SCIENTIFIC RESEARCH METHODOLOGIES AND TECHNIQUES

How to Write and Prepare a Competitive FCT Project Proposal

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PhD PROGRAM IN ELECTRICAL AND COMPUTER ENGINEERING

Outline

- The FCT Proposal Submission System
- FCT Regulations
- Application Form and Recommendations
- How to Write a Good Proposal
- Preparation of the Proposal
- Homework

The FCT Proposal Submission System

The FCT proposal submission system

The Calls for Project Proposals Portal gives you access to the following sections:

- List of projects
  - Proposal form
    - Project summary
    - Sections of the proposal form
  - Overview of the proposal
  - Validate and seal the proposal
- Instructions for completing the form
- News
- Sample overview of the form
- Sample Declaration of Commitment

Not all of the sections are accessible at the same time. They become accessible as you progress through the form, and sections may be hidden at times so as not to overload the interface.

FCT Regulations

What you should do before submitting a proposal

Official Announcement and Regulations

Before beginning to prepare your proposal, make sure you are well informed of the rules and requirements of the call to which you are submitting a proposal by reading the documents containing this information. This is for the most part administrative and financial information contained in the Regulations and in the Announcement of Call for Proposals.

The **Announcement of Call for Proposals** and the **Regulations** contain important information that you should be familiar with before you begin to submit your project proposal. Read them carefully.

Read the **News** section on the projects portal regularly.

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Application Form and Recommendations

Application Form and General Recommendations

The application form is organized in such a way as to provide the international evaluators with relevant information.

Learn about the structure of the application form and the information it asks for before you begin filling it out. **As Principal Investigator you will have to gather information from other colleagues and participating organizations**, e.g. their public keys. Get this information early on. If you wish to include a **recipient institution that is not available at the base of FCT**, remember that you should not delay **to fill out the Pre-registration of Institutions form** to request that addition. The new institution will be added to the list of choices within two working days after the completion of that form.

The FCT website has an overview of the proposal form available in pdf format.

Application Form and Recommendations

Check out **all the sections of the form in advance** so you will have an idea of what is being asked for and to give yourself time to gather all the information required for submission (e.g. public keys of colleagues and advisors).

Read the **instructions for filling out the form** given in this **guide** and on the **form** itself carefully. Also check the list of **FAQs**. Many of your questions or doubts will be answered in this information. Do this before contacting the FCT with your questions.

Many evaluation panels from previous calls referred that the CVs of the PIs and project key-elements were not sufficiently synthetic, making it difficult to find the relevant information. We recommend PIs to heed this comment, in particular **to distinguish the most important publications** and the **most relevant activities in recent years.** We also suggest that the **PI makes a read** and checks **all the CVs of the research team**, in particular with regard to the core CVs.

Application Form and Recommendations

Even though the PI's minimum allocation time is 35%, a larger allocation is important, as it emphasizes a larger commitment of the PI in the project he/she proposes to lead, and will be seen in a positive light by the evaluation panel.

The system provides an **explanation for each error detected**. Read and interpret this message carefully and proceed accordingly. It is much faster to do this than to contact the FCT to report the error messages you get when you have made a mistake completing the form.

There is usually a final verification process before sealing the proposal which may detect additional problems. Waiting until the last minute to make corrections can be risky.

Do not assume that a form or the rules for submission are the same as they were the last time you submitted a proposal for the same type of call.

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How to Write a Good Proposal

Write in such a way as to convince a top expert in your field that your ideas deserve to be funded. At the same time, you must convince someone who is scientifically literate, but may not have specific background in your area. The aim of your proposal is to convince the evaluators that the ideas you are proposing are so important that you should be entrusted with the taxpayers' money to develop them. You can also point out the importance of the project in terms of specific national interests should this be the case.

While you are writing the proposal, remember that your goal is to convince the evaluators of the merit of the ideas you hope to develop in the project. You will have to prove that your project is worthy of being funded. Remember that the proposal also represents a commitment in terms of time and involvement and cost, not only on your part as principal investigator, but also on the part of the entire team. Be positive and optimistic, but also realistic in terms of your expectations. If your proposal is approved, you must ensure that the team is capable of carrying out the project as described in the proposal.

