Good Practice Guidelines for Writing a Funding Application for Research

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Head of Research

Write lots of grants

- Brings focus to your idea and how to turn it into a tangible research project

- Forces you to consider all aspects of the research lifecycle:
    - Originality of your idea by means of a thorough literature survey
    - Feasibility of performing the research necessary to test it
    - Estimation of costs and resources needed
    - Consideration of what your competitors and potential collaborators are doing
    - Workpackages (or who should do what)
    - Timelines (and are they realistic)
    - Intellectual Property issues
    - Potential for commercialisation

- Provides an (often external) independent peer-review feedback from which one can learn about improvements that can be made
    - Feedback teaches you to reconsider your hypothesis or approach

- Depending on the funding call, success rates are <20%

Consider the SWOT

Strengths

Indigenous & FDI enterprise base in smart ocean technologies (>50), with strong research orientation.

FDI-led research, e.g. IBM, Veolia, Intel.

Wider indigenous & FDI enterprise base in ICT

Ireland's geographic location

HEI research capabilities in marine and ICT. Both with collaborative links to industry.

HEI research in other potentially enabling fields, e.g. nano, bio

Existing collaboration between industry-HEIs-State

Marine research infrastructure (e.g. vessels, test sites) & datasets (e.g. seabed mapping)

Ambitious marine renewable energy target (2020) & potential comparative advantage in marine renewable energy (long term)

Weaknesses

Requires engagement across multiple (very different) scientific fields and enterprise sectors that have little experience to date in each others' domains

No defence sector and very limited offshore oil & gas and shipping sectors (limited expertise; limits scope for collaboration with these sectors; limited near term local market beyond test-bedding or niche applications)

Smart ocean may struggle to compete on wider ICT research agenda because of relatively small market size (compared to other markets for ICT applications)

Opportunities

Small but growing global market (marine IT & survey = €6.7bn; of which real time marine monitoring = €0.2bn) driven by demand from massive, related marine sectors (oil & gas, shipping, transport, defence, marine renewables, fisheries & aquaculture)

Different applications for different technologies is opportunity for niche players

Threats

Research capability & infrastructure in other jurisdictions, e.g. USA, Canada

Well established marine sensor companies not located in Ireland, especially with expertise in offshore oil & gas and defence applications

SWOT example for an application in Ocean Energy

From draft of the Research Prioritisation Report

Establish the need for the research

1.2.1 Global and National Challenges

Between now and 2050, growth in global population and changing diets in emerging countries are projected to bring about a 70% increase in food demand to feed 9 billion people. In a world which will become increasingly economically integrated and affected by climate change and environmental degradation, **agricultural sustainability** is becoming a significant issue. Future sustainability largely depends upon key resources such as farmland, water and functioning ecosystems. The fundamental vision for 2050 is that of a world that is able to guarantee a growing population access to and control of safe, nutritious and culturally acceptable food and to manage the necessary balance between food demand, health and nutrition requirements and natural resources. Global systems for producing and distributing food must also be more resilient, more sustainable and more equitable[1].

EU agriculture in particular is facing a wide range of future challenges, which include: further globalisation, tightening of energy supplies, climate change, unsustainable consumption of natural resources, and the recent rise in food prices[2].The farming demographic in the EU is changing with number of farmers decreasing, farming labour force getting older, and lack of diversity away from production. Yet the socio-economic and environmental importance of

