Analysis and Standardisation of knowledge intensive business processes with Knowledge Modeling and Description Language (KMDL®)

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Agenda

- Introduction into KMDL
- Applications of KMDL process and activity models
- Standardization - chances and risks
- Social software and KMDL
- Remarks on the Siemens approach to process-oriented KM

Motivation for the development of the Knowledge Modeling and Description Language (KMDL®)

- Use of modelling metaphor to design knowledge intensive business processes
- Overcoming deficiencies of traditional business process modelling techniques
- Especially modelling of
  - Knowledge conversion
  - Knowledge flows
- Visualisation of weaknesses within business processes
Knowledge Modeling and Description Language (KMDL®)

Differentiation of explicit and tacit knowledge

Characterization of explicit knowledge
- Independent of persons
- Examples: books, manuals, etc.
- Easy to externalize, e.g. by saving on the computer, by writing down in a document

Characterization of tacit knowledge
- Personal knowledge
- Hard to communicate, context specific
- Hard to externalize

Knowledge conversions
- Internalization: Conversion of explicit knowledge into tacit knowledge
  - Example: learning-by-doing
- Externalization: Transformation of tacit into explicit knowledge
  - Problematical aspect: knowledge will get lost
- Socialization: Conversion from tacit knowledge of one person to tacit knowledge of another person.
  - Example: training-on-the-job
- Combination: Conversion from explicit to explicit knowledge

are used in KMDL to capture the creation, the usage and the flow of knowledge.

Conversions in KMDL®

Socialisation
- person A
- knowledge object
- person B
- atomic conversion

Externalisation
- person A
- knowledge object
- atomic conversion

Combination
- information object
- atomic conversion

Internalisation
- information object
- atomic conversion

are the main modeling concepts for the capture of knowledge processing in processes.
The KMDL® process view is used for the presentation of flows of information along a process.

Example: ITIL incident management process

- Incident detection and recording
- Classification and initial support
- Investigation and diagnosis
- Resolution and recovery
- Incident closure

Ownership, monitoring, tracking and communication

The IT infrastructure library contains process models but no hint on knowledge!

Example: ITIL incident life cycle in KMDL® (process view)

Knowledge intensive process: Incident detection and recording

The process view is similar to broadly used business process models.
Example: ITIL incident detection and recording in KMDL® (activity view)

- Only the activity view shows requirements, personal knowledge and hidden knowledge conversions.

Process analysis with KMDL® patterns

- **Occurrence patterns**
  - The pattern of occurrence shows where specific objects appear with exceptional frequency in the business processes
  - Example: mighty monopoly

- **Multi-step patterns**
  - The multi step pattern category describes a combination of two conversions
  - Example: information gets lost during a double socialization

- **Relevance patterns**
  - Relevance patterns indicate tasks with a great amount of input, output, integrated persons or task requirements

Process analysis with KMDL® patterns (II)

- **Exclusive patterns**
  - The Exclusive Patterns show that there are certain information or knowledge objects in the business process which are requested very frequently.
  - The loss of these process relevant objects can lead to a process disruption.

- **Prerequisite pattern**
  - The prerequisite pattern describes a process involved person, which only has the ability to fulfill a task after the generation of knowledge through a socialization with a non-involved person.
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**Simulation of knowledge intensive business processes**

- Emulation of knowledge intensive business process / activities
- Input and output
  - Degree of expertise
  - Degree of creativity
  - Availability
  - etc.
- Rules for information and knowledge diffusion
  - Enhancement
  - Definition of process dependencies
  - Constraints
  - Buffer time
  - Transmission medium
- Process simulation can improve management decisions on knowledge management.

