

707.009
Foundations of Knowledge Management
„Business Process Oriented Knowledge
Management“

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Overview

Agenda

- A glimpse at a 2,5 research project on
Business Process Oriented Knowledge Management

Presentation Overview



- ➔ – Introduction & Motivation
- Research Challenges & Objectives
- Principle Approach
- The B-KIDE Framework & Tool
- Proof of Concept
- Future Work & Lessons Learned
- Scientific Contributions

Schools of KM [Earl 2001]

Table 1. Schools of Knowledge Management

SCHOOL ATTRIBUTE	← TECHNOCRATIC →			← ECONOMIC →	← BEHAVIORAL →		
	SYSTEMS	CARTOGRAPHIC	ENGINEERING	COMMERCIAL	ORGANIZATIONAL	SPATIAL	STRATEGIC
FOCUS		Maps		Income		Space	Mindsot
AIM		Knowledge Directories		Knowledge Assets		Knowledge Exchange	Knowledge Capabilities
UNIT		Enterprise		Know-how		Place	Business
EXAMPLE		Bain & Co AT&T		Dow Chemical IBM		Skandia British Airways	Skandia Unilever
CRITICAL SUCCESS FACTORS		Culture/Incentives to share Knowledge Networks to Connect People		Specialist Teams Institutionalized Process		Design for Purpose encouragement	Rhetoric Artifacts
PRINCIPAL IT CONTRIBUTION		Profiles and Directories on Internets		Intellectual Asset Register and Processing System		Access and Representational Tools	Eclectic
"PHILOSOPHY"		Connectivity		Commercialization		Contactivity	Consciousness

Research Motivation

Integration of Knowledge Management and Business Processes is crucial:

According to a Delphi study [MHV03] conducted in 2001/2002

„The successful integration of *knowledge management* into an organization's *business processes* is regarded to be the **most pressing and challenging theoretical research issue** for the understanding and advancement of knowledge management.“

Two main research indicators for that development:

Why?

Workshops: gpoWM'01, MwiGP'03, BPOKI'04, BPOKI'05, kiBP'05

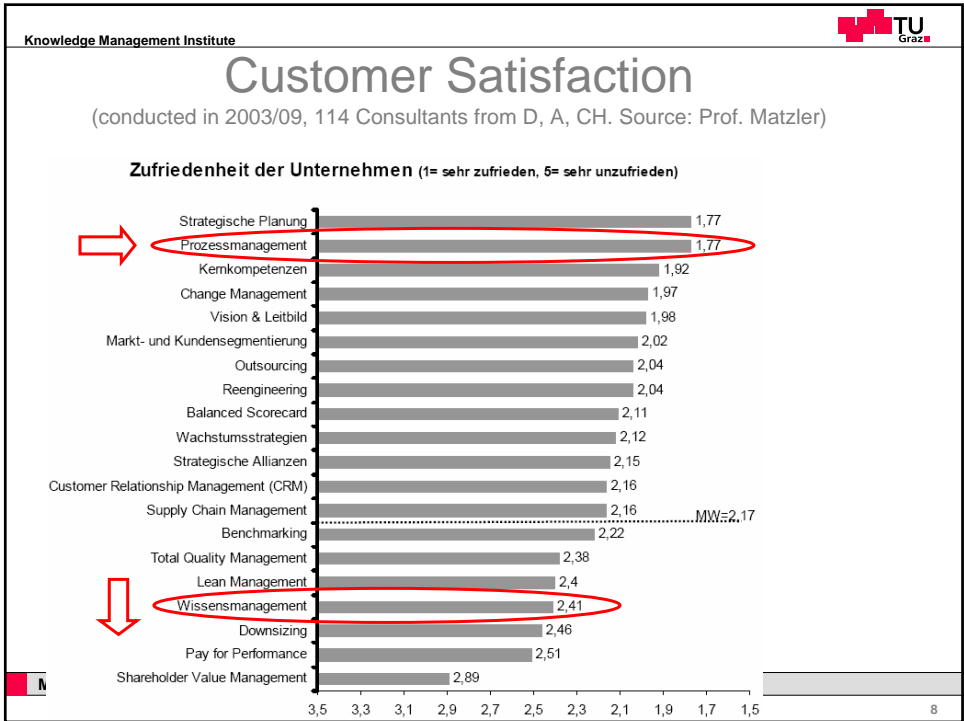
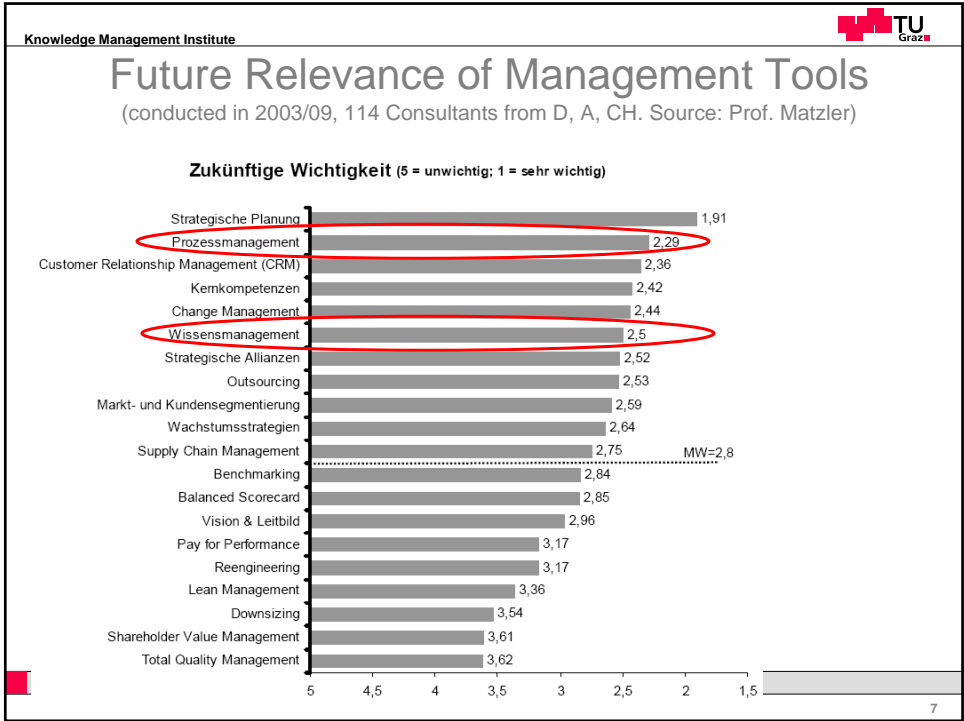
Publications: > 100 scientific publications in the broader context of this field

Benefits of BPOKM Approaches

Benefits:

- Value Chain Orientation
- Business Relevance
- Specificity
- Knowledge is regarded to be *actionable information*

- Business Process Management = widely implemented approach
- ~270.000 ISO certified organizations in Europe [iso01]



Business Process Oriented Knowledge Management Application Domains

AD-HOC [Far03], Advisor [SP01], MODEL [PPS02], ...

Aris [Sch96, Sch00],
K-Modeler [GPSW03],
Papavassiliou et al.
[PMA02, PNAM02], ...



BKM [BsV00, Har02], KNRM [RES+00], GPO-WM [Hei01, MHV03], [HHDG02], [Jan00], [MHA03], ...



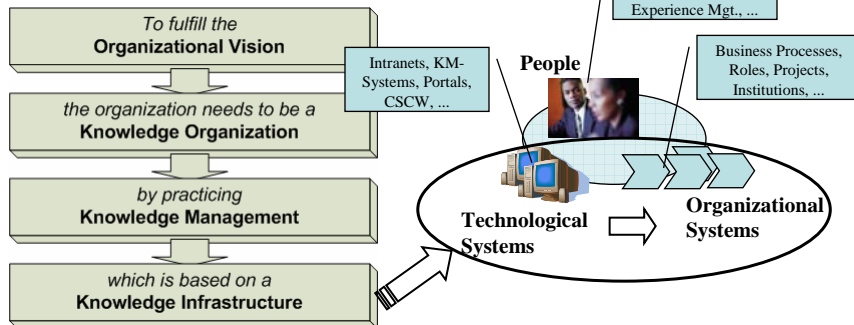
KODA [AHMM02, DHB01], indiGO [VA+02, DRA+03], ...



