

How to Research Methodologies

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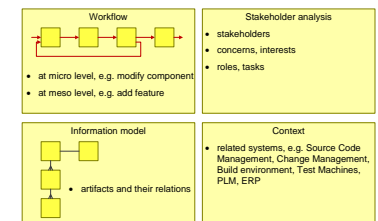
Abstract

This presentation explains how methodology research needs a context analysis.

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Research Approach

Determine as-is situation

in context

Determine characteristics and weaknesses

end-to-end

Determine objectives

end-to-end

Determine to-be situation

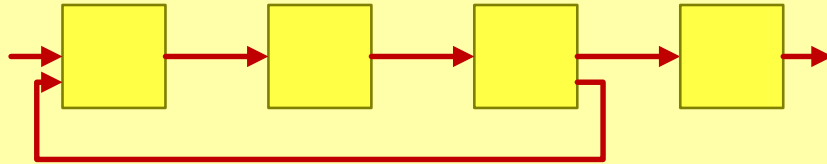
in context

Build and validate

end-to-end
in context

Methodology Context

Workflow

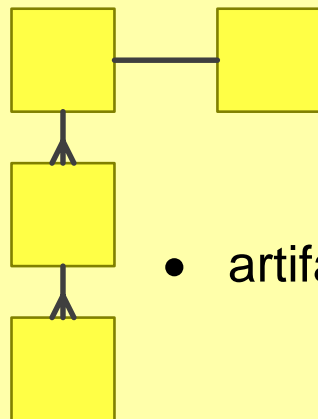


- at micro level, e.g. modify component
- at meso level, e.g. add feature

Stakeholder analysis

- stakeholders
- concerns, interests
- roles, tasks

Information model



- artifacts and their relations

Context

- related systems, e.g. Source Code Management, Change Management, Build environment, Test Machines, PLM, ERP

What should the Methodology bring?

Methodology objectives

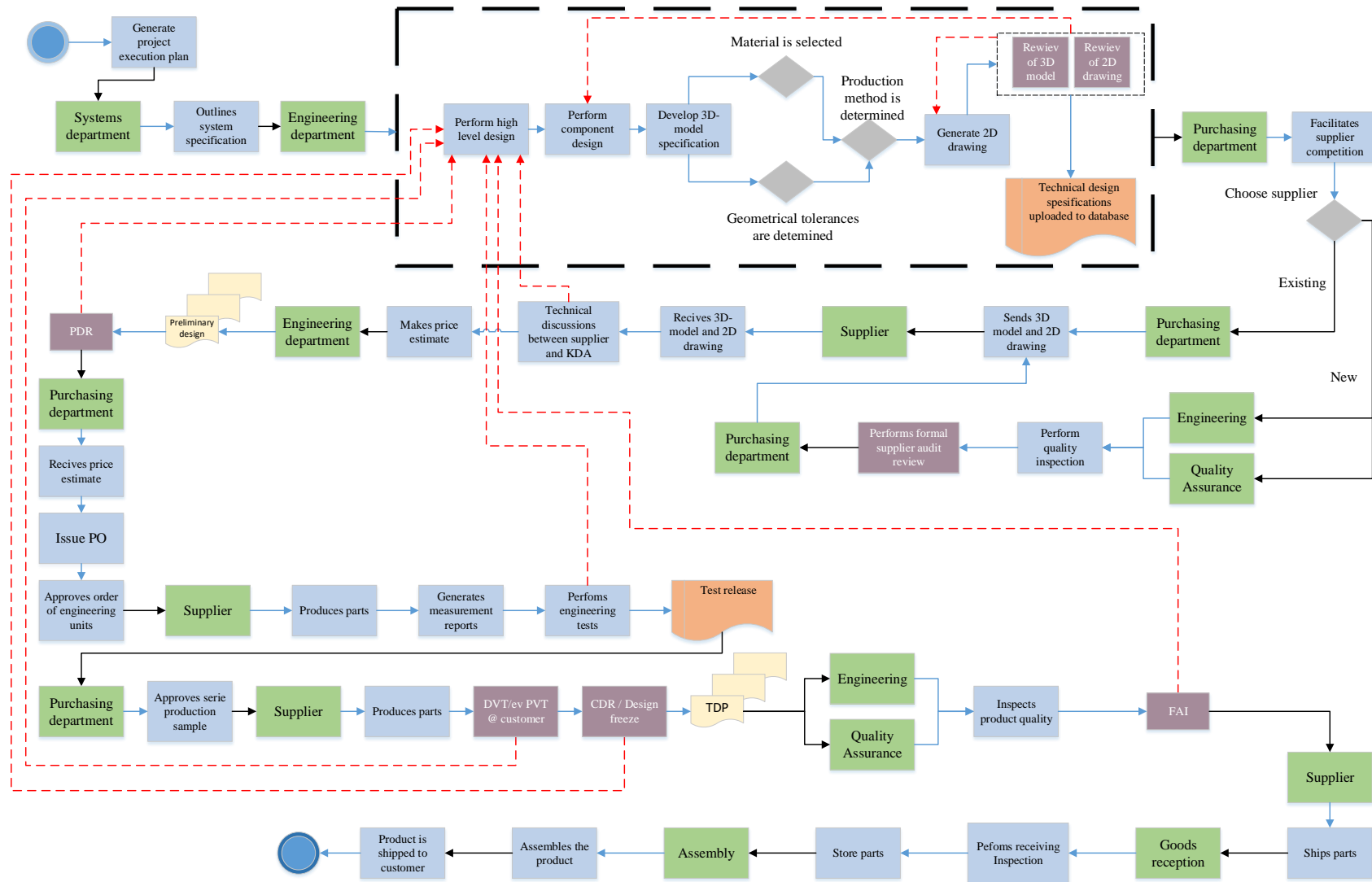
- Time to result
- Effort
- Quality of the result
- Constraints on resources, e .g. competence
- Compatibility with existing methods, processes, tools, ...
- ...