Draft report from Forfas Research Prioritisation Exercise

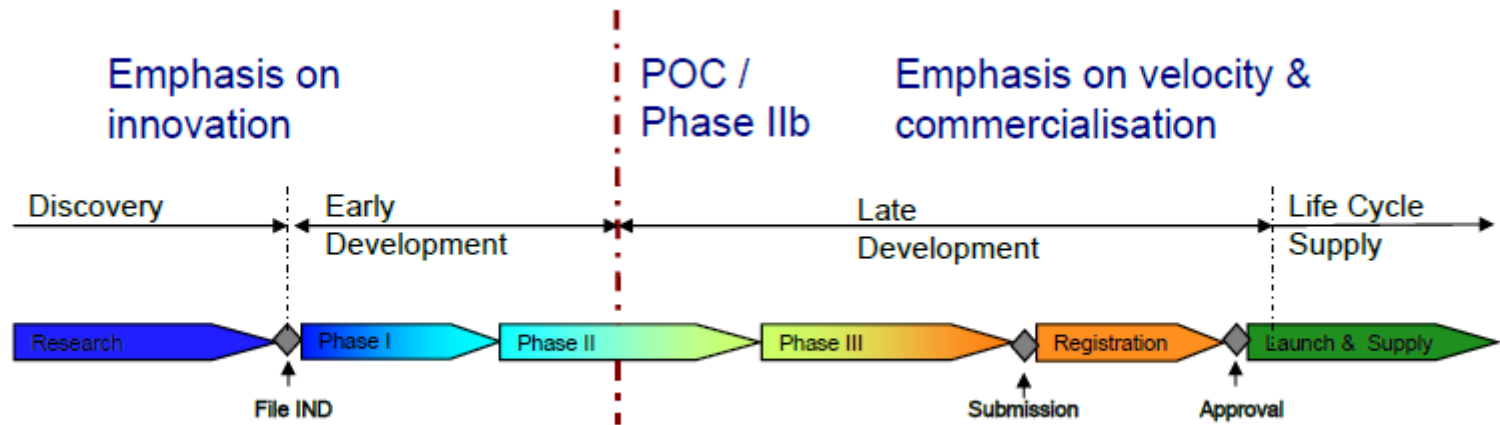*Note the specificity of the text*

Look for the Industry Angle

"If Irish industry is to grow, it needs to move progressively to undertaking research that will underpin products several generations forward and to complement the shorter term product and process development which is the focus of many current R&D performers". *STI report, page 39.*

"IP management and commercialisation should be seen as a central part of the institution's mission with equal standing alongside the traditional activities of teaching and curiosity driven research". STI Report, page 35

The relevant document is now "Innovation 2020"

Know the full pipeline

Emphasis on innovation

POC / Phase IIb

Emphasis on velocity & commercialisation

| Discovery | Early Development | | Late Development | Life Cycle Supply |

Research — Phase I — Phase II — Phase III — Registration — Launch & Supply

File IND — Submission — Approval

- Where does your project fit into the pipeline?   **TRL's**
  - What is the full potential of the project?

- Does the pipeline have a commercial endpoint, even if you won't be engaged in the commercialisation process?
  - A commercial endpoint can add tremendous value to a basic research project

- Talk to people with technology transfer knowledge

- Protect your IP!

Funding Applications

- In Science and Engineering funding proposals are usually made in response to an external funding agency who open calls at different times of the year. Calls can be seen on the relevant websites – some HEI's have a webpage where calls are advertised.

RESEARCH PROFESSIONAL

- Calls have specific objectives associated with them
  - Choose a call that fits with your expertise
  - If an early-stage researcher advisable to discuss calls with mentor

- Most calls will benefit from being a member of a team, so identifying collaborators early in the process is vital
  - Increasingly teams need to be multidisciplinary
  - This is easy to claim on paper, but not easy to implement in practice
    - But if it's not easy and you can do it, then you have a competitive advantage!
    - Beware slipping into clichés or using buzz words for the sake of it
      - Translational research; world class; convergent technologies …..
    - Beware of group hysteria ….
    - Argue <u>your</u> case/point rationally – that's what science is all about!

Components of a Proposal

There are eight basic components to creating a solid proposal package

(1) the proposal summary;
(2) introduction of organization;
(3) the problem statement (or needs assessment);
(4) project objectives;
(5) project methods or design;
(6) project evaluation;
(7) future funding; and
(8) the project budget.

Most of us ignore this advice at some point!

Spend lots of time on the formulation of the problem statement. Be brutally honest. Ask for others to be constructively critical – do not wait until the proposal is mostly written. Sanity Check!

Proposal Summary

- **The Proposal Summary: Outline of Project Goals**

- The proposal summary appears at the beginning of the proposal.

- Often limited by the agencies to a maximum number of words but in any case it should be brief (2-3 paragraphs).

- Summary should be prepared last so that it can reflect the final issues addressed within the proposal.

- Summary is often the first part of your proposal to be read by reviewers. If they don't like it, you're fighting an uphill battle.

- More than any other part of the proposal, you should review the proposal summary as many times, and by several people who are not closely associated with the project, as is reasonable.

