

# Topic Selection for Extramural Research Funding



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# What is Research?

- Research is a cautious, significant and detailed study about any question, issues and problems using scientific methods. It is a scientific and systematic search for pertinent information on specific topic
- According to Oxford Dictionary (1952, p1069), “A careful inquiry specially through search for new facts in any branch of knowledge”. Research comprises defining and redefining problems, formulating hypothesis or suggested solution; collecting, organizing and evaluating data; making deductions and reaching conclusion; and at last carefully testing the conclusions to determine whether they fit the formulating hypothesis
- Main motive of doing research is to make contribution to the benefit of the society



# Types of Research studies

- To gain familiarity with a phenomenon or to achieve new insights into it (**Exploratory or formulative** research studies)
- To describe accurately the characteristics of a particular individual, situation or a group (**Descriptive** research studies)
- To determine the frequency with which something occurs or with which it is associated with something else (**Diagnostic** research studies)
- To test a hypothesis of a causal relationship between variables (**Hypothesis-testing** research studies).

## Types of Research studies (Contd...)

- **Descriptive research** includes surveys and fact-finding enquiries. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening
- **In analytical research**, on the other hand, the researcher has to use facts or information already available, and analyze these to make a critical evaluation of the material.
- **Applied research** aims at finding a solution for an immediate problem facing a society or an industrial/business organisation
- “Gathering knowledge for knowledge’s sake is termed **‘pure’ or ‘basic’ research.**”

## Types of Research studies (Contd...)

- Attitude or opinion research i.e., research designed to find out how people feel or what they think about a particular subject or institution is also **qualitative research**
- **Empirical research** is data-based research, experimental type of research. Such research is thus characterised by the experimenter's control over the variables under study and his deliberate manipulation of one of them to study its effects

# What is a Research Problem?

Must have a significance

Its solution must have value- not just fascination for you

Attaining the goal may require time and effort

Many problems have long been known but not tackled

A new technique, method or apparatus often enables the solution of an older problem

Problem-oriented, not technically oriented research appreciated

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# Introduction

- **Motivation and Scope**
  - What is a **scientific project proposal**?
    - A **request for financial assistance to implement a scientific project**



# Introduction...

- **Motivation and Scope**

- Why write proposals?

- Write proposals so that you have **money to do research** and give your **contribution to understanding the world** (**Scientific career**: should be centered in the **creation of knowledge**)

- **Fund equipment** and **laboratory facilities**

- **Fund students** (both under- or post-graduate)

- Gives you **independence to attending meetings**

- » E.g., **collaborate with other scientists**, go to **conferences**, etc.



# Introduction....

- **Motivation and Scope**

- Why write proposals?

- Important indicator of **external approval of your activities**

- Raise your academic prestige

- Increase the **number of scientific publications**

- May **benefit your evaluation**

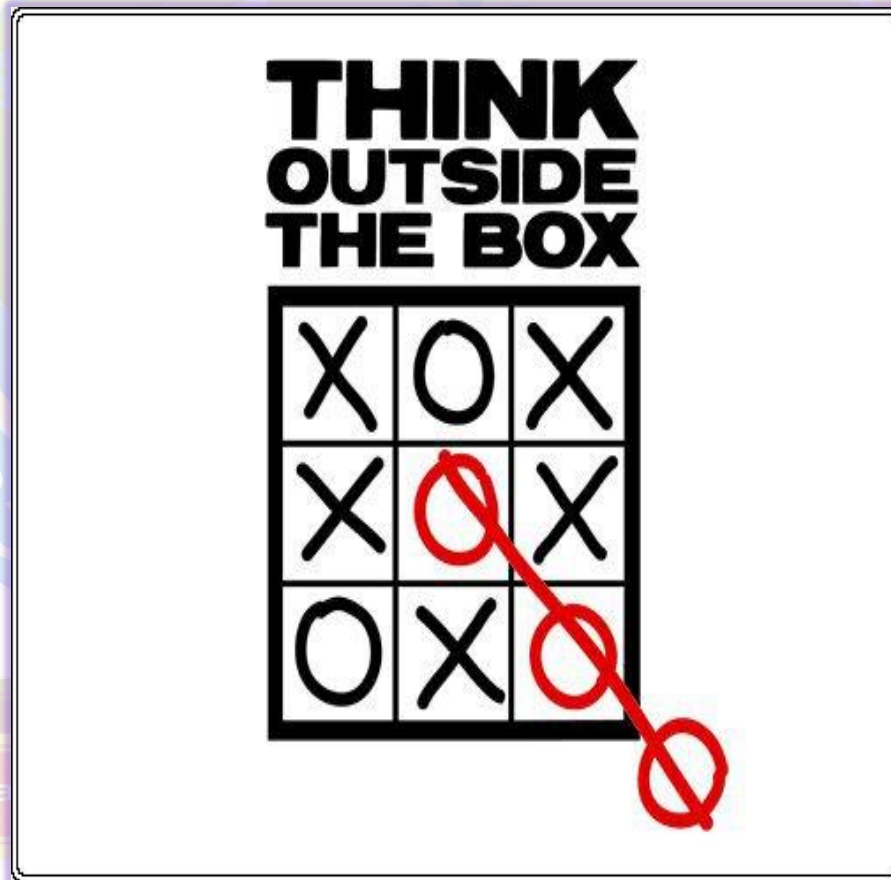
- **Grant-getters and people who publish more (always favoring quality over quantity) are ranked higher**

