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Writing a research funding proposal

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Abstract

The key to success in securing financial support for research projects lies in the preparation of a well-crafted research grant proposal, showcasing the competence, dedication, and organizational skills of the research group as well as the scientific merit of the proposed study. This paper delineates the essential elements of a successful funding proposal, providing a structured guide to enhance the prospects of obtaining the necessary financial support. In general, the research project should align with the objectives and priorities of the funding agency. Attention to formalities, such as proper formatting and adherence to application guidelines, is mandatory. The core component of a research grant proposal is the formulation of a clear and well-founded research question and hypothesis. The methodology section should address the measurement methods and experimental setup. Additionally, developing a realistic research schedule and milestones is of great importance, along with anticipating potential barriers and challenges. Finally, the proposal's financial aspect is addressed through a detailed cost breakdown that aligns with the sample size calculation and methodology.

Keywords

Clinical trial · Financing, organized · Methods · Science · Checklist

Introduction

Research projects often require substantial financial resources to cover all expenses such as equipment, materials, or personnel costs. However, obtaining adequate funding is a highly competitive process. In this context, the submission of a well-crafted research grant proposal is crucial to increase the chances of obtaining the necessary financial support. A well-prepared proposal should not only demonstrate the competence, dedication, and organizational skills of the research group, but also convey the potential im-

pact and scientific significance of the proposed study.

Structure of the funding proposal

Before embarking upon the preparation of a research grant proposal, the applicant should first gather detailed information about the specific type of expenses (e.g., material or personnel costs) and types of studies (basic research, clinical work, etc.) supported by the respective funding agency. In general, it is advisable to apply for research funding that aligns closely with the planned research project to have



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a favorable position for obtaining financial support.

Equally important as choosing the right “funding source” is adhering to the required formalities of the specific grant application. Typically, the application forms are provided by the respective organization, association, or industry. Proper formatting (font and size, margins, line spacing) and the structure of the proposal (outline, word count, etc.), along with the completeness of necessary attachments (CV, ethical approval, cost breakdown, etc.), are fundamental prerequisites for a successful application. Complying with the prescribed guidelines demonstrates professionalism and the ability to work precisely and follow instructions. A well-structured proposal allows reviewers to easily navigate through the document, comprehensively understand the research project, and effectively assess its scientific merits.

Many of the fundamental principles outlined for preparing a successful research grant proposal apply to many sponsors or organizations. Additionally, the topics naturally overlap with the fundamentals of crafting a meaningful research question and will be briefly covered in the following sections.

Research question/hypothesis

Precisely formulating the objectives, research questions, and hypotheses is of great importance for a proper evaluation by reviewers regarding the feasibility of the project and alignment with the goals of the respective sponsors. Funding agencies and organizations are keen to invest in projects with a clear and well-founded scientific approach. In this section, the entire project should be introduced briefly and concisely, with a short introduction to the topic, a clear formulation of the research question, and the development of the hypothesis(es). Finally, a brief description of how the hypotheses will be tested should be provided.

Background information

This section should contain a clear and concise introduction to the topic, highlighting the scientific or clinical problem, existing knowledge gaps, the goal, and

the potential impacts of the proposed research project. This is intended to capture the attention and interest of reviewers and stand out from the multitude of applications. Additionally, a well-prepared background information section emphasizes the novelty and innovation of the proposed work, highlighting how it addresses existing knowledge gaps or expands the boundaries of current understanding. Especially for applications for research funding from the Gesellschaft für Arthroskopie und Gelenkchirurgie (AGA), it is important to establish a direct connection to arthroscopy and joint surgery.

Preliminary data and preliminary work

Relevant previous work of the research group should be briefly described in this section, and it should be explained how these studies support the current application. These previous studies can serve as the basis for formulating the current research question or developing the methods used, lending credibility and significance to the grant proposal. Utilizing the results and insights from previous work reinforces the arguments for research funding, as it demonstrates the competence of the applicant or research group to conduct the scientific project. If significant preliminary work has not yet been conducted, it is advisable to seek specific seed funding, as this typically requires much less preliminary work.

Methodology

This section forms the core of any research proposal. The study's architecture, measurement methods, and experimental setup should be described briefly but precisely. This section's primary purpose is to convince the reviewers that the applicant is proficient in the methodology, thereby strengthening confidence in the successful execution of the proposed research. In addition to selecting the appropriate study design, measurement methodology, and experimental setup to address the research question, this section should also include a detailed and meaningful explanation of inclusion and exclusion criteria. Moreover, it should discuss the sample size calculation

and statistical analysis. Furthermore, it is important to demonstrate how the methodology logically and convincingly leads to the necessary funding and the subsequent cost breakdown (see “Cost breakdown” below).

Research schedule and milestones

This section should demonstrate that the allocated resources will be used efficiently and that the proposed research project can be successfully completed within the designated timeframe. A well-defined and, above all, realistic schedule shows that the applicant is capable of effectively planning, organizing, and executing the project. It is recommended to visualize the timeline in the form of a table or figure to clearly present each step, activities, and deadlines required to achieve the research goals. Defining realistic milestones (e.g., the start and end of patient enrollment, data analysis completion, manuscript writing) should allow reviewers to assess the project's feasibility, understand the expected progress, and evaluate which results can be delivered within the funding period. It should already be clearly defined when certain data should be collected.

