A model-driven reengineering framework to support organisational improvement

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CURRENT SITUATION

INNOVATION

COST REDUCTION

REGULATIONS

DESERVED SITUATION
Is this business activity just a formal acknowledgement step, or is it a seal of approval?

Can it occur that the decision is negative, that the approval is denied?

If software system does not account for such rejection, are the consequences not important?
BUSINESS PROCESS ARE IN CONTINUOUS IMPROVEMENT

Is this business activity just a formal acknowledgement step, or is it a seal of approval?

Can it occur that the decision is negative, that the approval is denied?

If software system does not account for such rejection, are the consequences not important?
OPEN CHALLENGE

Full support by means of methods and tools for the software reengineering process is still an open challenge
MAIN GOAL

We are aiming at providing a model-driven reengineering framework in order to support organisational evolution and information system maintenance
RESEARCH QUESTIONS

**RQ1** Which are the current reengineering frameworks to support evolution in information systems domains?

**RQ2** Which are the concepts and terminology involved in the reengineering process and its artefacts?

**RQ3** Which MDD methods, tools and technologies exist that can be effectively used in a reengineering activity aware within the organisational domain?

**RQ4** What are the artefacts, guidelines and tools to support model-driven evolution in the organisational domain?

**RQ5** How can the MDD reengineering framework be validated as a framework to support organisational improvement?
T2. SOLUTION DESIGN
T2.1 State of the art in MDD organisational reengineering frameworks
T2.2 Design artefacts to support model evolution

T3. PROBLEM INVESTIGATION
T3.1 Define motivation for proposing a new artefacts for evolving organisational models
T3.2 State of the art in model evolution and model management

T4. SOLUTION DESIGN
T4.1 State of the art in traceability
T4.2 Specify pattern definition metamodel
T4.3 Specify evolution metamodel
T4.4 Specify guide of use

T5. DESIGN VALIDATION
T5.1 Theoretical validation
T5.2 Laboratory case study

T6. RESEARCH PROBLEM INVESTIGATION
T6.1 Define research goals
T6.2 State of the art in modelling assessment

T7. RESEARCH DESIGN
T7.1 Design laboratory experiment to use guidelines for evolving models

T8. DESIGN VALIDATION

T9. RESEARCH

T10. ANALYSIS OF RESULTS

T11. SOLUTION IMPLEMENTATION
T11.1 Eclipse EMF/GMF tool

T12. IMPLEMENTATION EVALUATION
T12.1 Expressiveness
T12.2 Usability

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T14. RESEARCH PROBLEM INVESTIGATION
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T15. RESEARCH DESIGN
T15.1 Design laboratory experiment to use reengineering framework

T16. DESIGN VALIDATION

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T19. SOLUTION IMPLEMENTATION
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T20. RESEARCH PROBLEM INVESTIGATION
T20.1 Define research goals
T20.2 State of the art in action research and reengineering quality assessment

T21. RESEARCH DESIGN
T21.1 Design action research protocol to apply the reengineering framework

T22. DESIGN VALIDATION

T23. RESEARCH

T24. ANALYSIS OF RESULTS

T25. IMPLEMENTATION EVALUATION
T25.1 Expressiveness
T25.2 Usability
**RESEARCH METHODOLOGY**

**T25. IMPLEMENTATION**
- T25.1 Expressiveness
- T25.2 Usability

**T1. PROBLEM INVESTIGATION**
- T1.1 Define PhD. Motivation and goals
- T1.2 Analyse problem statement

**T2. SOLUTION DESIGN**
- T2.1 State of the art in MDD organisational reengineering frameworks
- T2.2 Design artefacts to support model evolution

**RC3. ASSES QUALITY OF REENGINEERING FRAMEWORK**

**EC1. DESIGN A MODEL-DRIVEN REENGINEERING FRAMEWORK FOR ORGANISATIONAL EVOLUTION**

**EC2. SUPPORT MODEL EVOLUTION IN ORGANISATIONAL DOMAINS**

**RC1. ASSES COMPREHENSIBILITY OF EVOLUTION GUIDELINES**

**RC2. ASSES COMPREHENSIBILITY OF REENGINEERING FRAMEWORK**

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- T13.1 Theoretical validation
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**T18. ANALYSIS OF RESULTS**
- T18.1 Research

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THE PROPOSAL

Communicative
Process
Behavioural
Goal
Interaction

AS-IS MODELS
EVOLUTION
TO-BE MODELS

REVERSE ENGINEERING
FORWARD ENGINEERING

AS-IS SYSTEM

ABSTRACTION LEVEL
RESULTS ACHIEVED SO FAR

As-Is Models

Pattern Definition Metamodel

Evolution Metamodel

Goal Metamodel

Process Metamodel

Pattern Repository

Evolution Model

Goal Model

To-Be Models

Evolution Process

Reverse Engineering

As-Is System

Forward Engineering

To-Be System

Legend

Model

Repository (Also a Model)

Metamodel

Process

Instance of

Existence of Association Relationships

Abstraction Level

+
RESULTS ACHIEVED SO FAR: A proof of concept

Evolution Process

- CA AS-IS MODELS
- CA TO-BE MODELS

Legend:
- Model
- Repository (also a model)
- Metamodel
- Process
- Existence of association relationships

Abstraction level

Reverse Engineering

As-Is System

To-Be System

Pattern Definition Metamodel

Evolution Metamodel

*i* Metamodel

CA Metamodel

Pattern Repository

Evolution Model

*i* Model

OO-Method Conceptual Models

Forward Engineering
SOME RELATED WORKS


WHAT ABOUT THE AUTHORIZATION PROCESS?
WHAT ABOUT THE AUTHORIZATION PROCESS?

Steps:

1) Analyse the pattern repository to trace the behaviour of the business process with the problem description of the patterns.

2) Apply the pattern by means of the evolution metamodel
**Name:** Exception in internal treatments  
**Creation date:** 01/12/2011  
**Problem description:** A business activity that involves an authorization can demand an exceptional behaviour related to approvals or decision taking  
**Goal description:** Offer possibility of rejections or alternative decisions.  
**Discovery guidelines:** The analyst should ask the stakeholders the following questions. *Is this business activity just a formal acknowledgement step, or is it a seal of approval? Can it occur that the decision is negative, that the approval is denied?*  

**Example**  
**Description:** In the illustrative example, the analyst should also investigate whether the employee could insist in case of rejection; for instance, by providing new proofs of the expenses and a letter justifying the total amount, or by lowering the total amount. In such case, a loopback in the process would appear.  

**As-Is**  
**To-Be**
During the meeting held on 09/10/2012, we analysed that supplies do not always have enough stock.

APPLICATION1: PATTERN_APPLICATION
DESCRIPTION: During the meeting held on 09/10/2012, we analysed that supplies do not always have enough stock.
CONCLUSIONS

• We defined the organisational reengineering framework.

• We started the alignment between the process metamodel and the goal metamodel.

• As a proof of concept, we have aligned the i* framework with the Communication Analysis method.

• We implemented the alignment of this metamodels in an Eclipse-based tool.

• We started a first version of the definition of the artefacts to support model evolution (the pattern definition metamodel and the evolution metamodel).
SOME TASK PLANNED AS NEAR FUTURE

• We are going to establish a pattern model repository.

• In addition, we are looking for implementing pattern definition metamodel and evolution metamodel in an Eclipse plug-in.

• We plan to support goal models into the reengineering framework.
THANK YOU!

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