PREPARING RESEARCH PROPOSAL RESEARCH METHODOLOGY

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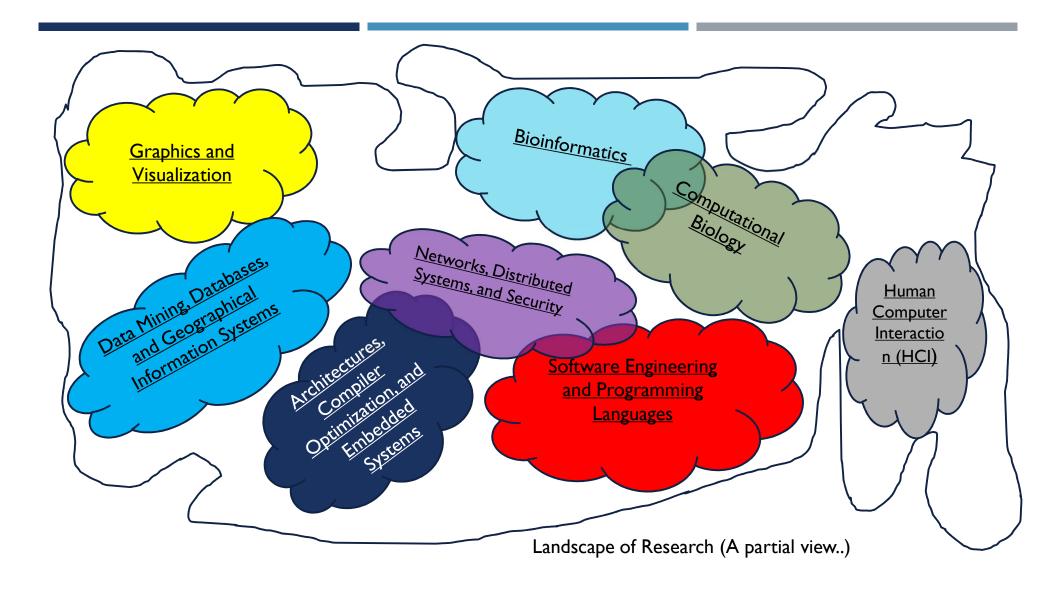
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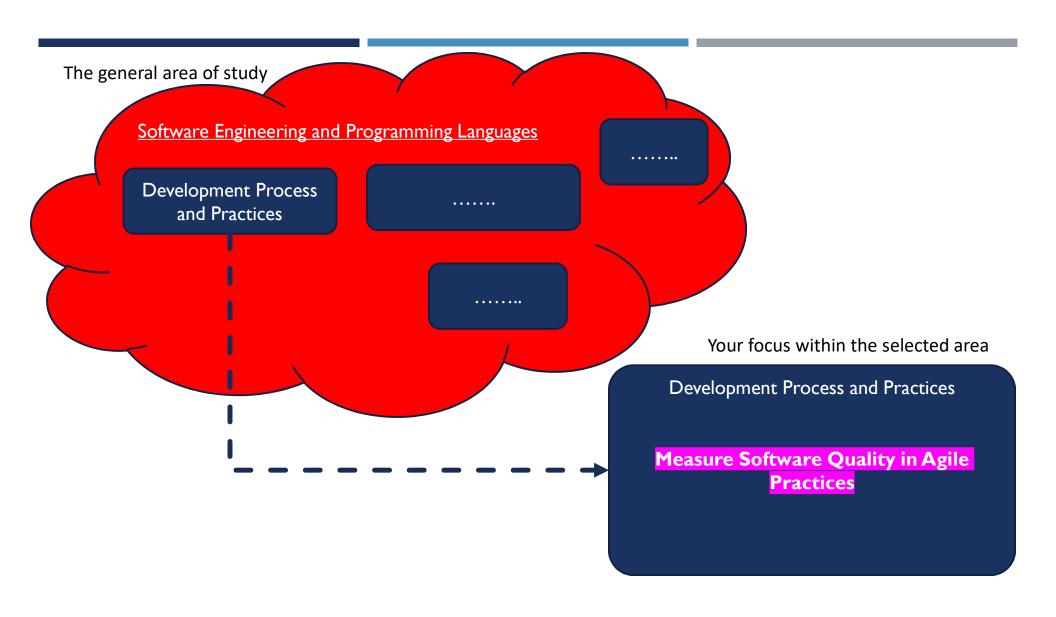
CONTENTS

- Writing a Research Proposal
 - Basics.
 - Why, What and How?

RESEARCH PROPOSAL - WHAT

- A research proposal is a <u>concise and coherent summary</u> of your proposed research.
- It sets out the <u>central issues or questions</u> that you intend to address.
- It outlines
 - The general area of study within which your research falls.
 - Your focus within the selected area of study.
 - Referring to the current state of knowledge and
 - Any recent debates on the topic.
 - Demonstrates the originality of your proposed research.