Potential barriers and challenges

A critical reflection on the research project and anticipation of potential problems during the study's execution are crucial to show reviewers that the applicant is aware of the project's challenges and complexity. Developed solutions to potential issues highlight the applicant's competence. In the case of clinical studies, for example, the number of patients finally included may be too low compared to the sample size calculation. Possible solutions in this case could include relaxing the inclusion criteria or involving additional study centers.

Bibliography

A comprehensive and thorough literature review is of paramount importance for obtaining research funding, as it helps to place the research project in the broader context of previous studies, building on published results and validated methods. A good literature review demonstrates the

applicant's expertise and critical thinking skills, increasing the chances of research funding. It is important that the bibliography is reduced to studies relevant to the topic and is formatted according to the guidelines (citation style, number, numbering) of the respective organization.

Cost breakdown

The research funding proposal should include a detailed and realistic cost breakdown, listing the anticipated expenses such as materials or personnel. It is essential that the cost breakdown aligns precisely with the sample size calculation and the methodology described earlier. A thorough and well-justified financial plan demonstrates not only the applicant's ability to plan and manage resources effectively, but also gives reviewers confidence that the requested funds will be used efficiently and transparently.

Funding application checklist

The following checklist is intended to help structure the application and, in particular, avoid rejections for formal reasons:

Checklist

1. *Formal criteria*
 - Structure (according to the application template)
 - Font and size, page margins and breaks, line spacing
 - Word count, grammar, and spelling
 - Bibliography (citation style, number, relevance, and currency of references)
2. *Content criteria*
 - Alignment of the project with the advertised funding
 - Clear formulation of research question(s) and hypothesis(es)
 - Significance and relevance of the study in the context of existing literature
 - Study design suitable for addressing the research question?
 - Measurement methodology and/or experimental setup
 - Sample size calculation and statistical analysis
 - Realistic time schedule and definition of milestones

Schreiben eines Forschungsantrags

Der Schlüssel zum Erfolg bei der Sicherung finanzieller Unterstützung für Forschungsprojekte liegt in der Erstellung eines sorgfältig ausgearbeiteten Forschungsantrags, der die Kompetenz, Hingabe und organisatorischen Fähigkeiten der Forschungsgruppe sowie den wissenschaftlichen Wert der vorgeschlagenen Studie präsentiert. Im vorliegenden Beitrag werden die wesentlichen Elemente eines erfolgreichen Förderantrags skizziert und ein strukturierter Leitfaden zur Verbesserung der Aussichten auf notwendige finanzielle Unterstützung zur Verfügung gestellt. Generell sollte das Forschungsprojekt mit den Zielen und Prioritäten der Förderorganisation in Einklang stehen. Die Beachtung formaler Anforderungen, wie die richtige Formatierung und die Einhaltung der Antragsrichtlinien, ist zwingend erforderlich. Die Kernkomponente eines Forschungsantrags ist die Formulierung einer klaren und fundierten Forschungsfrage und Hypothese. Der Methodenteil sollte sich mit den Messmethoden und dem experimentellen Aufbau befassen. Zusätzlich ist die Ausarbeitung eines realistischen Forschungsplans und die Nennung von Meilensteinen von großer Bedeutung, ebenso wie die Antizipation möglicher Hindernisse und Herausforderungen. Abschließend wird der finanzielle Aspekt des Antrags durch eine detaillierte Kostenaufstellung angesprochen, die mit der Berechnung der Stichprobengröße und der Methodik in Einklang stehen muss.

Schlüsselwörter

Klinische Studie · Organisierte Finanzierung · Methoden · Wissenschaft · Checkliste

3. *Attachments*
 - Curriculum vitae
 - Ethical approval
 - Cost breakdown

Conclusion

- The research project should align with the objectives and priorities of the funding agency.
- Attention to formalities, such as proper formatting and adherence to application guidelines, is fundamental to professionalism and success in grant applications.
- The core component of a research grant proposal is the formulation of a clear and well-founded research question and hypothesis.
- Providing detailed background information is crucial for capturing the attention of reviewers as well as emphasizing the scientific merit of the proposed work.
- The methodology section should address the study's architecture, measurement methods, and experimental setup.
- A realistic research schedule and milestones demonstrate efficient resource utilization and project execution.

- The cost breakdown section should align precisely with the sample size calculation and the methodology described earlier to instill confidence in reviewers regarding the efficient and transparent use of requested funds.

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Declarations

Conflict of interest. L.N. Münch, K.F. Schüttler, J. Ackermann, A. Deichsel, L. Eggeling, D. Günther, S. Kopf, B. Laky, D. Mathis, A. Wafaisade, and E. Herbst declare that they have no competing interests.

For this article no studies with human participants or animals were performed by any of the authors. All studies mentioned were in accordance with the ethical standards indicated in each case.

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