

How to Write a Research Proposal

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The Session Contents

- ▶ What is a Research Proposal? *Definition*
- ▶ Why Do I Need a Research Proposal? *Purpose*
- ▶ How Will my Research Proposal be Evaluated? *Reviewers*
- ▶ When Should I Write my Research Proposal? *Preparation*
- ▶ What are the Main Components of a Research Proposal? *Sections*

First; Let's refresh our information... Research is.....

- ▶ ----a search for knowledge
- ▶ ----a scientific and systematic search for pertinent information on a specific topic
- ▶ ----an art of scientific investigation

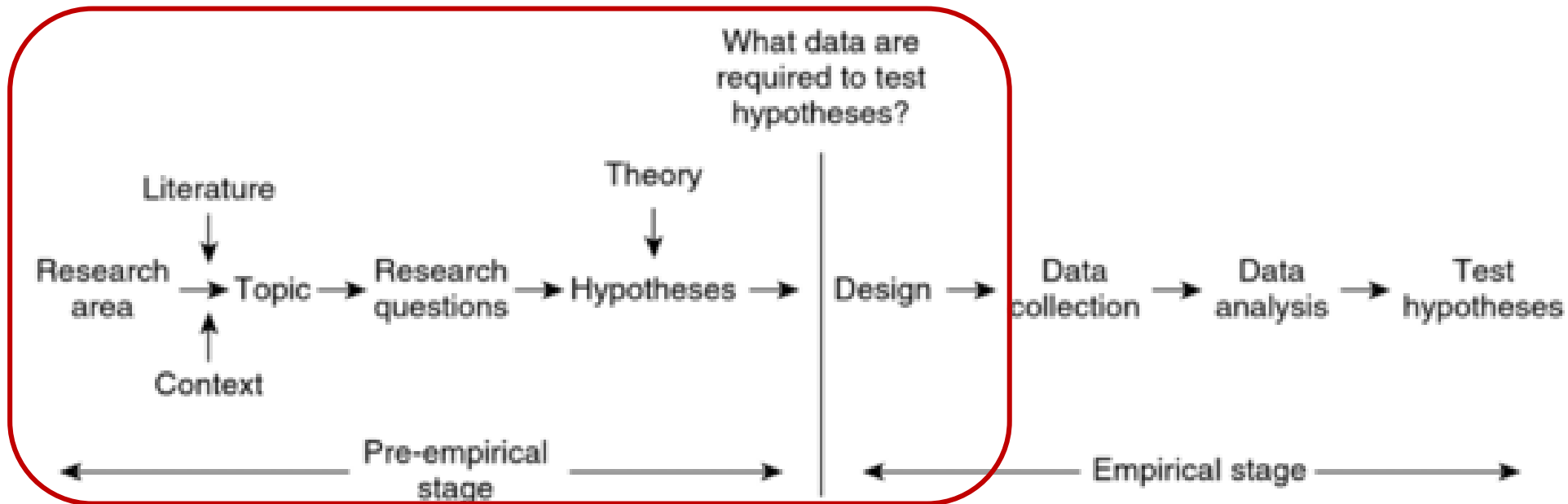


Let's refresh our information...
The purpose of Research is.....

---to **discover** answers to **questions** through the
application of scientific **procedures**



General Model of Research



Simplified Model of Research

“... the meaning of *proposal* ... suggests looking forward, to what the researcher *plans to do in the future*. ... The proposal lays out the **problem** for research, describes exactly **how** the research will be conducted, and outlines in precise detail the **resources** the researcher will use to achieve the **desired results**.”

What is a Research Proposal?

Definition 2:

“A research proposal is a **document** that describes the **essential** features of a study to be conducted in the **future**, as well as the **strategy** whereby the inquiry may be logically and successfully accomplished.”



What is a Research Proposal?

Definition 4:

- ▶ Any Medical research / Epidemiological study should have a proper proposal in written form before it is actually carried out
- ▶ It is like a **blue print** of a building plan before the construction starts



Why Do I Need a Research Proposal?

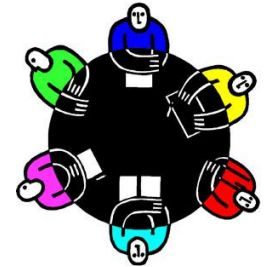
Purpose:

- Organising and developing your topic ideas
- Convincing others of the value of your ideas
- Demonstrating a Working Knowledge of the Process
- Demonstrating expertise &/or competency
- Planning tool in initiating the research process
- Being a basis on which to develop your research
- Identifying an appropriate supervisor
- Serving as a contract, Obtaining support and early access rights

How Will my Research Proposal be Evaluated?

