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Status Quo in Requirements Engineering: A Theory and a Global Family of Surveys

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Abstract: While researchers have been investigating the Requirements Engineering (RE) discipline with a plethora of empirical studies, attempts to systematically derive an empirical theory in context of the RE discipline have just recently been started. We aim at providing an empirical and externally valid foundation for a theory of RE practice, which helps software engineers establish effective and efficient RE processes in a problem-driven manner. We designed a survey instrument and an engineer-focused theory that has been conducted in 10 countries. We have a theory in the form of a set of propositions inferred from our experiences and available studies, as well as the results from our pilot study in Germany. We evaluate the propositions with bootstrapped confidence intervals and derive potential explanations for the propositions.

Keywords: Requirements Engineering; Survey; Theory

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1 Summary

This talk reports on the second run of the *Naming the Pain in Requirements Engineering* (NaPiRE) initiative that has the goal to characterise requirements engineering practice and problems and was published in the *ACM Transactions on Software Engineering and Methodology* in 2019 [Wa19].

An empirical theory of requirements engineering (RE) is needed if we are to define and motivate guidance in performing high quality RE research and practice. We aim at providing an empirical and externally valid foundation for a theory of RE practice, which helps software engineers establish effective and efficient RE processes in a problem-driven manner. We designed a survey instrument and an engineer-focused theory that was first piloted in Germany and, after making substantial modifications, has been replicated in 10 countries. We have a theory in the form of a set of propositions inferred from our experiences and available studies, as well as the results from our pilot study in Germany. We evaluate the propositions with bootstrapped confidence intervals and derive potential explanations for the propositions.

In this article, we report on the design of the family of surveys, its underlying theory, and the full results obtained from the replication studies conducted in 10 countries with participants from 228 organisations. Our results represent a substantial step forward towards developing an empirical theory of RE practice. The results reveal, for example, that there are no strong differences between organisations in different countries and regions, that interviews, facilitated meetings and prototyping are the most used elicitation techniques, that requirements are often documented textually, that traces between requirements and code or design documents are common, that requirements specifications themselves are rarely changed and that requirements engineering (process) improvement endeavours are mostly internally driven. Our study establishes a theory that can be used as starting point for many further studies for more detailed investigations and complements the theory we established on problems, their causes and effects in requirements engineering practice [Mé17]. Practitioners can use the results as theory-supported guidance on selecting suitable RE methods and techniques.

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