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Turning Open Access to Reality: The Case of Lithuania

Objective: This article aims to estimate the changes in the number of open access publications by Lithuanian authors at the national level, based on institutional publication data, as well as the impact of open access policies at the national and institutional levels on these changes. **Methods:** bibliometric analysis of scientific publications in the databases *Scopus* and Web of Science was carried out to assess the open access publications of Lithuanian authors and their changes over ten years. **Results.** Lithuanian author's publications from 2014 to 2023 by open access status increased by almost 33% (WoS) and 31% (*Scopus*), whereas the share of open access publications funded by the Research Council of Lithuania increased by 24% (WoS) and 37% (*Scopus*); the share of open access publications by authors from Kaunas University of Technology increased by 31% (WoS) and 26% (Scopus). When analyzing OA publications by open access mode, it is observed that the largest percentage of OA publications are Gold Access and Green Access publications. **Conclusions.** Lithuanian authors publish OA not only because of institutional and national funders policies but also by international funders, including EC, requirements on OA. When open access policies are guidelines, they have less impact than in those cases when they are mandatory. To measure authors' publications on the national scope, there is a need for metrics and tools to track all publications by Lithuanian authors.
Keywords: open access; OA policy; OA publication; OA monitoring

Introduction

The openness of scientific results has always been a core value of science, which is why research results are published in scientific journals and other publications. Providing access to publications, data, code, prototypes, software, and other intermediate results increases scientific productivity, reduces infringements of scientific ethics, and accelerates the production of scientific knowledge and innovation. However, it is also clear that progress towards open science is relatively slow, as it needs to be matched by a system that provides the right incentives for all participants and stakeholders in the research process.

In Lithuania the requirement to make the results of publicly funded research public is recorded in the Law on Higher Education and Research: "The results of all research work carried out in state higher education and research institutions must be communicated to the public" (Law on Higher Education and Research, 2009, revised in 2015 and 2016). However, this Article in the Law is not a directive, as Lithuanian research and study institutions are autonomous legal bodies that decide on access to their research results. On their web pages, almost all the biggest Lithuanian state higher education institutions declare support for the EU policy on open access to research information. Some have adopted internal documents like guidelines on open access to scientific publications and data (European Commission, 2018). The institutional OA policy documents are recommendations rather than mandates (Tautkevičienė, G. & Cesevičiūtė, 2019).

On 29 February 2016, the Research Council of Lithuania (RCL) approved a set of “Guidelines on Open Access to Scientific Publications and Data” (Research Council of Lithuania, 2016) that addresses publications and data from research funded by the Council. The Guidelines say that the data must be preserved for a period no shorter than years after the completion of the project and that a data management plan must be included in the project proposal. These provisions apply to projects funded by the RCL. The following requirements for projects funded by the RCL are presented in the Guidelines:

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- Open access to scientific publications is provided through repositories and journals.
- All project research publications must be uploaded and archived in repositories. Digital copies of publications must be submitted to the repository immediately after acceptance for publication. The repository shall assign an identifier to the submitted publications and immediately open their metadata. The metadata of publications must be fully open, searchable, and automatically retrievable, even when the scientific publication is under embargo. When scientific publications are published, the repositories must contain links to the officially published versions. Project research publications, unless embargoed, must be opened immediately after submission to the repository. Open access to scientific publications in the fields of biomedicine, physical sciences, technology, and agricultural sciences may be subject to a 6-month embargo period and 12 months for publications in the humanities and social sciences embargo period.
- Article processing charges (APC), book processing charges (BPC), and the costs of publishing in OA journals or OA books can be paid for by RCL-funded projects and are included in the project's cost estimate. Costs for opening publications in hybrid journals are not covered by RCL-funded projects. All books and articles published in OA journals for which article and/or book preparation fees have been paid must be published under a Creative Commons licence CC-BY.
- The guidelines require the project leader to ensure that the data generated during the implementation of the project is preserved in digital format and, at the end of the project, is transferred to the institution for preservation and/or made available to the repository. The data must be preserved for at least 5 years after the end of the project. A data management plan must be included in the project application and may be revised during the project. Costs incurred for the implementation of the data management plan during the project period may be charged to projects funded by the RCL and shall be included in the project cost estimate. The data on which the scientific publications are based must be made openly available at the same time as the publications. Exceptions to the opening of data shall be made subject to a reasoned explanation.

