

# Tailor Made: Situational Method Engineering for Empirical SE Research

## An Experience Report

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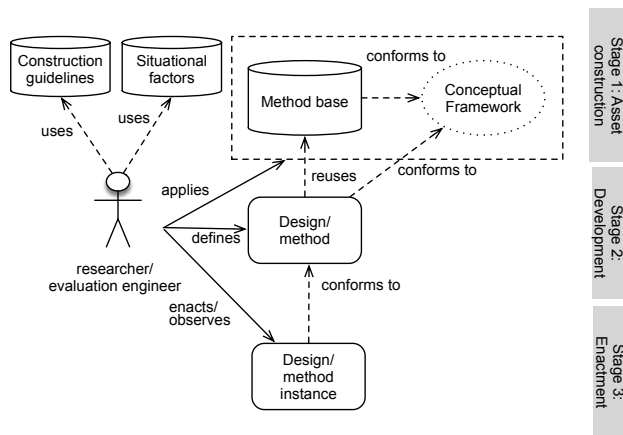


Fig. 1: Basic tenets of engineering situational (contextual) empirical designs and methods (inspired by [He14]).

**Custom-Fit Empirical Designs and Methods** Research and practice on designing adequate software-development methods and processes (“method engineering”) has for long acknowledged the need for *method customization* to match an organization’s or team’s needs. Numerous approaches to engineering situational development methods and processes have been proposed over the years. See [He14] for a comprehensive overview. As for methods and processes for validating and for evaluating software-engineering artifacts (methods, techniques, and tools) as part of empirical projects with or in industry, one-size-fits-all approaches dominate. This is despite the fact that the necessity of a situated, contextual artifact validation or artifact evaluation has been raised before. Regarding artifact evaluation in industry, situated designs and methods can be blended with existing project and development procedures. As for artifact validation in a research project with industry, situated designs and methods can contribute to explore contextual variation [RSA14] and to

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mitigating important threats to validity (e.g., construct validity). In praxis, situated methods lower entry barriers for empirical researchers, when engaging with practitioners and their organisations (e.g., by adopting data-collection techniques already accepted within an organisation).

**Assessing Domain-specific Developer Tools in Industry** Since 2017, we have contributed to a series of industry research projects (e.g., DLUX, HybriDLUX) on introducing domain-specific modeling and programming tools into software-development organisations in the automotive domain [St18]. In this context, we gathered experiences on engineering validation and evaluation methods specific to the partner organisations. In particular, we leveraged review techniques (walkthroughs) accepted among the target audience (firmware developers and testers) as instruments for mixed-method empirical designs. The designs aimed at assessing custom-made developer tools (DSL-based IDEs) for their quality-in-use characteristics.

**Outline** The talk will reflect on the potential and the limitations to situational method engineering for empirical research and evaluation. This reflection builds on our project experiences and challenges existing approaches to validating/ evaluating domain-specific developer tooling (e.g., FQAD, USE-ME).

- Motivation
- State of things: Situational engineering of empirical designs and methods (e.g., DESMET, 2G, ISO 14102)
- Challenges
  - Inventorising existing practises as a method base
  - Piggybacking onto existing practises (data gathering, daily work activities) versus requirements of empirical designs (participant selection, representation conditions)
  - Change agents: Validation/ evaluation efforts vs. organizational change processes
- An agenda for research and praxis

## Bibliography

- [He14] Henderson-Sellers, B.; Ralyté, J.; Ågerfalk, P.; Rossi, M.: Situational Method Engineering. Springer, 2014.
- [RSA14] Runeson, Per; Stefik, Andreas; Andrews, Anneliese: Variation factors in the design and analysis of replicated controlled experiments. *Empirical Software Engineering*, 19(6):1781–1808, 2014.
- [St18] Stieglbauer, Gerald; Burghard, Christian; Sobernig, Stefan; Korosec, Robert: A Daily Dose of DSL - MDE Micro Injections in Practice. In: *Proceedings of the 6th International Conference on Model-Driven Engineering and Software Development (MODELSWARD'18)*. SciTePress, pp. 642–651, 2018.