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Exploring open science practices at a national and research library in Central Europe

Assessing researchers' awareness and engagement

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The paradigm of Open Science (OS) is increasingly pivotal in contemporary scholarly research, promoting transparency, accessibility, and collaboration. This study, conducted as part of an Erasmus+ internship by a trainee at the National Széchényi Library (NSZL) assesses the level of Open Science awareness among its researchers and contributes to the formulation of an Open Science-compliant data management plan policy. By examining researchers' perspectives and current practices, the survey identifies some gaps and areas for improvement in data management and sharing. These insights are instrumental in developing strategic initiatives to enhance Open Science practices within the NSZL researchers. Furthermore, the findings have prompted the office for GLAM standards at NSZL to develop a specialized Open Science course for their researchers. This study not only supports the advancement of a more open and collaborative research culture within Hungary, but also aligns with global efforts to democratize scientific knowledge.

Open Science (OS), open data, data management plan, the National Széchényi Library (NSZL)

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1. Introduction

Central to the principles of Open Science is the unrestricted access to scientific knowledge and data, fostering innovation and societal progress. As institutions worldwide adapt to this evolving framework, assessing the awareness and integration of Open Science practices among researchers becomes crucial. This study aims to investigate the level of Open Science awareness among researchers at the National Széchényi Library of Hungary (NSZL)[1] and to contribute to the development of a comprehensive Open Science-compliant data management plan policy. By exploring researchers' perspectives and practices, this survey seeks to provide insights that will inform strategic initiatives aimed at promoting Open Science principles within the institution.

2. Background

In recent years, the term Open Science (OS) has gained momentum worldwide, originating in the Global North and gradually spreading to the Global South. This movement aims to democratize scientific knowledge, making it accessible

to everyone, thereby advancing science, ensuring transparency, and fostering a more developed society. Prior to 2021, there was no single, universally accepted definition of Open Science. However, UNESCO addressed this gap in their 2021 Recommendation on Open Science,[2] defining OS as follows:

"Open science is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community." (UNESCO, 2021)

A UNESCO's Recommendation has sparked many initiatives worldwide. For instance, the White House in the US and NASA declared 2023 the Year of Open Science. The term "science" encompasses knowledge creation both the natural and hard sciences, as well as the humanities. Therefore, "opening science" refers to making all forms of knowledge, including its creation and evaluation processes, accessible under Creative Commons licenses[3]. The goal is to make knowledge as open as possible while restricting it only when necessary, following the principle of "open as possible and as closed as necessary."

Frank Miedema defines Open Science as a transformative paradigm in scientific research that prioritizes transparency, accessibility, and collaboration (2022). He conceptualizes Open Science as a democratization of knowledge, facilitating the free and open dissemination of scientific discoveries. This approach aims to improve the reproducibility and societal impact of research. Miedema advocates a fundamental shift from traditional, closed scientific practices to an open, inclusive model to foster innovation and more effectively address global challenges.

In Europe, Open Science is a pivotal component of research and innovation policy, supported by various initiatives and frameworks. Key enablers include incentives and rewards to adopt Open Science practices, facilitated by the European Commission under the European Research Area Policy Agenda. The Commission has developed the Agreement for Reforming Research Assessment (ARRA) in 2022 and the Coalition for Advancing Research Assessment (CoARA 2024), having signed the ARRA, joined CoARA, and established an Action Plan to implement ARRA. Additionally, the European Union has developed a data, copyright, and digital legislative framework conducive to research, supported by Horizon Europe (European Commission, 2024) provisions on Open Science. Europe has also invested in significant infrastructures such as the European Open Science Cloud (EOSC), recognized as one of the Common European Data Spaces, enhancing the EU's leadership in the global data economy. Furthermore, Open Research Europe provides an innovative Open Access publishing platform for research funded by all EU programs, with substantial support for skills development and education to equitably practice Open Science and manage FAIR[4] (Findable, Accessible, Interoperable, and Reusable) research data. These concerted efforts and comprehensive frameworks underscore Europe's commitment to leading the global Open Science movement, promoting transparency, accessibility, and collaboration in scientific research.

