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MAKING FULL AND IMMEDIATE OPEN ACCESS A REALITY THROUGH THE REPOSITORY ROUTE – THE ROLE OF OPEN REPOSITORIES IN IMPLEMENTATION OF PLAN S

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KEYWORDS: CoalitionS. Open Access. institutional repositories. Plan S. open policy. Science Europe. National Science Centre. Academic libraries. Bridge of Knowledge repository. Gdańsk University of Technology

ABSTRACT: **Thesis/Objective** – In 2018, research funding institutions associated in CoalitionS issued PlanS document which aims to accelerate the transition to full and immediate Open Access to publications from publicly funded research until January 2021. Among the recommendations, which mainly relate to pub-

lishing in the Open Access model and its financing, there are also guidelines on the implementation of Plan S assumptions through the so-called "green route", or "repository route". These requirements are particularly important for libraries whose role in creating tools and platforms for Open Science is crucial. One of the Coalition S member organisations is the National Science Centre (NSC), which in May 2020 introduced an Open Access policy, thus implementing the Plan S assumptions in Poland. The article presents the requirements of Plan S concerning open repositories. It defines their role in implementing the vision of openness on the example of the Bridge of Knowledge repository, created by the Gdańsk University of Technology. **Research methods** – The critical literature review was used to analyse the content of foreign and Polish LIS literature published in the years 2018-2020. Also, official documents issued by the European Commission were analysed, as well as websites devoted to Open Access and PlanS implementation. **Results and conclusions** – For research financed by cOAlition S covered by the requirements of Plan S, all peer-reviewed scientific articles must be published in locations that meet specific needs. If such an article is published at the subscription site and then immediately submitted to the Open Access repository, the requirements for repositories must also be met. Although the primary attention of the institutions implementing Plan S is focused on financing publications, especially under the so-called transformation agreements, the repository option should also be monitored and developed. It is associated with lower costs, and at the same time provides immediate open access, even to articles in subscription journals.

The primary purpose of this article was to describe the requirements set by Plan S to open repositories that have not been discussed in the LIS literature so far. It presents the requirements of Plan S concerning open repositories. It also defines their role in implementing the vision of openness on the example of the Bridge of Knowledge repository, created by the Gdańsk University of Technology.

To prepare the state of research for this article, the Web of Science and Scopus databases were analysed for publications that deal with the subject of Plan S in the context of repository or the so-called the "green route" to share Open Access publications. The search queries used gave several search results. However, none of the found publications covered the subject discussed in this article: the requirements of Plan S concerning repositories. Accordingly, the primary source on which the conclusions of this publication are based is official documents of CoalitionS, Science Europe and the European Commission. The source for the article was also the *Data Needed to Identify Plan S Compliance* report, prepared by Delta Think, describing the Plan S compliance criteria and their technical interpretation. The analysis of the compliance of the MOST Wiedzy repository with the requirements of Plan S was performed by comparing the conditions indicated in the Coalition S guide with the assumptions of the MOST Wiedzy project and the functional analysis of the existing platform.

EUROPEAN OPEN SCIENCE POLICY

The Open Access (OA) movement, which was formally launched in 2003 by the publication of the *Berlin Declaration*, just a few years later inspired the creators of European Union (EU) project guidelines to implement the openness of research results financed by the EU. In 2006, the European Commission (EC) recommended that scientific publications financed from EU funding should be available in the Open Access repositories. In August 2008 the pilot OA program under the 7th Framework Program (FP7) was launched. In the document *Open Access Pilot in 7FP*, the EC indicates that publishing research results in Open Access model increases not only the visibility of scientific papers, which in turn increases the citability of publications and their impact on science, but it also reduces the likelihood of duplication of research which is of economic importance (European Commission, 2008).

In subsequent years, the policy was developed. The EC published at the Communication entitled *Towards better access to scientific information* (European Commission, 2012a) and recommendations (European Commission, 2012b) regarding the implementation of Open Access policy concerning research data, including Horizon 2020.