Reviewers:

- Review Committees, Panels:
 - Mixture of **experts in the field** and from **cognate disciplines**
 - Not only Specialists, but also Generalists
- Individual Reviewers



What are the skills needed to write my Research Proposal?

- Writing a research proposal is both science and art
- You will need:
 - ✓ Good **scientific** facts
 - ✓ The art of clear **communication**



When Should I Write my Research Proposal?

- A substantial amount of work has to be done **BEFORE** a proposal can be submitted
- Writing a formal research proposal should be started by the time you have decided on the Research question
- At a student level (both undergraduate and postgraduate), A research proposal is an **interactive** process: Seek **advice** on your **draft(s)** from faculty and seniors/peers
- A probable duration is ± 6 months



What are the CORE Components of a Research Proposal?

1. **WHAT** do you want to do?
2. **WHY** do you want to do it, **WHY** is it important?
3. **WHO** has done similar work?
4. **HOW** are you going to do it?
5. **HOW** long will it take?
6. **HOW** much is needed?



What are the CORE Components of a Research Proposal?

1. A description of the **Research Question**
2. **A Statement** of why the problem is important
3. A review of **relevant literature**
4. A description of the proposed **methodology**
5. **A time frame/time-line** of activities
6. **A detailed budget**

What are the ADDITIONAL Components of a Research Proposal?

1. **HOW** will the research findings be **disseminated**?
2. **WHAT** are the research **team** members' **capabilities** and **roles**?
3. Is the **institutional ethical approval** obtained?
4. **WHAT** are the anticipated **problem**? How would they be **faced**?
5. Any **other requirements** by the **funding agency**?

i.e.

Find out **exactly** what the funding
agency expects in a proposal,
and **do it!**

The Research Question

Find a Research Question/Research Problem.

Tips: where to get a research question?

1. Personal interest
2. Regional, national, international concerns
3. Previous research (Scanning/Reading published research)
4. Observation of the world
5. Questioning the validity of a generally accepted procedure
6. Replication – Redoing the same thing with an expectation of the same result
7. Designing and developing of new research tools/techniques
8. Developing new models

Write the Research Statement (Research Purpose/Aim)

Purpose
Research

The purpose of this research study is to test the theory of ---that ----
(compares? Relates?) the -----(independent variable) to -----
(dependent variable), controlling for -----(control variables) for --
----- (participants) at -----(the research site). The
independent variable(s) -----will be defined as -----(provide a
definition). The dependent variable(s) will be defined as -----
(provide a definition), and the control and intervening variables, -----
----- (identify the control and intervening variables) will be defined
as -----(provide a definition).

The Research Proposal's Aims (Expression of the Research Problem)

- ▶ In the aim statement, the following is specified:
 - ▶ the place of research
 - ▶ the guiding theory for the research
 - ▶ the type of study – quantitative or qualitative
 - ▶ the method
- ▶ For example: **The aim of this research is to perform a quantitative case-control study to investigate the metabolic association of leptin gene and protein expression levels in adipose tissue and the cardiovascular function in adult Saudi individuals'.**



The Research Questions (Expression of the Research Problem)

- ▶ Sometimes, you can express the Research Problem in a sequence of specific **Research Questions (RQ):**
- ▶ For example:
 - ▶ **RQ1** – What is the gene expression level of leptin in adipose tissue of obese Saudi individuals?
 - ▶ **RQ2** – the protein expression level of leptin in adipose tissue of obese Saudi individuals?
 - ▶ **RQ3** – What is the relation between the measured leptin gene and protein expression levels?
 - ▶ **RQ4** – What is the relationship between the gene &/or protein expression levels and the clinical status of the subjects' cardiovascular system?



The Research Proposal's Objectives

- ▶ The objectives are normally expressed as a set of closely specified statements that **would enable the aim to be achieved**.
- ▶ The objectives are likely to be the '**milestones**' of the research as it progresses.