- May **benefit your university/ research institution financially through overheads**

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# Introduction

- Out of box thinking



# Formulating A Research Question

- **Identify a broad area of interest**  
stimulating, long term potential, focus of institution; reflect/ contest contemporary thinking; fill a gap or greater understanding; not repetitive; interest of funding agencies or policy makers; impact
- **Evaluate your resources**  
level of expertise/ interest/ comfort with topic; skills or knowledge; time; resources; collaborators to complement expertise
- **Abstract or concept papers reflecting current thinking for feedback**
- **Discuss ideas- whether fits the priorities of funding agencies**
- **Reshape your ideas**
- **Good research question should be narrow enough to address specific issues**

# Formulating A Hypothesis

## Hypotheses

- more specific predictions about the nature and direction of the relationship between two or more variables. A well thought out and focused research question directly into hypothesis
- It should give insight into a research question, be and measurable by proposed methodology, spring logically
- Provide rationale for hypothesis- how derived and why strong
- Provide alternative possibilities they could be tested and explain why you choose the ones you did over others

# FIRST STEP:

## CHOOSING A BROAD AREA OF INTEREST

- Read research articles related to your interest which you are considering that it can be your tentative topic.
- Reading a broad summary enables you to get an overview of the topic and see how your idea relates to broader, narrower, and related issues.



Contd...

- Think and rethink
- Read
- Gather information
- Shortlist various questions
- Choose the one which fascinates you more
- Significance of your interest



## SECOND STEP: SPECIFIC AREA OF INTEREST

- Review of literature
- Utilization of sources, example-browsing, reading books
- Clearing the cloud of confusion
- Search for a question for which you are passionate about



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# THIRD STEP : ARISE A QUESTION

- After sorting out a question, try to figure out three things
  - (a) Whether my question is need based (~50%)
  - (b) Does it has the potential of solving a problem that exists?
  - (c) Can my question fill the gap which is still unearthed?



Contd..



- To answer the above question we should have in-depth knowledge of the topic
- Innovative idea is always welcome
- Discussion

(a) With experts in the area: helps you to refine your topic, gives motivation, more clear idea and proper direction

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(b) Group discussion : It is always good to discuss and share the ideas that's how science expands its horizon.