An essential step towards strengthening the policy and monitoring its progress was to set up an expert committee "Open Science Policy Platform" in 2016 to monitor the implementation of Open Science recommendations. The EC recommended member states of the EU to develop their national OA policies. Also in 2016, the EU Ministers of science and innovation, assembled in the Competitiveness Council, resolved that all European scientific publications should be made immediately accessible by 2020 (Council of the European Commission, 2016).

A milestone in introducing Open Access to the results of publicly funded research was the involvement of the European Commission in the creation and implementation of so-called "Plan S" in 2018 (cOAlition S, 2018).

SCIENCE EUROPE

Science Europe is an association of major Research Funding Organisations (RFOs) and Research Performing Organisations (RPOs). It was established in October 2011 and is based in Brussels. Thirty-six organisations from 27 countries are members of the association. They are the most important public research organisations funding and performing scientific research in Europe (Science Europe, 2020). The association facilitates co-operation among its members and supports excellence in science and research in all disciplines.

The RFOs and RPOs that makeup Science Europe share a joint mission: to fund and perform excellent research in a world where national borders less and less shape scientific communities. The organisation was established by its members to act as a platform to share experience and practice, develop collective strategies to face their everyday challenges, as well as to speak with one voice to other science policy stakeholders.

Science Europe supports Open Access as one of its priorities. It has also been instrumental in developing and promoting Plan S.

In April 2013, Science Europe's member organisations unanimously endorsed and committed to a set of universal principles (Science Europe, 2015) *Principles on Open Access to Research Publications on the transition to Open Access to research publications* (updated in 2015). As a result, a majority of its members have implemented OA policies or are actively developing them.

According to the principles document, each Science Europe member organisation is implementing policies according to its own needs, by committing to a shared set of principles. These principles are the basis on which the members of Science Europe continue to cooperate, by exchanging experience and information and engaging in collective activities to support the transition to OA. Ultimately the change is a worldwide process and, with these principles, Science Europe wishes to contribute to the discussion at the global level (Science Europe, 2015).

Already in this document, the role of repositories was emphasised as essential tools for disseminating knowledge without financial barriers. It states, among other things, that organisations associated in Science Europe:

- "continue to support any valid approaches to achieve Open Access, including those commonly referred to as the 'green' and 'gold' routes;
- recognise repositories and related facilities as key strategic research infrastructure which should comply with high-quality standards;
- advocate that research publications should either be published in an Open Access journal or be deposited as soon as possible in a repository and made available in Open Access in all cases no later than six months following first publication. In Arts, Humanities and Social Sciences, the delay may need to be longer than six months but must be no more than 12 months" (Science Europe, 2015).

In April 2015 Science Europe member organisations updated the principles and added the minimum expected services from publishers, which are applicable when providing payments for Open Access venues. One of them is that "Publishers must make copies of the publication automatically available in registered third-party repositories immediately upon publication. Furthermore, authors must receive all relevant information

and support services necessary in order to access the archived publication. Sustainable archiving of the publication must be demonstrated by the provision of a persistent address where the full content of the publication can be accessed, read and downloaded. Authors may archive any version of the publication to any registered third-party repository or website with no delay" (Science Europe, 2015).

COALITIONS AND PLANS

In September 2018, 11 Science Europe Member Organisations, supported by the European Commission and the European Research Council (ERC) created cOAlitionS. They launched so-called "Plan S", an initiative to accelerate the transition to full Open Access[1]. National Science Centre (NCN – Narodowe Centrum Nauki, Poland) was also among the organisations forming cOAlition S.

Plan S was initiated by Robert-Jan Smits the Open Access Envoy of the European Commission and further developed by both Marc Schiltz, the President of Science Europe and a group of Heads of national funding organisations[2]. It also drew on substantial input from the Scientific Council of the European Research Council.

The full title of the document introducing Plan S is: *Plan S - Making full and immediate Open Access a reality* (cOAlition S, 2018).