Open Data is a commodity. The sharing of data benefits other researchers. It exemplifies a public good, as its value does not decrease when shared. On the contrary, shared data can act as a benchmark, enabling others to study and

"In Europe, Open Science is a pivotal component of research and innovation policy, supported by various initiatives and frameworks."

[1] National Széchényi Library. Available at: https://www.oszk.hu/en (Accessed: 2024 April 20)
[2] UNESCO (2021) Recommendation on Open Science, UNESCO. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000379949 (Accessed: 2024.04.28.)
[3] Creative Commons (2024). Available at: https://creativecommons.org/ (Accessed: 2024.04.28.)
[4] GO FAIR. (n.d.). FAIR principles. Retrieved from https://www.go-fair.org/fair-principles/

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improve analytical methods. Once gathered, data can be creatively reused by numerous individuals in various ways, indefinitely. (Vision, 2010) The increasing emphasis on data management and sharing as foundational elements of Open Science in the EU regulations, underscores a commitment to enhancing the transparency, reproducibility, and accessibility of research. Proper data management practices ensure that research data are systematically organized, preserved, and accessible for verification and reuse, thereby strengthening the credibility and impact of scientific work. In this context, it is imperative for institutions such as the National Széchényi Library to formulate policies that align with Open Science principles. These policies would facilitate the systematic curation and open dissemination of research outputs, ensuring that scientific data and publications are readily accessible to the global scholarly community.

In this context, a survey was conducted to assess the awareness of Open Science among researchers at the National Széchényi Library (NSZL) and to explore their research workflows. This survey aimed to identify the extent to which NSZL's researchers are familiar with Open Science practices and to understand their current research workflows and practices.

3. Methodology

The data for this study were collected through a structured survey administered to researchers affiliated with the National Széchényi Library of Hungary (NSZL). Distributed electronically in a google format, the survey was open from February 16, 2024, to March 18, 2024. The participants included a broad spectrum of researchers, encompassing both early-career and experienced individuals, thereby ensuring a diverse range of perspectives. The survey included a total of N = 18 participants from the NSZL.

The survey instrument comprised multiple-choice and open-ended questions, targeting two key areas. The first was assessing Open Science awareness among researchers. The second focused on exploring the workflow inside NSZL, including documentation methods for research processes, frequency and channels of publication, and utilization of NSZL-provided tools. It also covered the types of data produced beyond scientific articles, adherence to Open Science practices, and challenges faced. Additionally, the survey looked into collaboration with other researchers, advocacy and support for Open Access and Open Data, specific obstacles encountered in the research workflow, and suggestions for improving Open Science support at NSZL.

"This survey aimed to identify the extent to which NSZL's researchers are familiar with Open Science practices and to understand their current research workflows and practices."

Responses were collected electronically and anonymized to ensure confidentiality. Qualitative data from open-ended questions were thematically analyzed to identify common trends and insights, while quantitative data from multiple-choice questions were statistically processed using Excel and analyzed to provide a comprehensive overview of the researchers' practices and challenges. Participation in the survey was voluntary, with informed consent obtained from all respondents. The survey complied with ethical standards for research, ensuring the confidentiality and anonymity of participants. No personal identifying information was collected, and data were securely stored and analyzed.

4. Findings

Of the 18 researchers surveyed at the NSZL, 14 (78%) have heard of the term "Open Science" in their professional capacity (Fig. 1.). However, 4 researchers

(22%) have not heard of the term, suggesting that there is still a notable portion of researchers who are unfamiliar with the term "Open Science."

