

EU-Armenia Scientific Partnership: A Bibliometric Analysis of Funding and Academic Output

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Introduction

The European Union (EU) plays a crucial role in providing substantial funding for scientific research across its member countries and outside through the Framework Programs for Research and Technological Development (FPs) (Gallo et al., 2021). The EU has established itself as a major contributor to research and innovation through the FPs (Dalen et al., 2024), which have become a central source of funding for both applied and basic research (Enger & Castellacci, 2016), covering cooperation with the EU-neighboring countries, including Armenia. EU-Armenia scientific collaboration is mainly focused on EU-supported projects under FP7 and, more recently, Horizon 2020. This form of 'science diplomacy' serves not only as an instrument of external policy but also as a means to enhance relations between the EU and its partners (Mazepus et al., 2017).

In this study, we examine the scientific output and cooperation between EU-funded major projects (such as the FP7, Horizon, and Horizon2020) and Armenia through bibliometric analysis. We aim to elucidate the year-wise distribution of scientific publications being published within the EU-funded projects, along with the relevant academic fields represented in these publications; and the contribution of Armenia as a partner, highlighting the most active organizations involved in these projects.

Data and methods

Following a structured bibliometric methodology, this paper examines the participation of Armenia in EU-funded scientific research projects within the

framework of a new dimension of funding acknowledgment analysis. We conducted a bibliometric analysis by extracting publication metadata from the Web of Science (WOS) database through country-based filtering, funding number identification, and source verification. Whereas traditional bibliometric studies only focus on tracing co-authorship or citation networks, here we incorporate the analysis of funding acknowledgment to directly trace the contribution of EU financial support. Afterward, the harnessed publications were categorized based on their references to EU projects. The retrieved data was analyzed to illustrate the total number of publications indexed in the WOS repository; the academic fields and disciplines were sorted according to Glänzel and Schubert's classification (Glänzel & Schubert, 2003) of subject categories. It's important to note that the full counting method was used when the publication simultaneously has full value for all specified areas.

We also utilized network analysis and techniques to reveal the role of Armenian organizations in the research networks funded by the EU by combining funding acknowledgment analysis with network-based institutional evaluation.

Results and Discussion

The conducted bibliometric analysis revealed that about 2408 publications were published and indexed in the WOS database through the EU-funded projects in the frames of the EU-Armenia partnership. The highest number of publications was recorded in the years 2016 and 2018. However, following 2018, the amount of publications dropped but

has continuously increased since the year 2023.

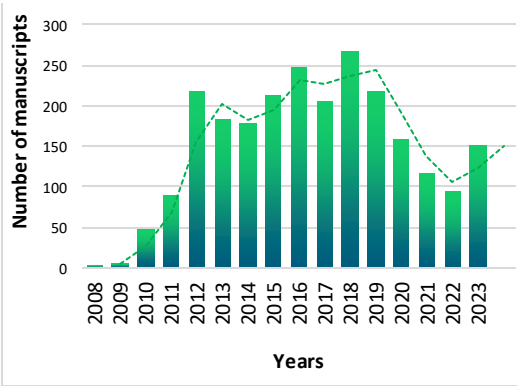


Figure 1. Number of publications published within EU-funded projects by year.

Notably, the fields of Physics and Geosciences & Space along with Multidisciplinary sciences exhibit the highest number of publications, indicating that EU-funded projects mainly focus on applied sciences.

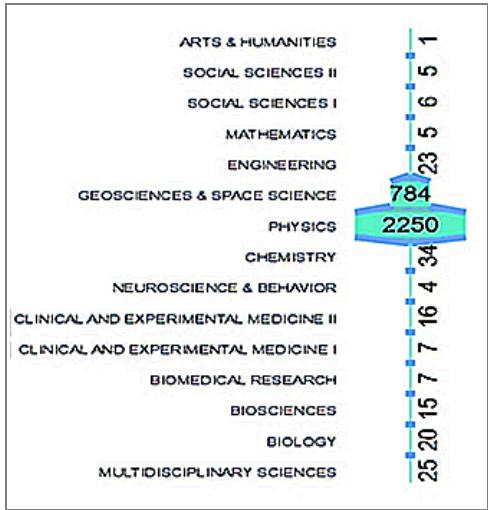


Figure 2. Total number of publications categorized by Glänzel and Schubert classification.

Particularly, the highest number of successful projects occurred in 2019 and in 2023, which aligns with the overall trends in the published publications.