It requires that recipients of research funding from cOAlition S organisations make the resulting publications available immediately (without embargoes) and under open licences, either in quality Open Access platforms or journals or through immediate deposit in open repositories that fulfil the necessary conditions.

Although the Plan S principles refer to peer-reviewed scholarly publications, cOAlition S also strongly encourages that research data and other research outputs are made as open as possible and as closed as necessary.

[1] The first organizations forming cOAlitionS were: Austrian Science Fund (FWF Austria), Academy of Finland (AKA Finland), French National Research Agency (ANR France), Science Foundation Ireland (SFI Ireland), National Institute for Nuclear Physics (INFN Italy), National Research Fund (FNR Luxembourg), Netherlands Organisation for Scientific Research (NOW Netherlands), Research Council of Norway (RCN Norway), National Science Centre (NCN Poland), Slovenian Research Agency (ARRS Slovenia), Swedish Research Council for Health, Working Life and Welfare (FORTE Sweden), Swedish Research Council for Sustainable Development (FORMAS Sweden), UK Research and Innovation (UKRI UK). Later, other organizations also joined, also from outside Europe. The full list of funders is available on the website.

[2] An important person in the history of PlanS is Robert-Jan Smits, the President of the Executive Board of the Eindhoven University of Technology in the Netherlands who was a senior adviser for open access and innovation at the European Political Strategy Centre, and from 2010 to 2018 he served as director-general of research and innovation (RTD) at the European Commission. He is known for his key roles in devising Plan S. According to different explanations, the "S" stands for "shock" or for "Smits".

Sharing of research results through preprints is also strongly encouraged. However, preprints are not sufficient to meet the provisions of Plan S. cOAlition S also undertook the task of stating the principles of Plan S that apply to monographs and book chapters, together with detailed guidelines for their implementation by the end of 2021. (cOAlition S, 2020).

THE PLAN S PRINCIPLES

cOAlition S signals the commitment to implement the necessary measures to fulfil its main principle which is worded as follows: "With effect from 2021[3], all scholarly publications on the results from research funded by public or private grants provided by national, regional and international research councils and funding bodies, must be published in Open Access Journals, on Open Access Platforms, or made immediately available through Open Access Repositories without embargo." (cOAlition S, 2020)

Plan S also contains additional, detailed rules that specify how its assumptions should be implemented by scientists receiving research funding from public funds, as well as by publishers of journals and platforms. These rules also partly related to repositories.

There are ten of them:

1. "Authors or their institutions retain copyright to their publications. All publications must be published under an open license, preferably the Creative Commons Attribution license (CC BY), in order to fulfil the requirements defined by the *Berlin Declaration;*

2. The Funders will develop robust criteria and requirements for the services that high-quality Open Access journals, Open Access platforms, and Open Access repositories must provide;

3. In cases where high-quality Open Access journals or platforms do not yet exist, the Funders will, in a coordinated way, provide incentives to establish and support them when appropriate; support will also be provided for Open Access infrastructures where necessary;

4. Where applicable, Open Access publication fees are covered by the Funders or research institutions, not by individual researchers; it is acknowledged that all researchers should be able to publish their work Open Access;

5. The Funders support the diversity of business models for Open Access journals and platforms. When Open Access publication fees are applied, they must be commensurate with the publication services delivered

[3] Full Open Access was originally to be introduced from January 2020 year. As a result of public consultations, some initial assumptions have been verified. The most important of them was the date of introduction of OA assumptions.

and the structure of such fees must be transparent to inform the market and funders potential standardisation and capping of payments of fees;

6. The Funders encourage governments, universities, research organisations, libraries, academies, and learned societies to align their strategies, policies, and practices, notably to ensure transparency;

7. The above principles shall apply to all types of scholarly publications, but it is understood that the timeline to achieve Open Access for monographs and book chapters will be longer and requires a separate and due process;

8. The Funders do not support the 'hybrid' model of publishing. However, as a transitional pathway towards full Open Access within a clearly defined timeframe, and only as part of transformative arrangements, Funders may contribute to financially supporting such arrangements;

9. The Funders will monitor compliance and sanction non-compliant beneficiaries/grantees;

10. The Funders commit that when assessing research outputs during funding decisions, they will value the intrinsic merit of the work and not consider the publication channel, its impact factor (or other journal metrics), or the publisher" (cOAlition S, 2020).

