

# 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?



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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

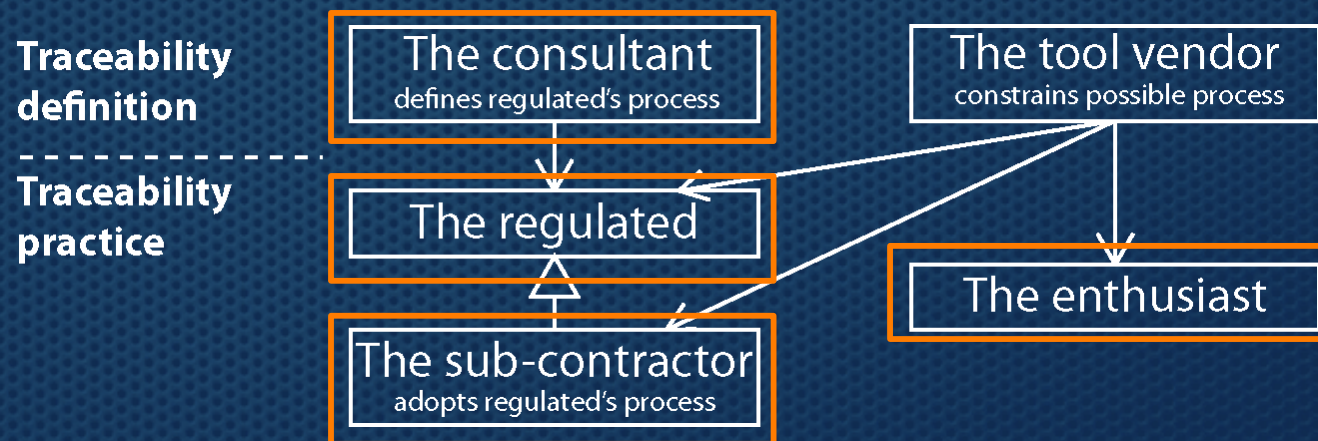


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## ❖ Categorizing the Cases

- ❖ 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 → 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



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## ❖ 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*

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