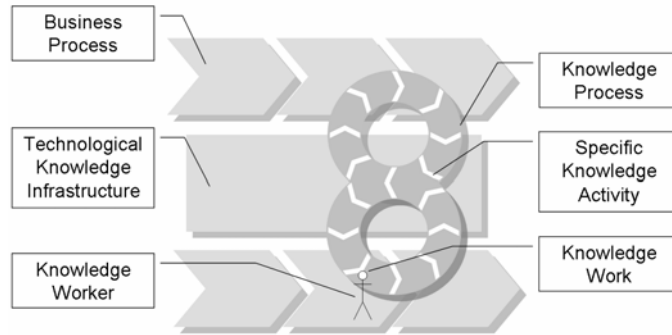
Milos [MH99, MT02], Promote [KT00, AHMM02, TK02, WK02, Woi03, WK03], Workbrain [WWT98], EULE [RMS00], ...

Knowledge Infrastructures

Knowledge Infrastructures are an Enabler for Knowledge Management [Siv01]:



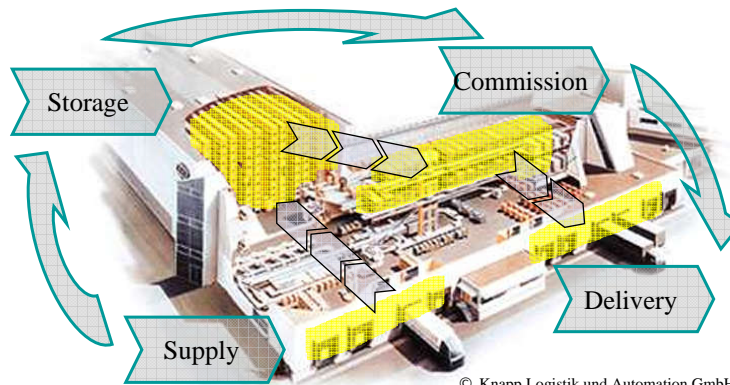
Terms and Definitions



Based on [Remus02]

Business Processes and Implications for Organizations

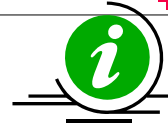
Example: A Logistics Center



© Knapp Logistik und Automation GmbH

Business Processes pose Implications for the Architecture of Knowledge Infrastructures.

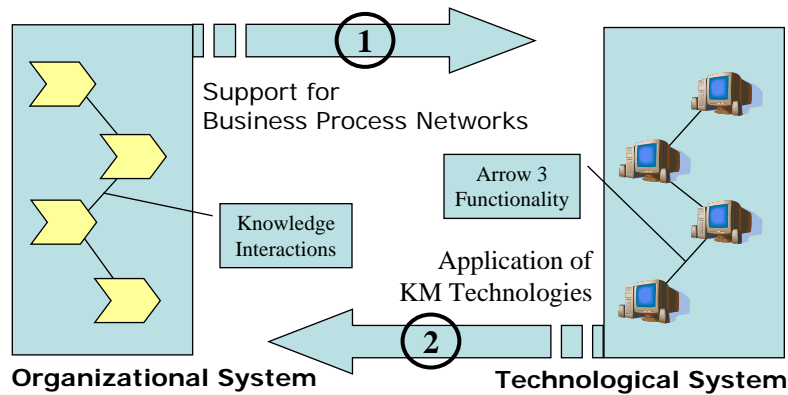
Presentation Overview



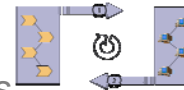
- Introduction & Motivation
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Research Challenges

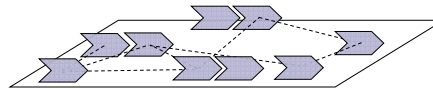
Two main Research Challenges:



Research Challenge 1 Networks of Business Processes

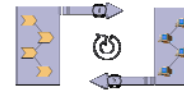


→ How can Networks of Business Processes be Supported?



- Current BPM Approaches Focus on Single Business Processes
- Industrial Standards suggest to Focus on Business Process Networks and – Interactions [iso00c]
- Knowledge Flows represent a Type of such Interactions [Str03]
- Improvement of Knowledge Intensive Business Processes stronger relates to an Improvement of Knowledge Flows rather than Workflows [RL00]

Research Challenge 2 Application of KM Functionality



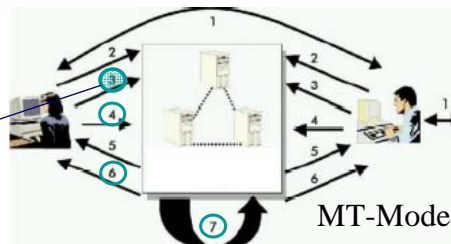
→ How can KM Functionality be Applied in Business Contexts?

- Failures of Technology-driven KM Projects in the Past [RoI03]
- Availability of Sophisticated KM Technologies [Hyp, Liv, Lot]
- Availability of KM Functionality Classifications [MT02, Mai02]

Need for Business Alignment

„Arrow 3“

- Implicit Input of Information (Non-Intrusive)
- Subsequent Autonomous Actions
- Automatic Archiving



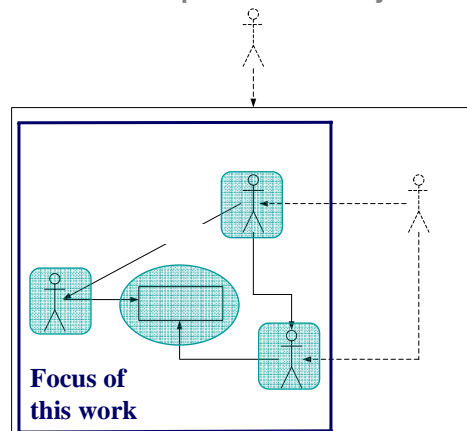
Research Objectives

„Introduce a framework and a supportive tool that allows for the development of business process supportive, technological knowledge infrastructures for knowledge intensive organizations.“

In detail,

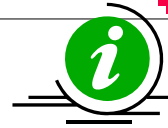
- **Improve environments** of knowledge workers
- **Enable role-oriented access** to knowledge
- **Enable autonomous routing** of knowledge
- **Standardize the execution** of knowledge work
- **Increase transparency** of knowledge

A Knowledge Infrastructure Development Project



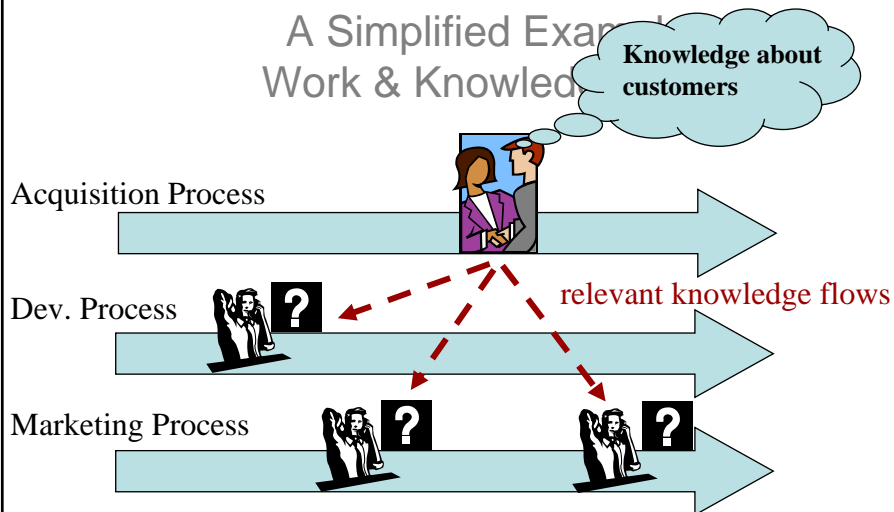
Based on [Schreiber et al. 02]

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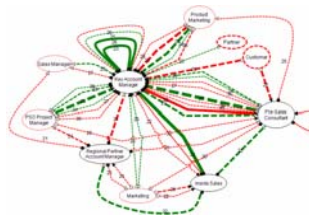
A Simplified Example of Knowledge Work & Knowledge



Problem: How can such knowledge flows be **identified** and **supported**?