Guidelines and technical requirements have further defined the above principles. Most of them are dedicated to scientific journals and their transformation, but also indicate technical requirements for tools such as platforms and repositories.

REPOSITORY ROUTE

There are three routes for being compliant with Plan S:

- Open Access publishing venues (journals or platforms) – Authors publish in an Open Access journal or on an Open Access platform.
- Subscription venues (repository route) – Authors publish in a subscription journal and make either the final published version (Version of Record (VoR)) or the Author's Accepted Manuscript (AAM) openly available in a repository.
- The transition of subscription venues (transformative arrangements) – Authors publish Open Access in a subscription journal under a transformative agreement.

Plan S is mainly perceived as the rules regarding changes in the scientific journal market and the principles of open publishing, but the third, repository route should also be appreciated. cOAlition S strongly encourages the deposition of all publications in a repository, irrespective of the chosen path to compliance. Several cOAlition S members require deposits of all attributed research articles in a repository.

Guidelines and explanations regarding compliance with Plan S are also described on the dedicated website[4]. Among them are also described rules of compliance of repositories with Plan S. There are several technical criteria for repositories following Plan S. Among them are mandatory and optional requirements.

The main requirement for Open Access repositories is that they must be registered in the Directory of Open Access Repositories (OpenDOAR) or in the process of being registered.

There are several criteria for assessing whether or not a given repository can be registered in the Directory of Open Access Repositories. The applications for registration submitted by repositories with inadequate functionality or insufficiently open will be rejected. According to the Open DOAR criteria, the basic rules determining that a given venue does not meet the requirements of the repository are:

- Site is repeatedly inaccessible;
- Site is an eJournal;
- Site contains no Open Access materials;
- Site contains metadata (bibliographic) references only or solely links to external sites;
- Site is a library catalogue or collection of locally accessible e-books;
- Site requires login to access any material (gated access) – even if freely offered;
- Site is a proprietary database or journal that requires a subscription to access (Jisc, 2020).

In June 2020, 115 repositories from Poland were registered in the Open DOAR database[5]. After a closer look at the list of repositories, it can be seen that most of them are digital libraries, providing access mainly to cultural heritage resources. The descriptions of individual platforms also show that they support file formats such as DjVu, which do not provide an adequate level of content indexing or provide it to a limited extent. Therefore, to determine whether a given repository or another platform (it may also be a digital library in exceptional cases) meets the requirements of Plan S, other specific criteria should be considered. Quite a controversial record is the statement that the repository may be during the registration process. This provision does not regulate the situation in which the application is rejected. Besides, there are several mandatory criteria for repositories (cOAlition S, 2020):

1. "Use of PIDs (persistent identifiers) for the deposited versions of the publications (with versioning, for example in case of revisions),

[4] PlanS Principles and Implementation: https://www.coalition-s.org/addendum-to-the-coalition-s-guidance-on-the-implementation-of-plan-s/principles-and-implementation/.

[5] Data source: https://v2.sherpa.ac.uk/view/repository_by_country/Poland.html).

such as DOI[6] (preferable), URN[7], or Handle[8]" – the use of persistent identifiers is a particularly important criterion because it ensures that a document with specific content and version is found in the event of a change in the repository's address/domain or, e.g. sharing files in different locations. Here the fundamental question arises whether the creators of the guidelines were about adding a separate DOI (or another identifier) to the records deposited in the repository, even if they have DOI in the publishing version, or entering the original DOI also meets this criterion. It is not clear if there is a distinction between deposited DOI and published DOI. The guidelines posted on the NCN website, in its Open Access policy, show that it is expected to give separate identifiers to different versions of the article (NCN, 2020).

