

Master's Thesis Final Presentation

Empowering End-users to Support Knowledge-Intensive Processes with CMMN

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1. Problem Analysis

- Knowledge Work and Knowledge-Intensive Processes
- Research Questions of the Thesis

2. Solution Design

- Literature Review on CMMN
- CMMN for Knowledge-Intensive Processes

3. Implemented Prototype

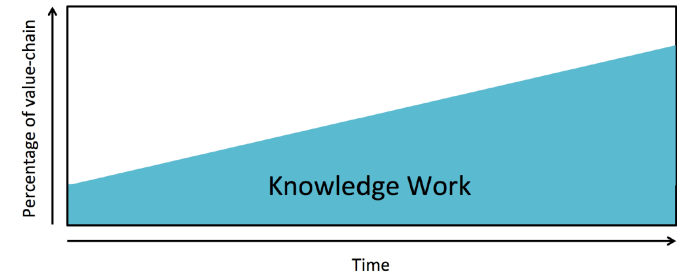
- Case Study: Innovation Management Process @ DATEV eG
- Interactive Web Based CMMN Editor

4. Discussion and Future Research

Making knowledge workers more productive is the key management challenge of the 21st century

Knowledge Work

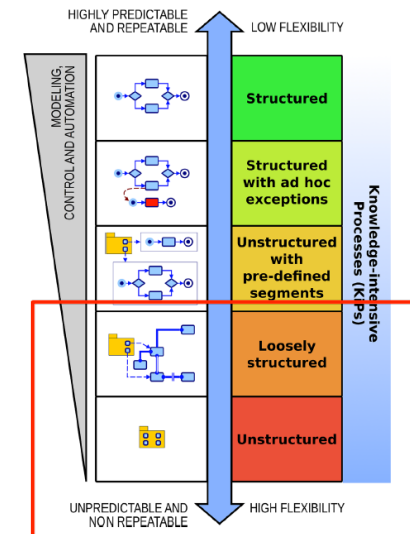
- Mainly human and intellectual activities
- Novel and complex problems
- Involved in the most important processes in organizations
- Becomes more and more important in highly developed countries



Source: Pffifner und Stadelmann, 2012, *Wissen wirksam machen...*

Knowledge-intensive Processes

- Range from unstructured to loosely structured
- Goal oriented describing the *what* and not the *how*
- Require high flexibility during execution
- Knowledge workers have to be empowered to structure their processes



Source: Di Ciccio et al., 2014, Knowledge-Intensive Processes: Characteristics, Requirements, and Analysis of Contemporary Approaches

Research Question 1

How can CMMN support users with the definition of Knowledge-intensive Processes?



Research Question 2

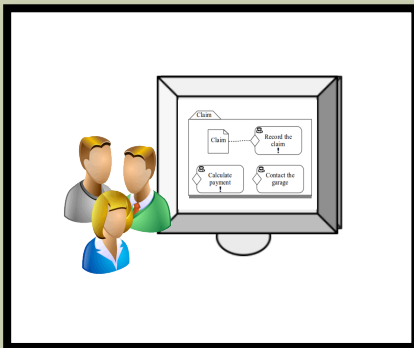
What is a useful subset of CMMN that can be used for Knowledge-intensive Processes?



Research Question 3

What is a suitable software environment for CMMN?

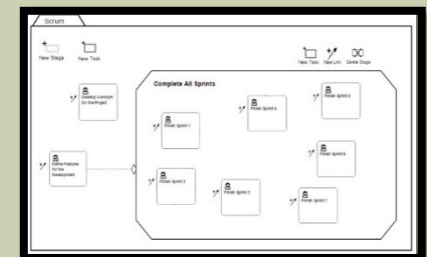
Deliverable: Concept for the usage of CMMN to support knowledge-intensive processes in a Wiki



