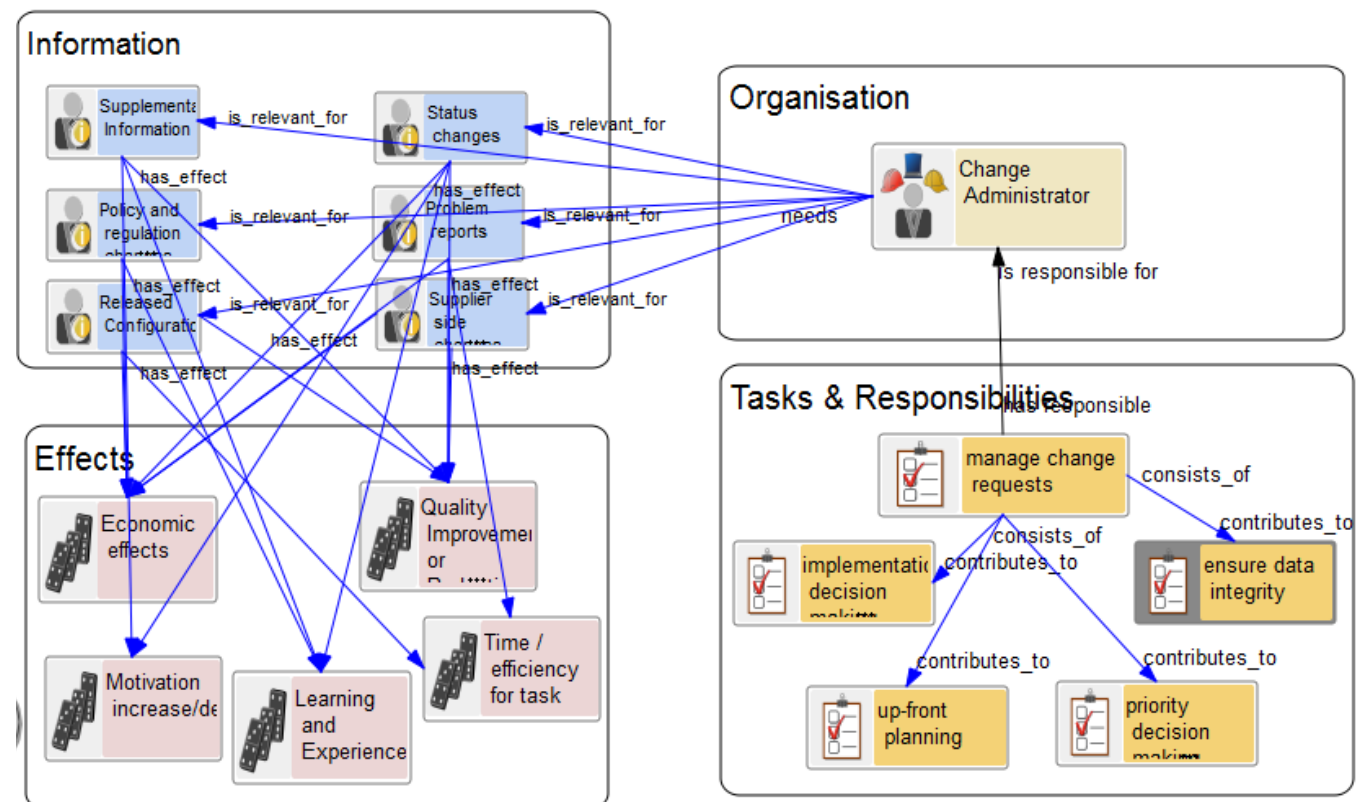
- Way of modeling and repository management – both dimensions of reuse

Design for reuse

Pattern

Pattern

Pattern

Pattern

Pattern

Design by reuse
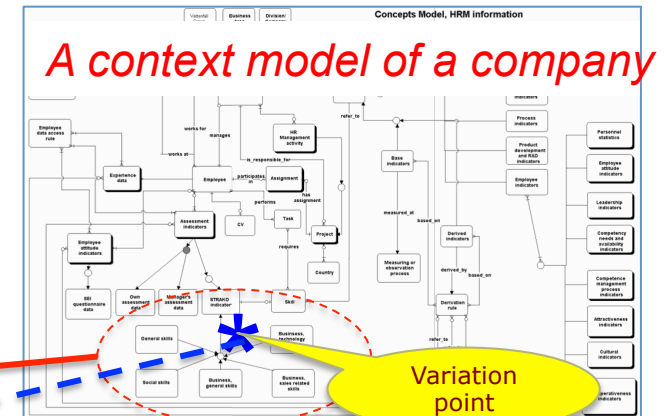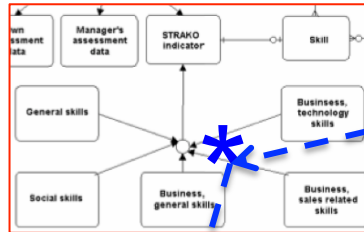
… and execution

Name: *PatterName*

Problem: *Some text here explaining the problem*
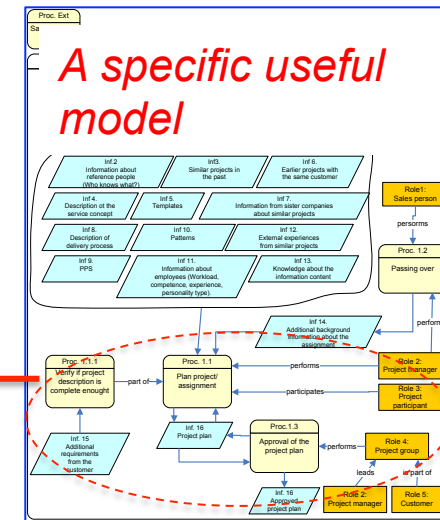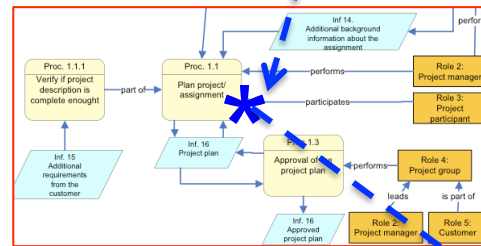
Context: *Some text and/or context model fragment*

A context model fragment relevant to this pattern

Solution: *Some text and/or model fragment*
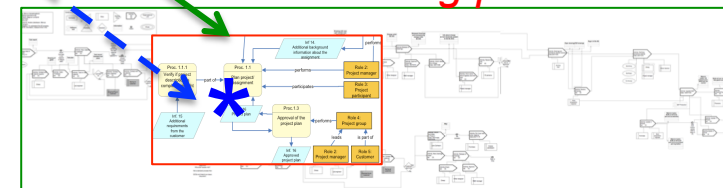
Reusable solution part of the pattern

Usage guidelines: *Some text explanatio here*

Keywords: *Keyword1, Keyword2, Keyword3*

Examples:

A context model of a company

trace

Variation point

A specific useful model

trace

trace

New business solution, e..g process model containing pattern

More Challenges

- Design oriented patterns (more traditional)
- Solution oriented patterns
  - need to specify how to compose the solution and how to run it

- What should the formalisms be:
  - Process models and concepts models have been widely used
  - What other types of models (e.g. goals, services, actors, IS architecture)?
  - How to represented algorithms within pattern?

Time for a discussion

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