A transition period for the implementation of the Guidelines until the end of 2020 was set to ensure a smooth process. During the transition period, only warning measures were foreseen in case of non-compliance with the provisions of the Guidelines.

In 2021, the transition period for the implementation of the Guidelines was extended until the end of 2022. The interim evaluation of the impact and progress of the Guidelines foreseen in the document by May 2018 has been postponed to January 2022. In 2022, when impact evaluation of the Guidelines was carried out (Tautkevičienė et. al, 2022), the transition period was extended until June 2024. Therefore, the requirements presented in the Guidelines still are recommendations rather than mandates.

Monitoring the implementation of open science is considered an integral part of policy implementation and there is a need data-based tools that enable them to make decisions (Barbers, Stanzel, & Mittermaier, 2022). The Guidelines approved by the RCL provided for interim monitoring in 2018 and measures to be taken in case of non-compliance with the Guidelines. A subsequent revision of the Guidelines to take into account the challenges in practice was also planned. However, neither the Guidelines nor subsequent documents have adopted a process for monitoring the implementation of the Guidelines, nor do they provide for monitoring indicators and tools. The interim monitoring, which was foreseen for 2018, was only carried out in 2022. The resulting data showed progress and a growing number of OA publications, but revealed a number of shortcomings, such as the lack of monitoring tools and indicators, and the lack of readiness of institutions and researchers to move towards mandatory OA requirements. The interim monitoring

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postponed the mandatory implementation of the requirements of the guidelines and the opening of publications until 2024.

Kaunas University of Technology, following the EC recommendations and the RCL guidelines, adopted the guidelines on 22 December 2016 in line with the national guidelines and the EC OA recommendations. These guidelines are in line with the national and EC requirements for OA to publications and data and are a guideline for authors whose research is funded by the University. KTU authors must also comply with the requirements of the funding institutions when their research is funded by other funders.

This article presents the results of a bibliometric analysis of scientific publications in the databases Scopus and Web of Science for the evaluation of Lithuanian authors' publications in Open Access: 1) how the number of Lithuanian authors' publications has changed in Open Access over the last decade; 2) what impact OA policy has on the opening of Lithuanian authors' publications in Open Access.

Methods

OA monitoring requires frequently updated comprehensive indicators collected using a consistent methodology and definitions to support decision-making and monitoring, and tools to enable monitoring. A practical example of the main problems related to the availability of publication information is the European Open Science Monitor, which aims to provide regularly updated country-level OA development indicators (European Commission & Waltman, 2019). Unfortunately, many countries do not have national monitoring tools, and data in international databases is incomplete and fragmented. Previous studies show that a variety of tools are used to monitor and evaluate OA publications: Google Scholar, Microsoft Academic, Scopus, Dimensions, Web of Science, and OpenCitations' COCI (Martín-Martín, Thelwall, Orduna-Malea, & Delgado López-Cózar, 2021; Pölönen, Laakso, Guns, Kulczycki, Sivertsen, 2020). The use of databases such as Web of Science and Scopus have the advantage of being considered authoritative and used for research evaluation in the country. In addition, Web of Science and Scopus are the only known sources that provide information on the authors of the articles concerned (Barbers, Stanzel, & Mittermaier, 2022). In addition to indicating whether a publication is OA, these databases also provide open access methods.

As part of the monitoring of the RCL OA guidelines, a study was carried out to assess the progress of open access since the guidelines were adopted (Tautkevičienė et al., 2022). The analysis used a survey of participants in RCL-funded projects and representatives of research and studies at different higher education institutions in Lithuania, as well as a bibliometric analysis of open access publications using data from the national repository eLABa, institutional repositories, bibliographic and citation databases WoS, Scopus, and Google Scholar data. The results of the study revealed that both national and international repositories provide fragmented information and data on the publications of Lithuanian authors and their open access (Tautkevičienė et al., 2022). The national repository eLABa has comprehensive data on publications at the national level, but does not collect complete information on the status of OA, funding sources, and the available information on OA is incomplete and fragmented. It has been identified that when analysing Lithuanian publications on OA access and access methods, one of the most appropriate tools may be the bibliographic databases Web of Science (WoS) by Clarivate and Scopus.

The data draw on the unique peer-reviewed publications published in 2014–2023 and indexed in the Web of Science and Scopus. The data are compared in terms of the total number of

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publications by Lithuanian authors, the number of publications funded by the RCL and Kaunas University of Technology, and their OA status.