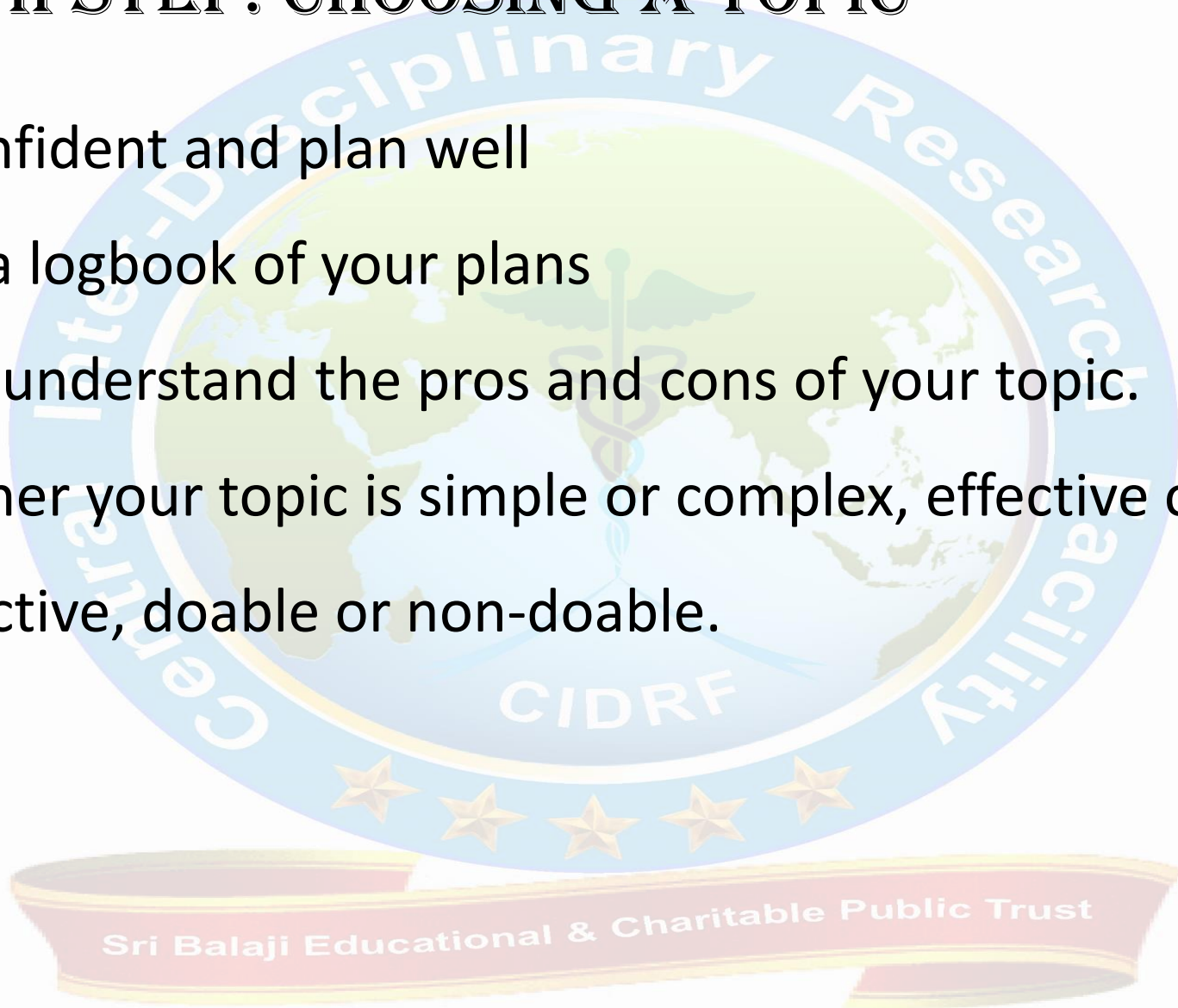
More scientific suggestions and ideas from others will add more valuable input to Your topic