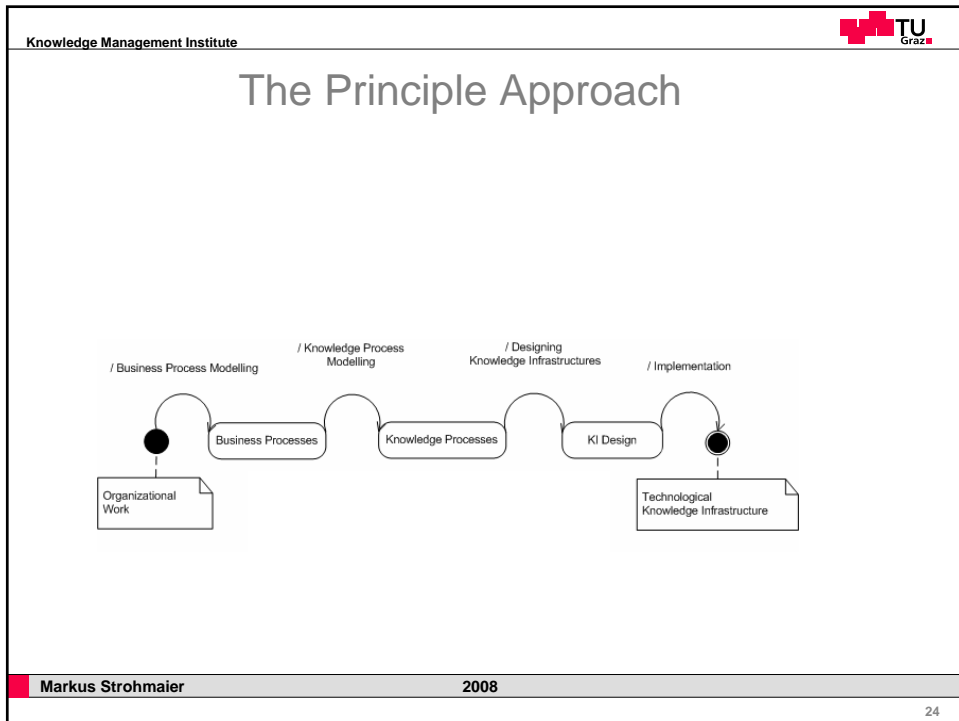
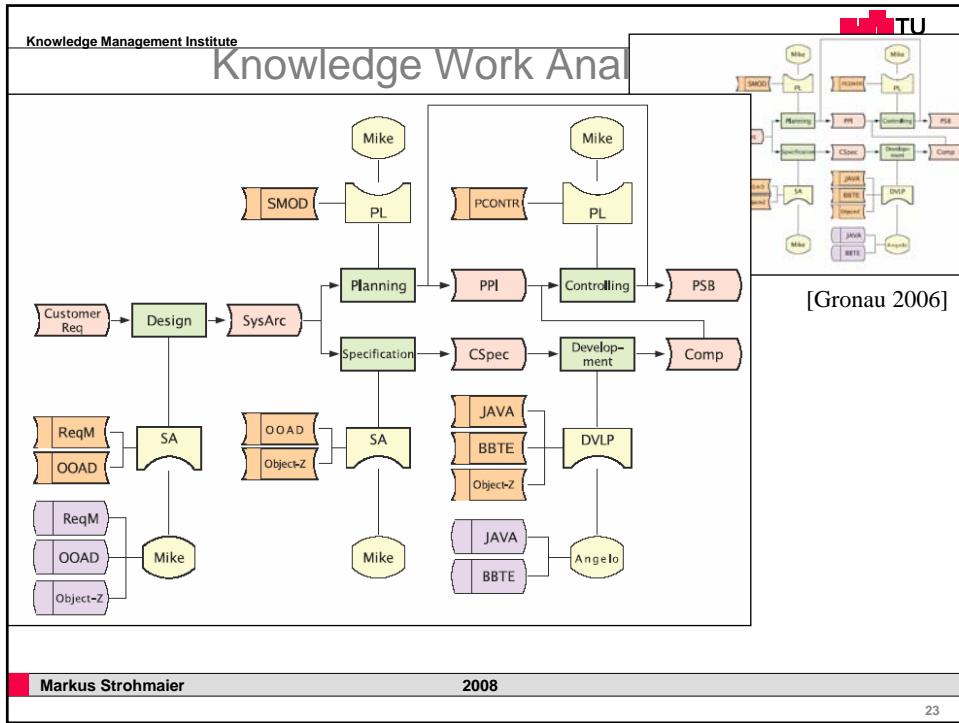
Knowledge Work Modeling and Analysis

- Who depends on what kind of knowledge?
- Who do people turn to in order to acquire knowledge?
- How is knowledge transfer executed and facilitated?
- What instruments are used?
- How is knowledge being transferred across organizational units / business locations?
- Who knows what?
- ...

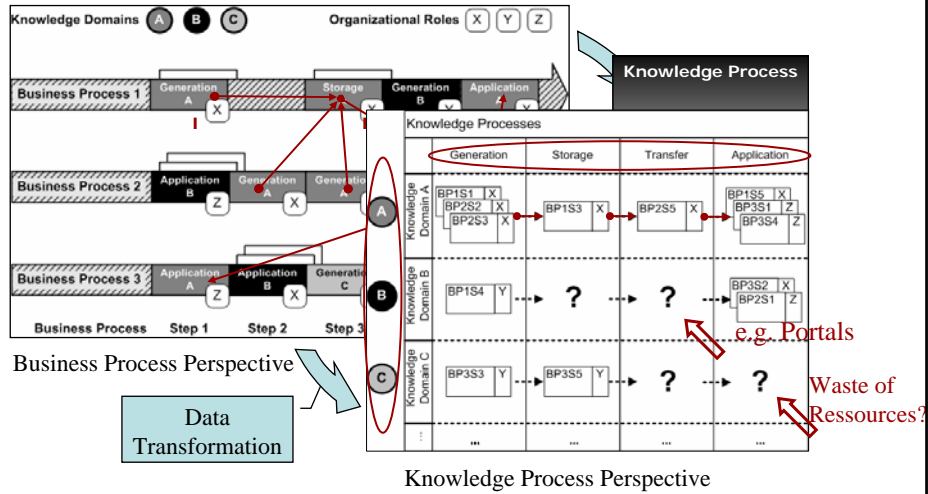


Motivation & Goals

- **Motivation**
 - Knowledge work modeling is expressive and powerful, but has not received widespread adoption yet
 - **Problems:** Efficiency of model construction, validation, analysis, etc
- **Goal**
 - Making knowledge work modeling adoptable in industrial settings (with a focus on **model construction**)
- **Research Context**
 - Application-Oriented Research (funded by Industry & Gov)
 - Professional Service Development „*Knowledge Flow Analysis*“



Principle Approach

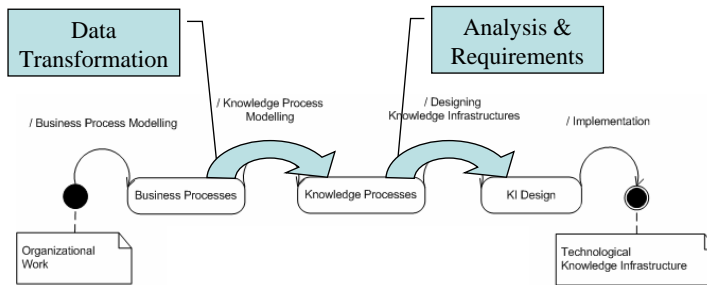


So, What are Knowledge Processes?

Simple Definition: The flow of information
Precise Definition: Knowledge processes describe distributed, organizational knowledge work. Thereby, knowledge processes typically include descriptions of [Str03b]: knowledge flows, specific knowledge activities, involved persons or roles and associated business processes regarding a certain knowledge domain.