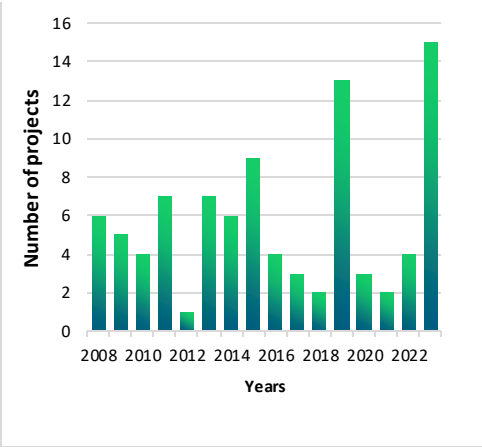


Figure 3. The year-wise distribution of EU-funded projects.

The sharp increase in publications in 2020 and 2023 may be explained by the large-scale projects or special funding initiatives, while fluctuations in other years suggest variations in project approval rates or policy shifts. Based on our analysis, Armenia has played a diverse role in promoting EU-funded projects. In most instances, Armenia acts as a participant (73%), while in some projects, it serves as a coordinator (18%) and a partner (8.1%). In only a few cases, Armenia plays a minor role as a third-party country, accounting for 0.9% of the projects. These results demonstrate that Armenia has engaged in various EU-funded projects in different capacities, which have contributed to an increase in publications and fostered connections among scientific collaborators.

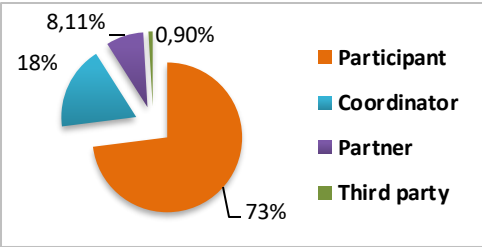


Figure 4. The contribution of Armenia within EU-funded projects.

In total, 29 organizations participated in EU-funded projects during the studied years; however, the most active organization is the National Academy of Science of Armenia.

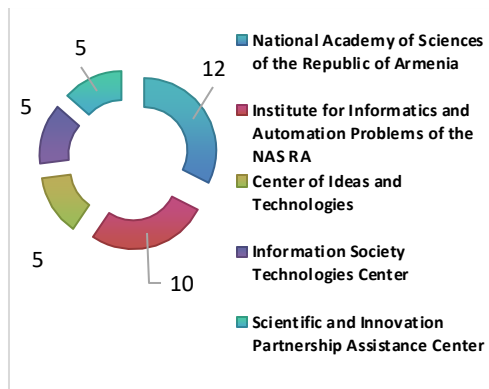


Figure 5. The top 5 active Armenian organizations participating in EU-funded projects.

Figure 5 illustrates the list of these five organizations. It is evident that the majority of the projects focus on the IT sector and related fields, which in turn indicates the priorities and policy direction of the EU in the context of a scientific partnership with Armenia and emphasizes the academic potential of the mentioned areas.

Conclusion

The outcomes of our bibliometric study represented the overall picture of the EU-funded projects, detailing the trends in scientific output, the diversity of academic fields engaged, and the active contributors associated with programs carried out with the support of the EU's financial and collaborative efforts. This investigation provides findings into the nature and extent of Armenia's involvement in EU-funded research initiatives, highlighting both achievements and areas for potential growth. By elucidating the contributions and evidence associated with EU-funded projects, we are keen to inform future policy decisions and foster enhanced cooperation in research and innovation between Armenia and the EU.

Additionally, the findings of this study demonstrate how funding acknowledgment analysis can enhance bibliometric assessments of international research collaborations. By integrating publication output trends with institutional network analysis, we offer a framework that can be adapted to other regions involved in EU-funded projects. Further, we will conduct a comparative analysis of research collaboration between the EU and the South Caucasus region utilizing co-authorship institutional network mapping, and financial output assessment. This could give an insight into the EU scientific policies and funding impact at the regional level.

References

- Gallo F., Seniori Costantini A., Puglisi M. et al. (2021). Biomedical and health research: an analysis of country participation and research fields in the EU's Horizon. *Eur J Epidemiol* 36, 1209–1210.
- Dalen van Rianne et al. (2014). Public funding of science: An international comparison. *CPB Netherlands Bureau for Economic Policy Analysis*. 4-5.
- Enger, S. & Castellacci, F. (2021). Who gets Horizon 2020 research grants? Propensity to apply and probability to succeed in a two-step analysis. *Scientometrics* 109, 1611–1612.
- Mazepus H., Toshkov D., Ramasheuskaya I., Chulitskaya T., Rabava N. (2017). *The Effects of the EU's Scientific Cooperation Programmes on the Eastern Partnership Countries: Scientific Output and Broader Societal Impact*. 35.
- Glänzel W., Schubert A. (2003). A new classification scheme of science fields and subfields designed for scientometric evaluation purposes. *Scientometrics* 56, 357–367.