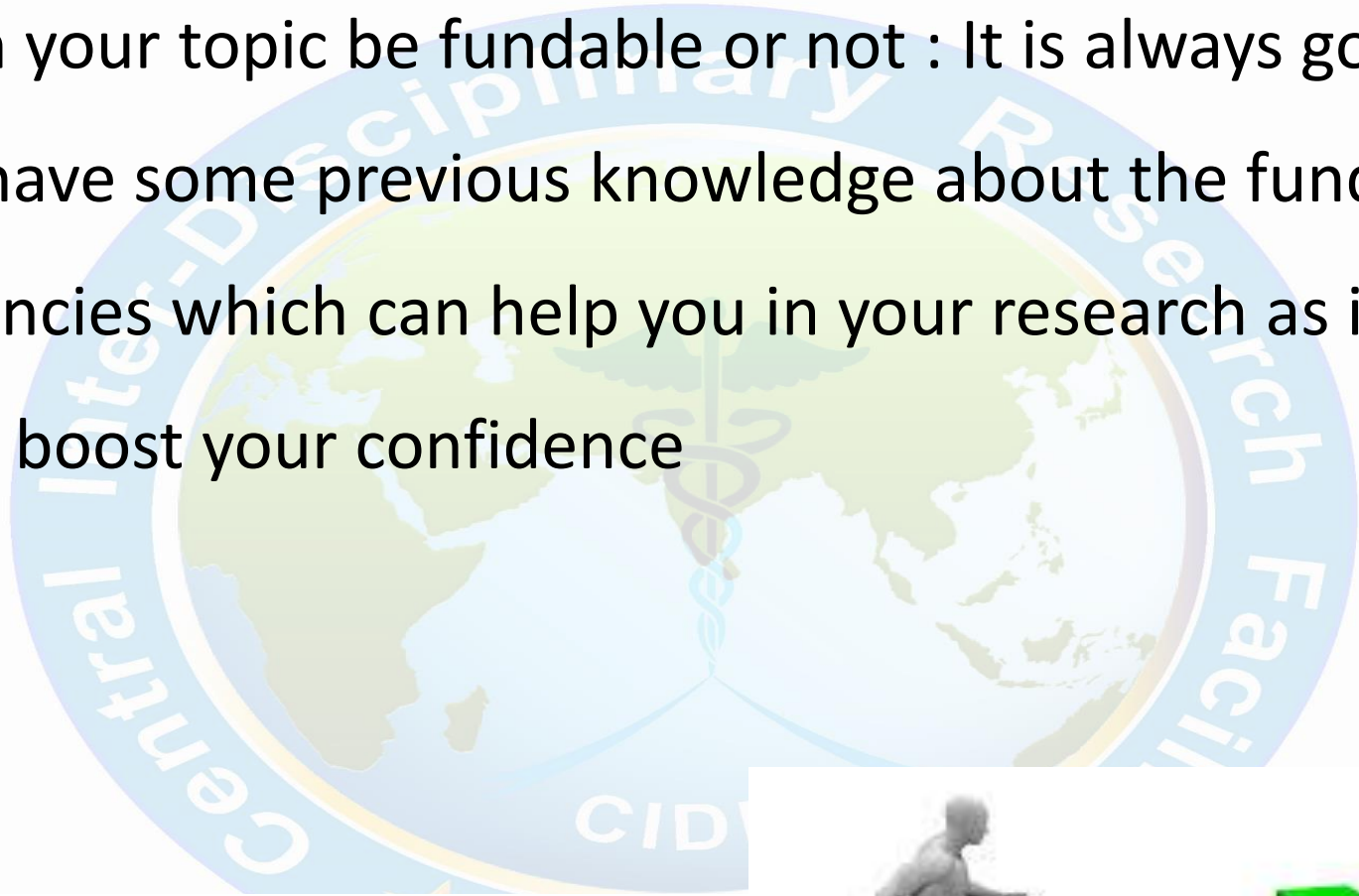
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# FOURTH STEP: CHOOSING A TOPIC

- Be confident and plan well
- Keep a logbook of your plans
- Try to understand the pros and cons of your topic.
- Whether your topic is simple or complex, effective or ineffective, doable or non-doable.



- Can your topic be fundable or not : It is always good to have some previous knowledge about the funding agencies which can help you in your research as it will boost your confidence



# FINAL STEP: EXECUTION

- Make a work plan for your research topic
- Discuss your experimental strategies with your research committee
- Get necessary ethical clearances
- Your work plan should be framed as per the facilities available to you
- Generate preliminary data or proof of concept to satisfy funding agencies

Contd..

- Be flexible- It is common to modify your topic during the research process.
- You can never be sure of what you may find. You may find too much and need to narrow your focus, or too little and need to broaden your focus. This is a normal part of the research process.
- When researching, you may not wish to change your topic, but you may decide that some other aspect of the topic is more interesting or manageable.

