Validity of Research on Large-Scale Agile Projects

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In this extended abstract we introduce and briefly discuss key challenges that possess threats to validity of empirical studies conducted within the context of distributed agile software development in the large scale. These challenges are based on our own research experience with agile and global software development.

To lead our discussion we use a hypothetical research project (see Fig.1), in which a team of researchers conducts empirical studies on a large-scale agile project consisting of three agile teams in two geographically distant locations. Common to many studies in such environments, researchers in our example have access only to one of the sites, and therefore data collection is performed primarily onshore. To get the offshore perspective researchers in our example distribute questionnaires to the remote sites with the help of the onshore team, as well as elicit additional information regarding the remote teams from the onshore team members.
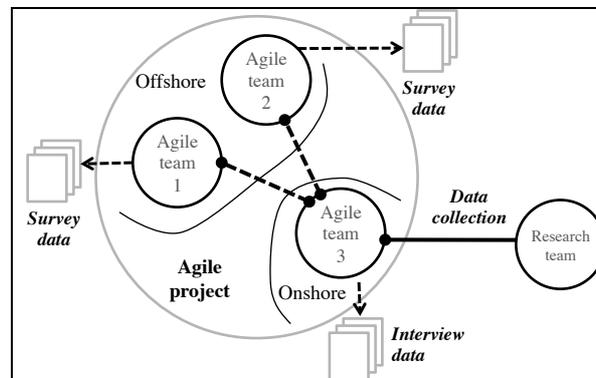

Fig. 1. Illustration of data collection in a hypothetical research project

Data Collection – Surveys: When data collection from the offshore teams is mediated by the onshore team, the researchers risk in receiving politically-correct responses due to fears and self-protective behavior. Besides, due to cultural peculiarities in collectivistic societies the respondents might even answer the surveys all together [3]. Similarly, in high power distance societies respondents might seek the "correct" answer to please their management and not share the actual course of events [3]. This means that researchers shall be especially careful in designing survey studies and perhaps consider electronically mediated interviews instead to address the threats to internal and construct validity.

Data Collection – Reliability of Perception-Based Studies: When eliciting information about the remote teams and environment from their onshore counterparts, the researchers risk in receiving that site's (potentially biased) view on the collaboration, which may be influenced by perceptions and prejudices, and is often found to be more pessimistic as opposed to direct measurements [1]. Methodological and data source triangulation in such studies is therefore essential to address the threats to internal and construct validity, respectively.

Data Analysis – Process Conformance: Due to the lack of collocation, agile practices are often implemented in the spirit of "lightweight" methods, but with adaptations to meet the demands of distribution [2, 4]. First of all, many cross-site practices might be reduced to the minimum due to geographic dispersion or even skipped due to a limited collaboration window caused by temporal distance. Furthermore, project members in different locations may have different interpretation of agile methods and concepts as a result of cultural differences and disparate guidance that shaped their perceptions. Therefore, each team might function differently. This means that teams at different locations might claim that they practice agile development, but a number of culture-related concerns suggest several important limitations. For example, autonomy and shared leadership are hindered in cultures having higher power distance [3]. Although team members possessing collectivistic ideas might have a strong inclination towards the group, promotion-seeking behavior might cause willingness to be evaluated upon individual performance. Such cultures are also associated with high attrition rates that endanger the stability of agile teams. Concerns about conformance with cross-team and within-team practices pose serious threats to internal validity of the study. Therefore, researchers shall capture the heterogeneity of the project environment and avoid synthesizing the use of agile methods while ignoring the differences in their implementation and interpretation.

Conclusion: To address the validity threats in research on large scale agile projects, we recommend researchers: (i) to employ direct data collection methods and observation based research strategies to the best extent possible, (ii) and to triangulate data sources and methodologies whenever the former is not feasible.

References

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