

Challenges and Opportunities in Applying Research Prototypes and Findings into Industrial Practice

Co-Chairs: Omar Badreddin and Tim Lethbridge, University of Ottawa; Hisham El-Shishiny, IBM Egypt; Margaret-Anne Storey, University of Victoria; Andrew Forward, University of Ottawa

Theme: Software Development Platform and Tools

Software Engineering has always been a fast moving and changing industry. This has continually presented an additional challenge for the Software Engineering research community; namely, how to catch up with fast changing technologies, tools, and practices? How to bring on-board yet another tool, methodology, or results to influence an industry that is driven by a variety of business objectives and regulations? How to make sure that current research efforts are aligned with cutting edge technologies and practices? Why is it that many of the technical advancements that we have seen in the software engineering and computer science come from the industry, rather than academia as it is the case in other disciplines?

Empirical evaluation of research prototypes and tools has been a growing trend in the software engineering field. However, most empirical results in new tools and technologies developed by academia are obtained using student participants. While the overwhelming majority of researchers and professionals agree that industrial participants are desirable, it has been very challenging, and sometimes impossible, to find industrial participants for many reasons. Such reasons may include:

- 1) The research prototypes are frequently not ready for industrial deployment.
- 2) Research tools do not integrate well with other tools, and lack industrial level of reliability and support.
- 3) Risk aversion on the part of industrial users.
- 4) Time constraints and other business commitments.
- 5) Legal regulations or conflict with business objectives.

What has been changing?

Recently, and particularly in the last ten years, there are two growing trends that may have significant positive impact on the challenge of industrial adoption:

Trend 1: Growing adoption of empirical work within the software engineering research communities.

Trend 2: Growing conference tracks and publications on industrial experiences.

These two trends had positive impact on the adoption of research findings and tools in the industry. For example, action research can better align research activities towards more immediate business needs and can help smooth the adoption of new tools and methodologies. On the other hand, publicizing industrial experiences in research conferences has helped align the vision of both, research and industry.

Goals and Outcomes:

The goal of the workshop was to bring researchers and practitioners together to discuss the challenges and experiences in both Trend 1 and Trend 2 to create a valuable experience and has previously helped increase adoption of academic prototypes by the industry. A higher adoption rate has enabled industrial practitioners to benefit from ideas that originated from the research community in order to increase productivity. Typical publications in these two trends focus on results and methodology, rather than the challenges and opportunities. A discussion on the challenges and opportunities is highly valuable in order

to help guide future research activities. Researchers, particularly those currently involved in empirical studies and those with interest in applying their research work in industrial settings, found this workshop valuable. In addition, entrepreneurs have their own experiences in infiltrating the industry with new ideas, and learned significantly by contributing and participating in this workshop.

Some of the challenges discussed were:

- The increased difficulty in finding students with sufficient motivation to go the extra mile, and sufficient background and skill to anticipate and respond to the quality needs of industry.
- In academia, dealing with a peer-review culture that has tended towards rejecting papers that are presented as work that has focused on the detailed needs of industrial deployment as 'It isn't research'.
- Finding the time to build the needed quality, if done by the research team.
- Getting industry interested in a product if the research team doesn't add the needed details of quality. For example, researchers reported having often presented a research prototype tool to a company, and received feedback that they might use it but would need it productised. Yet, companies generally don't want to devote the productization resources even though the case can be made that it would be a good investment. As a result, the company would often lose its original investment. One of the reasons for this is that a company doesn't invest in everything even if there would be a net return, simply because it needs to focus on where it has the greatest expertise.

Some of the recommendations post-workshop included:

- Research communities should adopt and adapt agile development methodologies to better fit research nature and needs.
- The encouragement of research granting agencies and journals to be more open at accepting papers and proposals that are more practical in nature, with 'active use in industry' as a valid way to demonstrate that an idea or a tool is valid.

Topics of interest included (but were not limited to):

- Experience Reports on challenges in finding professional participants in SE studies.
- Legal issues that may limit adoption of research tools and ideas in the industry.
- Empirical research taking place in industrial settings or analyzing industrial data that focuses on the challenges and opportunities of conducting such research.
- Ethical issues related to research in industrial settings.
- Collaboration models between academia and industry that could foster the adoption of research prototypes and ideas in the industry.

Although the workshop focused on the challenges in moving from research to industrial practice in software engineering, we accepted and fostered discussions related to any challenge associated with moving research results from laboratories to real world industrial practice. Special focus was given to discussions related to the different collaboration models between academia and industry and their impact on the adoption of research prototypes and proof of concepts in the industry.

Workshop Structure:

This full-day workshop included a number of presentations and round table discussions. The workshop has drawn a number of prominent researchers and practitioners whose contributions enhanced the depth and relevance of the discussions.