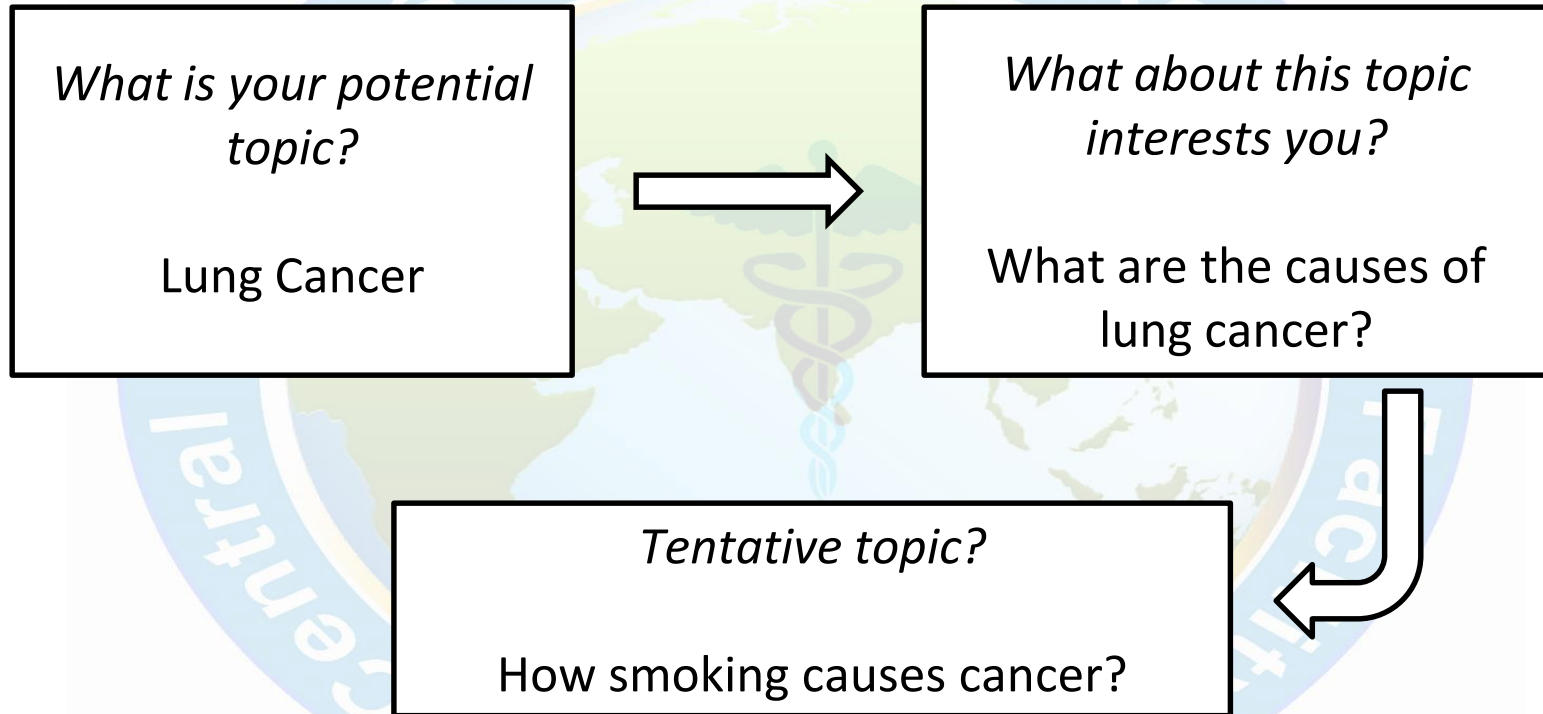
## EXAMPLE:

Broad Area - Cancer

Specific Area – Lung cancer

Topic- What is the role of smoking  
in lung cancer?

# General idea → Interest → Topic



“Now you’ve got a topic that you can begin searching in the library databases, one that you can keep refining, depending on the sources you find available in the library, literature & other sources. You’re off to a really great start.”



# ETHICAL ASPECTS OF RESEARCH

Important points to remember!

