

Research Information Standardization as a Wicked Problem: Possible Consequences for the Standardization Process

Case Study of the Specification Project of the German Research Core Dataset

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CRIS 2014 Quotes:

“Technical issues are not the main issue.”

**„I didn’t expect the process to
be this iterative“**

**“We then faced the question: Are there more
requirements?”**

“participatory user involvement is crucial“

“Scale and complexity of an institution matters“

“The work is evolving.”

**“We are in a continued dialogue and revision with the system
users.” “Did you do a survey on usage acceptance? Because I
fear users might reject such an approach.”**

Standardization process: nature and solution approaches?

Tame Problems

- have a well-defined problem statement - it is clear what they are and what they are caused by;
- require a systematic methodology typical of engineering or scientific inquiry, because they belong to a class of problems that can be solved in a similar way each time;
- have a definite stopping point and problem solving has no bearing on future options;

Rittel & Webber, 1973; Jentoft & Chuenpagdee, 2009

III-Structured Problems

- Have an ambiguous and incomplete problem specification
- Lack clear-cut criteria to evaluate whether a solution has been reached implying that there are no stopping rules
- Make use of several potential information sources that may be used to represent problem spaces

Rittel & Webber, 1973; Van Bruggen et. al. 2003

Wicked Problems

Problem Definition

- There is no unique formulation of a wicked problem;
- Wicked problems do not have a stopping rule;
- Every wicked problem is unique;
- Every wicked problem can be considered to be a symptom of another problem;
- The choice of explanation determines the nature of the problem's resolution;
- **The multiple stakeholders cause social complexity;**

Problem Solution

- **Solutions to wicked problems are not true-or-false, but good-or-bad;**
- There is no test of a solution to a wicked problem;
- Since it is impossible to learn by trial-and-error, every solution attempt has irreversible consequences;
- Wicked problems do not have an enumerable set of potential solutions, nor is there a well-described set of permissible operations;
- The planner has no right to be wrong

Rittel & Webber, 1973

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Wicked Problems

Influences on RI standardization approaches

Twofold influence:

- Design Science methodology was shaped substantially by Rittels critique on Simons „the sciences of the Artificial“. The term „wicked problem“ is used in all major method papers for Design Science without further problem characterization

Simon 1996, 1977; Hevner et. al. 2004; Vaishnavi & Kuechler 2007

Wicked Problems

Influences on RI standardization approaches

Twofold influence:

- WP largely influenced incremental and agile software development models

DeGrace & Stahl 1990; Sutherland 2004; Conklin 2006; Becker 2007

- 40 year lasting adoption process: only some parts remained popular □ most characteristics are neither stated nor analyzed in recent projects

Case Study Core Research Data Set

- Research Information standardization project initiated by the German Council of Science and Humanities (Wissenschaftsrat): 2013 – 2015
- Initial definitions for RI on staff, publications, patents, third-party funding and projects, research awards and promotion of young researchers

Data and Method

- Formal content analysis: interviews with thirteen experts from the project;
- Sample included representatives of all major actors (university administration, researchers, federal statistical offices, funders, ministries) in the science system
- Questions aimed at potentials and problems of RI standardization
- Inductive category building

Mayring, 2012

Results

Multiple Stakeholders cause social complexity

- Stakeholder's different background did not cause more complexity
- Common understanding about the necessity was clear to all stakeholders
- Central organization unit where all reporting information runs together
- + **Multiple stakeholders on science system, federal, state and research institution level**
- + Research information standardization requires acceptance and contribution among all stakeholders
- + Organizational reporting units are rigidly separated
- + Research information needs to standardize any research output
- + RIS have to be standardized
- + **Not all stakeholders want to make research information centrally available**
- + Which fields of research information should be standardized, which left on university level?
- + Research information standardization requires a consistent subject classification
- + Benefits of standardization will only be visible if a critical mass is reached

□ complete list of statement categories in the [paper](#)

