# A PERSUASIVE STRUCTURE FOR SCIENTIFIC RESEARCH PROPOSALS

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This document is based on the thoughts of Dr. Les Gasser, University of Illinois at Urbana-Champaign, developed through my own reflections on writing a persuasive PhD research proposal. Dr Gasser's original is at http://www.isrl.uiuc.edu/~gasser/info/research-schema.html .

## Structure of Proposal

The basic structure for a research proposal is shown in Figure 1. The numbered arrows refer to the section numbers, below.
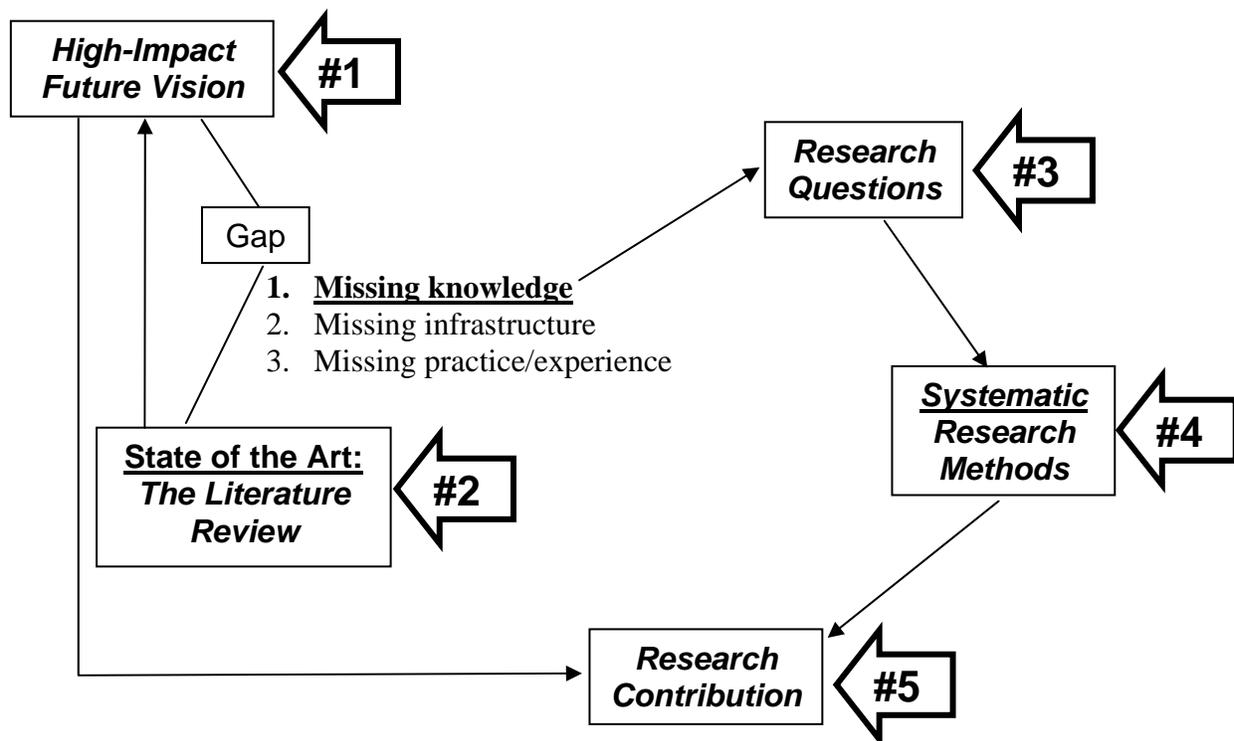


**Figure 1. Structure of a Persuasive Research Proposal**

Although these elements are presented as a "top-down" progression, they are closely interrelated. The process of research design is iterative, as you refine the elements of your proposal to be internally consistent and externally credible and acceptable.

## 1. Making The Case For Your Research

This element has three components: a vision of the future (once your research is complete), the state of knowledge now, and the gap between the two, that justifies the significance of your research.

### 1.1 High-Impact Future Vision

This element is the most important part of the proposal, because it justifies (and makes you focus on) the <u>contribution</u> of your research. Contribution can be defined in two ways, theoretical and practical. The first section of your proposal will deal with the practical impacts and the very last section will deal with the theoretical contribution. To do this, <u>you must articulate your overall</u>

(high-level) **research problem**, clearly and simply – not in academic terms, but in terms of how understanding this problem will make the world a better place.