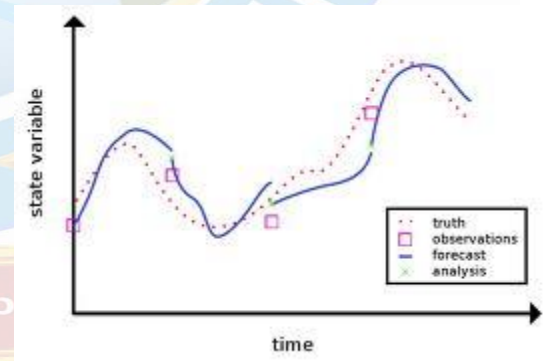
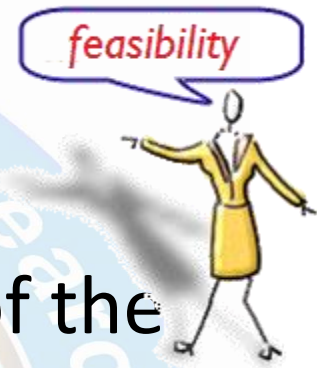
- While choosing a topic be careful that your idea will not cross the ethical issues of research
- Give proper credit to other people's ideas
- There should be no **Plagiarism**
- Idea should be **novel** and **innovative**

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# We will compare problems by imagining two axes:

## I. The first is *feasibility* ....

This axis is a function of the skills of the researchers and of the technology in the lab.



