

# Success in Grant Funding: Towards a Method of Measuring Convergence of the Project Abstract to the Call

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## Abstract

This study introduces a novel method to boost grant application success by analyzing the convergence between project abstracts and funding call texts using text mining. Focusing on Horizon 2020 data, it aims to identify how textual alignment affects funding outcomes and establish a quantifiable similarity threshold for eligibility. The research proposes a strategic framework to improve grant proposal competitiveness, especially benefiting institutions in the European Union with lower success rates, by providing a practical tool for enhancing grant writing processes. The findings are expected to fill a literature gap, offering empirical evidence on the relationship between textual similarity and funding success. This research not only has the potential to guide future grant writing practices but also provides guidelines for the internal (within the organization) application preselection, aiming to increase the effectiveness in obtaining research funds.

**Keywords:** Grant evaluation, grant funding, grant writing, text-mining, proposal abstract

## 1. Introduction

Writing a grant proposal is an integral part of the research work and mastering this skill is crucial for any scientist seeking to carve out their research program. As funding is tight and competition strong, obtaining research funding is becoming more arduous, with the odds of success for many schemes getting lower with each passing year [9]. It is worth noting that universities that receive a substantial number of grants typically employ systems of internal proposal preselection and offer comprehensive support for the writing process [9], [12].

The literature on grant funding success is categorized into two main strands: empirical research focusing on bibliometric indicators and reviewer bias [4], [15], and anecdotal advice from seasoned applicants, grantees, and reviewers [9], [12]. The prevailing factors for proposal success identified in the literature include adherence to call criteria and funding agency guidelines, along with the quality of the abstract. A deep familiarity with the call's guidelines, including its priorities, eligibility requirements, and evaluation criteria, is crucial [9], [10]. Research on submissions to the National Kidney Foundation revealed that 7% of proposals were disqualified for review due to misalignment with the call's priority goals [5]. While the application's text is vital for evaluation, the abstract plays a key role in evaluator selection and forming reviewers' first impressions. Evaluators are selected based on the project abstract, which underscores its significance as a critical factor for success, warranting detailed consideration.

To date, the relationship between the textual alignment of grant applications and the call text remains unexplored. Addressing this gap, our study aims to devise a methodology for analyzing the alignment between proposal abstracts and call texts, thereby enhancing proposal writing support. Therefore, we would like to answer the following research questions:

RQ1. Does the convergence of the project abstract with the call text influence the proposal's

success?

RQ2: What is the requisite level of abstract-to-call text convergence for obtaining funding?

This research will leverage the Horizon 2020 program's [11] publicly available database containing the calls and proposal abstracts. Horizon 2020, the European Union's flagship research and innovation funding program from 2014-2020, was both ambitious and prestigious, boasting a budget of nearly €80 billion. By the time it closed, nearly 250,000 eligible proposals had been received in response to over 700 calls for proposals — this is twice as many as under the predecessor program (FP7). Analyzing the abstract text for alignment with the call's topic description may be pivotal for applicants and will inform future studies on machine pre-evaluation of applications. This analysis will provide a strong foundation for research in these areas.

## **2. Research Background**

### **2.1. Importance of the proposal abstract**

An abstract is a concise summary of the proposed research written for other researchers in the same or a related field. It usually includes specific aims, research design, and methodology of the proposal and results and implications of a study [12], [16]. Guidance from non-empirical sources underscores that the abstract is crucial for establishing a positive initial impression among reviewers, and plays a big role in the funding outcome of the proposal. Some reviewers will rely heavily on the abstract to influence their “bird’s eye view” and it is therefore considered one of the most important elements of a grant application. Typically only two or three reviewers will read the full proposal [5]. Reviewers who see an application for the first time in a review panel meeting usually turn immediately to the abstract [12]. Due to a lack of training in scientific writing and sometimes unethical practices, abstracts are often poorly written, lack critical information, and sometimes contain spin [16].

### **2.2. Previous research on academic texts**

Academic writing has long been a focal point within applied linguistics and sociolinguistics, evidenced by journals dedicated to the study of academic writing [2]. While research papers frequently undergo analysis, grant proposals and their abstracts are comparatively less scrutinized. The adoption of text mining as a research tool is on the rise, showing exponential growth across various fields [17]. This technique is prevalent for extracting insights from the vast corpus of scientific literature [6]. In particular, scientific article abstracts have been the subject of extensive research aimed at examining their discourse [13], genre [18], and various other aspects [1].