Deliverable: Subset of CMMN with support of basic workflow patterns

Control Flow Patterns (13/43)		
Sequence	YES	Putting Tasks/Stages into a sequence is a key feature
Parallel Split	YES	AND-Split is possible, but is not specifically handled
Synchronization	YES	AND-Join is directly integrated
Exclusive Choice	NO	XOR Split not integrated
Simple Merge	NO	XOR Join not integrated
Multi-Choice	YES	OR Split is possible, but is not specifically handled
Structured Synchronizing Merge	YES	
Multi-Merge	YES	
Structured Discriminator	YES	
Arbitrary Cycles	NO	
Implicit Termination	YES	
Multiple Instances without Synchronization	YES	this is only possible with two sub-processes
Multiple Instances with a Priori Design-Time Knowledge	NO	
Multiple Instances with a Priori Run-Time Knowledge	NO	
Multiple Instances without a Priori Run-Time Knowledge	NO	
Deferred Choice	YES	
Interleaved Parallel Routing	YES	
Milestone	YES	according to the description this is handled by checking the status of a stage

Deliverable: Interactive web-based CMMN editor supporting the extracted subset evaluated in a case study



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4. Discussion and Future Research

Time

2003

- Business Artifacts are introduced by Nigam and Caswell at IBM Systems

2006

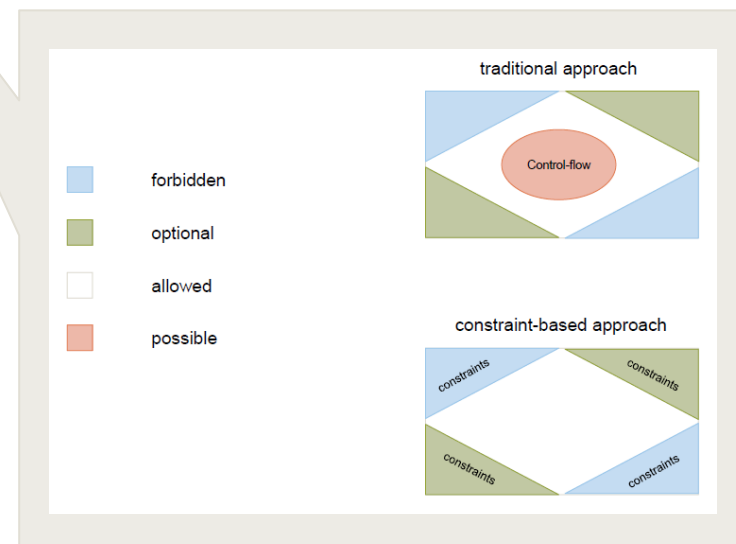
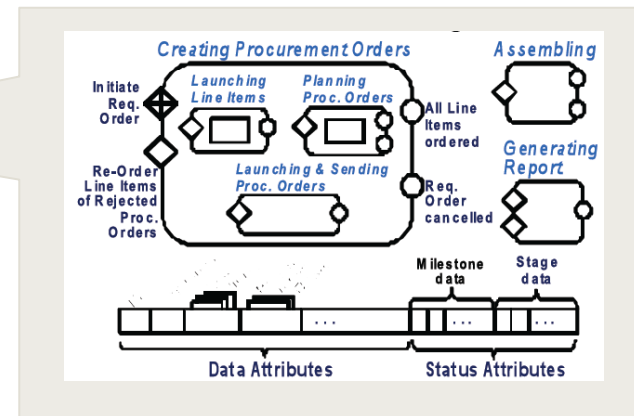
- Pesic and van der Aalst declarative process modeling language (ConDec)

2008

- Zur Muehlen et al. identify subsets of BPMN to make it less complex for end-users

2009

- OMG files request for proposal (RFP) to create a standard modeling notation based on business artifacts



Time

2013

- Jablonski et al. propose methods to learn process models and patterns from cases in CMMN

2014

- Complexity measurement for CMMN, UML, and BPMN by Mike Marin et al.