**Knowledge Modeling and Description Language (KMDL®)**

**Application fields for KMDL®**

**Modelling**
- Process instances
- Process schemes
- As is/to be-models

**Model Analysis**
- Process analysis
  - Process patterns
  - Views
  - Reports

**Knowledge Mapping**
- Topic maps
- Taxonomy
- Ontology

**Simulation**
- Knowledge dissemination speed

**System Design**
- Process improvement
  - Best practices
  - Complex ERP systems

**Skill Management**
- Skill profiles
- Search for experts
- Staffing

**IT Infrastructure**
- Configuration of knowledge management systems

**The analysis of interorganisational knowledge flows with KMDL**

- shows allowed and avoidable flows of knowledge, also in higher degrees of separation.

**Knowledge Modeling and Description Language (KMDL®)**

**Application fields for KMDL®**

**Modelling**
- Process import
  - Enhancement of existing process models (e.g. ARIS)

**Model Analysis**
- Process analysis
  - Process patterns
  - Views
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**IT Infrastructure**
- Configuration of knowledge management systems
The KMDL based configuration of knowledge management systems

- Process based selection and configuration of
  - IT tools and knowledge services
  - Content and meta-structure
  - Generated individual views

Results in a business process driven knowledge infrastructure

Benefits of a business process driven knowledge infrastructure

- Process analysis with KMDL -> process improvements
- Flexible knowledge infrastructures adopting to changing processes
- Consideration of complex demand situations

- Standardized knowledge tools and procedures
  - Standardized knowledge infrastructure repository
  - Systematic application of existing knowledge software
  - Reduced individual application development

- Improved knowledge access and reuse based on
  - Roles
  - Tasks
  - Individual knowledge profiles

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Standardization versus individual approaches

- There are drawbacks for standardization of knowledge management!
Possible benefits and risks of knowledge management standardization

Benefits
- Extensive gain of know-how
- High degree of maturity
- High degree of integration
- Extensive user documentation
- United terminology
- Additional services (training, hotline etc.)
- Internationality

Risks
- Functional overload and requirement gaps
- Difficult integration of other approaches
- Innovation brake
- Steps of innovation are heteronomous
- Terminology is branded by somebody else

Embedding KMDL®

KMDL closes the gap between business processes and knowledge flows

Wiki as knowledge management solution

"...a freely expandable collection of interlinked Web "pages", a hypertext system for storing and modifying information - a database, where each page is easily editable by any user…"

Design principles (extract)
- Open - Should a page be found to be incomplete or poorly organized, any reader can edit it as they see fit.
- Incremental - Pages can cite other pages, including pages that have not been written yet.
- Organic - The structure and text content of the site are open to editing and evolution.
- Observable - Activity within the site can be watched and reviewed by any other visitor to the site.
- Trust - Everyone controls and checks the content.

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Advantages due to structural freedom in a wiki in software documentation

In this example speed acceleration and improved user satisfaction were reached after introduction of a wiki.

Using metrics of social network analysis for analysis

- Social networks consist of a set of persons and relations defined on them
  - Social environment is described by a pattern or regularity among these interacting persons
  - Identified pattern explains individual and collective behavior
- Network analysis offers a range of metrics to analyze social structures in a systematic manner

KMDL® based analysis of knowledge activities in wikis

- Specification of an author network
- Research questions
  - Are there group forming capabilities within the network?
  - Which groups are closely knit together?
  - Which position has a person within the knowledge network (central connector, boundary spanner, information broker, peripheral specialist)?
  - Where are differences between the formal organisational structure and the structure of the virtual community?
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### Remarks on the Siemens approach to process-oriented KM

- What will be the best way to introduce knowledge management practices - top-down or bottom-up?
- Standardization doesn’t fit with different cultures - cultural understanding is a key element of knowledge exchange!
- Your approach seems to miss reuse of process/knowledge models e.g. for competency management or judgement of employees
- Knowledge flows arise and diminish dynamically - how do you handle dynamic aspects without any possibility to perform simulation?
- How do you discover gaps between knowledge demands and knowledge offers?
- Shouldn’t you standardize knowledge transfer patterns instead of whole knowledge processes?
- Are you able to investigate the border-crossing knowledge flows, for instance to avoid product piracy?