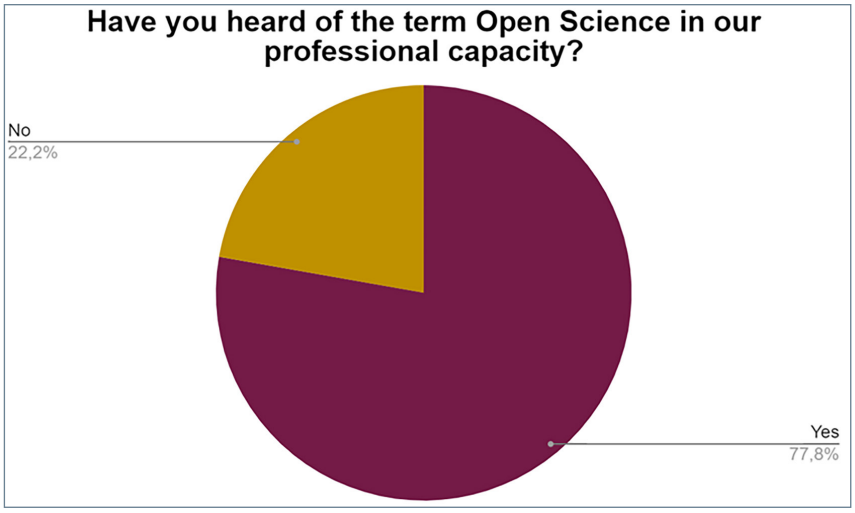

Fig. 1: Open science awareness among researchers

Familiarity with the Term "Open Access" (Fig. 2.)

The survey results indicate that familiarity with the term "Open Access" varies among the researchers. Specifically, 2 researchers (11%) reported being very familiar, 13 researchers (72%) reported being somewhat familiar, and 3 researchers (17%) reported not being familiar with the term. This distribution suggests that while a significant majority of researchers have some understanding of "Open Access," there is a small proportion who lack familiarity, highlighting the need for further education and awareness initiatives within the library.

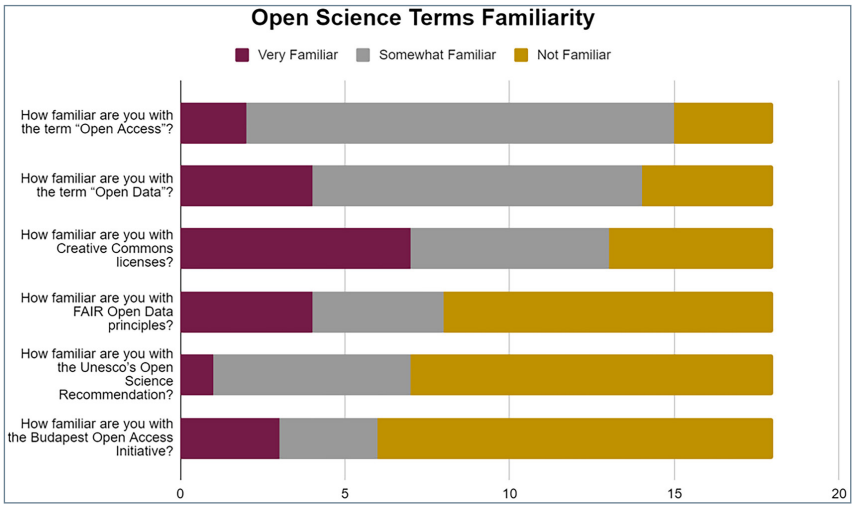

Fig. 2: Familiarity with Key Open Science Concepts Among Researchers at NSZL

Familiarity with the Term "Open Data"

When asked about their familiarity with the term "Open Data," 4 researchers (22%) indicated they were very familiar, 10 researchers (56%) were somewhat familiar, and 4 researchers (22%) were not familiar. These results suggest a moderate level of awareness, with a balanced distribution between those who are very familiar and those who are not. This indicates an opportunity for targeted training to enhance understanding of open data practices.