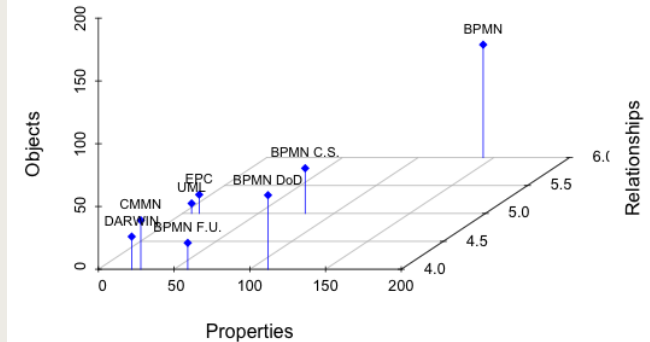
- Journal paper on requirements and characteristics of knowledge-intensive processes by Di Ciccio et al.

Start of the thesis

- CMMN v1.0 release by OMG in May

Now

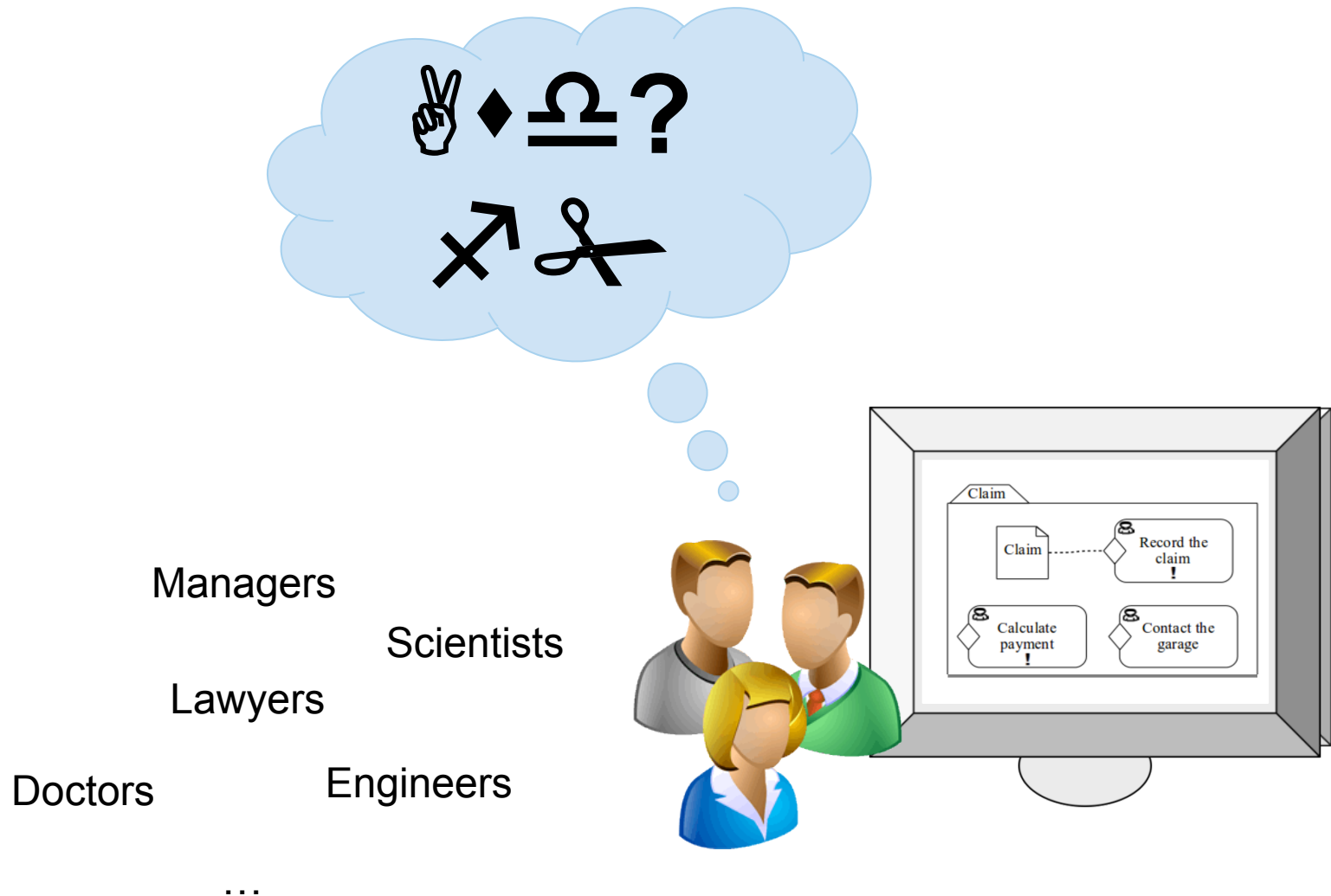
- Future work: Identify subsets of the CMMN specification (cf. Marin et al. 2014)



Requirement 7 Formalize rules and constraints: In a KiP, the existence of policies, rules and regulations can influence the process structure and constrain its execution. To this end, a user must be allowed to explicitly define constraints or business rules on process data.