2. "High-quality article-level metadata in a standard interoperable non-proprietary format, under a CC0 public domain dedication. This must include information on the DOI (or other PIDs) both of the original publication and the deposited version, on the version deposited (AAM/VoR), and on the Open Access status and the license of the deposited version. Metadata must include complete and reliable information on funding provided by cOAlition S funders (including as a minimum the name of the funder and the grant number/identifier)" – ensuring high quality and machine-readable metadata is a crucial postulate and requirement for digital objects, both publications and research data. They are designed to enable appropriate indexing and searching of digital objects as well as their thematic analysis already at the metadata level. It should be noted that the responsibility for metadata, especially those contained in the publication file itself, is primarily the responsibility of the authors.

3. "Machine-readable information on the Open Access status and the license embedded in the article, in standard non-proprietary format".

4. "Continuous availability (uptime at least 99.7%, not taking into account scheduled downtime for maintenance or upgrades)".

5. "Helpdesk: as a minimum, an email address (functional mailbox) has to be provided; a response time of no more than one business day must be ensured" (cOAlition S, 2020).

Strongly recommended additional criteria for repositories are (cOAlition S, 2020):

1. "Manuscript submission system that supports both individual author uploads and bulk uploads of manuscripts (AAM or VoR) by pub-

[6] DOI website: https://www.doi.org/

[7] URIs, URLs, and URNs: Clarifications and Recommendations are available on the website: https://www.w3.org/TR/uri-clarification/

[8] HDL.NET® Information Services website: http://www.handle.net/ ; Factsheet of DOI System and the Handle System available on the website: https://www.doi.org/factsheets/DOIHandle.html

lishers" – this criterion was one of the issues during the public consultations, especially in part concerning the bulk submission of manuscripts by publishers. Many repositories signalled that this criterion might not be possible to meet[9].

2. "The full text stored in a machine-readable community standard format such as JATS XML".

3. "Support for PIDs for authors (e.g., ORCID), funders, funding programmes and grants, institutions, and other relevant entities".

4. "Openly accessible data on citations according to the standards by the Initiative for Open Citations (I4OC)".

5. "Open API to allow others (including machines) to access the content. A compliant API must be free to access without any barrier. A light authentication mechanism such as a token for 'power users' – e.g., high-traffic collaborators – is acceptable as long as there is an open/anonymous route too".

6. Metadata must be compliant with the OpenAIRE guidelines

7. "Quality assurance processes to link full-text deposits with authoritative bibliographic metadata from third-party systems, e.g., PubMed, Crossref, or SCOPUS where feasible" (cOAlition S, 2020).

In February 2020, the consulting company Delta Think published an independent report commissioned by Jisc and funded by Science Europe on behalf of cOAlition S (Delta Think, 2020). The document entitled *Data Needed to Identify Plan S Compliance* summarises the results of a study to determine the data needed to identify publishers meeting all Plan S requirements. Assessing the compliance of publication sites with Plan S required identification and analysis of many data sources and various ways to ensure this compliance, followed by the development of a "prescription", i.e. an algorithm or series of logical steps to connect identified points. An integral part of the report are recommendations that relate to further actions and priorities both in the area of general requirements and concerning specific methods of publication. It has been suggested that cOAlition S should take a staged approach to implement conditions where data sources do not currently exist. A record available in the Figshare repository contains the final report and data specification from a project which, examined the data need for authors to identify Plan S-compliant publication venues.