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Familiarity with Creative Commons Licenses

The concept of Creative Commons licenses appears to be relatively well-known among the researchers, with 7 researchers (39%) reporting they are very familiar, 6 researchers (33%) somewhat familiar, and 5 researchers (28%) not familiar. Although a majority have some level of familiarity, the fact that nearly a third are not familiar suggests that further informational efforts are needed to ensure comprehensive understanding of licensing options available under Creative Commons.

Familiarity with FAIR Open Data Principles

The survey data reveal that familiarity with FAIR Open Data principles is limited. Only 4 researchers (22%) reported being very familiar, an equal number (4 researchers, 22%) are somewhat familiar, and a majority of 10 researchers (56%) are not familiar.

Familiarity with UNESCO's Open Science Recommendation

Familiarity with UNESCO's Open Science Recommendation is notably low among the respondents. Only 1 researcher (6%) reported being very familiar, 6 researchers (33%) somewhat familiar, and 11 researchers (61%) not familiar. This distribution highlights a substantial knowledge gap.

Familiarity with the Budapest Open Access Initiative

The survey results indicate that awareness of the Budapest Open Access Initiative is limited. Only 3 researchers (17%) reported being very familiar, another 3 researchers (17%) were somewhat familiar, and a majority of 12 researchers (67%) were not familiar.

Training in Open Science Practices Among Researchers at NSZL

The survey data indicates a significant deficiency in formal training related to open science practices among researchers at the NSZL. Specifically, only 2 researchers (11%) have received formal training or attended courses specifically related to open science practices. Conversely, a substantial majority of 16 researchers (89%) reported not having received any formal training in this area. This pronounced lack of formal training underscores a critical need for the implementation of structured educational programs within the library.

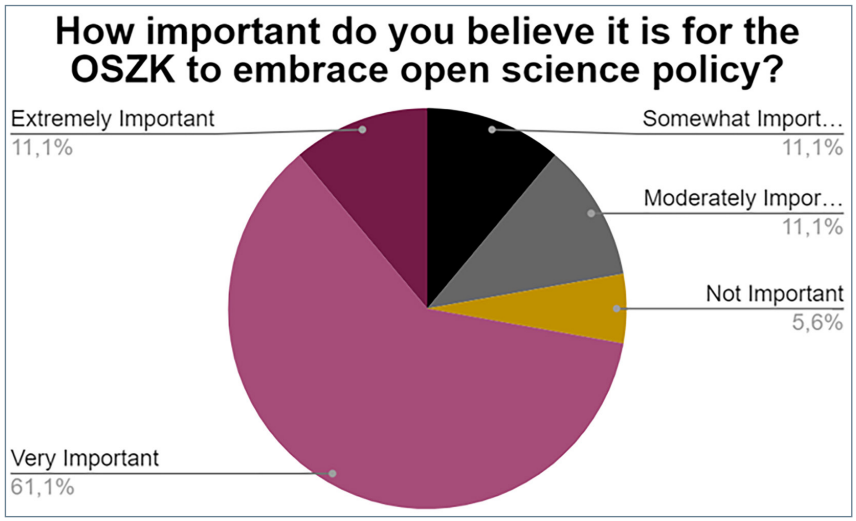

Fig. 3: Importance of Embracing Open Science Policy at NSZL

The survey data reflects a strong consensus among researchers regarding the importance of the NSZL embracing open science policy. [Fig. 3.] A significant majority of respondents, 11 researchers (61%), consider it very important for the library to adopt such policies. Additionally, 2 researchers (11%) view it as extremely important, further underscoring the high level of support for open science initiatives. A smaller portion of the respondents, 2 researchers (11%), rated the importance as somewhat important, and another 2 researchers (11%) as moderately important. Only 1 researcher (6%) believes that embracing open science policy is not important. These findings highlight a clear inclination towards the adoption of open science policies at the NSZL, with the majority of researchers recognizing the substantial benefits and necessity of such practices. This strong endorsement suggests that implementing open science policies would likely be well-received and supported by the research community, fostering a more open and collaborative research environment.

"The survey data reflects a strong consensus among researchers regarding the importance of the NSZL embracing open science policy."