Version	Release date	URL
1.0	May 2014	http://www.omg.org/spec/CMMN/1.0

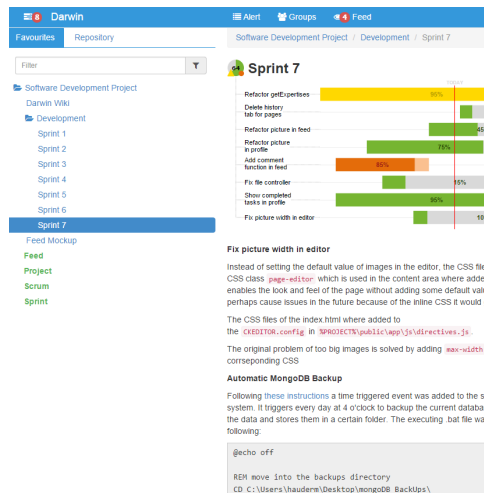
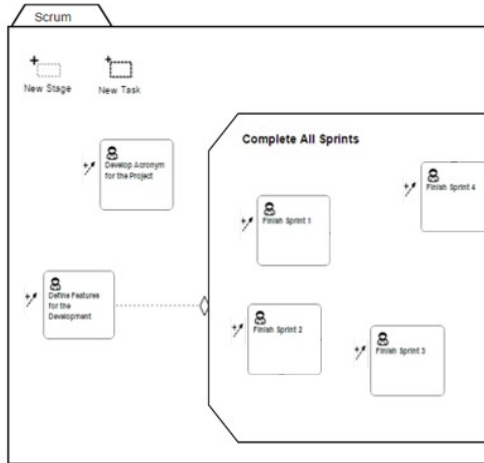
End-users have limited modeling capabilities and don't understand business process notations



Solution design of the thesis distinguishes between two roles

High

Modeling



Low



Modeling experts

- Familiar with process modeling
- Use CMMN to define dependencies
- Specify predefined work templates
- Improve work templates
- Analyse adaptations of end-users
- Work with an interactive CMMN editor



End-users

- Have limited modeling capabilities
- Create tasks, attributes and types
- Adapt work plans collaboratively
- Have an overview about the progress
- Reuse predefined work templates
- Work with extended wiki pages