Be specific

Introduction

- **Introduction: Presenting a Credible Applicant or Group**

- You need to portray the supporting organisation's abilities as well as you can. While you might be doing the research, they will form the backbone to the resources and they need to be behind the proposal
- An organisation/group with a strong track record in a relevant area has a distinct advantage
  - Funders are inherently risk-averse
  - Past evidence of success is an indicator of future likelihood of success
  - The same is true of an individual, so if you don not have a strong track record already then whom you choose as a collaborator on the proposal is very important
- All the information should be relevant to
  - The funding agencies mission
  - The objectives of the call
  - National (and international) policies

Be specific

Problem Statement

- **The Problem Statement**
- The problem statement is a key element of a proposal that makes a clear, concise, and well-supported statement of the problem to be addressed, but not too much about <u>how</u> that will be done (this will be covered later in the proposal, so get the reviewer to realise that there is a problem to be solved first and why it's important to do so!).
- The problem statement should cover:
    - The purpose for developing the proposal.
    - Who will benefit and how.
- The nature of the problem (provide as much hard evidence as possible).
- Why you decided to address the problem
    - Your personal motivation
    - The long term strategy of the proposing group/organisation
    - A particular relevance in your city/region
    - Or perhaps it's a global problem in which you or your team have specialist expertise
    - Your track record suggests you can find a solution to the problem
        - You represent excellent value for money

Be specific

Project Objectives

Project Objectives: Goals, Deliverables, Milestones and Desired Outcome

- Program objectives must be very carefully considered

- Along with the proposal summary they will define what the likely result of conducting the research will be.

- Objectives are usually captured in terms of Goals, Deliverables and Milestones
  - **Goals** are statements of the overall outcome (e.g., this project will measure the incidence of obesity in children between the ages of 6 and 10 in Cork)
  - **Deliverables** are specific measurables:
    - Deliverable 1: Identification of the ten schools who will take part in the research
    - Deliverable 2: Completion of the focus group sessions with the ten schools
  - **Milestones** record the time at which a significant body of work or activity is completed:
    - Milestone 1: By Oct 2012 a written report summarising the outputs from the focus groups.

- Remember, if the proposal is funded, the stated objectives will probably be used to evaluate program progress, so be realistic.

Be specific

Program Design

Program Design: A Plan of Action

- The program design refers to how the project is expected to work and solve the stated problem. Sketch out the following:
- The activities to occur along with the related resources and staff needed to operate the project(inputs).
- A flow chart of the organizational features of the project. Describe how the parts interrelate, where personnel will be needed, and what they are expected to do.
- Explain what will be achieved through 1 and 2 above (outputs)
- It may be useful to devise a <u>diagram</u> of the program design.
- A Program Evaluation and Review Technique (PERT) chart could be useful and supportive in justifying some proposals. A Ganntt Chart is also useful.
- The remaining alternatives available when funding has been exhausted. Explain what will happen to the project and the impending implications.
- Highlight the innovative features of the proposal which could be considered distinct from other proposals under consideration.
- Whenever possible, use appendices to provide details, supplementary data, references, and information requiring in-depth analysis. These types of data, although supportive of the proposal, if included in the body of the design, could detract from its readability. Appendices provide the proposal reader with immediate access to details if and when clarification of an idea, sequence or conclusion is required. Time tables, work plans, schedules, activities, methodologies, legal papers, personal vitae, letters of support, and endorsements are examples of appendices.