In the first section, discuss what the world will be like, when your research is completed. What will the research you propose lead to - and why is that important? How will this research change the world for the better? Think of this as a *competitive* investment decision: why should your research be supported in contrast to other proposals submitted? (In the future, you will have to position your work in relation to that of other academics, so best start now …). What vision or outcome is driving the work you propose, and what will its impact be? The issue of impact is critical, and is one that many researchers do not think through objectively, or articulate clearly.

## 2. Literature Review

In this section (which should be substantial), you must justify the state of knowledge, by synthesizing this knowledge across multiple literature research areas and sources. The point of this synthesis is to summarize the state of the art (what we know and what we can do as a result of this knowledge) and to identify lacunae in our knowledge (what we do not know and what we cannot do, as a result of these lacunae).

### 2.1 State of the Art

This section contains your literature review. Although this section may critique existing literature in terms of limitations of the methods used, the method is not the main focus. Focus on:

1. Mapping the areas of knowledge (research communities) that are significant in defining the state of knowledge about your research problem.

2. Identifying the state of knowledge about your research problem and discussing this in relation to what it tells us … and what is missing from the big picture.

3. Deriving **conceptual frameworks or models** that will guide your own research studies. There is nothing sadder than a paper that says "elements A, B, and C are important in determining XXX" without providing any basis for that statement. Why these elements and not others? What is the relationship between them and how do they appear to affect the outcome that you are analyzing? In other words, what conceptual model or framework guides your selection of variables or phenomena for study? Outlining these now will save you a lot of grief when writing up! The PhD evaluation criterion is defined as **making a significant contribution to knowledge**. The frameworks and models that you derive will be part of that contribution – they should actually contribute (synthesize), rather than just reusing the ideas of others.

### 2.2 Gap Analysis

The next issue is, in effect, an answer to the question "Why can't we just do that now? To use academic terminology, you identify lacunae in the literature. Why is there a gap between the current practice and the vision? What is missing?" Three things could be missing:

1. **Basic knowledge:** We don't know how to do this, and need the basic knowledge.

2. **Infrastructure:** We know how to do it but don't have the hardware, the databases, the community, etc. to do it.

3. **Practice and experience:** We know how to do it in principle, and we have the necessary human/technical infrastructure, but we have never done it - we need the practice and experience to work out the details.

The summary to each section of your literature review should state clearly the lacunae arising from your review of the literature, should outline what knowledge is necessary to achieve your

vision, and briefly discuss how your research will produce this. The last element can be presented in the form of *research questions*.

## 3. Research Questions

Needed knowledge is most often articulated in the form of some specific *research questions*. Depending on your research philosophy – and the extent to which your research problem may be viewed as dealing with investigation, exploration, or confirmation of extant theory – you will produce open research questions, research propositions, or research hypotheses from this discussion. You should justify the *form* of your research questions according to (i) your research problem, (ii) norms in your specific research field, and (iii) the known preferences of your research committee or reviewers.

## 4. Systematic Research Methods

This section discusses what tractable, systematic *research methods* will lead to credible answers to your questions, and thus to new basic knowledge? Good research methods and plans lower perceptions of risk on the proposal. What do you want to discover and how will you evaluate whether you have discovered this? You should review the methods used by other researchers in your field and also examine the intended outcome of your research, to determine how you will approach your research design.

At this point, draw up a timetable for your research, showing the major stages and deliverables from the study/studies, in the form of a Gantt Chart. For each research question, define five elements:

### 3.1 Research Objectives

Research objectives and evaluation criteria (below) are often overlooked when writing a proposal. *Paying attention to these elements will provide you with a distinct advantage, in terms of focus.* What is the objective of answering this research question – what will you know (have discovered) once you have answered it? What type of outcome do you expect to achieve from your data collection and analysis – for example, will you prove or disprove specific hypotheses, answer a specific question definitely, or provide rich insights that help to answer a specific question tentatively? *To give you some insight on this*, Walsham (1995) discusses four types of generalization which may be obtained from IS case studies:

1. The development of concepts, e.g. "informate" (Zuboff, 1988)
2. The generation of theory, e.g. Orlikowski & Robey's (1991) theory of the organizational consequences of IT
3. The drawing of specific implications, e.g. Walsham & Waema (1994): the relationship between design and development and business strategy
4. The contribution of rich insight, e.g. Suchman's (1987) contrast of situated action with planned activity and its consequences for the design of organizational IT.