The Research Proposal's Objectives

- ▶ This section needs deep thinking: A pivotal section & everything else in the study is trying to fulfill it!
- ▶ The objective(s) of the proposed study should be:
 1. stated very clearly
 2. specific
 3. achievable
 4. measurable
 5. reasonable (not too many. Even just one, clearly-stated relevant objective would be good enough.
 6. presented in the appropriate order of importance (if >1 objective are suggested)



The Research Proposal's Objectives

- ▶ In business research, the objective(s) of the proposed study should be

SMART:

1. **S**pecific
2. **M**easurable
3. **A**ttainable/Achievable
4. **R**elevant
5. **T**ime Based



Objectives of the Research Proposal:

- ▶ For a Research Proposal with the aim of: *“To investigate the role of diabetic educators in self-educating diabetic patients attending KKHU Diabetic Clinics and their families to detect manifestation of hypo/hyper glycemia”*
- ▶ Examples of Objectives:
 - ▶ Objective 1– Develop and pilot the methodology
 - ▶ Objective 2 – Clarify and define the population for the study, and select the sample.
 - ▶ Objective 3 – Distribute the questionnaires and follow up with a telephone enquiry for maximum response.
 - ▶ Objective 4 – Analyse the data and present the findings.
 - ▶ Objective 5 – Make recommendations to improve management practice.

The research problem: Aims, Questions, or Hypotheses?

- ▶ **THE AIM STATEMENT:** Using an aim statement to specify a research problem works well when the research is of a broad, exploratory or investigative nature.
- ▶ **RESEARCH QUESTIONS:** Using this method expresses your research problem in a much 'tighter' manner from the start, and is suitable where you have a clear set of issues arising from the literature that addresses the research problem.
- ▶ **RESEARCH Hypothesis:** Using a set of testable hypotheses – a set of logical, reasonable, tentative explanations of the subject under investigation.

The research problem: Hypothesis

- ▶ The research problem can also be specified using a set of testable hypotheses.
- ▶ It is normal to reject the 'null hypothesis' (H_0) before testing alternative hypotheses.
- ▶ The null hypothesis states that the two variables under consideration occurred solely by chance.
- ▶ If the null hypothesis is rejected, alternative hypotheses may be developed.

The research problem: Hypothesis

- ▶ The following hypotheses could be tested:
 - ▶ Hypothesis 1: Level of leptin gene expression is positively related to the level of leptin protein expression in adipose tissue
 - ▶ Hypothesis 2: Level of leptin gene expression is positively related to markers of cardiovascular system dysfunction.
 - ▶ Hypothesis 3: Level of leptin protein expression is positively related to markers of cardiovascular system dysfunction

The research problem: Hypothesis

► In a research study it is normal to either **support** or **reject** a hypothesis.

If the hypothesis is **rejected**, this would commonly lead to the substitution of a new hypothesis that is then either supported or rejected.

► If a hypothesis is **supported**, it may later be supported by further studies. Eventually, a hypothesis that is well supported from multiple sources may be developed into a well-grounded theory.

The Research Proposal's Introduction



- ▶ The problem proposed to be studied is introduced in this section
- ▶ It should help the reader to familiarize him/herself with the topic
- ▶ Introduction should be **short** (depending on the words/paragraph/page limits of the required application form).
- ▶ The problem should be stated in such a way that it's **importance** and **relevance** is realized by readers.

The Research Proposal's Introduction

A general template for writing a good introduction consists of five parts.

1. The research Problem
2. Studies that have addressed the problem
3. Deficiencies in the studies
4. The significance of the study for particular audiences
5. The purpose statement

This is called: the "Deficiencies Model"



The Research Proposal's Review of Literature

- ▶ It helps the investigator and reviewers to:
 - ▶ gain good knowledge in that field
 - ▶ have insight on different applicable methodologies
- ▶ **Should be:**
 - ▶ Extensive
 - ▶ Stating what is already known about the topic & the gaps or unanswered questions
 - ▶ coherent, relevant and easily readable knowledge
- ▶ **Should not be:**
 - ▶ Just quoting the literature word-by-word



