

Open Access in Scientific Communication: Bulgaria's Current OA Policies within the International Context

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Abstract. The following report aims to examine the current tendencies in the field of Open Access (OA) publishing. Ever since its inception in the 1990s, Open Access has been a topic of interest in regards to its potential to be viable alternative to more traditional publishing models for scientific information and communication. This report examines OA within the context of both international practices (with a focus on European experience in the Open Access field), as well as looking at the current tendencies regarding this publishing model in Bulgaria.

Keywords. Open Access, OA, scientific communication, Bulgaria, DRIVER, OpenAIRE, Sofia University "St. Kliment Ohridski", Bulgarian Academy of Sciences

1. Open Access and the International Scientific Community

The matter of communication has been one of ever increasing importance for the scientific community in the past few years. The advent and advancement of the new communication technologies (the World Wide Web, in particular) have enabled the rapid spread and sharing of information throughout the world. This trend also extends to the international scientific community. Through the Web, scientists are able to gain access to a rich vault of peer-reviewed information that can aid them in their respective research fields. In the past this was done mostly through paid electronic journals and databases. This all changed however with the advent of Open Access.

The term "Open Access" (or OA in short) is used to describe methods of information publication that are not linked to paid subscriptions. The definition of what OA is can be found in the comment of Charles Bailey made during the 2001 meeting in Bucharest. He states that "*Open Access online has to be that literature, which scientists provide to everyone without the expectation that they will be paid for it*" [1]. The beginnings of the Open Access movement can be traced back to the early 1990s. In 1991, Paul Ginsparg created the arXiv electronic publications repository which archives e-documents within fields such as nuclear physics, mathematics and more [3]. In the years following the creation of Ginsparg's electronic archive, Open Access became a topic of great interest for both the scientific community as well as librarians. Even so, the early years of scientific communication via the conduit of the Web were focused on paid electronic journals and databases. These platforms and their respective publishers

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were considered the only reliable means of distributing and gaining access to peer-reviewed information. Several factors however helped Open Access gain additional support as an alternative publication model to the traditional paid platforms. These include [1]:

- The fast development of new information technologies.
- Exponential growth of the volume of data and publications in the field of scientific research.
- The constantly rising prices of scientific information (based on data acquired from the Association of Research Libraries in the USA, the prices of scientific journals have increased by 215% over the past 15 years which has had a serious effect on the budgets of research libraries).
- The rapid development of the scientific fields and the increasing need for acceleration of the process of providing access to research outcomes and achievements to scientists (with traditional distribution methods there is a delay in the cycle of research documents publication: a considerable time can pass between the submission of the initial manuscript and the publication of the finalized document).
- Dynamic changes in the publishing sector.
- The continuing trend of digitalization of research literature (over 95% of all renowned scientific journals have an electronic version, over 35% of all scientific monographs are published in an electronic form and so on).
- Changes to the methods of creation, preservation, access and distribution of information resources and products.
- The appearance of new channels that provide researchers with new ways with which they can organize, store and provide access to scientific facts and knowledge.
- The search for solutions that can overcome the “information based isolation inequality in science”.
- The public’s disagreement to having their taxes be used to pay scientific organizations “two times” (On one hand, they pay for the financing of research activities. On the other, they also pay for the buy-out of the results of said research, subsidized with government funds, in the form of information products and publications distributed through commercial publications and databases).

Given the influence of factors such as those mentioned above, the Open Access method of information distribution has become a viable alternative to more traditional commercial publication platforms. It allows the greater scientific community to freely share research information and results both in between itself, as well as the those members of the public who might be interested in their findings.

There currently exist several initiatives that aim to create commonly accepted frameworks for Open Access. Some of the more noteworthy examples of such initiatives are:

- **The DRIVER project** (Digital Repository Infrastructure for European Research): Initiated by the European University Association in 2008 and financed by the European Commission, the objective of this project is to foster the creation of institutionalized OA repositories in universities throughout Europe that serve as part of a greater network that can provide free scientific information from all possible research fields. In 2014, DRIVER merged with the OpenAIRE initiative (another Open Access repository project funded by the

European Commission) [7]. As of February 2015, DRIVER/OpenAIRE provides access to over 9, 4 million scientific publications (journal articles, dissertations, books, etc.) which are stored in 5,776 datasets derived from 580 repositories and OA journals. These 580 repositories are located in 38 European countries (Bulgaria does participate in DRIVER but does so with only 5 repositories: the digital archive of The Institute for Mathematics and Informatics – Bulgarian Academy of Sciences, Pensoft, New Bulgarian University, Medical University- Sofia and the Burgas Free University).

