Editorial
Special Section on Conducting Empirical Studies in Industry

An empirical study is an investigation, using established procedures (also called "empirical research methods"), for the purpose of gaining knowledge through observation. Empirical methods fall under the broad categories of case studies, scientific experiments, focus group studies and surveys. Investigative questions are determined and related data is gathered and analyzed to answer these questions. There are various "research designs" to cater for different investigative situations. Examples include: independent measures, repeated measures, matched pairs, etc.; exploratory case studies, longitudinal case studies, ethnographic studies, action research, etc.; and online surveys, focus groups, interviews, etc. With empirical studies being widely entrenched in fields such as social sciences, psychology, management sciences, and medicine, there is obviously a huge amount of research on empirical studies in the general literature.

In so far as Software Engineering (SE) is concerned, empirical studies lie at the heart of this burgeoning field. The quality of these studies is a determinant of the validity of the research findings, including that of the comparative analysis of competitive methods, techniques and tools. With increased awareness over the last two decades, more and more researchers are conducting empirical research in SE and, increasingly so, involving the software industry.

While there are established empirical procedures in the general literature, relatively little is known about conducting empirical studies involving the software industry. What pitfalls should be avoided when investigating phenomena in an organization; what challenges should be anticipated when evaluating the efficacy of methods and tools in actual projects; what are the Dos and Don'ts when conducting practitioner surveys? Such questions abound and formed the primary trigger for organizing a series of workshops on this subject, called "Conducting Empirical Studies in Industry" (CESI). To date, five workshops have been conducted, in conjunction with the International Conference on Software Engineering (ICSE).

Experience suggests that empirical studies conducted in industrial settings are particularly challenging because the actual environments are complex and what is first observable by researchers may only be a tip of an iceberg. Yet, relevant investigative questions must be formulated, valid constructs need to be defined, trust needs to be in place, relevant data must be gathered within the small time-frames available, inaccuracies in data gathered (including missing data) needs to be managed, appropriate interpretations of the findings need to be made fitting the industry contexts, results need to be delivered in real-time, etc. In essence, researchers often need to be able to run while they are still learning how to walk.

We are pleased to introduce this Special Section on Conducting Empirical Studies in Industry of as part of the Information and Software Technology Journal. In response to the Call for Papers (CFP), we received 13 submissions, from 45 different authors, from 15 countries and 25 distinct affiliations. Seven of the submitted papers were desk-rejected by the editors, because they were considered out of the scope specified in the CFP. The remaining six papers were reviewed by 18 experts from academia and industry. This special section features the four accepted papers.

The paper by Mikkonen, Lassenius, Männistö, Oivo and Järvinen proposes a continuous and collaborative technology transfer model for SE research that aims to insure real-time industry impact. They argue that previous models do not address the current needs of contemporary SE research, which is usually performed by large collaborative consortia between industry and academic institutions. They draw observations and conclusions gathered from interviews with four companies involved in national Finnish software research programs. The authors propose a scalable model wherein technology is pulled by companies and cooperation occurs in rapid interaction cycles.

The paper by Budgen, Brereton, Williams and Drummond discusses the contributions made by empirical studies performed in industry to practice-oriented systematic reviews, which aggregate and synthesize knowledge on specific topics. The authors analyze 48 systematic reviews of primary studies conducted in industry that consider case studies, experience reports and position papers as sources of evidence. They argue that the use of rigorous industry-based primary studies provides improved authority to the findings of systematic reviews.

In the paper by Sherman, Haddar and Luria, the authors study stakeholder involvement in empirical studies conducted in the software industry. By means of a literature review, they elicit the most relevant challenges of industry-academia collaboration and analyse them through the lens of "organizational climate theory". The authors identify the organizational climate components that should be enhanced to address the reported challenges and argue that the theory may serve as a means to develop improvement measures and interventions. They also provide a research outline and a roadmap for further investigation.

The paper by Salleh, Hoda, Ting Suc, Kanij and Grundy reports on the specific challenges in the recruitment, engagement and feedback phases of industrial empirical software engineering studies. They adopt a body of knowledge comprising four case studies, five grounded theory studies, seven surveys and two quasi-experiments involving over 400 participants. They provide recommendations on study design, conduct, and reporting, aiming to mitigate the identified challenges.

Finally, we thank the authors of all the submitted papers and gratefully acknowledge the contributions made in the accepted papers. We are particularly indebted to the reviewers of the papers for their valuable time and effort spent reviewing the papers. Lastly, but not the least, we thank Claes Wohlin for his guidance and support in managing the reviewing process.

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