5. Current research workflows and practices

"Can you walk us through the initial steps you take when starting a new research project at the NSZL?"

The responses from NSZL researchers reveal a range of approaches to initiating research projects, reflecting both structured methodologies and more informal practices. Key initial steps commonly mentioned include identifying a problem or need, brainstorming solutions, and creating project initiation documentation that defines the scope, goals, deliverables, schedule, and budget criteria. For instance, one researcher emphasized the importance of defining the research questions, objectives, and selecting an appropriate research design and methodology. Conducting a literature review to understand existing knowledge, identify gaps, and inform research questions or hypotheses is also a prevalent practice. Engaging stakeholders and defining communication tools are highlighted as crucial for collaborative research efforts. However, while obtaining necessary ethical approvals and considering funding and resources are part of the planning process for some, only one researcher explicitly mentioned developing a Data Management Plan (DMP). This researcher outlined steps for data collection, storage, management, and addressing data privacy and security, suggesting a comprehensive approach to data handling. The absence of DMP mentions by other researchers indicates that formalized data management may not be a widespread practice. Collaboration and feedback from colleagues are valued by some researchers, as is engaging in minor research tasks related to daily responsibilities or external academic pursuits such as PhD studies.

"How do you identify and discover relevant resources within the NSZL's open collections for your research?"

The NSZL researchers predominantly use catalogues and databases to identify and discover relevant resources within the library's open collections. Common tools include the electronic and printed catalogues, and specific databases such as Nektár, DKA, Copia, and Hungaricana. Researchers often start with the NSZL's online catalogues, with one highlighting the use of the Hungarian Electronic Library and Proquest for accessing scientific literature. Some researchers leverage

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their prior knowledge of the literature, including lexicons and bibliographies, to guide their searches. In cases where fields are new and specialized, researchers noted a lack of relevant materials within the NSZL collections. However, the process of discovery often leads to new and surprising findings, reflecting the dynamic nature of research at the NSZL.

"What criteria do you use to select specific (primary/secondary) resources for your research, and how do you determine their relevance?"

NSZL researchers use several precise criteria to select primary and secondary resources for their research. Relevance to the research topic is paramount, often assessed through abstracts and the known activity of authors. Quality indicators such as peer review, citations, and references are crucial for determining reliability and validity. Researchers prioritize sources that are open access and offer full-text access, especially digitized copies of manuscripts that may be in poor physical condition. The reputation of the publisher and the reliability of the source are also significant factors. In historical studies, a thorough approach includes using primary resources like manuscripts and archival documents, alongside secondary resources such as essays and monographs. Printed media are often primary sources for 20th and 21st century research. The research topic largely dictates the resources used, with an emphasis on collecting all pertinent sources available, particularly those within the library's collection.

"Do you utilize other resources from outside the library? If you do, how do you access them? Are they Open Access or under subscription, etc.?"

The survey responses indicate that researchers at the NSZL employ a diverse range of external resources. Many researchers utilize a combination of subscribed databases and open access (OA) resources, mentioning specific platforms such as JSTOR, Arcanum (under subscription), and Szaktárs with institutional subscriptions. There is a notable preference for open access resources due to their ease of access and cost-effectiveness. Researchers also leverage institutional affiliations, such as university access, to obtain a broader range of materials, including databases of the Hungarian National Academy and various digital libraries not directly available through the NSZL. Digital libraries and databases are frequently used for both primary and secondary literature, emphasizing the importance of digital infrastructure and comprehensive collections. Additionally, some researchers require physical visits to other libraries and archives to access critical primary sources, underscoring the need for collaborative efforts and partnerships to facilitate access to unique materials. The use of open source software and publicly accessible databases is also prevalent, indicating a modern, resourceful approach to research that maximizes the availability of free resources. Furthermore, researchers draw from a wide array of external resources, including EU research reports, statistics, and strategies from various cultural heritage institutions, which are generally available with open access.