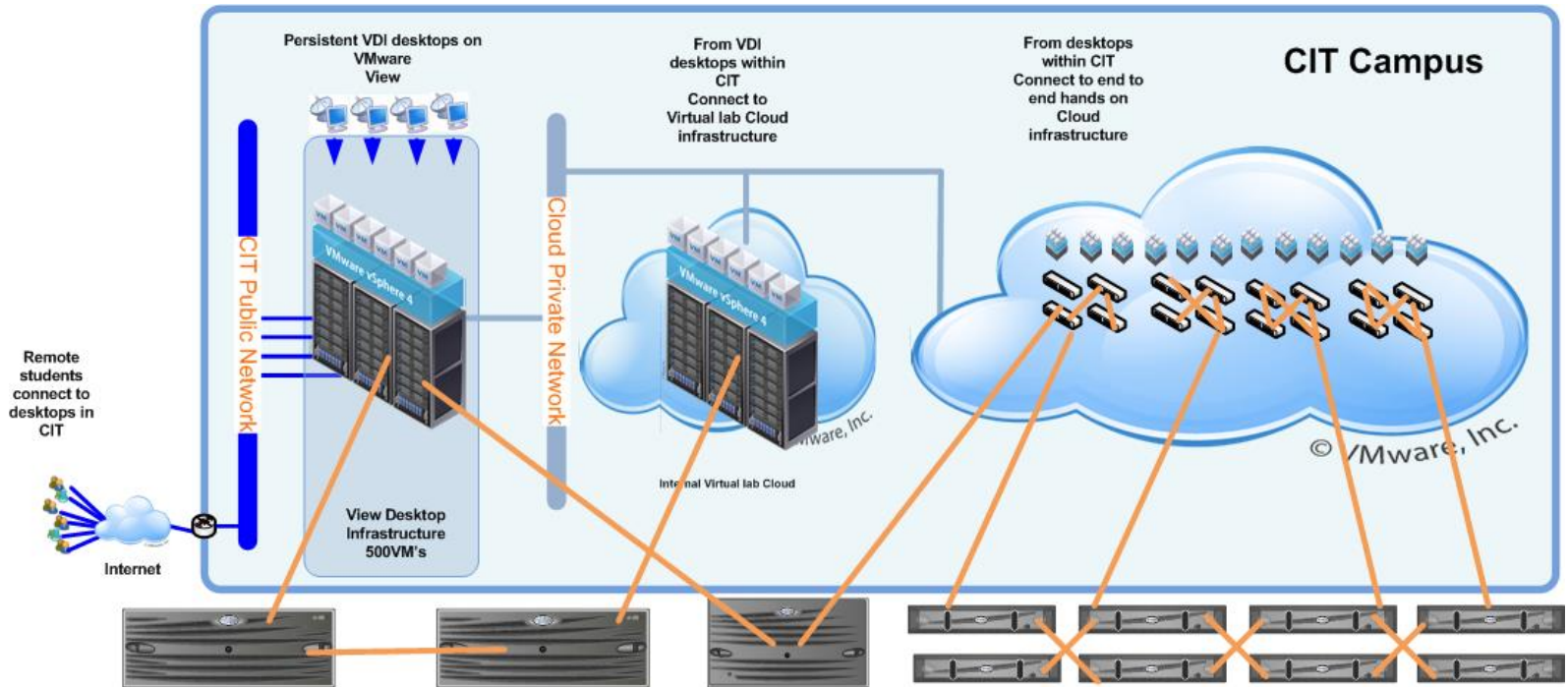Be specific

Use Diagrams to good effect
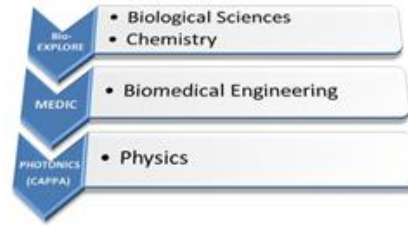
Diagram 1 showing the overall contributions to the project from different disciplines

Diagram 2 showing the key funding performance over the previous 5 years
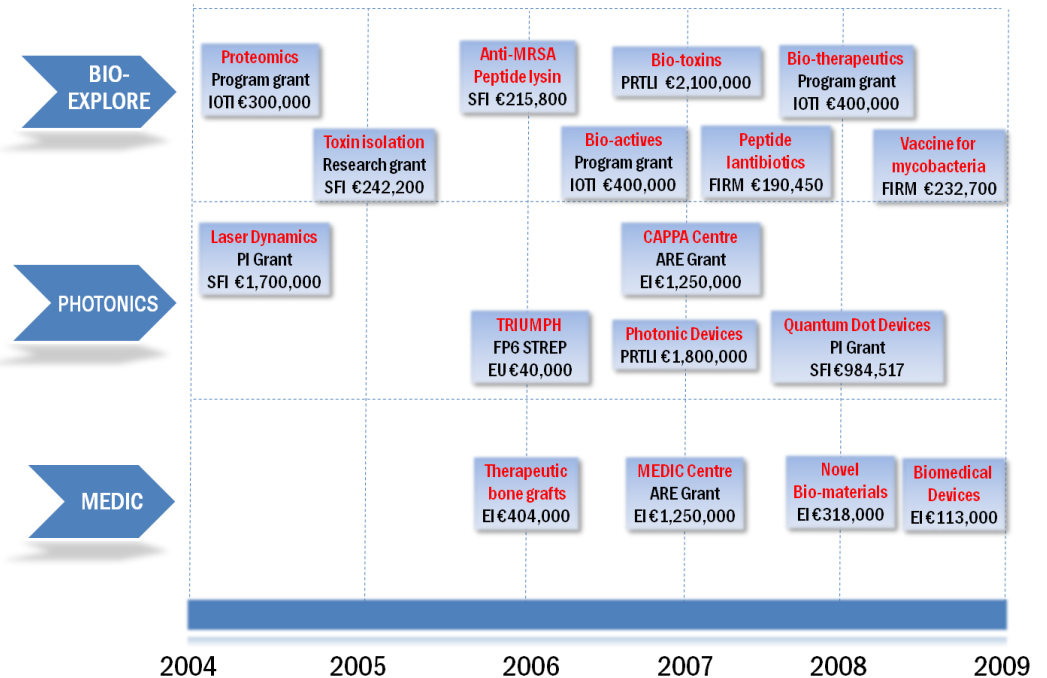
Use Diagrams to good effect