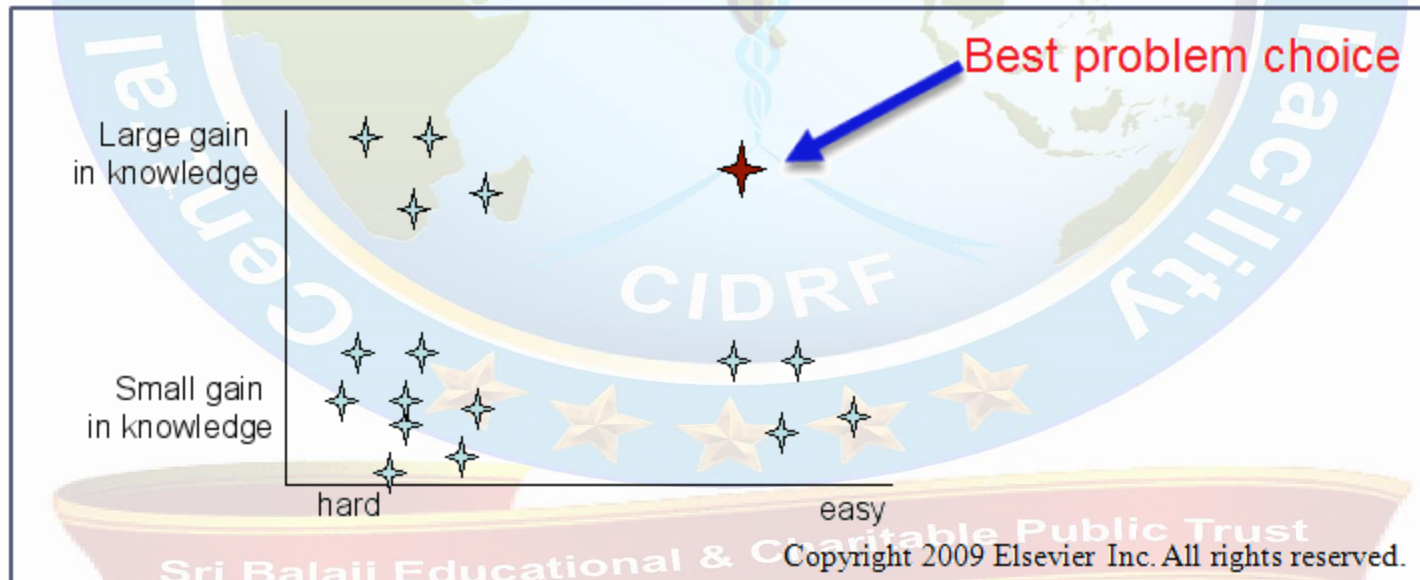
interest



## II. The second axis is *interest*:

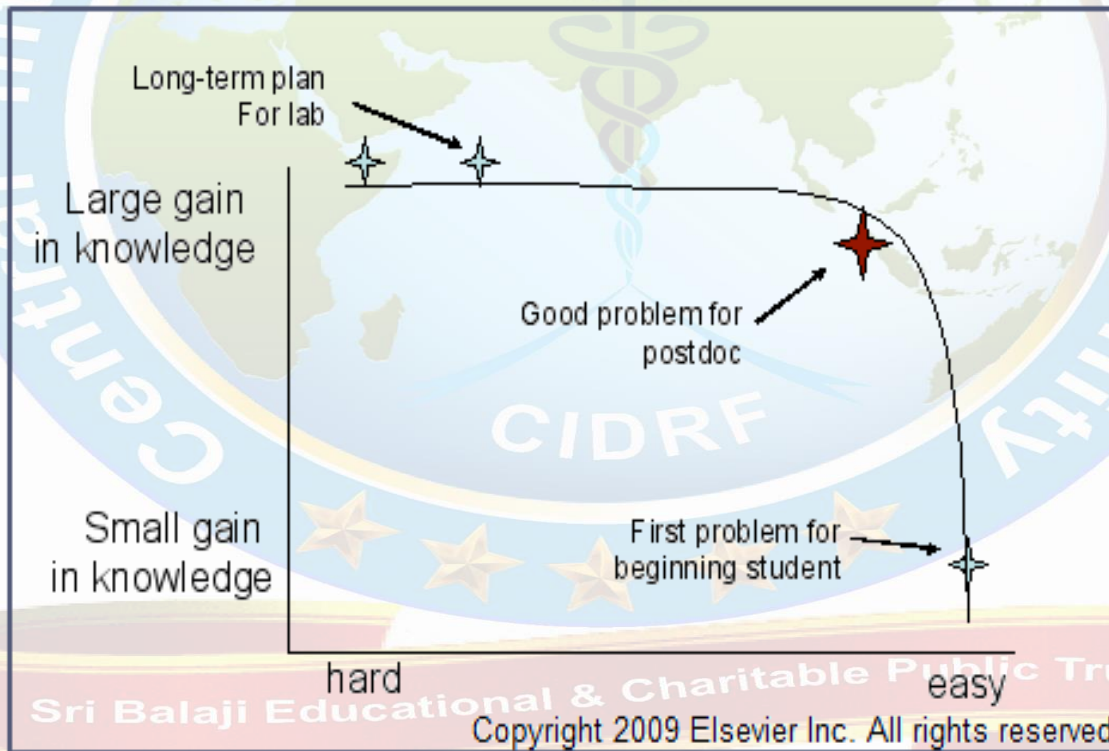
The increase in knowledge expected from the project.

Problem can rank in term of ease and interest



To decide which problem to select along the front depends on how we weigh the two axes.

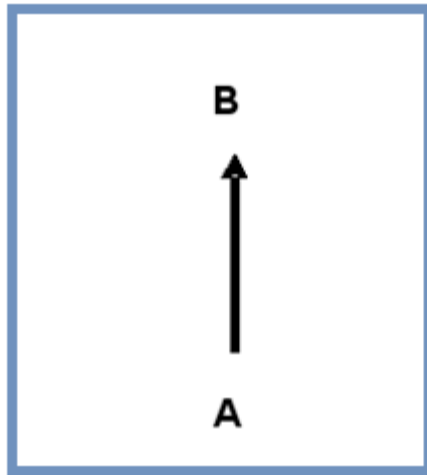
Choice of problem along the pareto front moves with life stages of scientist



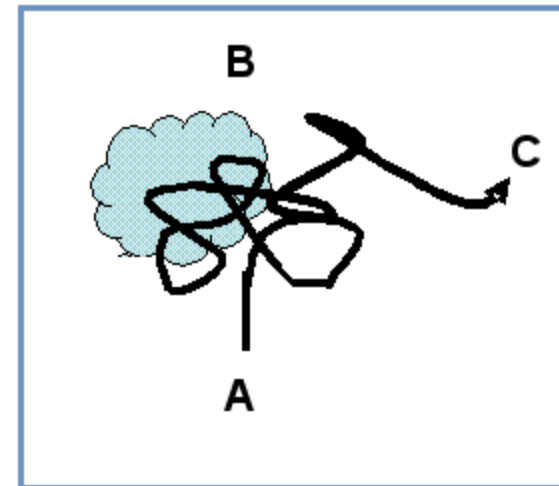
# The schema of research

- A common schema is expressed in the way papers are written: one starts at point A, which is the question, and proceeds by the shortest path to point B, the answer.