Open access to publications refers to the possibility to freely access and use research publications. These are the most common routes to open access:

- Gold Open Access: research outputs that are publications in an open access journal,
- Green Open Access: research outputs that are publications in a journal that are also available in an open access repository,
- Hybrid Open Access: research outputs that are publications in a subscription journal that are open access with a clear license, and
- Bronze Open Access: research outputs that are published in a subscription journal that are open access without a license.

Results and Discussions

Analysing the data by year, it can be seen that the data in both databases are similar. Between 2014 and 2023, OA publications by the authors from Lithuanian institutions grew by 25% on average. A slightly faster growth can be observed in the overall sample of publications by Lithuanian authors: WoS – from 34.73% (in 2014) to 68.08% (in 2023); Scopus – from 1,343 (38.15% in 2014) to 4,005 (69.09% in 2023). Open Access publications of the RCL-funded research: WoS – from 197 (40.29% in 2014) to 433 (64.15% in 2023); Scopus – 166 (30.12% in 2014) to 872 (66.86% in 2023). In the KTU sample, the share of open access publications: WoS – from 243 (38.94% in 2014) to 404 (69.9% in 2023); Scopus – 209 (35.79% in 2014) to 522 (61.56% in 2023) (see Figure 1). This suggests that the growth in the number and percentage of OA publications has been less influenced by the guideline-based RCL Guidelines (2016) than by the requirements of other funders, that have been more stringent and prescriptive. For example, the results of the FP6 funding rounds were more stringent and more demanding than those of the Horizon 2020, European Horizon, etc. Other factors also had an impact on the opening of publications: dissemination of information on OA, training and growth of expertise in this field, etc.

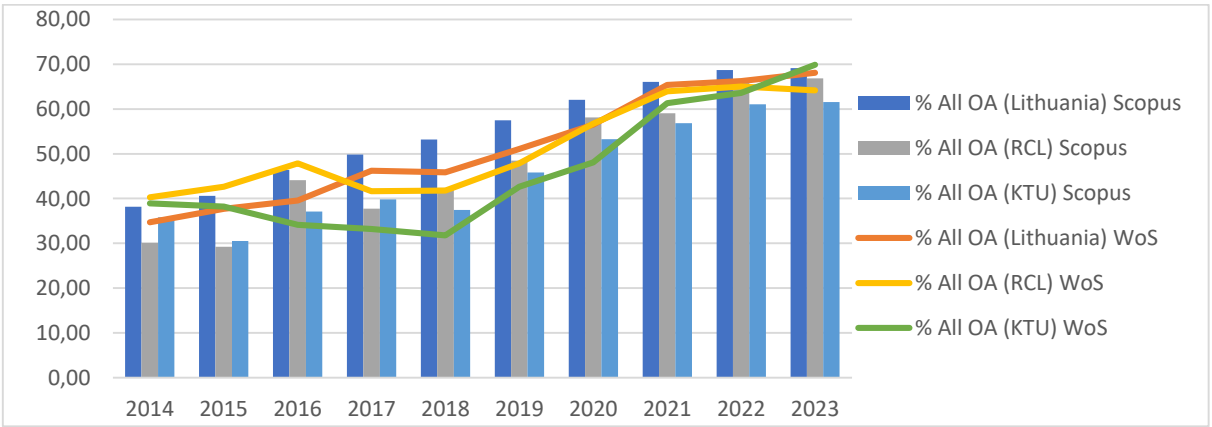

Fig. 1. Total percentage of publications funded by Lithuanian institutions, RCL, and KTU in open access (2014-2023)

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The data from Scopus and WoS allow monitoring of the way OA publications are made open. There are general trends in making publications OA by Lithuanian authors, Lithuanian authors funded by the RCL, and authors from KTU according to the OA mode (Gold, Green, Hybrid, or Bronze) (see Figures 2-7). The largest share of publications is accounted for by Gold OA and Green OA. Analyzing the publications of Lithuanian authors, RCL, and KTU-funded research by type of OA, we can see that in all three cases, the number of Gold OA publications doubled. The number of open access publications has also doubled, except in the case of RCL, where the increase was lower. WoS provides a more detailed analysis of Green OA, taking into account submission after acceptance and the embargo period in force. The proportion of publications in hybrid journals is low. The lower popularity of hybrid access to publication is because APCs in hybrid journals are not recommended in Lithuanian institutions and no funding is provided by the RCL for APCs in hybrid journals. Bronze OA, which allows free reading but does not specify a licence to access the publication, represents a small proportion of OA publications. These are mostly journals published by research and academic institutions, which publish articles that provide free access but do not specify a licence for use. They are limited in choice and do not exist in individual scientific fields.