"Researchers prioritize sources that are open access and offer full-text access, especially digitized copies of manuscripts that may be in poor physical condition."

"What methods or tools do you employ for documenting your research process, including notes, references, and findings?"

The survey responses reveal a variety of methods and tools employed by researchers at the NSZL for documenting their research processes. Commonly

used tools include Microsoft Word and Excel, with one respondent noting the use of "Word documents, Excel tables, photos, notes entered on PDF documents." Handwritten notes remain prevalent, with several researchers indicating, "I make handwritten notes or I use my computer to make notes." Zotero is frequently utilized for managing bibliographic data and references, as exemplified by the response, "I use all of them, managing bibliographic data and references with Zotero." Additionally, some researchers incorporate project management tools such as Redmine and Trello for collaborative projects, as one respondent stated, "Office programs (Word, Excel) and also project management tools (Redmine, Trello) for multi-participant projects." Practical approaches, including "saving documents and organizing them into folders" and using "Chrome bookmarks," are also employed. This diversity in documentation practices reflects a blend of traditional and digital methods, accommodating individual preferences and the specific needs of various research projects.

"Do you utilize the tools provided by the NSZL for the documentation? if applicable what tools are you using?"

The survey data reveals a mixed approach among researchers at NSZL regarding the use of documentation tools provided by the institution. While some researchers utilize external tools like Redmine, Teams, Google Drive, and Drupal, often through international affiliations, others predominantly rely on Microsoft Office software such as OneDrive and Planner. However, a significant portion of respondents either do not use or are unaware of specific tools provided directly by NSZL.

"How often do you publish?"

The survey responses indicate diverse publication frequencies among researchers at the NSZL. High productivity is noted by some, such as publishing "31 articles between 2018 and 2021" and "approximately 4-8 studies a year." Others report more modest rates, typically "1–2 times a year" or "once a year." Some researchers produce regular professional content, with one noting, "every few weeks I produce short professional news pieces for the website." Academic requirements also influence publication, with doctoral candidates publishing "2–3 times a half year."

"Where do you publish your research outputs? Is it open access?"

The survey responses reveal that NSZL researchers publish their research outputs in a variety of formats, including scientific journals, conference papers, blogs, and websites. Several respondents noted that their publications are partly or fully open access. For instance, one researcher indicated publishing in "Hungarian LIS journals Könyvtári Figyelő (Library Review), Tudományos és Műszaki Tájékoztatás (Scientific and Technical Information)" and noted that these journals "are all open access since COVID-19 at the latest." Another respondent mentioned that their scientific papers and conference papers are "Open Access." Many researchers publish in printed books and periodicals, with varying levels of open access availability. Some publications are fully open access, while others remain under embargo before becoming openly accessible. One respondent

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"Researchers also generate national library statistics, trend reports, and results from various library surveys and questionnaires."

stated, "The journals I publish are open access, and as for the book chapters I usually have the right to share the scanned copies on the internet." Overall, the data highlights a strong engagement with both traditional and digital publishing formats, with a significant emphasis on open access to increase the reach and accessibility of research outputs.

"What forms/types of data do you produce alongside/beyond the scientific articles?"

The survey responses indicate that researchers at the NSZL produce a variety of data types alongside their scientific articles. These include recommendations for implementing metadata standards and vocabularies, as well as creating metadata schemes and mappings. Several researchers mentioned producing data in formats such as "excel, sql," "HTML text and illustrative figures," and "digital text editions of manuscript sources, data visualizations based on data extracted from text corpus." Additionally, shorter forms of writing such as "blog entries, articles for the general public," and "educational blogs on the NSZL platform" are common. Researchers also generate national library statistics, trend reports, and results from various library surveys and questionnaires. Specific examples include "national library statistics, trend reports on library usage, and international reviews of LIS literature." Bibliographical records for online catalogs and work with mandatory copies, such as recently published maps and atlases, were also highlighted. Other forms of data include publishing early texts and historical sources, "data visualizations," and contributions to "bibliographies and monographies." Researchers also noted producing visual content such as "photos, illustrations," and conducting analyses of historical data for their publications.

