Figure out a Competitive Research Project Proposal

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Self-Introduction

• **Zhi Jin, Ph.D, Professor**
  • Peking University, Chinese Academy of Sciences
  • Deputy Director, Key Lab. Of HCST (MoE)
  • Chair, TCSE of China Computer Federate
  • Executive Chief Editor, Chinese Journal of Software

  – **Research Interests:**
  • Requirements Engineering, Knowledge Engineering

  – **Research Funding Leader:**
  • Project Chief Scientist: National Basic Research Program
  • Project Leader:
    – 3 National Basic Research Program
    – 1 National High-Tech Project
    – 3 Key Projects of Natural Science Foundation
    – More ……
• Fail, and disappointed


• Logical, systematical, rational, reasonable, ...... not only itemized following the structure

• After ......
General Messages

Planning
• Identifying the issue
• Choosing a title
• Leading out the project purpose
• Defining the solution

Writing
• Stating clearly issue and solution
• Arguing by evidence
• Editing and proofreading the work
Defining the Issue: Motivation

- There is an issue
  - What?
  - Where and Why?
  - How?

- With great confidence in tone

This is an issue

Is it too small or too big?
Is it important?
Are you sure?
There is an issue
- What?
- Where and Why?
- How?

Evidence: Related efforts
- Many think this way
- Who does what? How is it solved? To which extent? If no, why?

- Systematically and in a certain depth of technology
Defining the Issue: Motivation

• Think of this as the "state of affairs"
  – What is the issue?
  – What is causing the issue?
  – What effects does this issue have?

• Emphasize
  – why the issue needs to be solved now?
  – How will it affect the world/community/… if it is left alone?

Make sure to answer all questions and cover them with research and facts. Use credible sources liberally.
Defining the Issue: Motivation

Observation: There is an issue
- What?
- Where and Why?
- How?

Evidence: Related efforts
- Many think this way
- Who does what? How is it solved? To which extent? If no, why?

Have a new idea

Novelty: Why and How? Different angle or extension

E.g.
- Static to dynamic
- Specific to general
- General to specific but of more depth
- ……
Defining the Issue: Motivation

Observation: There is an issue
• What?
• Where and Why?
• How?

Evidence: Related efforts
• Many think this way
• Who does what? How is it solved? To which extent? If no, why?

Novelty: Why and How?
Different angle or extension
• Static to dynamic
• Specific to general
• General to specific but of more depth
• ……

Have a new idea

This is an issue

Lead out the purpose of the research project

Conclude a title

Include key words about the issue and the new idea
As clear and simple as possible
Making the Plan: Research Content

- Milestone-driven refinement
- Case-driven refinement
  - Decomposition-by-case
  - Guard-introduction pattern
- Divide-and-conquer pattern

Top-Down:
- Objective and task decomposition
- From objective to the research tasks?
Making the Plan: Research Content

• describe the solution
  • \textit{how} you will address the issue
  • \textit{why} you will do it in this way, and
  • \textit{what} the outcomes will be

– Discuss the larger impact of your ideas

• Addressing why you will do something is as important as stating what you will do
• Show that you've considered your idea from all angles
Making the Plan: Research Strategy

Bottom-Up:
• Conductive
• Satisfactory
• ……

How would you like to conduct the research?
• Think about the feasibility

With obtainable facts / results
Making the Plan: Task Assignment

Project Purpose

Sub-Purpose/Task

Sub-Purpose/Task

Sub-Purpose/Task

Task

Task

Task

Task

Task

With obtainable facts / results
"let a dentist perform brain surgery"

"let someone who has never cut hair, do your hair"

Let right persons do right things

With obtainable facts / results
Making the Plan: Task Assignment

A competent team matters
- Have enough background
- Have preliminary results
- ……

Can you do it?
- Think about the competence

With obtainable facts / results
Just Like to Conduct a Requirements Engineering (W5H1) Process
Making the Plan: How this contributes

- Summarize the potential contributions in a systematical way
- Make this clear that these contributions will achieve the project objective
- State them briefly but not too brief
- Use simple language
Writing the Proposal: Check on Outline

• Make a list to organize the thoughts
  – Check through the outline to make sure it consists of
    • the issue, the objective
    • the solution, the strategies, the competence
    • The outcome, the deliverables/contributions

Make sure not miss any of the relevant details
Writing the Proposal: Tips for Writing

• State them briefly but not too brief
• Use simple language
• Emphasize on the possibility of the research’s influences
• Stress on the feasibility of your research in your research proposal
Writing the Proposal: Editing

• Following the structure (if there is)

• Edit the work
  – Be meticulous in writing, editing, and designing the proposal.
  – Revise as necessary to make it clear and concise
  – ask others to critique and edit it, and
  – make sure the presentation is attractive and engaging as well as well organized and helpful
Writing the Proposal: Proofreading

• Proofread the work
  – Get the content as clear and concise
  – Make sure to be free of mistakes
    • Any mistakes will make you look less educated and less credible, reducing the likelihood of getting approved
    • Make sure that the formatting is in line with whatever the guidelines require
Take Home Message ($A^5$-Success)

- A Proper Topic
- A Novel Idea and Rational Strategy
- A Competitive Researcher/Team
- A Good Understanding
- A Nice Story with Significant contributions