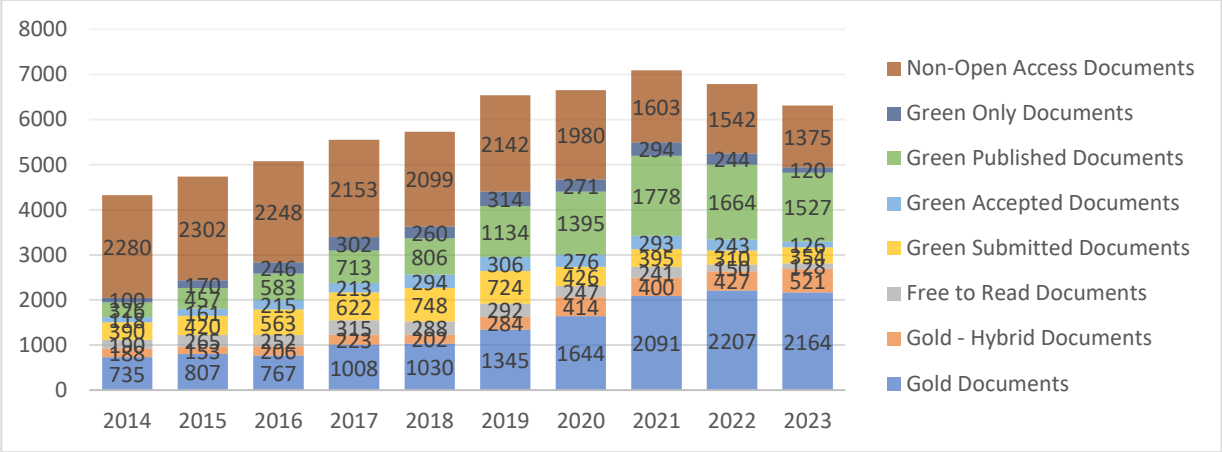

Fig. 2. Number of publications by Lithuanian authors from 2014 to 2023 by open access status (WoS data)

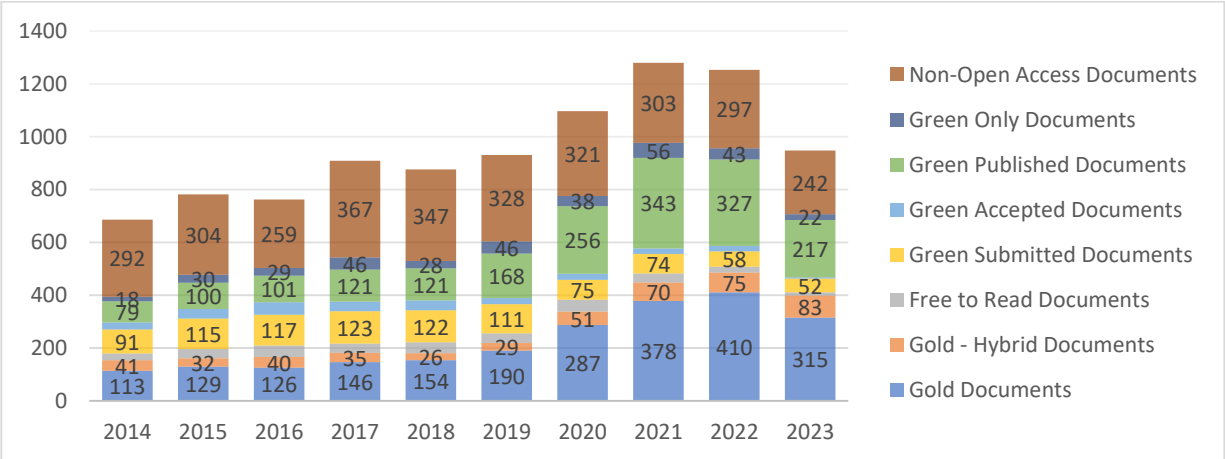

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Fig. 3. Number of RCL funded publications from 2014 to 2023
by open access status (WoS data)