How to Write a Good Proposal

Avoid the temptation to repeat the same text or entire paragraphs in different sections. The evaluators can always go back and read these paragraphs. Word for word repetitions of portions of text will not advance your proposal in the eyes of the evaluators.

A careful review of the evaluation criteria listed in the Announcement of Call for Proposals will give you a good idea of how the proposal will be evaluated. Read these criteria carefully and make sure that your proposal addresses each one positively.

If you provide the URLs of bibliographic references or other relevant material, **make sure that the links remain active for the duration of the evaluation process**. You must understand that an inactive link will not be viewed favorably by a dedicated evaluator and will be interpreted as evidence of a lack of commitment to the proposal.

Just as in writing good scientific articles, writing a good proposal is an interactive learning process. If your proposal is not successful, don't give up on a good idea – persistence is the name of the game. After venting your frustration, carefully read over the evaluations, assimilate the feedback given by the evaluators and try to answer the following questions: Why wasn't the proposal funded? What can we do differently next time? If your proposal is not funded, it will not be for lack of attention on the part of the evaluators, but rather for lack of good ideas or because the proposal did not communicate your ideas adequately, or because execution of your project may not be compatible with the level of funding of the call for proposals in question.

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Preparation of the Proposal

Title of the project (in Portuguese and in English)

The title should be brief and to the point, and should be understandable to a reader with a general scientific background and suitable for public dissemination.

Acronym of the project

You can assign an acronym for identification of your project, which should not exceed 15 characters.

Keywords (in Portuguese and English)

Importance in the evaluation process - must be chosen in order to characterize briefly the scope of the project and assist the FTC in the proper selection of experts that will evaluate it.

Preparation of the Proposal

Scientific Component

The Scientific Component of the project is the central nucleus of the proposal and the section that will be subject to the closest scrutiny by the evaluation panel to determine its scientific merit.

This section is organized into the following subsections:

- Summary
- Technical Description
  - Literature Review
  - Research Plan and Methods
  - Tasks
  - Project Schedule and Management
- References
- Previous Publications

Preparation of the Proposal - Abstract

Summary (5,000 characters max.)

The summary should be the central point of the argument designed to win the evaluator over to the research ideas proposed and the methods to be used. Unlike a conventional introduction, this should be an analysis that focuses more on the state of the art, the main problems that need to be solved, the knowledge and know-how the group brings to the project, the strategy and methods to be used, the novelty of the project and the expected results.

If the summary is too ambitious for the length of time or the human resources and funding requested for the project, this may weigh in on the negative side when the proposal is evaluated. A good summary should be positive and supported by solid references and key observations that will make the proposed work stand out from other research being conducted in the same field.

Preparation of the Proposal

Technical Description

This subsection should answer the question "Why should public funds be spent on this project?" Your description should be written in a positive tone and explain in detail what you intend to do in the project, what objectives you hope to achieve and the reasons why these are important.

You are expected to describe **in detail** the problem to be researched, the challenges it poses, and the approaches and methods to be used to achieve the objectives. You must also convince the evaluators that the PI and the research team are capable of achieving these objectives. You should show that the proposed methodologies are appropriate for achieving the objectives.

Specific details are required. General statements of objectives that are not properly substantiated or ideas not shown to be *new* ideas of the PI and his/her team are neither useful nor sufficient. The PI's goal is to convince the evaluation panel that he/she has the potential to contribute to progress and not just to the "status quo".

Preparation of the Proposal

Technical Description

It should contain a brief description of how the PI proposes to organize the work into various tasks, the interaction between the various tasks, the role of each participant and what each of the research groups involved will do, the schedule, and a set of milestones with which to judge how the work is progressing.