Your focus within the selected area

Measure Software Quality in Agile Practices

- Do a Literature Survey to highlight on the current state of knowledge.
- Refer / Highlight the open scope of research based on Literature Survey.
- Define the outcome (tentative) of your research and demonstrates the originality.

RESEARCH PROPOSAL - WHAT

- It gives you an opportunity to demonstrate that
 - you have the aptitude for graduate level research.
 - demonstrating that you have the ability to communicate complex ideas clearly, concisely and critically.
 - also helps the evaluator to match your research interest with an appropriate supervisor / domain.

RESEARCH PROPOSAL - WHY

- ✓ It is the most important document that you submit as part of application process. (funding)
 - ✓ As part of the application for admission onto MPhil and PhD program.
 - ✓ To apply for a funded Project.
 - ✓ To initiate a large research work under a certain domain.

HOW TO WRITE A RESEARCH PROPOSAL

ORGANIZATION OF THE RESEARCH PROPOSAL

- I. Title
- 2. Abstract
- 3. Research Context
- 4. Research Questions
- 5. Research Method
- 6. Significance of Research
- 7. Timing and Budget
- 8. Bibliography

- ✓ Follow the chronological order strictly.
- ✓ Naming of the Sections may differ.

TITLE

Title

- This is a tentative title for your intended research.
- The title offers scoping your research area and interest.
- A good **title** contains the fewest possible words that adequately describe the contents and/or purpose of your **research**.
- The **title** is without doubt the part of a **paper** that is read the most, and it is usually read first.
- The title often subject to alter during the course of research.

Comprehending co-evolution of OSS projects: Analytical methods and tool support

- ✓ The purpose of the research
- ✓ The methods used
- √ The narrative tone of the paper

ABSTRACT

- The proposal should include a **concise statement of your intended research** of no more than 120 words.
- This may be a couple of sentences setting out the problem that you want to examine or the central question that you wish to address.

Rule of thumb:

Overall research domain + the problem + need for solution + your proposal + implication (5 - 7Sentences!)

Overall research domain + the problem + need for solution + your proposal + implication

Abstract

Open Source Software (OSS) is continuously gaining acceptance in commercial organizations. These organizations strive for a better understanding of the evolution of OSS projects. Therefore research on OSS project evolution received a substantial attention from the research community over the last decade. These efforts resulted in an ample set of research for which there is a need for comprehensive literature surveys.

This paper reports on a systematic literature survey aimed at the identification and structuring of research on evolution of OSS projects. In this review we systematically selected and reviewed 101 articles published in relevant venues. The study outcome provides insight in what constitutes the main contributions of the field, identifies gaps and opportunities, and distills several important future research directions.

Index Terms— Open Source; Evolution; Systematic Literature Review.

~125 words 7 Sentences

RESEARCH CONTEXT

RESEARCH CONTEXT

- You should explain the <u>broad background</u> against which you will conduct your research.
- You should include a <u>brief overview of the general area of study</u> within which your proposed research falls.
- Summarizing the <u>current state of knowledge</u> and <u>recent debates</u> on the topic.
- This will allow you to <u>demonstrate a familiarity with the relevant field</u> as well as the ability to communicate clearly and concisely.

Open Source Software (OSS) development has become a powerful mechanism for developing and distributing IT applications. A number of IT pioneers are now putting serious interest and investment in favor of OSS movement which supports OSS to gain substantial market credibility and legitimacy [1].

Broader Domain

Often an OSS project consists of a wide range of components, coming with a large number of versions reflecting their development and evolution history. Broadly, such components can be classified into two dimensions: software artifacts and the community surrounding it. Software artifacts consist of, for example, source code repository, bug reports, mailing list, and change logs; whereas the community can be classified into developer and user community.

The two dimensions – Software and Community (Co-Evolution)

Meaning of the two

OSS development is a dynamic process, thus the software keep changing over time. These changes constitute different form of contributions, such as modification, improvement and extension to the software (e.g., a bug fix, reporting a bug, or adding new functionalities). This continuous process of change and modification is termed as software evolution [12].

What is Software Evolution?

[2], the successful evolution of OSS has possible described an (among been made other factors) by their attraction of large communities of both developers and users. In such communities, users often initiate the need for changes and the developers implement it in the form of contributions [3]. In OSS realm, such contributions drive the software evolution, which in turn re-define the role of these contributing members and change the social dynamics of the OSS community.

→ What is Community Evolution?

Thus, the evolution of the software and the community in an OSS project are mutually dependent and need to evolve amicably for the long term sustainability of an OSS project. This interdependent nature of evolution of the code and the community in OSS projects can be effectively termed as co-evolution of the code (i.e., software) and the community.

What is Co-Evolution?