Results

WP Characteristics

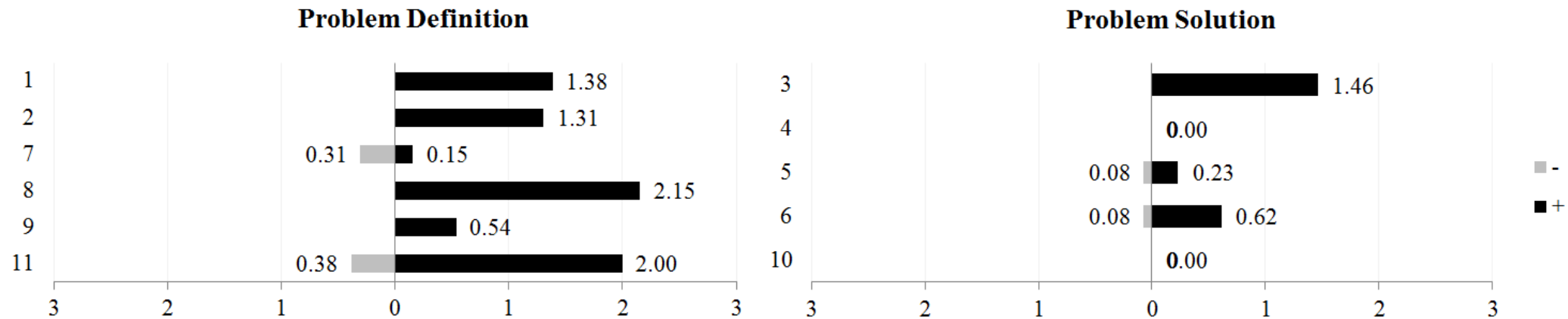


Fig. 1: Number of Codes per Interview for the Characteristics of a wicked problem

Contradicting statements:

7 - Every wicked problem is essentially unique

No answer possible in this sample:

4 – There is no immediate test for a wicked problem

10 – The planner has no right to be wrong

Limitations

- Explorative study: only members of the German Science System
- Sample: project in the starting phase
- Hardly any comparable empirical work systematically studying the intricacy of problems

□ first, explorative attempt to evaluate complexity and “wickedness”

Consequences and Outlook

- **Results underline interpretation of the standardization process of RI as a WP**

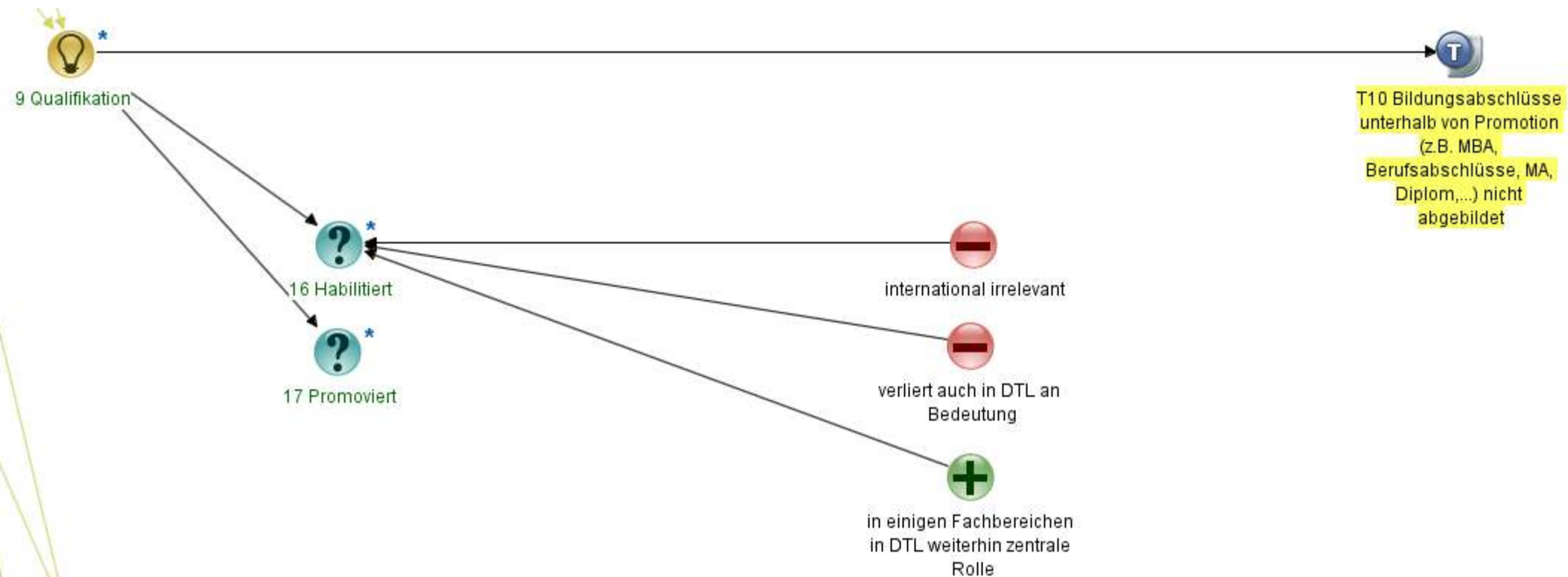
Consequences I

- High complexity in problem definition for RI standardization → more formal comparative evaluation leads to deeper understanding of RI problems and potentials
- Supported by methods like prototyping, scenario development, delphi methods

Consequences II

- Addressing wicked problems: focus shifts from solution to definition quality
- Argumentative nature can be addressed by using computer supported argument visualization (CSAV) □ explicit documentation of issues, alternatives and arguments
- Visual models and tools are well-known in software development and RI standardization, yet CSAV plays a minor role

Example - CSAV



Consequences III

- Integrating and distributing relevant information among all players is crucial for the solution process – acceptance is more important than solution itself
- We expect the acceptance to depend on the extent and quality of the information shared
- No studies on the relationship between information distribution and acceptance yet

Literature

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Thank you for your attention.