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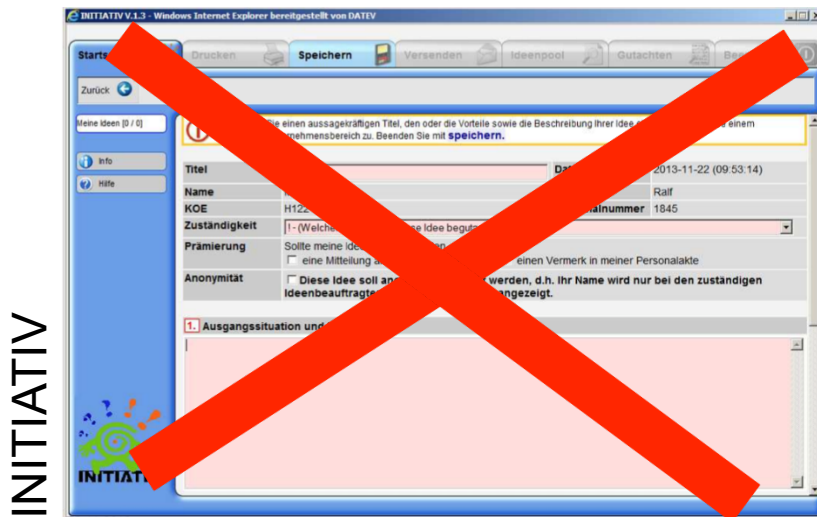
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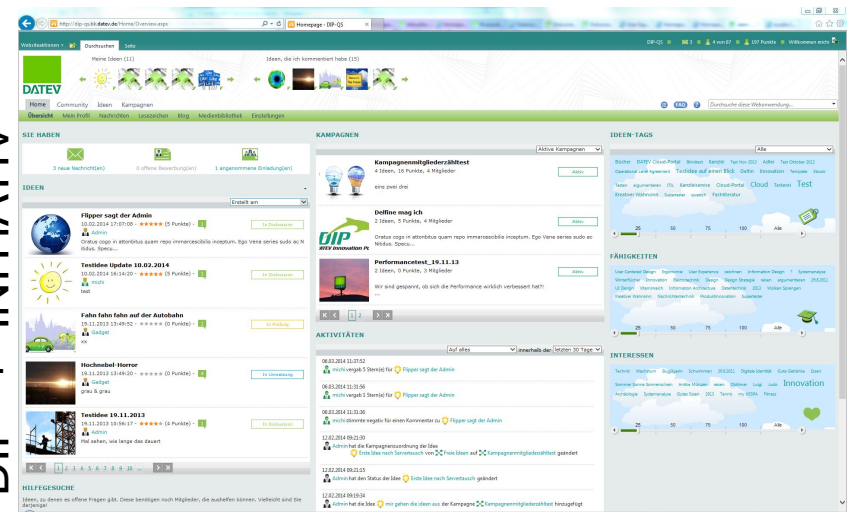
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Innovation Management Process @ DATEV eG

- Many logical dependencies between tasks in the process
- Currently two tools are used in parallel
 - INITIATIV: Structured process with peer reviews
 - DIP: Open Innovation Platform
- Average of 800 ideas per year
- Goal: Integration of both tools in one process in the future



DIP + INITIATIV



End-Users: Use simple structuring elements (not developed in this thesis)



End-Users

- Tasks and attributes as metaphors
- No CMMN knowledge required
- Reuse of work templates possible
- Structuring of the process „on the fly“

Tasks for this page

- Add task to this page ...
- New Task **New Task**
- Idee beschreiben
- Zustandigkeit angeben
- Anonymität-Einstellungen definieren

Metadata for current task:

- Start date: 09.12.2014
- End date: 02.04.2015
- Progress: 75%
- Expertise: Not defined!
Add keyword...