This subsection is organized in four parts:

- Critical Review of the Literature - here you make the team's previous work known, you show your knowledge of the state of the art and you explain the innovative nature of your proposal;
- Research Plan and Methods - here you describe, in detail, the research plan you intend to carry out, the methodologies to be adopted, the expected results and how the activities will be divided into tasks;
- Tasks - here you describe, in detail, the methods to be used and expected results for each of the tasks in the plan of work, along with the resources needed, the duration of each task and the roles of the various participants;
- Project Scheduling and Management - here you describe the management of the project, how team members will be coordinated and the planned reports.

Preparation of the Proposal - SOTA

LITERATURE REVIEW (6,000 CHARACTERS MAX.)

The goal of this section is to describe the group's previous work and the methodologies that compete with those proposed in this project, and to justify the need for the proposed innovation. The literature review should be critical. Simply referring to previous work without commenting of the contribution the work makes to the approach proposed in your project or without mentioning its limitations is neither significant nor useful. Previous results of the PI and the research team are viewed favorably. The evaluators look at this section to evaluate the vision and the knowledge that the PI has regarding the state of the art and the reasons why the PI believes that the methodologies proposed will perform the best. The PI must convince the evaluators that he/she and the research team have the background needed and understand the open problems in the field of research in which the proposal falls.

Preparation of the Proposal – Plan

RESEARCH PLAN AND METHODS (10,000 CHARACTERS MAX.)

Based on the critical review of the literature presented above, describe the proposed research plan and methods to be used, focusing on the following questions:

- What is the problem to be investigated; what are its challenges and what is the "great idea" that the PI and his/her team have to overcome them?
- Why is the problem important and interesting?
- What points of view and methods are to be adopted?
- How will the project advance the state of the art, and what are the new basic ideas that will enable the team to reach their goal?
- What important ideas do the PI and his/her team have for achieving these ends?
- What results can be expected from the project?

Preparation of the Proposal - Tasks

TASKS

For each task into which the project's activities are organized, the following information should be provided:

Task denomination
Task denominations should be self-explanatory.

Start date for the activity
In "day-month-year" format.

Duration of the task (in months)
Self-explanatory.

Person*month
The amount in full months equivalent to the total work of an investigator during the course of the project. To calculate this, begin by estimating the percentage of a full-time week of professional work that the investigator will dedicate to project-related tasks in each phase of the project.
Examples:

- 1 person at 50% for 6 months = 3 person*months
- 1 person at 30% for 6 months = 1.8 person*months
- 1 person at 50% for 15 days = 0.25 person*months

Preparation of the Proposal – S&M

PROJECT SCHEDULE AND MANAGEMENT

The PI should indicate a timeline and describe the management structure to be adopted in the project, in particular with respect to coordination between participants, any meetings to be held and the reporting structure. A list of "milestones" should also be indicated.

Description of the management structure (3,000 characters max.)

In this section you should describe the management structure to be adopted, in particular the coordination among partners, the planned meetings, and the reporting process. The relevance of this item will depend on the dimension of the project, in particular, the number of participating research units.

List of milestones

A milestone or marker is a date by which a certain objective should be achieved or a phase should be completed. Enter a scheduled list of milestones that will allow independent evaluators to verify whether or not the project work is progressing towards the objective stated in the proposal.

For each milestone, include a name (60 characters max.), a date and a description (300 characters max.) of what can be demonstrated or reported by that date. Milestone dates should be entered in the timeline graph described below. Example:

Milestone M1
Date: Month 8
Name: Preparation of a test or questionnaire
Description: Validation of the measuring tool