"If applicable, how often do you publish Open Access?"

The survey responses indicate varying frequencies of Open Access (OA) publication among researchers at the NSZL. Some researchers consistently publish OA, with one stating, "If I publish, I usually do it via OA." Another noted that "all data published on our official website is in open access format," and "our text editions are Open Access, as well as my publications." Others publish OA less frequently or selectively. For example, one researcher mentioned, "only scientific articles," while another stated, "it depends on the opportunities" and "sometimes." One respondent highlighted financial constraints, noting, "open access journals with higher prestige would be extremely expensive without special financial support of the Library." Overall, while some researchers regularly utilize OA platforms, others face limitations or make decisions based on specific circumstances and opportunities.

"Do you share your research data alongside the scientific article or upon request? (for example if you have prepared a survey for your research, do you share data resulting from the survey alongside the article or only upon request)"

The survey responses indicate a varied approach among NSZL researchers regarding sharing their research data. Some researchers prefer to share data only upon request, as reflected by multiple respondents stating, "I only share data

upon request." Others routinely share their data alongside their scientific articles, with several noting, "I share my data alongside the scientific article." A few researchers have a mixed approach, sharing relevant data within their publications but providing additional data upon request. One respondent highlighted the importance of context, saying, "I usually share it verbally because I like to see the reactions, it's really inspiring." Another mentioned that sharing practices depend on the nature of the data, particularly in historical studies where sources must be traceable and cited appropriately. Some respondents noted constraints such as copyright issues, while others emphasized the practice of publishing in open access periodicals to ensure wider accessibility of their research data.

"If applicable, is the data shared compatible with the FAIR Open Data Principles (Findable, Accessible, Interoperable and Re-usable)? What standard, metadata schemes and licenses do you implement for your research data?"

The survey responses regarding the compatibility of shared data with the FAIR Open Data Principles reveal diverse practices among NSZL researchers. Some researchers indicate adherence to open standards and licenses, such as "OA, CC BY," and "DOI registration." Others use specific metadata schemes like TEI XML for digital publications, ensuring data is structured according to international guidelines for textual material. However, several respondents either do not apply these principles consistently or lack awareness of specific standards and metadata schemes. For instance, one researcher mentioned, "We do not knowingly use different standards, metadata schemas or licences," while another noted, "We do not use, even in the case of the annual trend reports published on our website." Some respondents acknowledged partial compliance with FAIR principles, using standards and metadata schemes like "OAIS, Dublin Core, METS, PREMIS," but admitted that not all data shared meets these criteria.

"If applicable, what are the reasons for not sharing research data openly?"

The survey responses reveal several reasons for not sharing research data openly among NSZL researchers. Some researchers express concerns about data being stolen, noting that "some of the researchers are concerned that their results will be stolen this way." Others highlight the issue of sensitive data, such as "archival personal data," which necessitates restricted access to protect privacy.

The role of publishers is also significant, with decisions about open access often being beyond the researchers' control. One respondent mentioned, "some of my articles became open access after a while (it was the publisher's choice)." Copyright issues and the consideration of the advantages and disadvantages of open access further influence data sharing practices. Additionally, some researchers are hesitant to share data openly due to the potential for it to be reused by others, thus affecting their ability to publish future research. One noted, "I produce long-term data that could be used for future research, so if I publish it other researchers will use it." The lack of proper documentation and metadata also poses a challenge, with one researcher indicating that their data "needs to be more developed as it lacks metadata." These responses underscore a complex landscape of considerations that influence decisions on data sharing,

"Additionally, some researchers are hesitant to share data openly due to the potential for it to be reused by others, thus affecting their ability to publish future research."

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including concerns about intellectual property, data sensitivity, publisher policies, and the readiness of data for open access.

"If applicable, what are the challenges faced in adhering to Open Science practices?"