Context Assignment

Make the following steps for the as-is situation as far as time allows

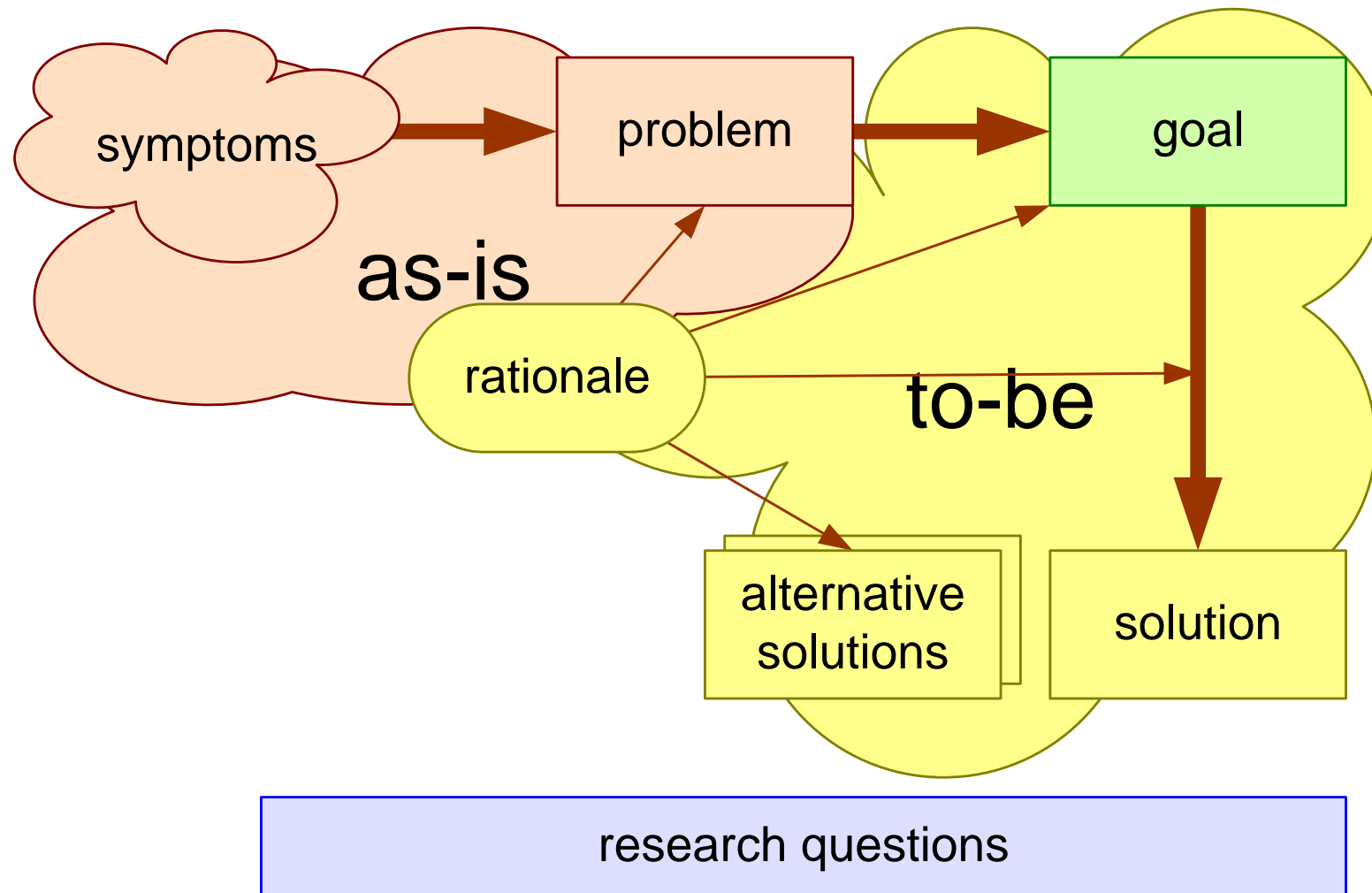
- Sketch the workflow at micro level in 10..20 steps
- Sketch the workflow at meso level in 10..20 steps
- List stakeholders
- List the 3..5 concerns for each stakeholder
- Indicate what stakeholder performs what step of the workflow
- List the incoming and outgoing artifacts for each step of the workflow
- Make an information model of the artifacts
- Identify the main characteristics per step, e.g. effort, time, quality, ...
- Quantify these characteristics

Example Workflow Model Based Engineering



Sandberg, M., Kokkula, S., and Muller, G., Transitioning from technical 2D drawings to 3D models: a case study at defense systems, INCOSE 2019 in Orlando, FL, USA, https://gaudisite.nl/INCOSE2019_SandbergEtAl_MBE.pdf

Line of Reasoning As-Is, To-Be



Next Steps in the Context

Make the following steps for the as-is situation

- Sketch the workflow at macro level in 10..20 steps
- Identify ~5 Key Performance Indicators (KPIs)
- Measure current KPIs

Start shaping the to-be situation

- Explore solutions
- Repeat context assignment for to-be
- Repeat macro level steps (workflow and KPIs)