Motivation Matters in the Traceability Trenches

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- Research Motivation and Questions
- Study Design
- Categorizing the Cases
- Findings, Observations and Limitations
- Conclusion and Future Work
Research Motivation

Study of state of the art in traceability showed that many findings were quiet old:

- Gotel and Finkelstein (1992)
- Ramesh and Jarke (ca. 1997-2000)

Studies often cited for today's research

But: What traceability practice occurs in companies today?
Research Questions

Whether – Are practitioners doing traceability?
Where – What kinds of companies are doing traceability (i.e., size, domain, project types)?
Why – Why is traceability being undertaken?
Who – Who is establishing the traceability, maintaining it and using it?
When – When is the traceability established, maintained and used?
What – What level and degree of traceability is actually being done? What artifacts are included? What relations are formed?
How – Do practitioners define and follow a traceability process? What is the role of tools?
- Research Motivation and Questions
- **Study Design**
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Study Design

Selection of cases

- Ten practitioners selected at random from amongst 30 business cards

Process

- 4 interviews in company’s office; 6 interviews by phone
- 1–3 interviews with 1-2 hours
- Prepared interview protocol for consistent results
Information about the subjects and the companies

- Subject’s development experience (avg.): 8.6 years

- Subject working for company (avg.): 4.8 years

- Subject’s position: 3 system analysts, 2 consultants, 1 requirements engineer and 4 team or project leaders

- 9 German and 1 Czech company

- Company size: 1x <50, 6x 50–500, 3x >500 employees

- Company age: 7 – 25+ years
Information about the projects

- Company offering: 4 product, 4 project, 2 consulting
- Project context: 6 automotive projects, 2 avionics projects, 1 IT security project and 1 insurance project
- Duration of reported project (avg.): 2.1 years
- Consultants reported about customer project
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Categorizing the Cases

- The regulated (R) – conforms with rules and regulations
- The sub-contractor (S) – agrees to perform services for others
- The consultant (C) – gives professional expert advice
- The enthusiast (E) - interested and willing to learn
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Whether, Where and Why?

- All companies had established traceability within their development process.
- All subjects knew what was expected, but none what was really attained by using traceability.
- R: many sub-divisions and stakeholders, quality problems $\rightarrow$ defined development process (safety-critical systems).
- Interested in coverage analysis, implementation status.
Who, When and What?

- Establish traceability in parallel to development

Artifacts

- R/S/C: multiple levels of requirements or use cases, design, test cases, directives (2), code (2)
- E: user-interface models, work items and bugs (1)
- All: reported problems in defining appropriate granularity
- All: Creating and maintaining done by the same person
- E/C: defined traceability information model – required (1), suggested (1); enthusiast not up-to-date
How? (1)

- R/S/C: DOORS as RM tool + additional modeling tool
  - Problem 1: working over organizational boundaries
  - Problem 2: Versioning of relations
- S: weak integration between RM and modeling (traceability, analyses, change propagation)
  - Possibility to use existing tool with data of regulated
How? (2)

- C: defined whole tool-chain for their customers
  - Tools are main limiting factor
  - Vision: common repository for whole tool-chain
- E: one tool to prevent consistency issues (no RM tool)
  - Visualizing of traces
  - Poor integration between issue tracking and additional tools
Limitations

- Small study with ten cases from mostly European transportation industry
- There might be a gap between telling and doing
- No means to verify importance of representative and project
- Findings offered as preliminary
Research Motivation and Questions

Study Design

Categorizing the Cases

Findings, Observations and Limitations

Conclusion and Future Work
Conclusions

- Tools are central enablers, like it or not
- More practitioner guidance and conceptual support
- Traceability across boundaries
- Versioning of trace relations

Ongoing and Future work

- More empirical studies from the field
Thank you. Patrick Mäder