To measure the extent to which an open source project is successful has often been evaluated empirically by measuring endogenous characteristics. Such attempts focus on either the software evolution or the community evolution. A little attention is paid to date to study the pattern of co-evolution under one platform. This lagging in current research on OSS evolution shapes the necessity of this thesis.

Why to Conduct this study (In brief)

RESEARCH QUESTIONS

RESEARCH QUESTIONS

- > The proposal should set out the central aims and questions that will guide your research.
- You should take time to reflect on the <u>key questions</u> that you are seeking to answer.
- Many research proposals are too broad, so reflecting on your key research questions is a good way to make sure that your project is sufficiently narrow and feasible.

The primary target of this research is to investigate the extent to which the two dimensions of OSS projects, e.g., software and the community, influence and overlap each-other during the evolution of the project, and ascertain their implications on OSS projects sustainability, survivability, maintainability and quality issues. The fundamental point of argument of this research can be stated as follows,

"The evolution of the Open Source Software (OSS) project is constrained by the non-orthogonal evolution of the software and the community surrounding it".

Under the hood of this focus the study examines the following set of research questions.

- ✓ What are the endogenous and exogenous drivers in the OSS projects that constitute and drive the coevolution?
- ✓ What correlations can be established between the co-evolutionary pattern (i.e., drivers) of OSS projects and their evaluation criterion, e.g., long term sustainability, maintainability and quality?
- ✓ What kind of metrics and collaboration models can be defined for modeling and generalizing the co-evolution of sustainable OSS projects?
- ✓ How to analyze, conceive and exhibit the co-evolutionary pattern of OSS projects?

RQs (Exact ToDo)

Central Aim (Narrow and Focused)

Broader Domain

RESEARCH METHOD

RESEARCH METHODS

The proposal should outline your research methods,

- What research method(s) you are planning to use. Define them.
- Connect the research method(s) in relation to solving your research problem. (*How you will use the methods in your research?*).
- > Explain challenges and validation issues related to your research.

For example, If you plan to conduct field work or collect empirical data, you should provide details about this.

- if you plan interviews, who will you interview?
- How many interviews will you conduct?
- Will there be problems of access?
- Explain how you are going to analyze your research findings.

For this research, case study research method is applied. This section put a detail discussion on the rationale for the selection of this research method, and on the protocol defined for carrying out the case studies.

Case Study research method

What is the Research Method and Why (In General)?

Case study can be defined as an empirical method aimed at investigating contemporary phenomena in their context [15][16][17][18]. This method provides a flexible means of studying phenomena when the boundary between the phenomenon and its context is unclear [17].

Also detail:

- 1. Relevance of this Research method in your Research.
- 2. How you will use the Research method for your Research (Research Design).

For detail on these two topic please read the uploaded sample research proposals..

SIGNIFICANCE OF RESEARCH

SIGNIFICANCE OF RESEARCH

- The proposal should demonstrate the originality of your intended research.
- You should therefore explain why your research is important
 - > by explaining how your research builds on and
 - > adds to the current state of knowledge in the field or
 - > by setting out reasons why it is timely to research your proposed topic.

Read the Motivation Section of the Sample research proposal....

BIBLIOGRAPHY

■ The proposal should include a short bibliography identifying the most relevant works for your topic.

- 1. Grewal R, Lilien GL, Mallapragada G (2006) Location, Location, Location: How Network Embeddedness Affects Project Success in Open Source Systems. Management Science 52:7: 1043–1056.
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- Mockus A, Fielding R T, Herbsleb J (2002) Two case studies of open source software development: apache and mozilla, TOSEM, 11:3, 309–346.
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- 5. Wang Y, Guo D, Shi H (2007) Measuring the Evolution of Open Source Software Systems with their Communities, ACM SIGSOFT Software Engineering, 32:6.
- 6. Syeed M.M., Altonen T, Hammouda I, Systa T (2011) Tool Assisted Analysis of Open Source Projects: A Multi-Faceted Challenge, International Journal of Open Source Software and Processes, 3(2), 43-78.
- 7. Nakakoji K, Yasuhiro Y, Nishinaka Y, Kishida K, Yunwen Y (2002) Evolution Patterns of Open-Source Software Systems and Communities, In Proceedings of the international workshop on Principles of software evolution, 76-85.
- 8. Syeed M.M., Kilamo T, Hammouda I, Systa T (2012) Open Source Prediction Methods: a systematic literature review, In Proceedings of 8th. IFIP International Conference of Open Source Systems, Springer.
- 9. Syeed M.M. (2012) Binoculars: Comprehending Open Source Projects through graphs, In Proceedings of 8th. IFIP International Conference of Open Source Systems, Springer.
- 10. Syeed M.M., Hammouda I, Systa T (2013) Evolution of Open Source Software: a systematic literature review, Journal of Software.

LENGTH OF THE PROPOSAL

- ✓ The proposal should usually be around 2,500 words.
- ✓ It is important to bear in mind that specific funding bodies might have different word limits.