Metadata

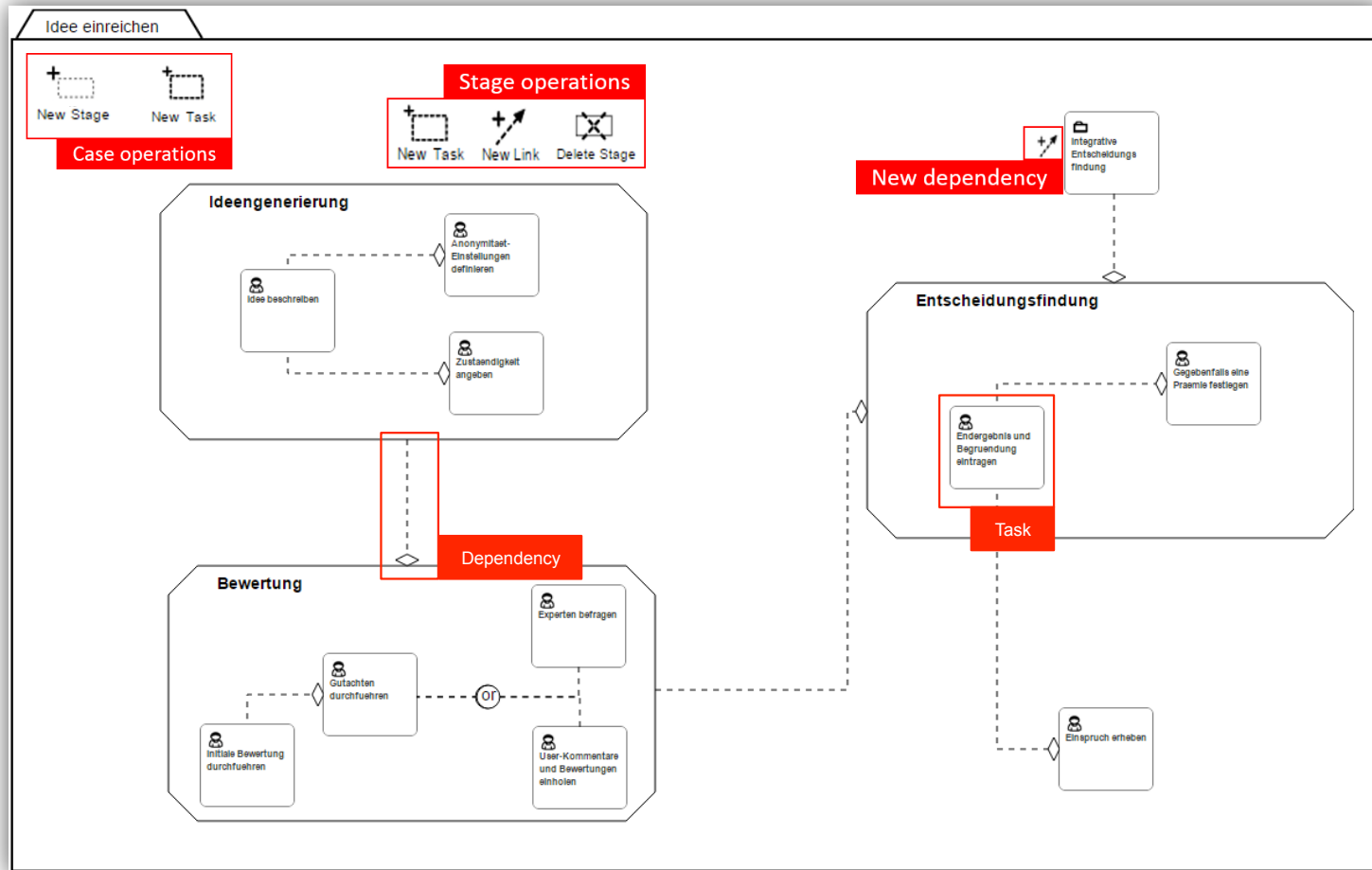
Hintergrund für die Gründung waren die damals neuen Einsatzmöglichkeiten der EDV.

Modeling expert: Interactive web-based CMMN editor (developed in this thesis)



Modeling expert

- Interactive web based editor for CMMN
- Dependencies between tasks
- Definition of work templates
- Input from the created structuring concepts of end-users



Creating AND / OR – Dependencies

Tasks for this page

Connecting Tasks and Stages

Tasks for this page

Add task to this page ...

Mandatory attributes

Decision

+ New attribute

Tasks for this page

Add task to this page ...

☐ Final decision

Metadata for current task:

Start date: 10.12.2014

End date: 01.01.2015

Progress: 10%

Expertise: Not defined!

Add keyword...

Connecting Producer-Consumer dependencies with one or more consumers

Tasks for this page

Mandatory attributes

Title

+ New

End date:

Progress:

Expertise:

Tasks for this page

Add task to this page ...

☐ Define responsibilities

☐ Define privacy settings

1 completed task

☒ Describe idea

Redo

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4. Discussion and Future Research

- Logical dependencies in the innovation process @ DATEV eG could be implemented with the solution and not only step-by-step flows
- Degree of flexibility can vary depending on the number of constraints which allows a wide range of knowledge-intensive processes ranging from unstructured to loosely structured
- New constraints might have to be added in future from the workflow management patterns

Future research:

1. Application of the apriori algorithm for CMMN from Schönig and Jablonski et al. on the execution history to learn process pattern and templates
2. Migration of changes in the work templates on instantiated work plans without creating inconsistencies
3. Recommendation techniques for tasks and attributes that were created by other end-users in the same context

THANK YOU FOR YOUR
ATTENTION