Workpackages

- Invaluable tool for making decisions about who does what and the period during which it should be done

Work package No	Work package title	Type of activity	Lead participant No	Lead participant short name	Person-months	Start month	End month[5]
				TOTAL			

- Work Package 1: In silico modelling & functional engineering of peptides and bio-molecules
- Work Package 2: Cloning and expression of peptides & bio-molecules
- Work Package 3: Extraction, characterisation & purification of peptides and other bio-molecules
- Work Package 4: Evaluation of bio-activity
- Work Package 5: Biomedical Device Development
- Work Package 6: Photonics for Bio- and Process-Imaging

Evaluation

Evaluation: Product and Process Analysis

The evaluation component is two-fold:

- (1) Product Evaluation addresses results that can be attributed to the project, as well as the extent to which the project has satisfied its desired objectives.
- (2) Process Evaluation addresses how the project was conducted, in terms of consistency with the stated plan of action and the effectiveness of the various activities within the plan.

- You must be able to evaluate the project during its execution so that amendments can be made if it is performing outside of the original plan or scope.

- It is useful to consider an evaluation design at the start of a project for two reasons:
  - Convincing evaluations require the collection of appropriate data before and during program operations; and,
  - If the evaluation design cannot be prepared at the outset then a critical review of the program design may be advisable.

- Even if the evaluation design has to be revised as the project progresses, it is much easier and cheaper to modify a good design.

- Sometimes a pilot study is needed to begin the identification of facts and relationships. Often a thorough literature search may be sufficient.

Be specific

Outputs ⟹ Impact

- As part of the evaluation element of the proposal you will need to define the likely outputs of the project.
- As always, try to be as specific and realistic as you can.
- Outputs should be linked to the requirements of the funding body, so think carefully about these.
- Outputs include:
  - Peer Reviewed Publications
  - Conference Proceedings
  - Workshops organised (attendance is not a strong output on its own)
  - Reports
    - Work summaries (these will be mandatory, so you get no additional credit!)
    - Surveys
    - Focus Groups
    - To other stakeholders not directly involved in the project (local councils, community groups, industry)
- Initiatives with industry
  - Anything that helps to embed R&D activity in companies
- Patents, licenses, spin-outs
  - Careful here – agencies are becoming skeptical of projects which generate lots of "useless" patents
- Engagement with the public

Be specific

Budgets

- Typical categories
  - Personnel (PI's, technicians, research assistants, postdocs)
  - Students (PhD, Masters)
  - Consumables (used up during project)
  - Materials (may endure beyond the project)
  - Travel (conferences, workshops, visiting collaborators – relevant)
  - Equipment
  - IT (e.g., computers – this is often not allowed as it is assumed institution will provide critical infrastructure)
  - Overheads (costed as a percentage of the non-pay element of the project; varies from one funding agency to the next, so must be carefully considered; a proportion goes back to the research team)

- Do NOT inflate your budget on the assumption that it will be cut

Be specific

Fifteen Ways to get your Research Proposal Turned Down

1. **Don't bother to familiarise yourself with the guidelines provided**

2. **Omit information that is asked for**

3. **Ensure that the title has little relationship to the stated objectives**

4. **Produce woolly, ill-defined objectives**

5. **Don't worry about matching your objectives with those of the funding agency**

6. **Leave the statement of the central problem or research focus vague**

7. **Leave the design and methodology implicit**

8. **Have some mundane task, routine consultancy or poorly conceptualised data trawl masquerade as a research project**

9. **Be unrealistic in what can be achieved with the time and resources**

10. **Be either very brief or preferably long-winded**

Fifteen Ways to get your Research Proposal Turned Down

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11. **Take the opportunity to apply for a "pet" instrument: do not bother to justify its purchase for the project**

12. **Feel insulted that you should have to convince any evaluation panel of your ability to undertake the research**

13. **Make it clear what the findings of your research are going to be and demonstrate how your ideological stance makes this inevitable**

14. **Don't worry about a theoretical or conceptual framework for your research**

15. **Do not promise any outputs like publications, patents or conferences**

Getting Help

- **Research Office**
    - niall.smith@cit.ie
    - elizabeth.twomey@cit.ie

- **ILO Office**
    - ilo@cit.ie

- **Other researchers**

- **National Contact Points**
    - http://www.horizon2020.ie/
    - Also john.mcaleer@cit.ie

- **Research Professional**
    - Contact the Research Office

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