The eligibility of some criteria has changed from mandatory to recommended as a result of public consultations in which, among others, orga-

[9] More information about the consultations could be found for example in the Joint Response to Plan S Implementation Guidelines by the Council of Australian University Librarians (CAUL) & the Australasian Open Access Strategy Group (AOASG): https://aoasg.org.au/joint-response-to-plan-s-implementation-guidelines-by-the-council-of-australian-university-librarians-caul-the-australasian-open-access-strategy-group-aoasg/.

nisations of institutional and domain repositories took part. Taking into account the numerous opinions expressed during the consultation phase, the cOAlition S partners verified some technical requirements that have been considered too ambitious (e.g. storing full texts in XML in the JATS standard) – in the new version of the plan the requirements are indicated as recommended solutions. It is worth noting that meeting all of Plan S guidelines can be a significant challenge for some already existing repositories. The assumptions of Plan S are in fact at odds with some good practices which have been applied by OA repository creators for several years, nor are they in agreement with the assumptions underlying the Open Access framework of the already existing institutional repositories. The premises of Plan S contradict parts of OA's original assumptions. It is argued that they contribute to reducing the importance of the green road and assigning repositories mainly an archival role. There are also concerns that commercial publishers will not want to comply with the restrictive requirements related to the immediate availability of final versions of articles in the repositories. However, according to the signatories of Plan S, the principles of Open Access set out therein are to become independent of the models under which they are implemented (Otwarta Nauka, 2019).

Until now, the topic of repositories in the context of Plan S has not been raised on a larger scale. There are also no studies that would further analyse this issue. In January 2020, cOAlition S and COAR, one of the largest organisations that associate and support open repositories, entered into co-operation in this regard. The result of this co-operation was the formulation of assumptions and an action plan. To ensure that repositories can comply with Plan S, COAR and cOAlition S intend to work together to support repositories in adhering to the requirements through several activities. One of the goals is that COAR and cOAlition S will work on a strategic roadmap to strengthen and transform the role of repositories in supporting Open Access and Open Science. COAR will also engage with the most widely adopted repository platforms to determine their current capabilities to support Plan S, identify any challenges, and provide expertise and knowledge to help with the adoption of technical requirements by the platforms (OpenAIRE, 2020).

GDAŃSK UNIVERSITY OF TECHNOLOGY – MOST WIEDZY (BRIDGE OF KNOWLEDGE) REPOSITORY

The creators of Polish repositories should be well familiar with the importance of meeting and understanding the requirements described above. Activities in this area are also ongoing at the Gdańsk University of Technology. Preliminary analyses show that the Bridge of Knowledge Re-

pository (MOST Wiedzy[10]) meets most requirements. Still, some of them are indefinite or difficult to fulfil (e.g. adding DOI number for deposited articles that have already got a publisher's DOI does not seem to be justified and involves additional costs).

Since the 2016 Gdańsk University of Technology implements a project called Multidisciplinary Open System Transferring Knowledge, the acronym of its name in the Polish language is „MOST Wiedzy", which means „the bridge of knowledge". The result of this project is a platform of the same name, whose aim is to provide free access to the resources created and gathered at the University. The objective of the platform is to promote the research and educational potential of the University widely. It is also a solution supporting communication between researchers and a platform for cooperation between science and business. The platform is also available to other universities in the region of Pomerania, to create shared knowledge resources as well as for individual scientists who want to create their research profile. An essential part of the platform is the open repository of scientific publications, currently being developed towards a research data repository (in co-operation with the University of Gdańsk and Gdańsk Medical University).

The MOST Wiedzy portal is a web-based system running at the central data centre of the GUT, and it is accessible via every web browser. The designed architecture of the platform is focused on ensuring a high level of security, availability and dependability. To meet these assumptions it was decided, that its location should be applied in a private cloud which provides appropriate redundancy and ease of scaling accordingly to the current system load. The whole development process is agile and focuses on User eXperience (UX). According to the user-centred design methodology, selected users were engaged in the early stages of the development process, including consultations of many prototypes of different functionalities. The implementation of the interface according to the Responsive Web Design (RWD) technique, results in the adaptation of the interface to different types of devices (both traditional computers and mobile devices with touch navigation). Another significant aspect is the organisation of the processed data. The semantic relationships between different objects allow navigating from one object to another easily. It provides information about, e.g. other publications written by the researcher, the projects and teams in which the person is involved as well as his/her inventions and research areas. Such an organisation of data supports contextual navigation in the system, simple data analysis and reporting (Wałek, Lubomski, 2017).