Knowledge Process - Knowledge About Design Decisions					Process/Role
Knowl.-Domain	Generation	Storage	Transfer	Application	Description
Knowledge about Design Decisions	S05.2 Planning & Design	PM		S05.4 Implementation	Design decisions that led to specific SRD & ADD are of interest for the employees that need to implement the requirements. (suggestion by the interviewpartners: meeting minutes, e-mail archives, TVWSs)
				TL, MD	

The Principle Approach



Presentation Overview

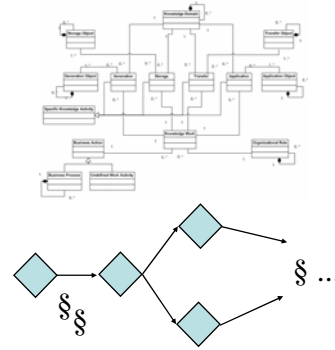


- Introduction & Motivation
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The B-KIDE Model Architecture

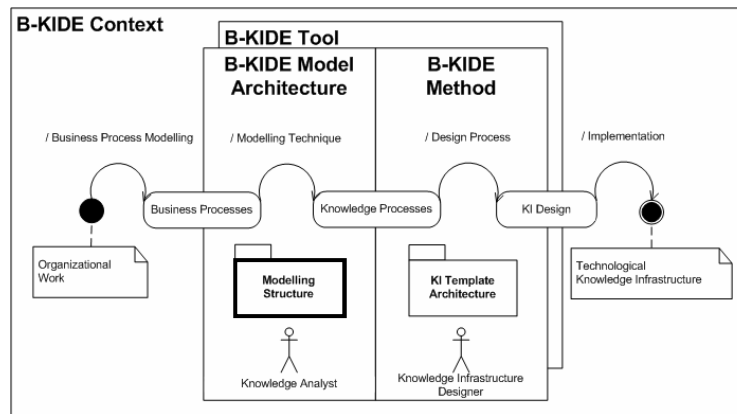
- **Modelling Structure**
 „The Way of Modelling“ [HVR00]
 - Notations, Structures

- **Modelling Technique**
 „The Way of Working“ [HVR00]
 - Activities, Guidelines, Rules



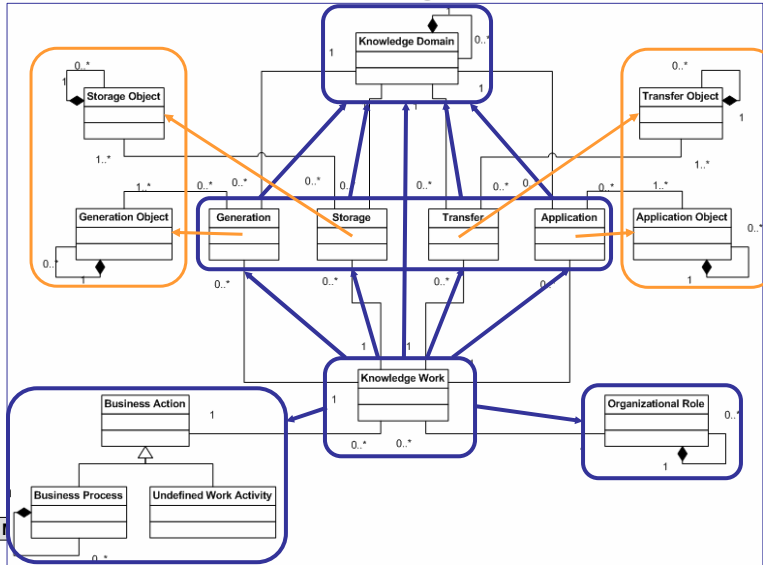
The B-KIDE Framework and The B-KIDE Tool

B-KIDE: Business process oriented **K**nowledge **I**nfrasturcture **D**evelopment



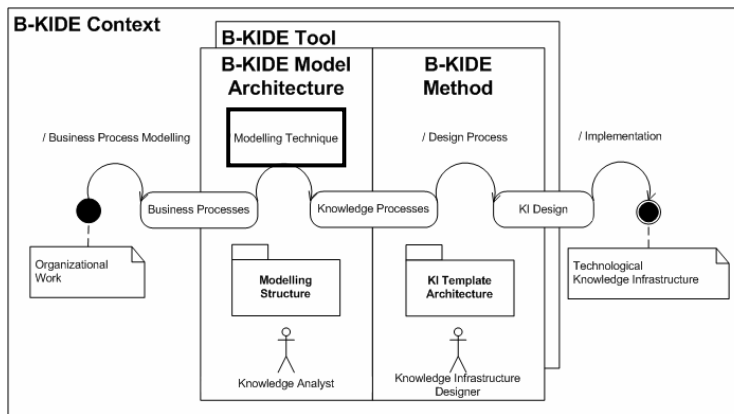
B-KIDE Model Architecture

The Modelling Structure in UML

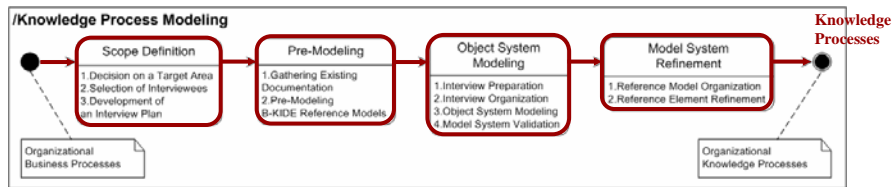


The B-KIDE Framework and The B-KIDE Tool

B-KIDE: Business process oriented **K**nowledge **I**nfrasturcture **D**evelopment

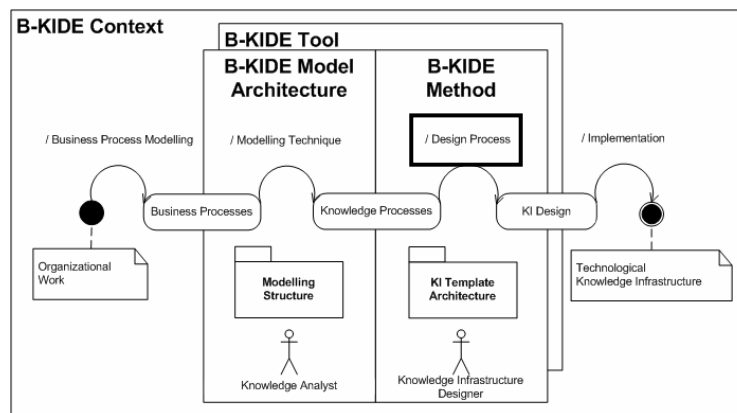


B-KIDE Method Modeling Technique

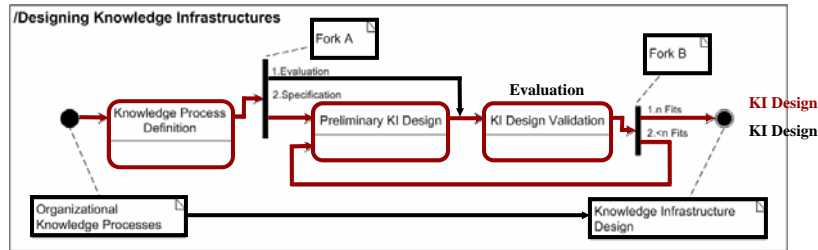


- Existing documentation within organizations such as
 - Business Process Landscapes, Organigrams, IT Concepts, ...

The B-KIDE Framework and The B-KIDE Tool

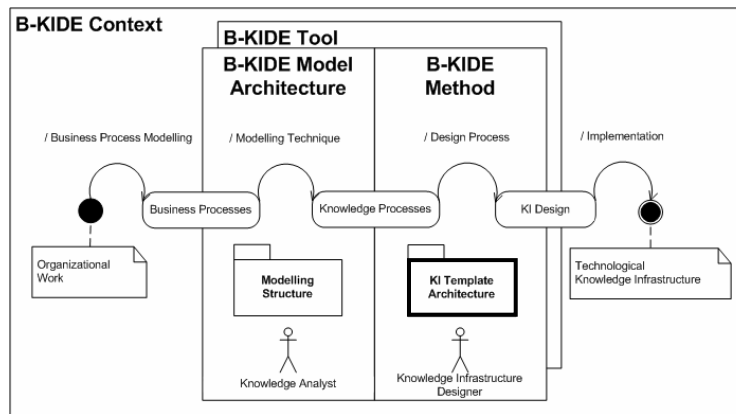


B-KIDE Method Design Process



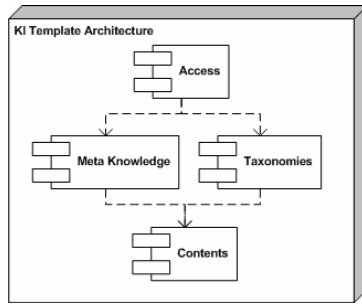
- KI Template Architecture
- Existing Design Methods, Instruments and Approaches

