A Marketplace for Industrial Case Studies in Software Engineering

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ABSTRACT

Case studies are valuable for both sides of the Software Engineering community, the practitioners and the researchers. To perform such research, collaboration between them is necessary. However, establishing such partnerships is not straightforward. We identified a set of challenges that must be overcome and propose a research plan with the goal of creating a marketplace for industrial case studies.

KEYWORDS

Software Engineering, Case Study

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1 INTRODUCTION

A case study is an empirical examination of a phenomenon in its real-life context [3]. Typical methods of collecting data for case studies include surveys (interviews, questionnaires, etc.) and artifact analysis (source code, tests, and meta-data repositories, etc.). Case studies are extremely valuable for the field of Software Engineering since they provide both researchers and practitioners with valuable practical insights that cannot be observed in a controlled experimental environment. To gather data for such studies, cooperation between researchers and practitioners is essential.

Establishing collaborations to perform case studies is not a straightforward task [2]. Various factors make this a challenge:

(1) **Using personal networks**
The most obvious method would be to use one's personal network to reach potential collaborators. Frequently, this approach may be enough [5]. However, it has the following disadvantages:
- **Practitioner's burnout** - Any given researcher or group of researchers has a limited professional and social network. If researchers rely solely on their network, the same organizations will be relied on repeatedly. It is not unusual for practitioners in that situation to lose interest in working with researchers.
- **Negative impact on research quality** - To get objective data, a multiple-case study with a random sample of cases representing the research target population would be optimal. However, when all of the subjects are connected to the researchers, the sample cannot be considered random.

(2) **Separate goals and incentives**
When performing case studies, researchers' and practitioners' goals may diverge significantly[4]. Researchers and practitioners operate on different *Technology Readiness Levels (TRLs)*[1]. TRLs range from TRL 1 ("Basic Principles Observed and Reported") to TRL 9 ("Actual system "flight proven" through successful mission operations"). Researchers usually work on TRLs from 1 to 3, whereas practitioners require practical and applicable results, i.e., TRLs from 7 to 9.

(3) **Data vaporization**
After the data is collected and a paper is published, the data may be made public for future use. However, this is not always the case. Sharing case study protocols is not the norm, nor does there exist a space dedicated to storing such data. This means that valuable data may get lost, and potential future research can not be accomplished.

Several other concerns and challenges, including internal politics [2], use of employee time, individual participant biases as well organizations' concerns regarding the use of their data, also negatively impact researchers' ability to produce high-quality case studies [4]. Our goal is to improve this situation by creating a service that:

(1) Allow researchers and practitioners to find each other to create collaborations.
(2) Allow practitioners to share their open problems and research needs.
(3) Save case study protocols and data for future use.
(4) Allow researchers and practitioners to share structured feedback on the case studies.

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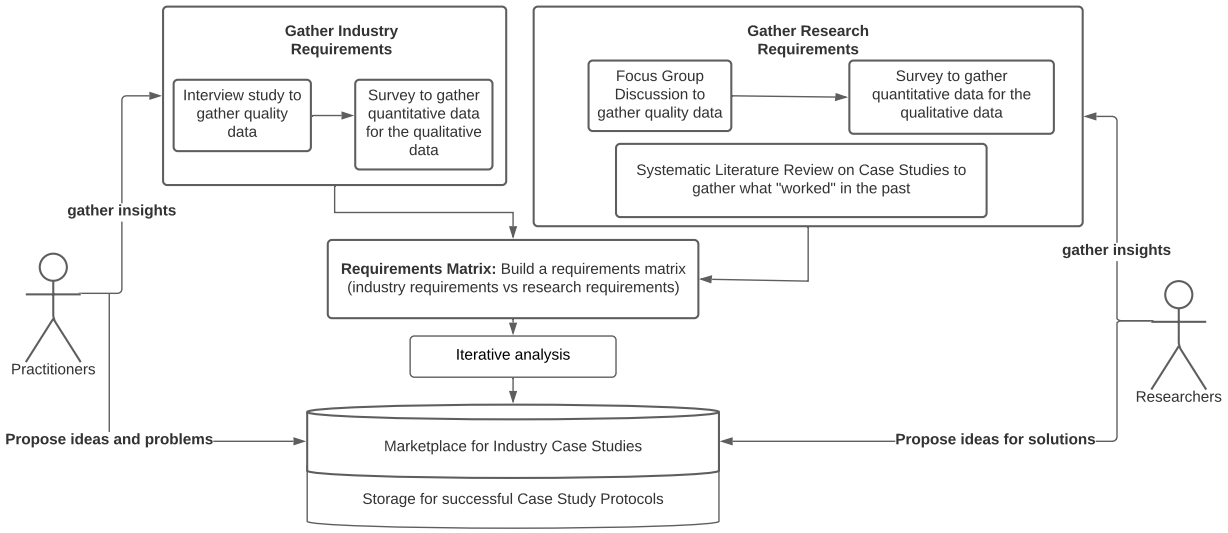

Figure 1: The research plan for a Marketplace for Industrial Case Studies in Software Engineering

2 RESEARCH METHOD

We plan to first perform the following steps described in the subsections: gather researchers' and practitioner's requirements, build a requirement matrix to identify key requirements and friction points. On this basis, we will design and implement a case study marketplace service. An overview of the research plan is given in Figure 1.

2.1 Practitioners' requirements

To gather information about the practitioners's requirements, we plan a two-step approach. Firstly, we plan to interview practitioners to obtain qualitative data. This will be followed by a survey that would support our findings with quantitative data. This research will focus on the following questions:

(1) What do practitioners hope to gain from case studies?
(2) What leads practitioners to participate in case studies (Do's)?
(3) What deters practitioners from doing case studies (Dont's)?

2.2 Researchers' requirements

To obtain researchers' requirements, we plan to obtain qualitative data from a focus group discussion, quantitative data from a survey, and additionally perform a Systematic Literature Review to inspect their current approach to case studies. Our focus group and survey will aim to answer the following questions:

(1) What do researchers hope to gain from case studies?
(2) What demands (requirements) do researchers place on industrial partners?
(3) What are their experiences with case studies? What worked? What did not work?

The systematic literature review, will summarize the latter:

(1) How do researchers find participants for their case studies? Do they report this information?
(2) What kind of research questions do researchers usually want to answer with case studies?
(3) What data collection methods do software engineering researchers use in case studies?
(4) Are the case study protocols and data shared? In what form?

2.3 Requirements matrix

We plan to summarize our findings in the form of a requirement matrix. The requirements will be divided into the following categories.

(1) Mutual points - requirements that match from both groups.
(2) Distinct points - non-contradictory requirements that should be satisfied to find a collaborator from one of the groups.
(3) Friction points - contradictory requirements, which create problems that have to be addressed and solved.

2.4 Design and implementation

After an in-depth analysis of the key requirements from both researchers' and practitioners' points of view, we will proceed to design and implement the Marketplace for Industrial Case Studies.

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