### **2.3. Research on grant proposal texts**

Grant proposals persuade reviewers and agencies to fund research by capturing attention, describing ideas, showing need, and establishing the author's competence. They resemble research article introductions, highlighting field importance, problem identification, and research solutions. Writing style significantly predicts grant success [2]. The first linguistic analysis of the European Union's research grant proposals identified and described features of academic grant proposals based on the theories of genre analysis and social construction of meaning [7]. Discourse analysis of National Health Institute proposals showed that clearly articulated proposal is more likely to be funded than a proposal with a lower quality of discourse [4]. Analysis of National Science Foundation grant abstracts revealed longer, less common, and more verbally certain abstracts received greater funding, indicating verbosity and complexity enhance credibility and reduce uncertainty [13].

## **3. Future Research Plan**

We will use text mining [3] and similarity measures for the examination of the convergence of the text of each call for proposals with several dozen abstracts of proposals submitted to this call. For analysis, we will select specific calls and abstracts from the Societal

Challenges pillar of the Horizon 2020 program due to the abundance of proposals. We will determine its applicability by conducting a study using abstracts rather than full-text proposals, as we have limited access to the latter. Even if a proposal has not received funding, it can still contain original research ideas. If the results of our study are satisfactory, we will expand the method in the future. The procedure will involve the following steps (conducted for every call separately) from Research and Innovation (RIA):

1. Data preprocessing (input = text of call + proposals abstracts): A. Tokenization at the word level - punctuation and whitespaces will be removed and also numerals as relatively less relevant for the study; B. Stopwords removal - removing common words like articles, prepositions, e.g. a, an, the, in, on, under, off, out, with; C. Stemming - reducing a word to its root word. A stemming algorithm for the English Language will be adopted; D. Synonym detection - based on some language databases, e.g. WordNet.

2. Vector generation: the TF-IDF (Term Frequency-Inverse Document Frequency) formulation or Word2Vec [14] will be used for text representation in a form of vectors of numbers.

3. Measuring similarity: the similarity function is a real-valued function that calculates the similarity between two vectors. The calculation of similarity is achieved by mapping distances to similarities within the vector space. Many measures of similarity are specified nowadays, but the most known are the Cosine and Jaccard measures, and the authors will use these methods.

4. Comparative analysis of the results: knowing the original classification of the proposals, the correlation between similarities of their abstracts to the call description will be calculated, and this result will be examined. In this way, we answer RQ1.

5. Determining the convergence threshold of abstract and call text in proposals that receive funding (this way supporting the internal process of application preselection within organisations). By doing so, we address RQ2.

R package for data analysis will be used, such libraries as e.g. tm, Pdfutils, ggplot2, and word cloud. The CORDIS database (Community Research and Development Information Service), serving as the official repository, will supply our data, encompassing all H2020 calls for proposals and project abstracts in .csv format [8].

If we get a positive answer to RQ1 and upon identifying an empirical, quantifiable threshold for the alignment between proposal abstracts and call texts that determine funding eligibility (RQ2), it will be possible to develop an IT tool designed for this specific analysis. This innovative tool will compare the call's text with the application's abstract, employing programmed steps 1-4 to assess their degree of convergence. Moreover, it will offer a "prognosis" indicating whether the abstract is likely to secure funding or requires refinement to enhance alignment and surpass the established threshold. Such a tool promises to enhance the grant application process by providing researchers with actionable feedback, thereby increasing their chances of success in obtaining funding.

It should be noted that the research might have some limitations related to using historical data for training the algorithm as they might have been biased.

#### **4. Implication for Research and Practice**

Analyzing the determinants of research proposal success is crucial for both theoretical understanding and practical applications. With the vast archives of research proposals maintained by universities and funding agencies, a wealth of data is available for analysis. Techniques such as text mining can provide insights to enhance proposal writing and the success rates of applications. The competitive landscape for research grants necessitates innovative support strategies for researchers in crafting concise, compelling applications.

Our study seeks to provide empirical evidence and measurable indicators for the convergence between proposal abstracts and call texts, addressing a notable gap in the literature. This approach aims to improve the research methodology, understanding of proposal success factors, and the efficiency of the grant preparation process. By applying text-mining technologies, we propose a method that probably streamlines the pre-selection process for funding applications, focusing resources on those with a higher likelihood

of funding.

The significance of the abstract throughout the review process cannot be overstated, serving as a critical factor in aligning reviewers with applications and influencing both initial reviews and final deliberations. Our proposed method, if effective, will be expanded to entire application texts in future research efforts, potentially increasing the success rates for universities, especially from new countries of the EU e.g. Bulgaria, Croatia, Czechia, Estonia, Greece, Poland with historically lower success rates in obtaining funding.

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