The B-KIDE Framework and The B-KIDE Tool



B-KIDE Method

KI Template Architecture



Access

Tree/List, Portals, Catalogues, Visualizations, etc

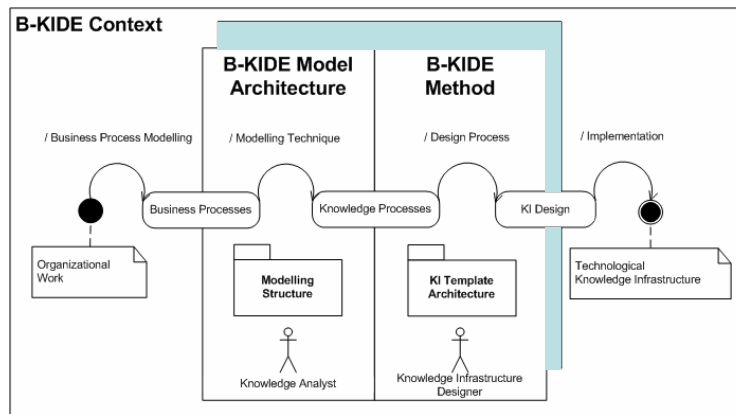
Meta Knowledge & Taxonomies

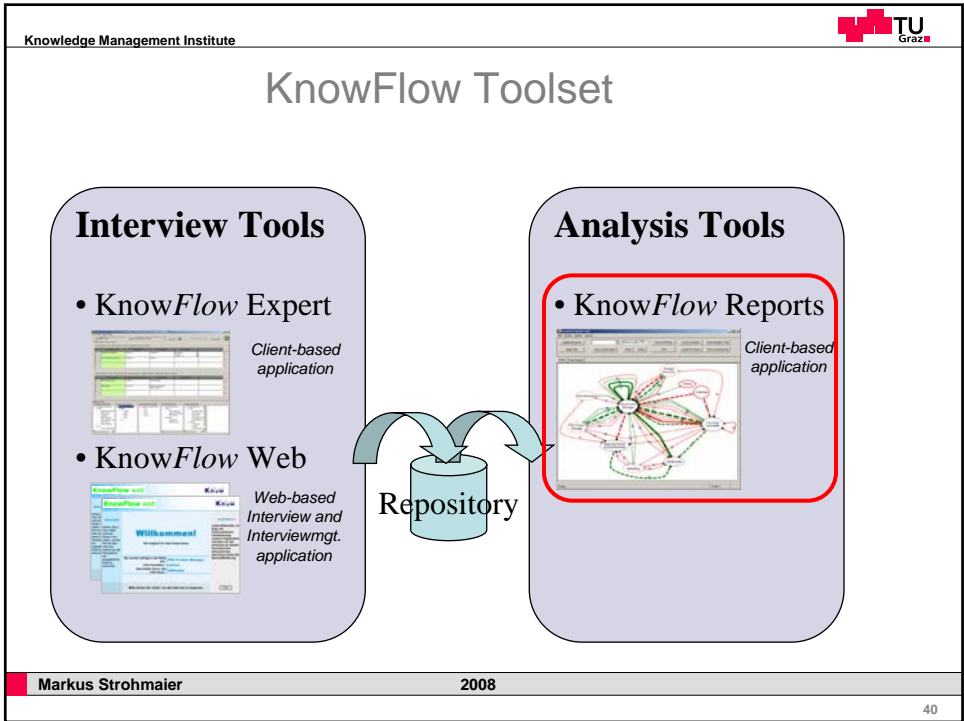
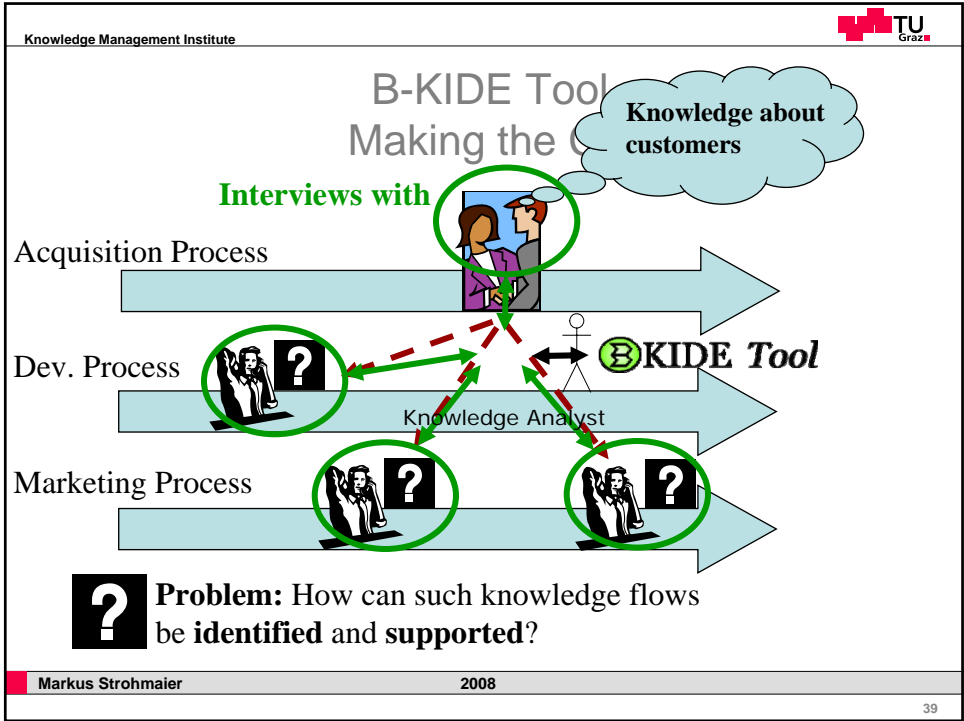
Ontologies, Semantic Web, etc

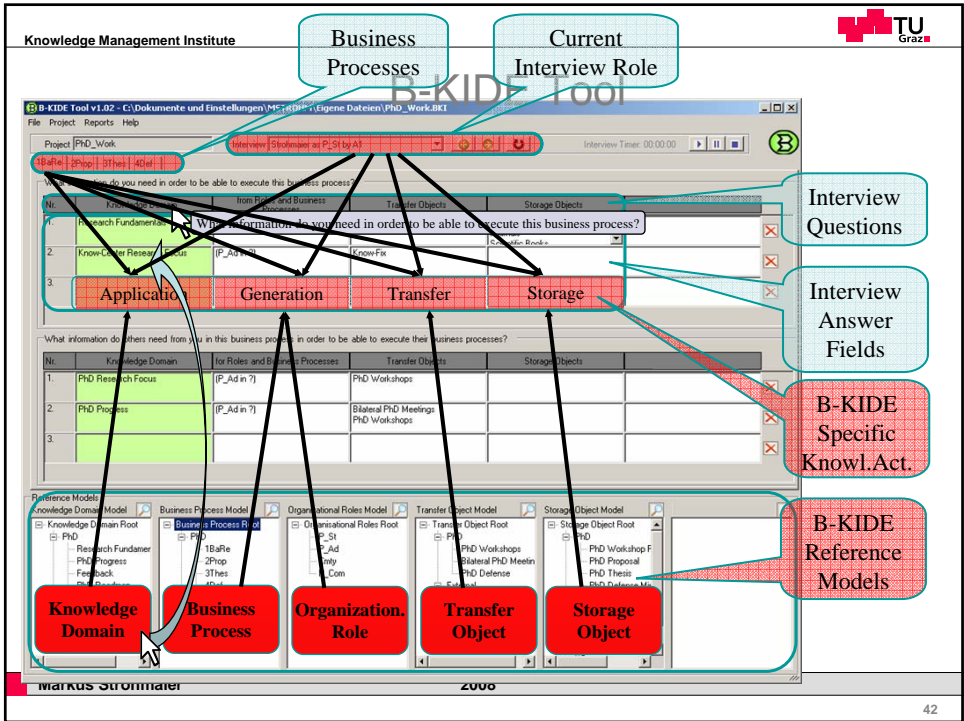
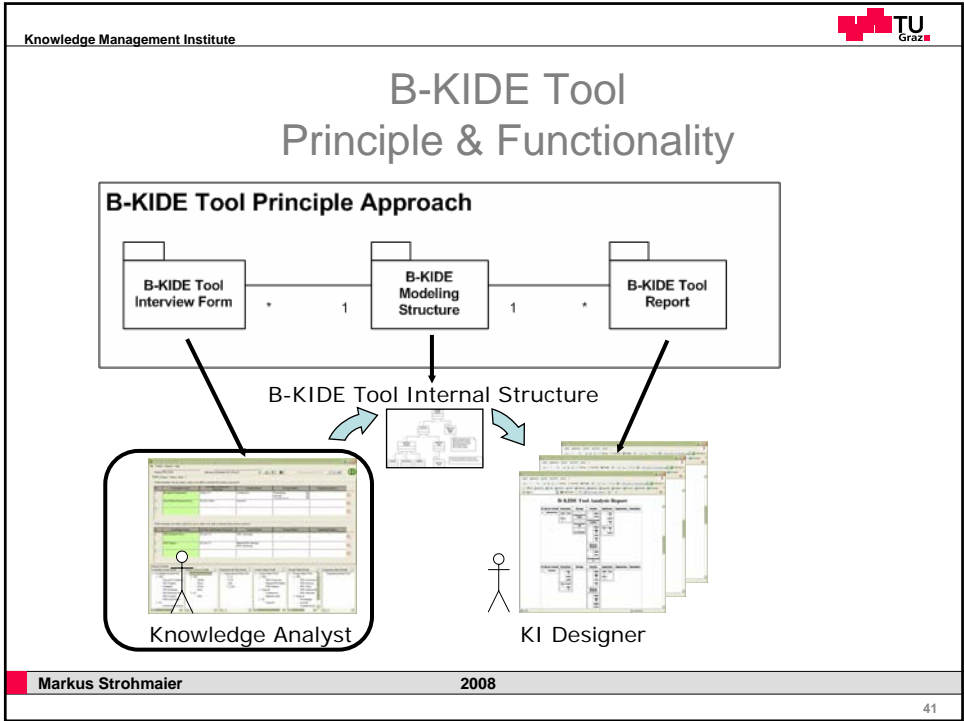
Contents

