# Template for a Case Study Protocol in Software Engineering

Author One[a], Author Two[b], Author Three[a,b]

[a]*Department One, Address One, City One, 00000, State One, Country One*
[b]*Department Two, Address Two, City Two, 22222, State Two, Country Two*

**Abstract**

**Background and Context:** What are the theoretical aspects that the case will be about, or in what context the case study will take place?
**Objective:** What is the primary goal of the case study?.
**Methodology:** What type of case study is e.g., exploratory, evaluatory?. What are data collection actions planned?
**Expected results:** What are the expectations regarding the outcomes of the study?

*Keywords:* case study, software engineering, template

## About this template

Case study research is a well-established technique for investigating different phenomena in software engineering. This template aims to provide a squeleton for designing a Case Study. The template is mainly based on two resources. One is the facto reference for conducting case studies in software engineering by Runeson, and Höst 2009 ***Guidelines for conducting and reporting case study research in software engineering***[1]. The other is the book ***Case Study Research in software engineering: Guidelines and examples***[2].

I am preparing this template since every time I was planning a new study, I felt like starting from scratch and lacking a template to add content to design the study. Although there are checklists of aspects to consider in case study research, I have not seen a template to start designing a case study. Additionally, I also provide some hints and pointers to helpful resources.

## 1. Background

*1.1. Related work*

*1.2. Research questions*

Define the research questions for this study.

## 2. Design

Single case vs multiple cases. How the case is connected to the research questions?

What is the object of study, units of analysis?

How the research questions will be addressed? Add propositions or sub-research questions to the research questions.

## 3. Selection

Criteria for case selection

## 4. Roles and procedures

Who is involved in the case study?

What are the roles and responsibilities of the researchers?

## 5. Data collection

What is the data that will be collected?

Define a data collection plan.

How the data will be stored?

## 6. Analysis

What id the criteria for interpreting the case study findings?

How the data findings will answer the research questions?

## 7. Plan validity

### *7.1. General validity*

Check against the following checklist:

**Checklist for Case Design from [1]**

1. What is the case and its units of analysis?
2. Are clear objectives, preliminary research questions, and hypotheses (if any) defined in advance?
3. Is the theoretical basis- relation to existing literature or other cases -defined?
4. Are the authors' intentions with the research made clear?
5. Is the case adequately defined (size, domain, process, subjects, etc.)?
6. Is a cause-effect relation under study? If yes, is it possible to distinguish the cause from other factos using the proposed design?
7. Does the design involve data from multiple sources (data triangulation), using multiple methods (method triangulation)?
8. Is there a rationale behind the selection of subjects, roles, artifacts, viewpoints, etc.?
9. Is the specified case relevant to validity address the research questions (construct validity)?
10. Is the integrity of individuals/organizations taken into account?

### *7.2. Construct validity*

Show that the correct operational measures are planned for the concepts in the study. Some tactics to consider: multiple sources of evidence, establish chains of evidence, expert reviews.

### *7.3. External validity*

Identify the domain to which the study is relevant. Use multiple-case studies to investigate outcomes in different contexts.

## 8. Study limitations

Identify potential conflicts of interest.

## 9. Reporting

How the results will be reported?
Venues for reporting. Specify the reporting format.

## 10. Schedule

Time plan for planning, data collection, data analysis, and reporting.

## Appendix A. Checklist for data collection

Checklist for Preparation for data collection [1]

11. Is a case study protocol for data collection and analysis derived (what, why, how, when)? Are procedures for its update defined?
12. Are multiple data sources and collection methods planned (triangulation)?
13. Are measurement instruments and procedures well defined (measurement definitions, interview questions)?
14. Are the planned methods and measurements sufficient to fulfill the objective of the study?
15. Is the study design approved by a review board, and has informed consent obtained from individuals and organizations?
16. Is data collected according to the case study protocol?
17. Is the observed phenomenon correctly implemented (e.g., to what extent is a design method under study actually used)?
18. Is data recorded to enable further analysis?
19. Are sensitive results identified (for individuals, the organization or the project)?
20. Are the data collection procedures well traceable?
21. Does the collected data provide ability to address the research question?

## Appendix B. Checklist for analysis of collected data

Checklist for Preparation for data collection [1]

22. Is the analysis methodology defined, including roles and review procedures?
23. Is a chain of evidence shown with traceable inferences from data to research questions and existing theory?
24. Are alternative perspectives and explanations used in the analysis?
25. Is a cause–effect relation under study? If yes, is it possible to distinguish the cause from other factors in the analysis?
26. Are there clear conclusions from the analysis, including recommendations for practice/further research?
27. Are threats to the validity analyzed systematically and countermeasures taken? (Construct, internal, external, reliability)

## Appendix C. Checklist for reporting case studies

**Checklist for Preparation for data collection [1]**

28. Are the case and its units of analysis adequately presented?
29. Are the objective, the research questions and corresponding answers reported?
30. Are related theory and hypotheses clearly reported?
31. Are the data collection procedures presented, with relevant motivation?
32. Is sufficient raw data presented (e.g., real-life examples, quotations)?
33. Are the analysis procedures clearly reported?
34. Are threats to validity analyses reported along with countermeasures taken to reduce threats?
35. Are ethical issues reported openly (personal intentions, integrity issues, confidentiality)
36. Does the report contain conclusions, implications for practice, and future research?
37. Does the report give a realistic and credible impression?
38. Is the report suitable for its audience, easy to read, and well structured?

## References


[1] P. Runeson, M. Höst, Guidelines for conducting and reporting case study research in software engineering, Empirical software engineering 14 (2) (2009) 131–164.

[2] P. Runeson, M. Host, A. Rainer, B. Regnell, Case study research in software engineering: Guidelines and examples, John Wiley & Sons, 2012.