[10] www.mostwiedzy.pl.

The table below presents an analysis of the repository in terms of meeting the mandatory and recommended criteria of Plan S. The first column contains the requirement, the second column specifies the level of meeting the conditions directly (yes / no), and the third column contains comments on the interpretation of individual requirements and difficulties in reaching them by the platform.

Criterion	Meets the requirements Yes/No	Additional information
Mandatory criteria		
Use of PIDs (persistent identifiers) for the deposited versions of the publications (with versioning, for example in case of revisions)	No*	DOI for the original version of the publication; no DOI broadcasting mechanism for deposited publications
High-quality article-level metadata in a standard interoperable non-proprietary format	Yes	Metadata is stored and made available using open formats (RDF / JSTON-LD)
Metadata CC0 public domain dedication	No*	No CC0 declaration is defined for metadata. But the metadata is shared openly – no objection
Metadata must include information on the DOI (or other PIDs) both of the original publication and the deposited version, on the version deposited (AAM/VoR)	Yes*	DOI for the original publication only
Metadata must include Open Access status and the license of the deposited version	Yes	
Metadata must include complete and reliable information on funding provided by cOAlition S funders	No*	The metadata contains information on funding awarded by the funders, but there is no verification of data correctness.
Machine-readable information on the Open Access status and the license embedded in the article, in standard non-proprietary format	Yes	
Continuous availability (uptime at least 99.7%)	Yes	
Helpdesk: as a minimum, an email address (functional mailbox) has to be provided; a response time of no more than one business day must be ensured	Yes	

Strongly recommended additional criteria		
Manuscript submission system that supports both individual author uploads and bulk uploads of manuscripts (AAM or VoR) by publishers	No	
The full text stored in a machine-readable community standard format such as JATS XML	Yes	
Support for PIDs for authors (e.g., ORCID), funders, funding programmes and grants, institutions, and other relevant entities	Yes*	Where such information is provided
Openly accessible data on citations according to the standards by the Initiative for Open Citations (I4OC)	Yes*	This functionality is still under development
Open API to allow others (including machines) to access the content. A compliant API must be free to access without any barrier	Yes*	Access to API on demand
A light authentication mechanism	Yes*	Login via an institutional account or ORCID
Metadata must be compliant with the OpenAIRE guidelines	Yes	
Quality assurance processes to link full-text deposits with authoritative bibliographic metadata from third-party systems	Yes	

Bridge of Knowledge Repository' analysis performed according to mandatory criteria shows the following features:

- The repository is registered in OpenDOAR[11]
- The repository stores and makes available existing DOI (for the original version of the publication); there is no DOI broadcasting mechanism for deposited publications. However, there is a technical possibility to introduce such functionality on demand.
- The metadata in the Repository is stored and made available to the public domain using open formats (RDF / JSTON-LD). No CC0 declaration is defined for metadata.
- Information about the deposited version (author's version, etc.) is stored on the internal MyPG website. At the moment, the repository

[11] http://v2.sherpa.ac.uk/id/repository/9653.

does not display this information, but it is technically possible.
- The metadata contains information about the license under which the publication was deposited.
- The metadata contains information on funding awarded by the funders, but there is no verification of data correctness, either there are not any required fields defined for the name of the funding institution and project number/identifier.
- The repository meets the constant availability requirement of 99.7%.
- The repository meets the requirements defined for the helpdesk/support (a working email, contact form, quick response time).
- Machine-readable information on Open Access to publications and licenses is provided to a limited extent and should be verified for compliance with the requirements.