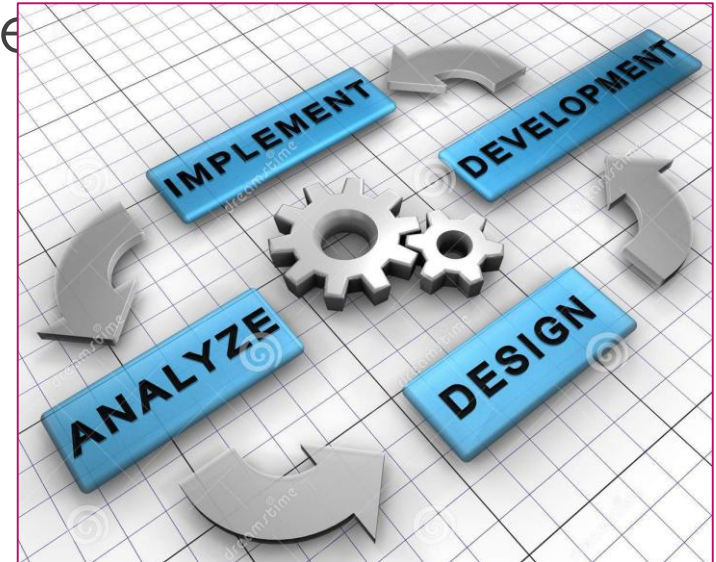
The Research Proposal's Review of Literature

- ▶ The literature review of the proposal is likely to be a list of possible sources related to the research problem. The sources must be closely related to the research you intend to carry out.
- ▶ **Literature review may contain:**
 - ▶ critical explanation of main theories that could guide the research
 - ▶ professional websites related to the research topic
 - ▶ Journal articles related to the research



The Research Proposal's Methodology

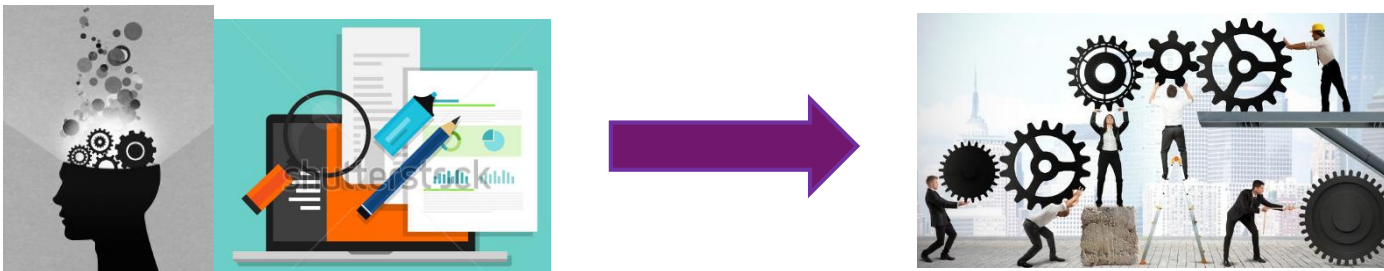
- ▶ This is your way to systematically solve the research problem.
- ▶ It describes how research is done scientifically
- ▶ Investigators need to know the methods & techniques
- ▶ But methodology is more detailed and includes
 - ▶ Study design
 - ▶ Study population / Sampling specifications
 - ▶ Sample size needed
 - ▶ Instrumentation/Facilities
 - ▶ Specific procedures



The Research Proposal's Methodology.

Study Design:

- ▶ Is a specific plan or protocol for conducting the study
- ▶ It allows the investigator to translate the conceptual hypothesis into an operational one.
- ▶ The study design should be:
 - ▶ Clearly-stated
 - ▶ Appropriate for achieving the objective(s)



The Research Proposal's Methodology.

Study population / Sample specifications

- ▶ Which would be the study population?
- ▶ How study subjects would be selected? (Recruitment plan)
- ▶ Randomization process
- ▶ Other relevant details



*“...it would be nice
to just observe ALL
of the people...”*

The Research Proposal's Methodology. Inclusion and Exclusion Criteria

- It is important to describe in details the characters of the subjects to be included and those of the subjects to be excluded.



The Research Proposal's Methodology.

Sample size:

► How large should my sample be?