- **Digital Agenda: more open access to scientific information:** The initiative was started as an idea of the European Commission, Neelie Kroes (vice-president of Digital Agenda) and Máire Geoghegan-Quinn (the European Commissioner for Research, Innovation and Science for the period 2010-2014). The core concept of the project is that European researchers, engineers and entrepreneurs need to have quick and easy access to scientific information so they can stand on an equal footing with their international colleagues. A modern digital infrastructure can play a key role in making access to knowledge easier and can help in the formation of a unified European scientific environment.

The participation of the European Commission in both of the above initiatives shows that the idea of Open Access has become an integral component of the European information policy. In fact, Open Access plays an important role in the new Horizon 2020 research and innovation program of the European Union. This role is reflected in the Open Research Data Pilot which is an initiative with the goal of improving and maximizing access to and re-use of research data [7]. This is further reflected in the fact that Europe has, as of data from 2015, the largest number of registered OA repositories in comparison with the other parts of the world. This is reflected in Table 1.

Table 1. Registered OA repositories per continent (information relevant as of 2015)

Repositories per continent	Percentage of repositories in comparison with the rest of the world	Number of registered repositories
Europe	45.5%	1,241
North America	19.9%	543
Asia	18.4%	503
Other	16.2%	441
Total	100%	2,728

The next segment of this report will cover the current developments of the Open Access movement in the context of the Bulgarian academic community and its impact on scientific communication in the country.

2. Bulgaria's Experience in Open Access

It has to be noted that, in comparison with the above presented international experience, the current developments in regards to Open Access in Bulgaria are somewhat lackluster. That is despite the fact that Open Access, as matter of interest, is the topic of several documents detailing the future developments of the Bulgarian scientific and educational sectors and that *“due attention will be given to creation and development of scientific networks in which scientific information, knowledge and technology can be*

shared freely” [1]. Unfortunately, as of 2015, these documents remain purely theoretical and little has been done to have Open Access become an integral part of Bulgaria’s scientific and academic societies [4, 5, 6]. In the few cases where OA has become a practical reality in Bulgaria, this has mostly been thanks to individual projects and initiatives driven by singular organizations rather than through the aid of any government institutions. The Bulgarian Academy of Sciences (BAS) intends to create a network of OA centers with the idea that its Institute of Mathematics and Informatics will be the coordinating body for this nationwide system. The institute aims to provide support to both academic organizations, as well as individual researchers. The aim here is to achieve integration between BAS, the public and industrial sectors, and to have ties between notable scientific centers, universities and other educational institutions in the country be strengthened. These expectations are based around the future creation of Open Access repositories mainly in university libraries and scientific organizations. As of right now though, this network of academic repositories is fairly small (as can be seen in Table 2) as there are currently only 5 Bulgarian OA archives registered in OpenDOAR (Directory of Open Access Repositories).

Table 2. Open Access repositories in Bulgaria registered in OpenDOAR (information relevant as of 09.02.2015).

Organization	Purpose	Profile	Type of archived documents	Language(s) of the documents	Number of archived documents
Burgas Free University	Research documents of the BFU	Inter-disciplinary	Articles, conference papers, books	Bulgarian, English	460
Institute of Mathematics and Informatics- BAS	Research documents of the IMI	Inter-disciplinary	Articles, conference papers, books	Bulgarian, English	2,203
Pensoft Publishers	Repository for documents	Inter-disciplinary	Books	English	447
Medical University of Sofia-Central Medical Library	Research documents of the MU	Healthcare and medicine	Articles, dissertations, books, study materials	Bulgarian, English	574
New Bulgarian University	Research documents of the NBU	Inter-disciplinary	Articles, dissertations, books, study materials	Bulgarian, English	1,634

Another useful source of information regarding OA repositories in Bulgaria can be found in the **OpenAIRE “European Open Access Repositories Landscape”** tool [8]. The following table presents Bulgaria’s standing in regards to the total number of Open Access documents published in comparison with several other European countries.

Table 3. OpenAIRE data regarding number of OA repositories/documents per country (information relevant as of 12.02. 2015)

Country	Number of repositories	Number of OA publications
United Kingdom	71	3,050,186
Germany	78	561,665
France	16	477,334
Bulgaria	12	4,998
Poland	9	27,012
Turkey	11	2,161
Hungary	5	4,076

As can be seen in Table 3, Bulgaria lags considerably behind some of its EU co-members in regards to pure volume of OA information available online. This information source also shows that a greater number of OA repositories do not always correlate with a greater number of OA documents (Poland has a significantly greater volume of published OA documents despite having less OA repositories than Bulgaria). A possible explanation for this can be found in the differences in document publication output rates in the various countries. Bulgaria, for example, has a fairly low publication output which could understandably also affect the number of OA documents published.