Yellow pages, e-learning modules, discussion forums, FAQs, etc

The B-KIDE Tool







B-KIDE and Interviews

Benefits of Interviews

- BP do not have to be available in a formal way
- *Relevant KP* represent the basis for design efforts

Reasons for conducting interviews within the B-KIDE Framework:

- KP are often *invisible* and/or *hidden* [HGM01]
- Knowledge work is *not depicted* in traditional BP models
- BPM is widely implemented [iso01/02], KPM *is not*
- Validation of resulting KM interventions should take place against *relevant KP*

B-KIDE Tool Benefits

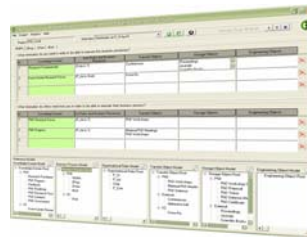
B-KIDE Tool is an instrument for:

- Identification of Knowledge Processes
- Development of Knowledge Infrastructures

B-KIDE Tools achieves that through

- Support for Interview Situations (Model Creation)
- Support for Analyzing Created Models (Model Analysis)
- Support for Designing Supportive Knowledge Infrastructures

The B-KIDE Tool

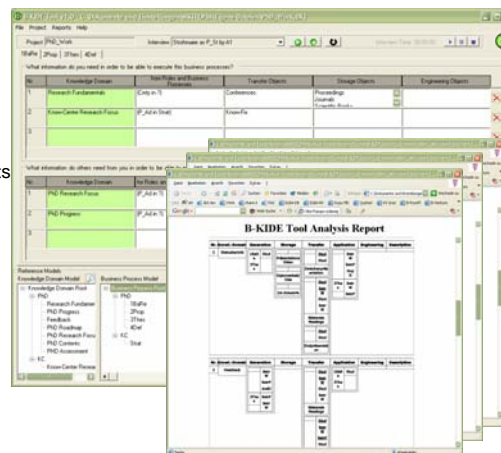
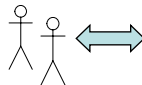


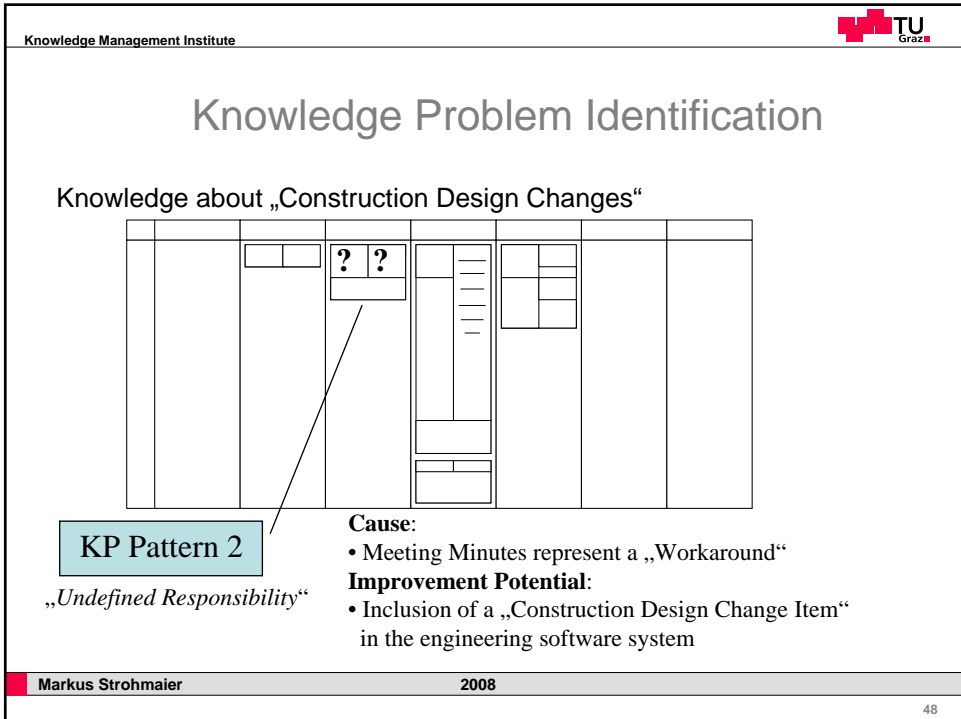
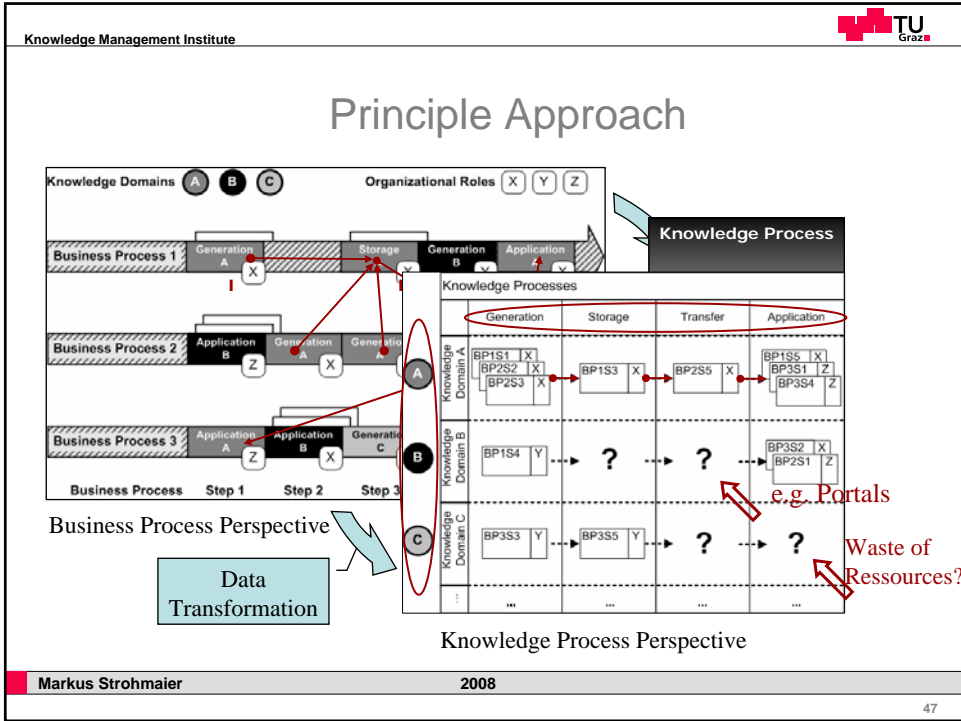
Live Demo -  *B-KIDE Tool*

B-KIDE Tool Functionality

Provides the Ability to Model Organizational Work through...

- **An Implementation** of the B-KIDE Model Architecture
- The Ability to Perform the B-KIDE **Data Transformation**
- **Support** for Knowledge Analysts and KI Designers





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Knowledge Problem Identification

Knowledge about „Part Lists“

			?				

KP Pattern 5

„Knowledge Outage“

Cause:

- Detached logistics and engineering software systems

Improvement Potential:

- Integration of the two systems

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Nr. Knowl.-Domain Generation Storage Transfer

6.1 Part Lists 4Stl DetK 1Mc DetK

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Knowledge Problem Identification

Knowledge about „Part Lists“

		? ?	?				

KP Pattern 2

„Undefined Responsibility“

KP Pattern 5

„Knowledge Outage“

Cause:

- Excel Files were created because of lacking engineering system reports

Improvement Potential:

- Engineering system report generation
- Integration of transfer activity in business processes

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Interview Tool Screenshot 1/4

Notes

In case you have multiple roles in your organization, please focus on answering the following questions from the perspective of the specified role.