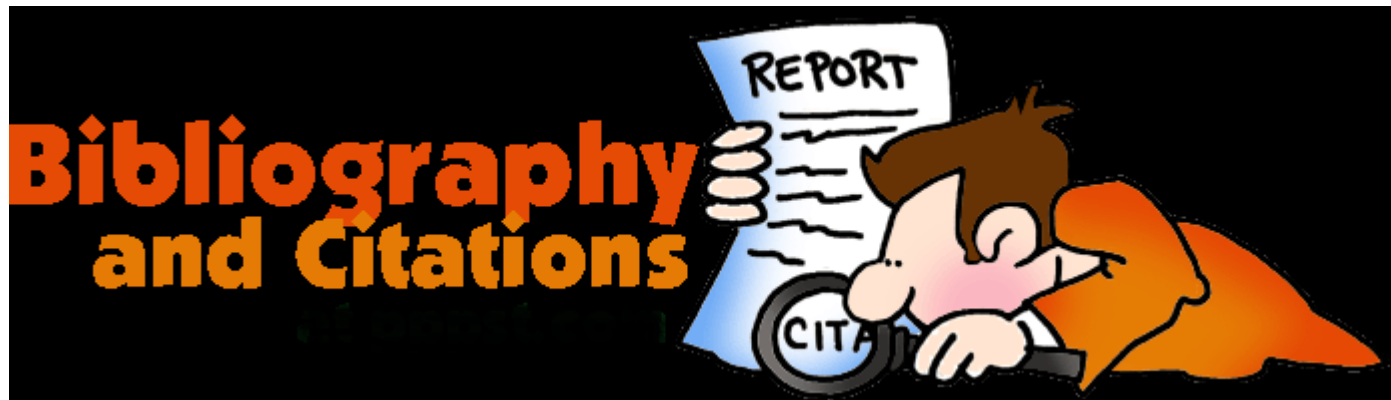
It is important to mention in the protocol what would be the **minimum sample required** and how was it calculated.

- Determination of sample size is a bargain between precision and the price (Resources & expenses involved)
- There are statistical equations to determine the sample size.



Preliminary Working Bibliography:

- ▶ Materials cited in the proposal
- ▶ Full bibliographical details
- ▶ Style of citation



What is the Significance of the Study

- ▶ Why this study is significant?
- ▶ Why do it now?
- ▶ What will it contribute to the existing research literature?
- ▶ What implications your findings may have?
- ▶ Who will benefit from it?



What is the Time Frame & Work Schedule?

- ▶ The sequence of tasks to be performed
- ▶ The anticipated length of time required for its completion
- ▶ The personnel required
- ▶ It can be presented in tabular or graphic form



What are the needed Facilities?

The proposal should include the important facilities required/available for the study:

- ▶ computers
- ▶ laboratories
- ▶ special equipmen; e.g. EM, Confocal microscopy, Flow Cytometry, Autoanalyzer...etc



Research Personnel

- ▶ Senior Personnel:
 - ▶ The Principal investigator (PI)s
 - ▶ **Their qualifications, research experience and expertise, and their major roles**
 - ▶ Consultants (±)
- ▶ Other Research team Personnel:
 - ▶ Researcher(s)
 - ▶ Research assistant (s)
 - ▶ Under/Postgraduate student(s)
 - ▶ Physician(s)
 - ▶ Nurse(s)
 - ▶ Administrative(s)/Accountant(s)
 - ▶ Others



Research Budget



- ▶ The budget translates project activities into monetary terms
- ▶ It is a statement of how much money will be required to accomplish the various tasks

Major items

- ▶ **Incentives:** Salary for investigators/stuff
- ▶ **Insturments/Reagents:**
 - ▶ Purchase of equipment
 - ▶ Maintenance of equipment
 - ▶ Software, database registry

▶ Miscellaneous:

- ▶ Travel
- ▶ Stationary
- ▶ Consultancy charges
- ▶ Publication fees
- ▶ Institutional overheads

الميزانية المقترحة* Proposed Budget*		
اعتقاد الصرف USRSP Approval	المبلغ المطلوب (ريال) Required Amount	تفصيل الميزانية Budget Details
أولاً، المكافأة (Incentive)		
Certified معتمدة	5000	الطلبة الباحثون Student Investigators
ثانياً، المستلزمات (Expenses)		
		الأجهزة Equipment /Tools / Application
		البرمجيات Software
		المواد Materials
		أدوات قياس Research Instruments
ثالثاً، التفرقات (Miscellaneous)		
		1.
		2.
		3.
		4.
		5.

* لا يزيد إجمالي الميزانية عن 10,000 ريال (غير شاملة المكافأة).

*Cannot exceed SR 10,000 (Not including the incentive for student researchers).

The Research Proposal Ethical Considerations..

- ▶ If your research will include minorities or any human- or animal-based research data that may cause harm, you must indicate this clearly in the research proposal.



Will be discussed in a separate Session...

TAKE HOME MESSAGE

- ▶ The research proposal is the '**gateway**' to your research
- ▶ Develop a clear set of **aims/objectives**.
- ▶ If your research warrants it, use research questions and/or hypotheses.
- ▶ Consider **the ethical implications** of your research.





THANK YOU!