Preparation of the Proposal - Timeline

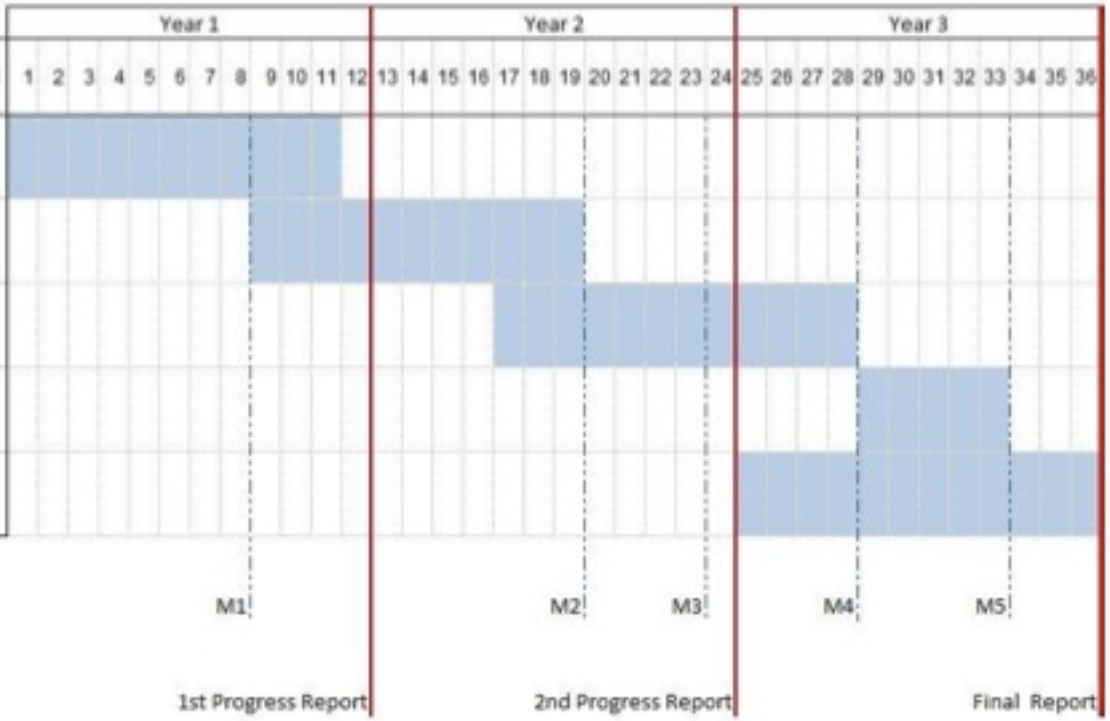
Timeline

A sample timeline is shown below:

Project reference : xxxxx/xxx/xxxxx/2008

Project title: title of the project as introducted in the form

Task N°	Task Denomination	Person*month	Partner responsible for task	Acronyms of partners involved in task
1	Task 1 denomination	8,00	ABC	ABC, XYZ
2	Task 2 denomination	12,00	XYZ	XYZ,ABC, MNO
3	Task 3 denomination	14,00	MNO	MNO,XYZ
4	Task 4 denomination	7,00	ABC	ABC, MNO
5	Task 5 denomination	12,00	ABC	ABC, XYZ
		53,00		



THIS IS AN EXAMPLE THAT HAS TO BE ADAPTED FOR EACH PROJECT

Preparation of the Proposal - Team

Research Team

4.1. List of members

The information on the Principal Investigator (Name, Position and Academic Degree) will be automatically filled in. This is the information that the PI entered in his/her **curriculum vitæ** on the site https://www.fct.mctes.pt/fctsig/cv. The percentage of full time dedicated to the project should be filled in on the application form. You can access this field by clicking on the link associated with the PI's name.

Read the Regulations and the Announcement of Call for Proposals carefully for the requirements regarding minimum allocation amounts for PIs.

Each research team member to include (except for individual grant recipients or other personnel contracted specifically for the project) is required to supply his/her FCT association key (**and no other FCT supplied credentials**) to the Principal Investigator as a means of confirming the intent to participate in the project. Association keys are issued after completing the registration process in the FCT Management area in https://www.fct.mctes.pt/fctsig/ and can be consulted there.

Preparation of the Proposal - Indicators

Outcome Indicators

Outcome indicators for the project

In the proposal phase, this list represents a commitment to carrying out the project. The deliverables achieved as a result of the project activities must be described in progress reports and in the final report and will be subject to scrutiny in the final evaluation.

Be positive, but also realistic in terms of your expectations. If your proposal is approved, you must ensure that the team is capable of carrying out the project as described in the proposal.

The minimum number of indicators is 5.