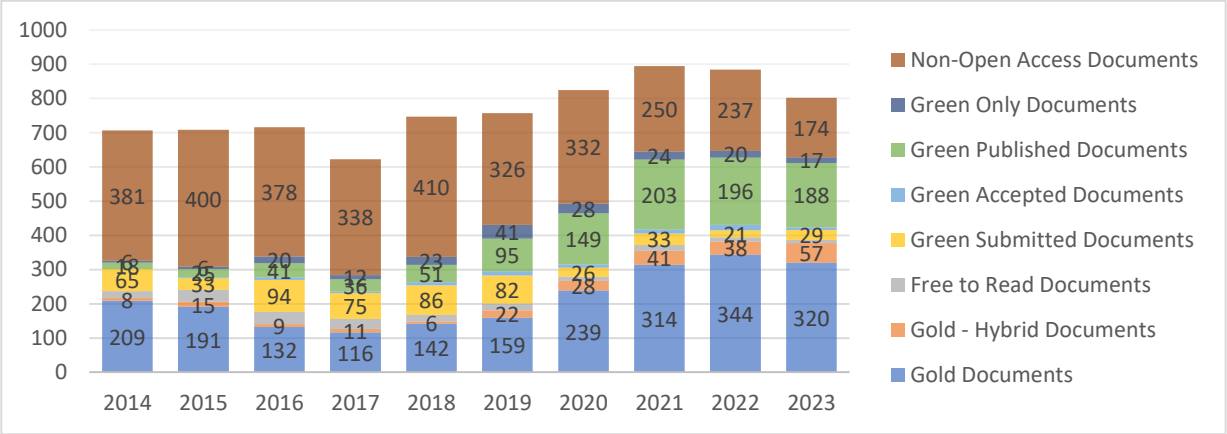

Fig. 4. Number of KTU-funded publications from 2014 to 2023
by open access status (WoS data)