As for Open Access journals, Bulgaria ranks as 37th (from a total of 136 countries covered) in the world based on information from DOAJ (Directory of Open Access Journals) relevant as of 2015 [11]. Please note that the following table aims to compare Bulgaria not only in relation to the top ranking countries, but also those who are closer to it in terms of the number of available Open Access journals.

Table 4. Bulgarian ranking in DOAJ with regards to the OA journals available to the public.

Rankings	Country	Number of OA journals
1.	USA	1,237
2.	Brazil	952
3.	Great Britain	664
6.	Germany	341
9.	Romania	307
11.	Turkey	210
13.	France	175
24.	Croatia	93
25.	Serbia	88
30.	Czech Republic	71
32.	Russia	70
37.	Bulgaria	45
39.	Slovenia	41
40.	Greece	39

The above information provided in Table 4, indicates that the total number of OA journals in Bulgaria is fairly small in comparison with what is found in other countries in the world. Even so, these numbers are comparable with those found in other neighboring countries such as Greece and Slovenia.

There are several factors that can be connected with the current state of Open Access in Bulgaria. Some of the more notable of them are the following [5, 6]:

- The low level of financing of the science and research fields in Bulgaria (roughly 0.5% of the country's GDP, whereas the recommended norm in the rest of the EU is 3%).
- There exists a declared desire to have Open Access become part of the Bulgarian scientific society. Yet this desire is not backed by practical suggestions as to how an OA framework can be created in the country (i.e. the mostly theoretic state of the OA environment in Bulgaria).
- The idea of Open Access is still largely unknown to Bulgarian scientists. There is also their lack of determination to convert to a more digitally focused method of publishing their research results (as opposed to the more traditional printed publication platforms).
- The lack of a common vision for the creation of OA repositories. As stated above, current Open Access initiatives in Bulgaria are handled by individual

institutions and there is distinct lack of cooperation in regards to the creation of a unified OA network.

- An existing crisis in the Bulgarian publishing sector in regards to scientific periodicals and literature that is mostly the result of poor financing.
- The current trend of having Bulgarian scientists focus on having their works be published in renowned foreign peer-reviewed journals and databases with high impact factors as opposed to local publications.
- The lack of qualified specialists who can work towards the implementation of OA in Bulgaria.
- Lack of financing for the development of the Open Access sector in Bulgaria. Despite the OA model being focused on providing free access to scientific information to all who would benefit from it, the actual implementation of a functioning framework nevertheless requires adequate financial resources.

Apart from the above mentioned there are two additional factors that have a significant impact on the current development of the scientific fields in Bulgaria. These factors also have their effect on Open Access and will therefore be mentioned in this report. The first of these is the notable lack of a proper apparatus for scientific critique and review in Bulgarian universities and scientific organizations. The reviewing institution, as of now, has a mostly formal role in Bulgarian academic publishing. In turn, this has led to a decrease of both the quality, as well as the prestige of Bulgarian scientific publications. The second factor is connected with the above mentioned and has to do with the decrease in the quality of the requirements and criteria for the professional development of academic staff in Bulgarian scientific and educational institutions. This has led to several tendencies that have negative impact on the Bulgarian academic society as a whole. These include:

- The lack of encouragement for the creation of higher quality scientific literature.
- The decreased number of documents published per individual researchers.
- The isolation of part of the Bulgarian scientific society from the greater worldwide scientific community and achievements.

The Bulgarian scientific community is a relatively small one in terms of resources and lacks the capabilities to produce a significant quantity of research documents. Even so, despite its shortcomings, the Bulgarian research community has managed to gain some level of international recognition for its scientific achievements and publications. There are notable Bulgarian scientific publications in all 21 major scientific areas covered in the Essential Scientific Indicators. Similarly, in Scopus, Bulgarian scientists have managed to publish important research papers in all 26 core categories [5, 6]. Based on information gained from the above two sources, there are a several scientific sectors in which the Bulgarian scientific community has managed to achieve some level of international renown. Notable among these are publications in the fields of agriculture, chemistry, physics and medicine (and the various sub-fields connected with them). On the other hand though, some scientific sectors such as the social and humanitarian sciences are poorly represented in Bulgarian scientific literature. This could hopefully be mitigated with gradual introduction of Open Access publishing.