The contribution is related to the next element, research design. Obviously, other types of contribution pertain to other types of research method. For example, you can prove or disprove theory using a quantitative sampling method, such as survey research. Relate your contribution back to the high-impact vision. How will making this contribution enable you to achieve your vision (this is the research contribution, to be elaborated below)?

### 3.2 Research Design

This element deals with matching the research method to the question. What data collection and analysis methods will be used to answer the question and how will using these specific methods achieve your objective? Why will using these specific methods achieve the objective that you

defined (section 3.1)? What are the <u>alternative methods</u> that you could employ and what are your selection criteria, in choosing this specific method or methods? What results have other authors achieved with these (or alternative) methods? You may critique the limitations of other studies to justify your own approach. How will you ensure that you apply these methods rigorously?

### 3.3 Expected Findings

This section outlines what you expect to be able to report, having concluded your research. For each research question, how will obtaining <u>specific results</u> from your data provide you with evidence that answers the research question and that achieves your objective?

### 3.4 Evaluation Criteria

This element deals with how you will know if you have achieved your research objective(s). Once you have defined the outcomes, how do you intend to <u>evaluate</u> whether you have achieved them? What criteria will you apply, to determine whether your data analysis has achieved what you set out to achieve?

### 3.5 Anticipated problems and alternative strategies

You will (doubtless) encounter some problems in achieving the outcome that you intended. For example, it may be that your hypotheses are not supported by the data collected, or that transferring "best practice" elements of prior observational studies to an experimental context may prove more difficult than anticipated. How could your obtain an alternative source of data (e.g. perform more studies on a different sample), or use the data that you have to achieve an alternative outcome (e.g. provide rich insights on the situation, instead of providing substantive theory)? You should clearly state what you will do, in the event that your evaluation does not reveal the outcome that you planned. Derive a contingency plan, to provide you with sufficiently good findings to achieve an outcome that is near to the "high-impact vision" that you had planned. Determine the impacts on your timescales of adopting the contingency plan and map out exactly what would need to be done, to retrieve the situation. Doing this in advance will not only impress your reviewers/committee, but it will save you a lot of stress when things go wrong (and they will!).

## 4. Research Contribution

As I stated earlier, the PhD evaluation criterion is defined as **making a significant contribution to knowledge**. This section deals with the intellectual contribution of your research, which is then related to the three elements discussed in the gap analysis, above:
1. Basic knowledge.
2. Infrastructure.
3. Practice and experience.

In general, there are two areas where IS research can have a significant impact: contribution to research and contribution to practice. Both of these elements should be discussed.

**Contribution to research.**

- **Contribution to knowledge.** The determination of theory, frameworks, knowledge, or approaches to guide the practice and/or management of <u>specific types of activity or context</u> (e.g. see Walsham's four types of contribution, above);

- **Contribution to method.** *[May be achieved, but not necessary].* The development of research methods that enable different types of outcome than those achieved previously.

**Contribution to practice.**

- The design of appropriate technology support for <u>specific types of activity</u>, to enable technology users to achieve specific outcomes, or the analysis of technology impact on <u>specific types of context</u>, or the .

Note that the significance of much research is emergent – the point of this section is to focus your mind on what you intend to achieve and to enable you to assess what you achieve as your progress. For example, while Zuboff (1988) developed a new theoretical concept that helps researchers understand how IT supports organizational work in different ways, it is unlikely that she set out to do this. It is worth thinking about the potential contributions of your work, in terms of *alternative* contributions that you may make. Be temperate in your claims to contribution -- you can always upgrade these later …

*Finally*, consider how making these contributions will allow you to achieve your high-impact vision. This summary of the proposal tells the reviewer about the <u>significance</u> of your research and makes a persuasive case for supporting the research proposal.

## References

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