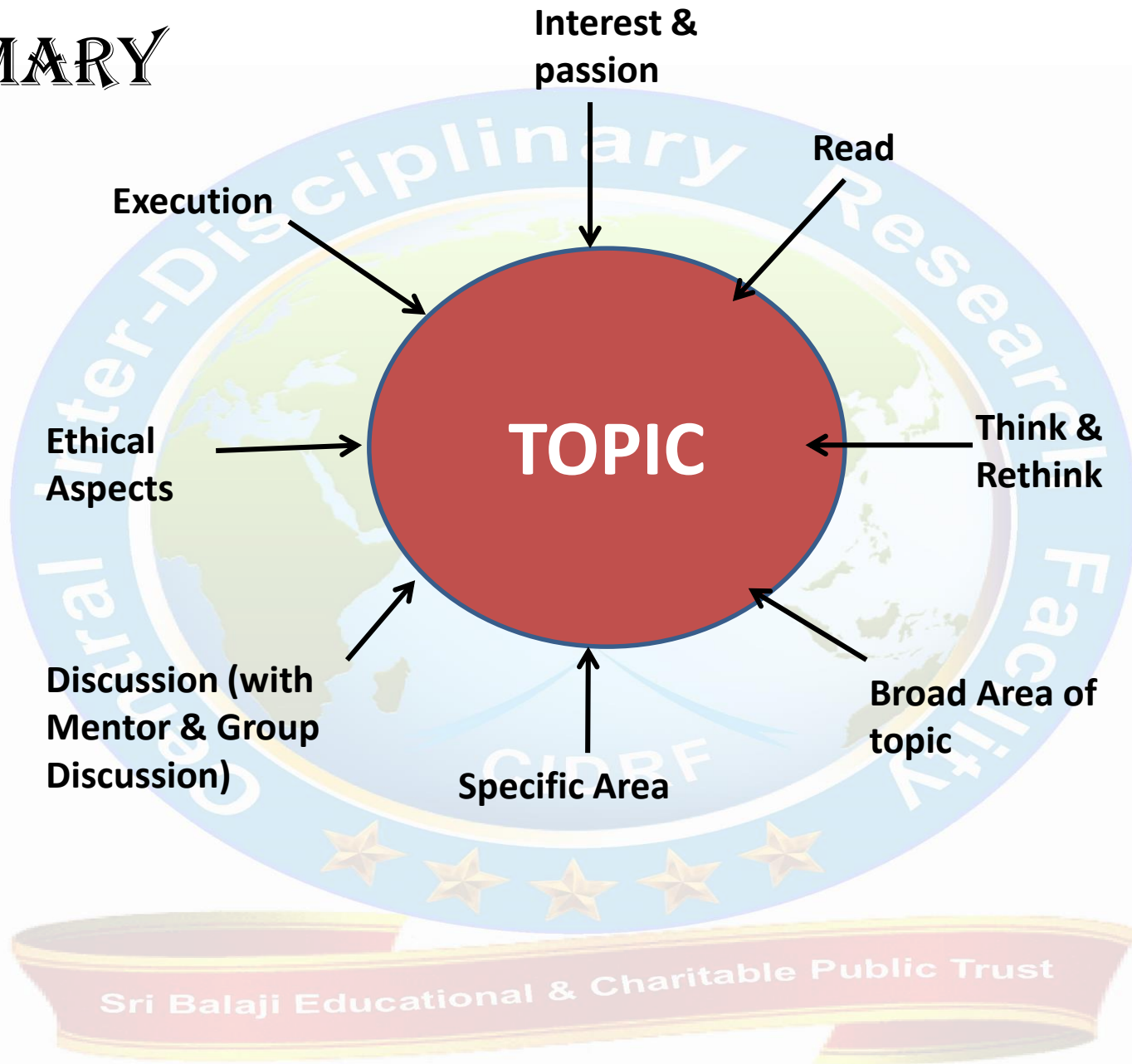
The objective schema can lead to frustration when the project goes off track



The nurturing schema of scientific research gives support and opens new directions



# SUMMARY





**THANK YOU**

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