SUMMARY

The presented analysis shows that most of the mandatory criteria are not, in principle, impossible to achieve for Polish repositories. The key in this respect is to design the platform in such a way that it meets the standards already at the construction stage. If existing technological solutions are used, one should be chosen that can be improved as new guidelines and technologies are developed.

Due to the ambiguities of some criteria described above, in the case of the Bridge of Knowledge repository, but also probably in the case of many other Polish repositories, it may not be possible to determine whether the repository meets the requirements of Plan S. Although the main path that is promoted as part of the implementation of Plan S is the gold path, repositories should be able to make such explicit verification. It is particularly important in the context of the recently introduced Open Access Policy of the National Science Center (NCN, 2020). The role of libraries, which are usually responsible for creating institutional repositories, is to support scientists in choosing the right tools that meet the criteria of NCN projects in the field of open access. Therefore, a thorough analysis and understanding of the above rules seem to be crucial.

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PEŁNY I BEZPOŚREDNI DOSTĘP OTWARTY JAKO RZECZYWISTOŚĆ DZIĘKI DRODZE REPOZYTORYJNEJ – ROLA OTWARTYCH REPOZYTORIÓW WE WDRAŻANIU PLANU S

KEYWORDS: Coalition S (Koalicja S). Open Access (Dostęp Otwarty). Repozytoria instytucjonalne. Plan S. Polityka otwarta. Science Europe (Nauka w Europie). National Science Centre (Krajowe Centrum Nauki). Biblioteki akademickie. Repozytorium Bridge of Knowledge (Most Wiedzy). Politechnika Gdańska

ABSTRACT: **Teza/Cel artykułu** – W 2018 r. instytucje finansujące naukę zrzeszone w Koalicji S wydały dokument zatytułowany Plan S, którego celem było przyspieszenie przejścia do pełnego i bezpośredniego Dostępu Otwartego do publikacji naukowych finansowanych ze środków publicznych przed styczniem 2021 r. Wśród rekomendacji dotyczących głównie publikowania w modelu Open Access oraz jego finansowania znalazły się także wskazówki, jak wdrażać założenia Planu S za pomocą tzw. zielonej drogi lub drogi repozytoryjnej. Wymagania te są szczególnie ważne dla bibliotek, które pełnią kluczową rolę w rozwijaniu narzędzi i platform dla Otwartej Nauki. Jedną z organizacji członkowskich Koalicji S jest Narodowe Centrum Nauki (NSC), które w maju 2020 r. wdrożyło poli-

tykę Open Access, tym samym wdrażając założenia Planu S na terenie Polski. W artykule przedstawiono wymogi Planu S dotyczące otwartych repozytoriów i zdefiniowano ich role we wdrażaniu wizji otwartości na przykładzie repozytorium Mostu Wiedzy tworzonego przez Politechnikę Gdańską. **Metody badań** – Zastosowano analizę krytyczną piśmiennictwa polskiego i zagranicznego w dziedzinie bibliotekarstwa i informacji naukowej publikowanego w latach 2018-2020. Analizę uzupełniono o przegląd oficjalnej dokumentacji Komisji Europejskiej oraz dane ze stron internetowych poświęconych Otwartemu Dostępowi i wdrażaniu Planu S. **Wyniki i wnioski** – W przypadku wyników badań finansowanych przez Koalicję S, a objętych wymogami Planu S, wszystkie recenzowane artykuły naukowe muszą być publikowane w miejscach spełniających określone wymogi. Jeżeli taki artykuł zostaje opublikowany w dostępie płatnym, a potem natychmiast przekazany do repozytorium Open Access, muszą zostać spełnione wymogi dotyczące repozytoriów. Chociaż instytucje wdrażające Plan S są głównie zainteresowane finansowaniem publikacji, zwłaszcza w ramach tzw. porozumień transformacyjnych, opcja repozytoryjna również powinna być monitorowana i rozwijana. Wiąże się ona z niższymi kosztami, a jednocześnie zapewnia bezpośredni otwarty dostęp, nawet do artykułów z czasopism objętych subskrypcją.