CARES: Computer-Aided Requirements Engineering Software

Requirements Specification with BPMN 2.0 in WTO procurement

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Overview

• Context: Public Procurement
  – Regulations
  – Appeals, costs
  – Problem: specify the need → RS

• Requirements specification (RS)
  – comprehensiveness, completeness, reduce ambiguity
  – avoid extra cost
  – business context
  – assessment and evaluation

• CARES Methodology
  – Innovation by using business processes as a foundation (systematic, business oriented)
  – Incorporate literature and best practices

• Prototype

• Conclusion & Perspectives
CONTEXT: PUBLIC PROCUREMENT
Context: Public procurement

• Regulations:
  – Threshold values for public expenditure
    • 150’000 – 250’000
  – Equity of treatment
  – Fair use of public funds
  – Transparency
REQUIREMENTS SPECIFICATION
Known issues in public procurements

Wo können Probleme in IT-Projekte liegen?

Vielfältig, z.B.:
- Projektsteuerung und -führung: Fähigkeiten, Zeit, Informationslage
- Fehlerhafte Planung
- Schlechte Anforderungserhebung, mangelnde Architektur
- Mangels Einbettung in der Stammorganisation
- Organisations- und Change- vs. IKT-Projekt
- Schlechte Integration der Beschaffungsabläufe
- Zu wenig Beschaffungskenntnisse seitens Projektleitenden
- Zu wenig IT Kenntnisse seitens Beschaffungsspezialisten
- Zu wenig Einbezug/Unterstützung von Beschaffungsspezialisten
- Angst vor Rekursen und Medien
- Lange Durchlaufzeiten der Beschaffungen

Quelle: Peter Fischer, Delegierter ISB
What happens with bad specification?
How to deal with public procurements

Public procurement

- Specify the whole need
- Specify the requirements
- Validate requirements

Call for bids

- Select a procedure
- Evaluate the bidders
- Check legal aspects

Decision

- Evaluate the bidders
- Decide
- Appeals

Need satisfied

Need satisfied
What is a good Requirements Specification

- Comprehensive and complete to avoid extra cost
- No ambiguity
  - validated by business users
  - used by IT-specialists
- Allows the precise assessment and evaluation of the bids
  - To ensure quality in the decision process
  - To avoid appeals
  - To evaluate the product
Methodology for RS

Model business processes > Specify requirements > Weight requirements > Consolidate in a template
Why start with business processes?

• Allow the business users to validate the requirements
• Make sure the whole need is specified
• Use BPMN
  – International standard for process documentation
  – Bridge the gap between business and IT people
Why start with business processes?

The first level gives an overview of the domains of activities (inventory of services). Services are delivered by processes.

The second level gives details on each service group of the inventory.

The third level show the end-to-end process delivering the service selected on the second level.

The fourth level show all details and complexity of the process selected on the third level.

Model business processes
How to specify requirements?

• Systematically review the processes
• Add requirements on
  – processes (global requirements)
  – shapes (functional requirements)
  – messages (mostly non functional requirements)
• Use a standardized phrase pattern

→ Business user do it themselves
How to specify requirements?

Model business processes
Specify requirements
Weight requirements
Consolidate in a template
Weight requirements

• Common understanding between users of the importance of the requirements

• Foundation for the evaluation
  – The evaluation scale is public
  – Guarantees the equity of treatment
Use a standard template

• Using the same template allows:
  – systematization for the writers of the RS
  – the bidders to familiarize easier and faster with the documents

• Our template is based on the recommendations of
  – IEEE 830-1998 recommended practice for software requirements specifications
Modified IEEE Recommended Practices template

• Introduction
  – Purpose
  – Scope
  – Definitions, acronyms, and abbreviations
  – References
  – Overview *

• Overall description
  – Product perspective* CONVERSATION DIAGRAMS FOR SYSTEM PERIMETER
  – Product functions* PROCESS MAPS
  – User characteristics
  – Constraints
  – Assumptions and dependencies

• Specific requirements* END-TO-END PROCESSES
  – End-to-end process 1 “Name of the Process”
    • Use-case 1 “Name of the use-case”
    • Use-case 2 “Name of the use-case”
  – End-to-end process 2 “Name of the Process”
    • Use-case 1 “Name of the use-case”
    • Use-case 2 “Name of the use-case”
  – Etc.
PROTOTYPE
Concept of «CARES»

• CARES: Computer Aided Requirements Engineering Software:
  – Supports the methodology
  – Simplifies communication
  – Guides the user in the process of gathering, specifying and weighting requirements
  – Allows for traceability of requirements
**Concept of «CARES»**

- **Business user**
- **Project manager**
- **IT-Specialist**
- **Functional requirements & weights**
- **BPMN Process documentation**
- **DB**
- **GUI**
- **Monitoring / QS**
- **non-functional requirements & weights**
- **Procurement documents**

**CARES**

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Information architecture

Selected by default

Home (login)

Projects

Requirement Manager

Collaborator

Learn Cares

Trash

My Projects

Shared projects

New Cares Project

Project 1

Project 2

Add New Files

Process Files

Requirement Files

Folders

BPMN process with requirements specified

Requirements in Tabular manner

Requirement Specification

Project Details
Information architecture
Information architecture
Demo
CONCLUSION & PERSPECTIVES
Validation

• Informal validation of the methodology has been carried out in real projects
  – Canton Bern
  – Canton Basel-Stadt
  – City of Lucerne

• Procurement process using the methodology successful (incl. no appeals)
Perspectives

• Business model

• Further development

• Searching for business partners

• Target private corporations as well as the public sector
Thank you

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