Dissemination of scientific activity

Although it is important to carry out initiatives to disseminate scientific activity, in the proposal phase, this indication expresses intent to do so. Actions of this nature during the execution of the project should be described in the progress and final reports and will be subject to scrutiny by the evaluators after the work has been completed.

Preparation of the Proposal - Budget

Budget

The per project funding limit is set forth in the respective Announcement of Call for Proposals. A budget table must be filled out for the Proposing Organization and for each Participating Organization. The total of all the tables represents the sum of funding requested, which is calculated automatically and shown in the table "Overall Budget".

For all institutions, except for-profit organizations, the budget equals the funds requested from FCT as eligible expenses are funded at a 100% rate. In the case of for-profit organizations such as companies, eligible expenses are funded at a 50% rate. Hence the budget in this table should be 50% or less of the full budget. The remaining budget should presented in an additional table.

The budget should be distributed over the different years taking into account the number of months in each calendar year of the project. If the project is approved, there is a possibility that changes will be made to the budget distribution schedule based on observations of the evaluation panel or when the project is approved. See the timeline for the evaluation and decision process.

Preparation of the Proposal - Budget

Budget

Human resources

Human resources dedicated to the project's R&TD activities, including costs of individual grant recipients and contracts. The funding of these grants shall comply with the (Norms for the award of grants in R&TD projects).

Travel

Expenses resulting from project-related participation in conferences travel for fieldwork, meetings and visits in Portugal or abroad. Example: Travel expenses, registration fees, daily allowances, and accommodation.

Consultants

Consulting expenses for project support. Foreign scientists residing outside Portugal may collaborate on the project and receive financial support for travel to Portugal and accommodation and may be paid for consulting work done on behalf of the project.

Preparation of the Proposal - Budget

Budget

Acquisition of goods and services

Expenses related to acquisition of goods or services for the project and which can be documented by: "Green" receipts, receipt for an "Isolated Act" or an Invoice/Receipt.

Also included in this category are other current expenses directly related to execution of the project (e.g., consumables, reagents, etc., and acquisition of books and subscriptions to scientific journals when these fall within the scope of the project) and expenses paid to licensed auditors or accountants.

Patent registration

Registration **abroad** of patents, copyrights, utility models and designs, national models or brands when associated with other forms of intellectual property, namely fees, prior-art searches, consultant's fees.

Preparation of the Proposal - Budget

Budget

Equipment

Expenses related to obtaining instruments and equipment, provided they are directly and unequivocally used by the project and remain tied to the project during the period of its execution. Indicate the phase of the project in which they are to be acquired.

Overheads

Overheads based on the real costs incurred due to execution of the project and which are imputable to it on a pro-rated basis according to a fair and equitable method of calculation duly explained and periodically reviewed, up to a limit of 20% of **ALL** eligible direct costs of the project.

As the budget is presented by civil year, the above referred limit of 20% also applies for each year.

Since there were doubts about whether the costs of overheads also concerned about the direct costs of equipment, we clarify that the costs of overheads relate to **ALL** (including equipment) the direct costs.

Homework

Write and prepare a Project Proposal, to be readily submitted to FCT, in the scope of the field of your(s) PhD(s).

The Proposal should comprise:

- **A Title;**
- **An Acronym for Project;**
- **Keywords (up to 6);**
- **A Summary (up to 1000 chars);**
- **A Technical Description including:**
  - **State-of-the-Art (up to 1000 chars)**
  - **Research Plan and Methods (up to 1000 + 1000 chars);**
  - **Tasks (up to 6, with associated descriptions up to 500 chars, each);**
  - **Project Schedule (a first Table with the Timeline);**
  - **Outcome Indicators (a second Table with the expected scientific indicators per year, namely, Books, articles, conf. papers, Prototypes, Models, CAD-Tools and Patents);**
- **A Budget (set for 3-years, up to 250 k€, split into HR, Missions, Consultants, Acquisition of Goods and Services, Patent Registration, Equipment, Overheads (25 %, including equipment expenses) – the third Table; (equipment must be acquired at the early days of the project).**