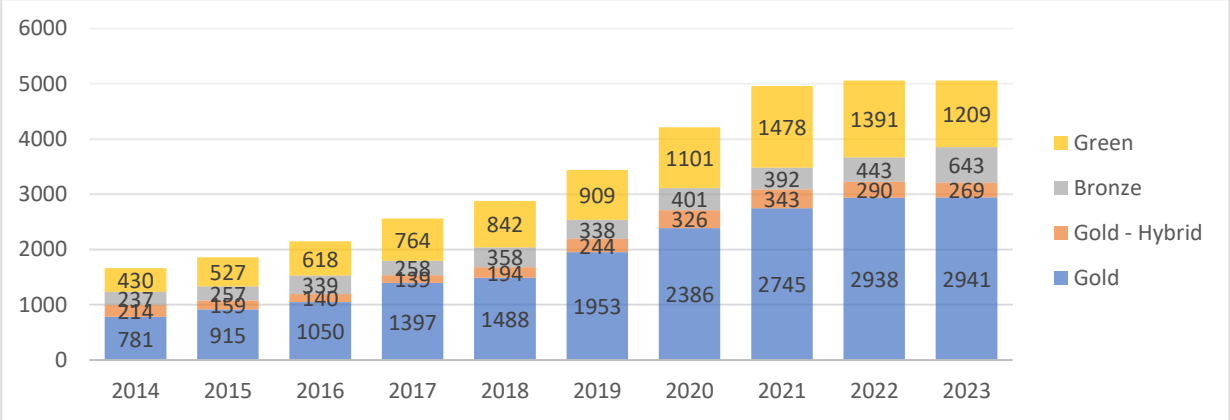

Fig. 5. Publications by Lithuanian authors indexed in Scopus by access type

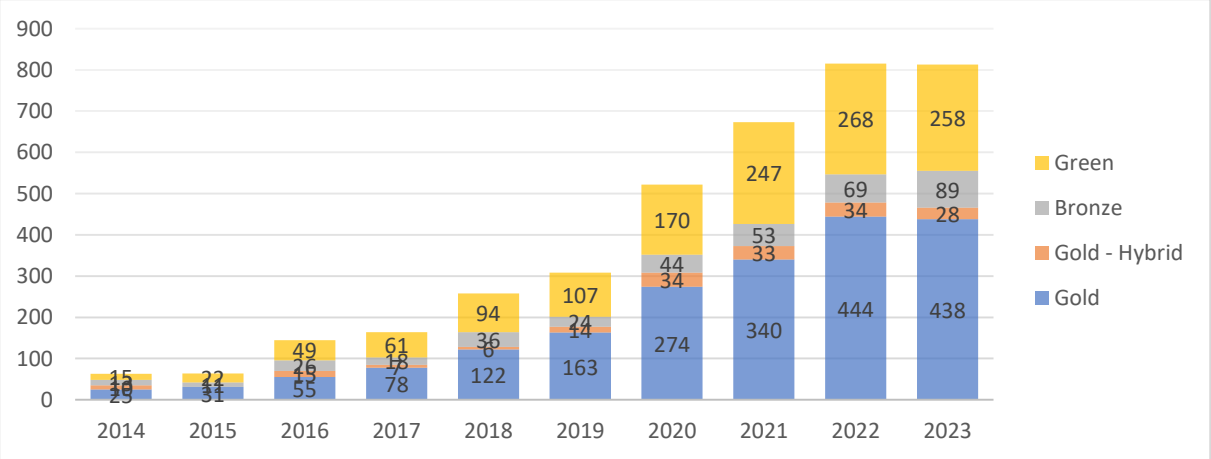

Fig. 6. The RCL-funded OA publications in Scopus by access type

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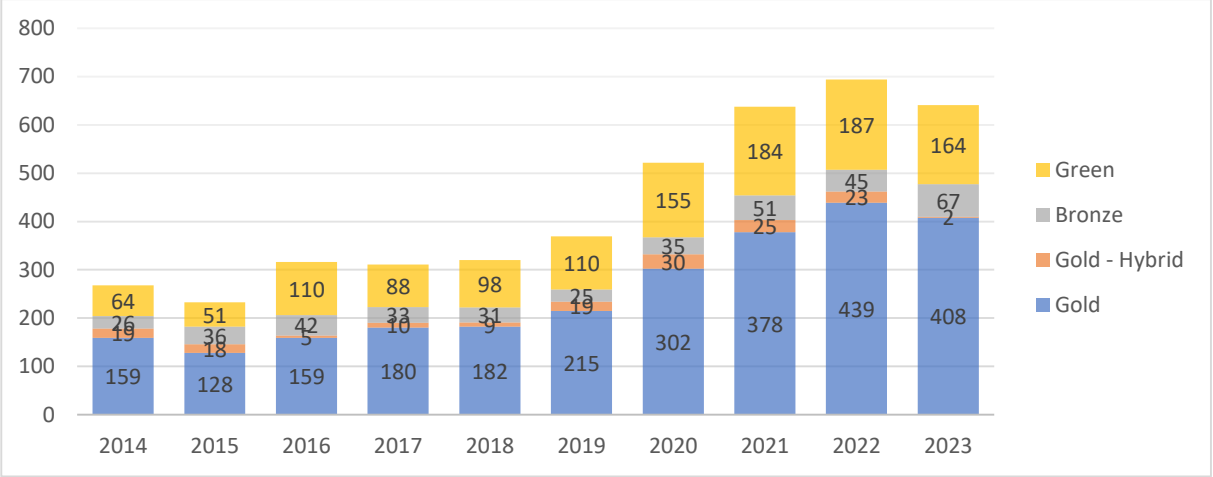

Fig. 7. KTU-funded OA publications in Scopus by access type

The distribution of WoS-indexed articles with the RCL as a funder by scientific category shows that the majority of OA publications are in the field of Natural and Technical Sciences (NTS). This is in line with a general global trend showing that researchers in the NTS are more likely to open publications than those in the Social Sciences and Humanities (SSH). This is explained by the long tradition of OA policy and the investment in and use of infrastructure by the respective research communities: 88% in Medical and Health Sciences, 83% in Natural Sciences, whereas Engineering and Technology, as well as Social Sciences and the Humanities, account for 78% of OA publications.[1] However, if we compare the breakdown by scientific category with the overall distribution of open access publications by Lithuanian authors, we can see that in the overall Lithuanian sample, the majority are in the fields of Economics, Management, and Education. In the case of KTU, there are also publications in Economics, Management, and Business. This suggests that the priority given to NTS in the RCL research funding is higher than the overall national and European context.