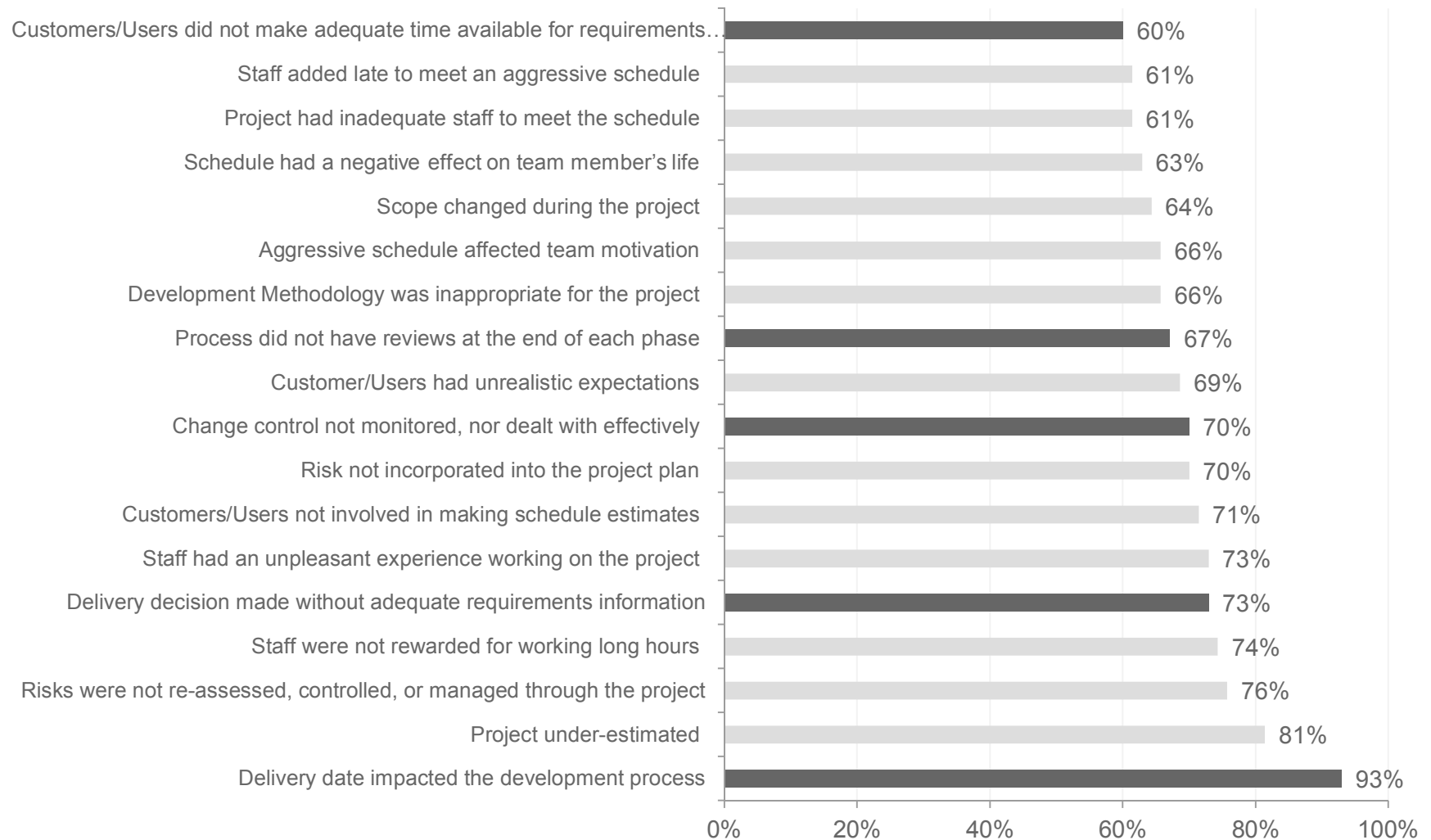
More information about the project::

<http://www.forschungsinfo.de/kerndatensatz/en>

Compendium argumentation visualisation:

<http://compendiumld.open.ac.uk/>

Failure Factors IT Projects



Cerpa, N., & Verner, J. M. (2009). Why Did Your Project Fail? Commun. ACM, 52(12), 130–134. doi:10.1145/1610252.1610286

Results

Symptom of another problem

- + Standardizing research information raises the question if research should be documented transparently
- + Standardizing research information means standardizing reporting processes
- + Standardizing research information does not solve the **problem of their interpretation**
- + Research information standardization **requires acceptance and contribution among all stakeholders**
- + Broader scope (national / international level) increases standardization requirements
- + Standardization of research information aims at making research comparable
- + Research information standardization **requires a consistent subject classification**
- + Benefits of standardization will only be visible if a critical mass is reached
- + Different definitions cause different adjustment mechanisms
- + Research information standardization **raises data protection issues**
- + Research information needs to standardize any research output