Hyperwave-Sales

The following roles will be asked for their respective view of the Hyperwave sales process and the type of information required: Key Account Manager, Partner Account Manager, Pre-Sales Consultant, Sales Manager. The interview starts with a question for your main activities. Please select these carefully as they will be detailed further in the interview. Deadline for completing the interview is 2005/09/02. Thank you for your input. For help with the Know-Flow interview, please contact Manuel Fischer (mfischer@know-center.at) Astrid Jancke Knowledge Officer Hyperwave AG

Welcome!

Your interview process starts here.

You are interviewed in your role as: **(KAM) Key Account Manager**

Interview status: **initiated**

Estimated interview duration: **22 minutes**

To navigate through the interview, please use the 'back' and 'next' buttons on the bottom right. Do not use the back button of your browser to avoid viewing the interview screen in wrong order.

[next](#)

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Interview Tool Screenshot 2/4

Notes

?

The next questions will build upon your answers given here. You will have a chance to review and revise them later.

Your role: **(KAM) Key Account Manager**

Please name the most important activities of your role and assign them to the predefined activity areas.

Examples for such activities would include: Preparing a customer presentation, Cold Calling, Proposal Writing

In order to identify the most important activities you might browse through the defined activity areas on the right hand side or think of the activities that are most critical to the success of your role.

Activity	takes place in	Activity area
1. Customer Relationship Management *	→	other *
2. 2 *	→	6 Proposal / Price Quote *
3. 3 *	→	8 Post Sales *

Page 1

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Notes

?

Please name the kind of information that is most important for your role. Your answers will be further detailed in subsequent questions.

Your role: (KAM) Key Account Manager
is involved in activity: Customer Relationship Management

What information does your role need in order to be able to execute the above mentioned activity?
Examples for such information would include: Hyperwave Products, Partner Solutions, Competitor Pricelist

Information	is part of	Knowledge Domain
1. Past Projects & Products *	→	Products *
2. Past Project Members	→	Customers
3. Future Plans	→	Customers

What information do others need from your role in order to be able to execute their activities?
Examples for such information would include: Hyperwave Products, Partner Solutions, Competitor Pricelist

Information	is part of	Knowledge Domain
1. A1 Info Gen1 *	→	Pricing *
2. A1 Info Gen2	→	Sales Tools and Methods
3. A1 Info Gen3	→	Solutions

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Notes

?

In case you do not find your answer among the listed options, please use the comment field to provide your answer.

Your role: (KAM) Key Account Manager
is active: Customer Relationship Management
needs information about: Past Projects & Products

What role(s) provide that kind of information? (multiple answers possible)

From Role: Contract Mgmt. Customer
 KAM MKT
 Order Admin. PAM
 Partner PMT
 Pre-Sales Cons. PSO
 Sales Att. Sales Mgr.
 Telesales

Answer not listed? Your comment:

From which location(s) do you receive that kind of information? (multiple answers possible)

From Location: Graz London
 Munich Washington
 Westford

Answer not listed? Your comment:

How is the information being transferred? (multiple answers possible)

Via: E-Mail Ext. Meeting
 Fax Informal Communication
 Int. Meeting Mail
 Paper Copy Phone
 Salesforce Server

Answer not listed? Your comment:

How is the information being stored? (multiple answers possible)

In: Central Mailserver Demoserver
 Extranet Internet
 Intranet Laptop
 Paper People
 Sales CD Salesforce

Answer not listed? Your comment:

How important is that kind of information for your role? Critical Neutral Not important

How satisfied are you with the information flow? Satisfied Neutral Unsatisfied

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B-KIDE A

Graph-based Visualization

color

- Satisfaction

line thickness

- Nominations

line type

- Confirmation

arrows

- Direction of Flow

Edge Colours:
Green - High Satisfaction
Red - Low Satisfaction

Supply	A	A	B	B	Type 1: Coordinator	
Demand	A	A	B	B	Type 2: Lineman broker	
Supply	A	A	B	B	Type 3: Gatekeeper	
Broker	A	A	B	B	Type 4: Representative	
Supply	A	A	B	B	Type 5: Liaison	
Broker	A	A	B	B		

[Kraaijenbrink 2003]

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B-KIDE Analysis Tool

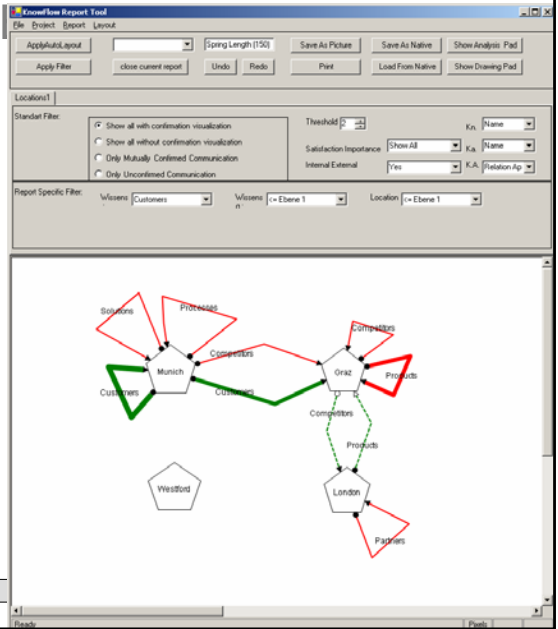
Role-based Knowledge Flow Diagram

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B-KID

Location-based Knowledge Flow Diagram

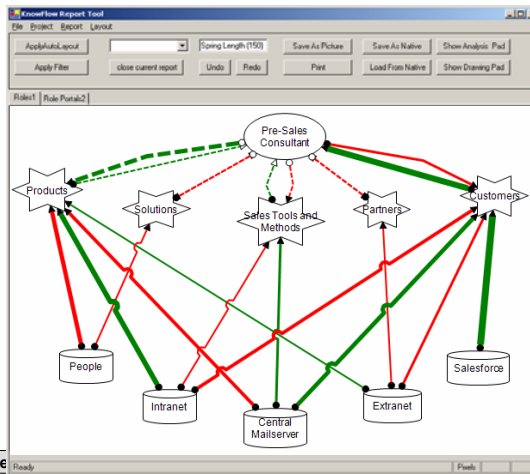
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B-KIDE Analysis Tool

Role-Based Knowledge Processes

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Proof of Concept Design Research

	Case Study 1	Pilot Study 1	Pilot Study 2
Project Context	Software Industry	Automotive Industry	Consulting Industry
Project Goals	Knowledge Portals	EDM System Improvement	Intranet Improvement
Study Style	Explorative	Justificative	Justificative
Hypothesis Tested	Tentative B-KIDE Framework	B-KIDE Framework & B-KIDE Tool	
Framework Application	Design	Evaluation	Design
Results	4 Knowledge Portals	Improvement Potentials	KI Design for Acquisition Process
Evaluation Concerning		PhD Objectives	

EDM...Engineering Data Management
KI...Knowledge Infrastructure

Proof of Concept Case Study 1

The Case:

- Software Development Company
- R&D Department with 80 employees (ISO 9001:2000 certified)
- Emergent & Competitive Environment

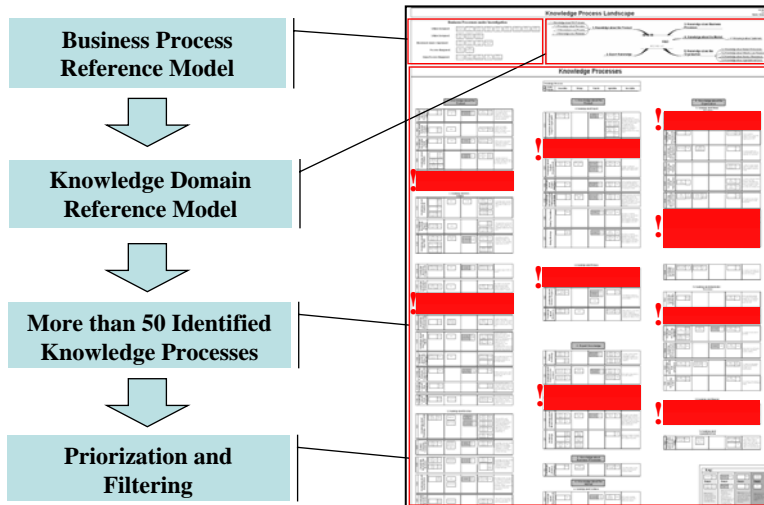
Goals:

- Business Process Supportive Knowledge Infrastructure

(Pre)Selected KM Interventions:

- Knowledge Portals
- Metadata
- Filing Structure / KMS

Case Study 1 B-KIDE Modeling Technique Application



Proof of Concept B-KIDE Method Application

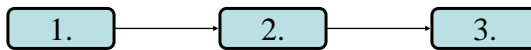


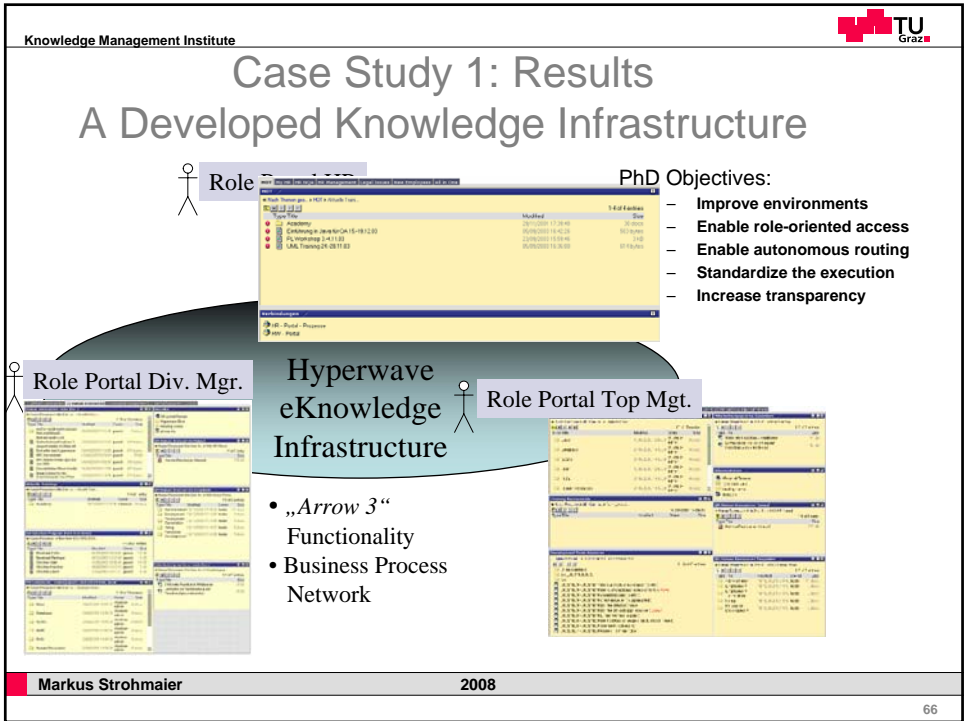
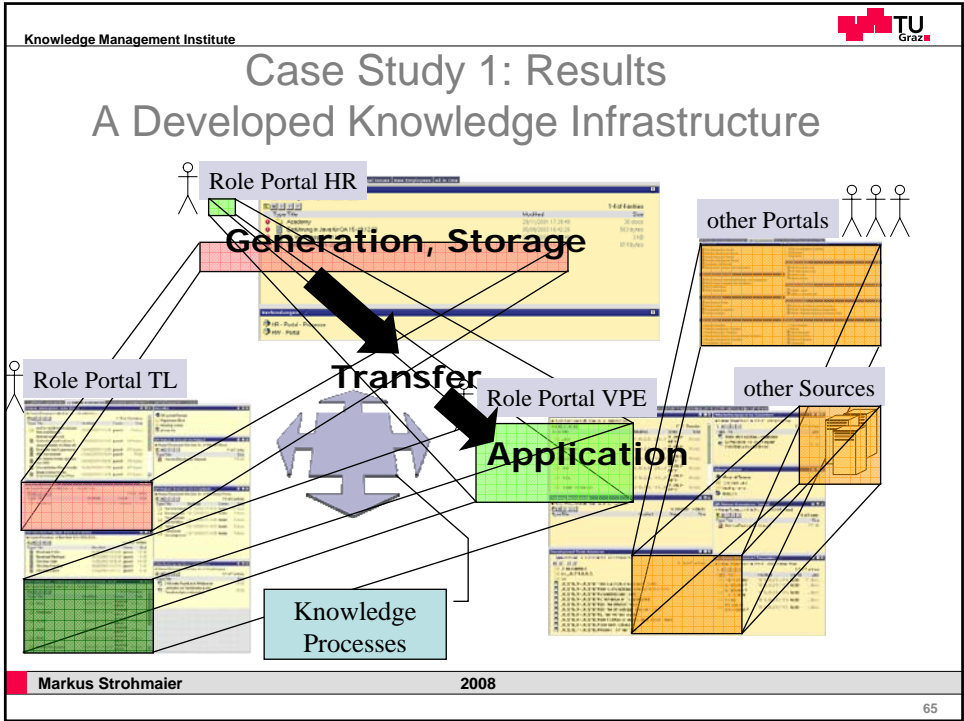
Nr.	Knowl.-Domain	Generation	Storage	Transfer	Application	Description
1.3 .1	Knowledge about Project Progress	Impl TestA TestB TestC	?	EM CRD, TL, PM Weekly Meeting	Impl TestA TestB TestC Impl TL, PM TestA TL VPE	This knowledge domain contains knowledge about project milestones, deadlines, progress and delays

Identified
As-Is
Knowledge
Process

Knowledge Infrastructure Implementation Case Study 1

To-Be KP Filtering Mock-Up Implementation





Presentation Overview



- Introduction & Motivation
- Research Challenges & Objectives
- Principle Approach
- The B-KIDE Framework & Tool
- Proof of Concept
- - Future Work & Lessons Learned
- Scientific Contributions

Further Applications

- Maturity Models
- Communities of Practice
- (Knowledge) Risk Management
- Skills Management
- Quality Management

Further Applications: Maturity Models The KPQM Model [Paulzen02]

Maturity Stage	Description
1 - Initial	The quality of knowledge processes is not planned and changes randomly. This state can be best described as one of chaotic processes.
2 - Aware	Awareness for knowledge processes has been gained. First structures are implemented to ensure a higher process quality.
3 - Established	This stage focuses on the systematic structure and definition of knowledge processes. Processes are tailored to react to special requirements.
4 - Quantitatively Managed	To enhance the systematic process management, measures of performance are used to plan and track processes.
5 - Optimizing	The focus of this stage is on establishing structures for continuous improvement and self-optimization.

chaotic

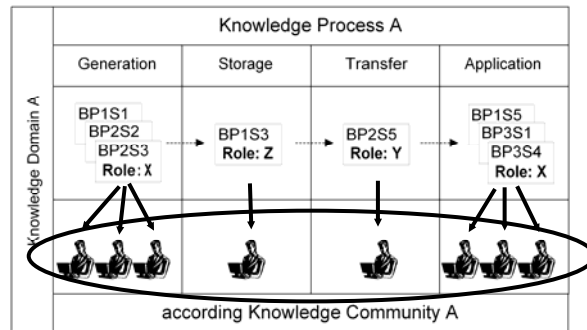
B-KIDE Modeling Architecture

B-KIDE Method

Future work

Future work

Further Applications: Identification of Knowledge Communities



Lessons Learned from applying B-KIDE in 3 studies

- Knowledge domain labeling & matching
- Fit Criteria definition & knowledge problem patterns
- Availability of quality business process models
- Influence of domain-dependent business processes

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→ – Scientific Contributions

Scientific Results

The B-KIDE Framework represents

- **A generic framework** for the development of business process supportive knowledge infrastructures
- **A novel approach** to modeling knowledge work
- An approach to **integrating** org. & techn. dimensions of KI
- An approach to **raise KM maturity levels** of organizations¹

The B-KIDE Framework was evaluated through

- **An implementation** in the B-KIDE Tool
- **Corroboration** in three conducted studies

¹ as e.g. described in the KPQM [Paulzen02]

Administrative Issues

Final Exam in three weeks

- Scope: All lecture slides and listed readings (see course website)
- Excerpt: Explicitness, Perspectives on KM, Categorization, Principles of Knowledge Organization, Semiotic Triangle, Knowledge Acquisition Techniques, Knowledge Transfer, KFT, Knowledge Reuse, Knowledge sharing dilemmas and solutions, Metadata, bpoKM, ...
- 5-10 Questions
- **You need to register for the exam with TUG online**
- Date: 31.1., 13:00-15:00, HS i12
- Results: within 4 weeks

Next week: no class

Next class: 24.1.2008

Any questions?

End of Presentation