In the past several years, another major issue emerged that has had a significant impact on the ability of Bulgaria to participate in the sharing of scientific information with the international research community. This problem is connected with the lack of

resources in Bulgaria's major scientific libraries. This prevents these institutions from sharing information with other scientific and university libraries, as well as other academic organizations from other countries. Thus, since many Bulgarian scientists rely on these libraries for research information, the Bulgarian academic community has some difficulty in gaining access to part of the current scientific output of their international colleagues. The information presented in the current reports of the National Library "St. St. Cyril and Methodius", University Library "St. Kliment Ohridski" and the Central Library of the Bulgarian Academy of Sciences contains some highly troubling statements in regards to the ability of these institutions to maintain effective international book exchange programs. These libraries lack the required financial resources to buy publications that they can include in these exchange programs. What is more, these institutions lack the financial resources required for them to be able to send these publications to their exchange partners (provided, as mentioned above, that they can buy them in the first place) [14, 15]. As mentioned above, these issues manage to partially isolate the Bulgarian academic community from the rest of the scientific world. The creation of electronic information systems such as OA repositories and journals could mitigate some of these issues but the current efforts in regards to this, as mentioned above, have so far been made on an individual basis with a general overlaying framework missing. This leads to lack of coordination in regards to the creation and support of these information systems. Furthermore, not only are the financial resources provided to the Bulgarian scientific and academic institutions scarce but what is provided is fairly poorly managed (lack of an effective spending strategy). All of this means that the Bulgarian scientific community should be looking to create and/or participate in national and inter-institutional initiatives and projects that help create a unified framework for the effective allocation and use of resources. The next segment of the report will examine the current OA initiatives of the Sofia University "St. Kliment Ohridski" as a whole, as well as the Open Access projects of its "Library and Information Sciences" department.

3. Open Access in the Sofia University: Current Tendencies and Projects

Though at a slow pace, the model of Open Access is gaining momentum in the publishing sector of the Sofia University "St. Kliment Ohridski" [2]. The reasons for the slow introduction of OA into the university are very similar to the ones already discussed as issues encountered by the greater scientific community in Bulgaria: the lack of a critical understanding of what Open Access publishing actually is, lack of an adequate technological framework, lack of a unified OA strategy, financial issues and so on. Even so, the Sofia University has several active OA initiatives. These include:

- **The digital library of the SU** (online portal: <http://research.uni-sofia.bg>) [13]: An online archive which aims to provide access to the results of the various academic projects developed by researchers at the university. What is more, archived materials are indexed in various search engines and information systems such as Google. This increases the visibility of the publications made by SU researchers in the international scientific environment (bypassing the above mentioned issues related to the more traditional book exchange programs). The digital library archives a variety of documents including articles, conference reports, books, patents and others. What is more, electronic versions of all academic papers defended in the Sofia University

(such as dissertations) are also archived in the digital library. The repository is registered in OpenDOAR [10, 11].

- **Horizons:** An electronic journal for scientific publications which aims to popularize research publications of the SU in regards to fields such as the social and humanitarian sciences (which we mentioned above, as two of the least covered scientific fields in Bulgaria), chemistry, biology, mathematics and others. The journal is maintained by the “Information procurement” department of the university. The publication comes out twice a year and is, as any OA resource should be, completely free of any charges or subscription fees. The journal is accessible through the online portal of the “Scientific research” sector of the SU and ensures that all copyrights are retained by the authors of the archived materials.
- Finally, the SU also maintains and develops a number of specialized digital libraries that provide free access to their documents. These include “Publications of the Sofia University “St. Kliment Ohridski”, “Digital library of Bulgarian Slavic studies” and “Chetivo”. All of these resources are in the beginning stages of their development and as such provide access to relatively small amount of documents.

In addition to the above initiatives, the individual faculties and departments of the SU are also free to create their own OA resources. An example of this is the “Library and Information Sciences” (LIS) department.

In 2009, the LIS department began to maintain a digital library. It provides free access to the department’s yearbook, as well access to the various documents published by the department’s academic staff. A major milestone for the department was made in 2012 when LIS entered into an agreement for the purpose of sharing relevant academic information with several international universities located in Germany, Poland, Holland, Latvia and Spain. This agreement was highly beneficial for the department as it provided access to a wealth of scientific information from international colleagues, as well as creating the opportunity for LIS publications to be available to wider research public. The department’s staff played major role in promoting Open Access as an alternative publishing method for the “Philosophy” department of the SU (of which the LIS department is part of). Another notable decision made in 2012 is that all research publications (financed through the SU’s budget) be deposited in the above mentioned digital library of the university [9]. An analysis of the statistics regarding the use of the electronic versions of the department’s yearbook and three other digital publications show that there is a considerable interest in them [12]. The example of the Sofia University (and in particular: its LIS department) shows that Open Access can have an integral part to play in Bulgarian academic society.

4. Conclusion

It has been stated numerous times in the span of this report that Open Access can play a key role in the future of academic publishing on both a national, as well as international level. However this change cannot happen on its own. The scientific community must actively strive to create and maintain effective policies and information systems that will enable it to effectively share and provide access to research materials. This also includes Bulgaria. While the current individual OA initiatives have met with some

measure of success it is imperative that unified framework be created. Through OA, Bulgaria's scientific community has the opportunity to engage in a shared dialogue with its international counterparts and improve the overall quality of its academic output.

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