In summary, the research of Lithuanian authors and the publication of their results in open access shows clear progress in this area, as the share of publications in open access almost doubled. However, given that authors' choices are determined by the requirements they face in terms of making their publications open access, it is usually the desire to meet the requirements of the funding institution, rather than the wishes of the author, that drives the choice. This is also influenced by the funder's funding for open access. Lithuanian authors' open access publishing choices have been influenced by the different open access requirements of different funders: the EC, the national funder, and the research and study institutions, whose open access publishing requirements are similar, but in the case of the EC these requirements are mandatory, whereas the open access policies adopted by the Lithuanian funder and the Lithuanian research and study institutions are recommendatory. The European Commission's leadership in the Open Science policy has paid off. Uptake has steadily increased over the past four years, achieving an average success rate of 83% in Horizon 2020 for open access to scientific publications (European Commission, 2021). Although the OA publication rates of Lithuanian authors are below the EC average, progress is also evident.

[1] European Commission Directorate-General for Research and Innovation. (2021). *Monitoring the open access policy of Horizon 2020: final report*. https://data.europa.eu/doi/10.2777/268348.

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Comparing the overall percentage of Lithuanian authors' publications available in OA with the percentage of RCL-funded publications available in OA, it cannot be said that the RCL Guidelines have had a significant impact on making publications OA, as the overall percentage of Lithuanian authors' publications in OA grew more rapidly than the percentage of publications of RCL-funded projects or KTU. This may be due to the guidance requirements and the postponement of mandatory measures. It can be assumed that Lithuanian authors whose research was funded by other funders, e.g. Horizon 2020, had a greater impact on the decision to open publications, as they were not subject to a recommendation, but to a requirement for OA to the results of the funded research.

Limitations. To enhance comprehensive and comparable monitoring of OA, there is a need for well-structured and comprehensive national and international publication information sources, e.g. CRIS, something which should be seen as an integral tool for working towards open science in both policy and practice (Biesenbender, Petersohn, & Thiedig, 2019). When national monitoring tools are not available and commercial bibliographic databases such as WoS and Scopus are used, the monitoring possibilities are incomplete and limited to the publications indexed by these databases. Taking into account the fact that only some of the publications produced by Lithuanian authors are not indexed in these databases, the data obtained still do not provide a comprehensive picture of the OA publication's situation in the country.

Conclusions

The policy of research funding bodies with requirements for open access publications has a definite impact on the growth of open access publications. The data show an increasing trend in the share of open access publications in the total number of publications indexed in databases, both in the total sample of Lithuanian authors and in the sample of publications by authors of research funded by the Research Council of Lithuania or by research and study institutions. This shows the impact of funding institutions on the choice of authors to open access their publications. It can also be observed that when open access requirements for authors are a mandatory, the number of publications increases faster than when open access publication is provided in the form of recommendations. To assess the full range of publications by national authors, metrics and tools are needed to track all publications by Lithuanian authors.

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Перетворення відкритого доступу на реальність: приклад Литви

Мета статті – оцінити зміни в кількості публікацій литовських авторів у відкритому доступі на національному рівні на основі даних інституційних публікацій, а також оцінити вплив на ці зміни політики відкритого доступу на національному та інституційному рівнях. **Методика.** Проведено бібліометричний аналіз наукових публікацій у базах даних Scopus і Web of Science для оцінки публікацій литовських авторів у відкритому доступі та їх змін за десять років. **Результати.** Публікації литовських авторів з 2014 по 2023 рік зі статусом відкритого доступу зросли майже на 33 % (WoS) та 31 % (Scopus), водночас частка публікацій у відкритому доступі, профінансованих Науковою радою Литви, зросла на 24 % (WoS) та 37 % (Scopus); частка публікацій у відкритому доступі авторів з Каунаського технологічного університету зросла на 31 % (WoS) та 26 % (Scopus). Під час аналізу публікацій відкритого доступу за типами статей можна побачити, що найбільший відсоток відкритих публікацій припадає на публікації Gold Access та Green Access. **Висновки.** Литовські автори публікуються у відкритому доступі не лише через інституційну політику та політику національних донорів, а й через вимоги міжнародних донорів, зокрема ЄС, щодо відкритого доступу. Коли політика відкритого доступу є рекомендаційною, вона має менший вплив, ніж у тих випадках, коли вона є обов'язковою. Для вимірювання публікацій авторів у національному масштабі необхідні метрики та інструменти для відстеження всіх публікацій литовських авторів.

Ключові слова: відкритий доступ; політика відкритого доступу; публікація відкритого доступу; моніторинг відкритого доступу

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