The survey responses reveal several challenges faced by researchers at the NSZL in adhering to Open Science practices. One significant issue is the risk of "predatory publishing," where researchers might be targeted by deceptive publishers. Another concern is the potential misuse of publicly available research data. As one respondent highlighted, "If data from our publicly published research is used by others without acknowledging the original source of the data, that is a problem." Additionally, publishing images can pose difficulties, and there is a need for an appropriate digital environment and platform for data sharing, along with continuous IT support. Researchers also pointed out that repositories "are not user-friendly and require a lot of time and metadata," making the process cumbersome. Legal issues are repeatedly mentioned as a major hurdle. One respondent explicitly stated, "The biggest challenge is the legal issues." These legal concerns can complicate the sharing and reuse of research data. Overall, the challenges encompass technical, legal, and practical aspects that hinder the seamless implementation of Open Science practices.

"Could you suggest improvements or solutions to the obstacles you have encountered?"

The survey responses suggest several improvements and solutions to overcome obstacles in adhering to Open Science practices at the NSZL. A recurring theme is the need to raise awareness about the advantages and goals of Open Science. One researcher emphasized that "awareness regarding advantages and goals of OS should be raised." Another suggestion is to increase the focus on the importance of open access, highlighting its benefits for the research community. Furthermore, more funding for IT development and support is necessary to create a robust digital infrastructure. This would address the current issues with user-unfriendly repositories and the need for continuous IT support. As one respondent noted, "More funding for IT development and support" is essential.

By implementing these improvements, the NSZL can better support researchers in overcoming the challenges associated with Open Science practices.

"Do you collaborate with other researchers? If applicable, how often do you collaborate and in what way do you collaborate (methods, please mention which projects)?"

The survey responses indicate a varied landscape of collaboration among researchers at the NSZL. Many researchers engage in collaborative efforts, both domestically and internationally. One respondent mentioned collaborating with "researchers from areas that are interested in development and adapting standards, also those who are interested in solving the problem of making digitized collections under copyright accessible for the large public." Collaborations often involve joint projects and publications. For instance, a respondent

stated, "We compiled a questionnaire to survey demographic and sociological data on librarians in Hungary," in partnership with the Research and Analysis Department of the Library Institute. Another noted, "I work in a research group where we have common projects, we collaborate daily. We compile manuscript catalogues and a database of manuscript fragments." While some researchers collaborate occasionally or have not yet had the opportunity to collaborate extensively, others report continuous cooperation with both national and foreign institutions. These collaborations include tasks that require specialized expertise, such as artificial intelligence, where partners perform specific tasks in exchange for data. Methods of collaboration vary, including the use of digital tools like Google Docs and Transcribus for transcription and critical edition of manuscripts. Regular meetings, often on a monthly or weekly basis, are common in some collaborative efforts. Additionally, many researchers participate in international research groups and share their findings through consultations and email. Overall, the data indicates that while collaboration is widespread, the frequency and methods of collaboration differ among researchers, influenced by the nature of their projects and the specific needs of their research.

"While some researchers collaborate occasionally or have not yet had the opportunity to collaborate extensively, others report continuous cooperation with both national and foreign institutions."

"If applicable, how does collaboration play a role in your research process, and how do you coordinate with other researchers? (for example you are working on a project, and you needed a particular thing from another institution, what role did collaboration play in your research process?)"

Collaboration plays a significant role in the research process at the NSZL, facilitating access to specialized expertise, external collections, and research methodologies. Researchers use various platforms and forums for collaboration, including international working groups such as those of IFLA, ISO, EURIG, and Europeana. For example, one researcher noted, "The Research Department of the Library Institute provided research methodology assistance," highlighting the importance of internal support. Collaboration is particularly crucial when researchers need access to collections beyond their own library. As one respondent mentioned, "I often need the special expertise of my colleagues. I do not work solely with sources available in our own library, therefore it is important to get access to other collections." This access is often facilitated through agreements with other public institutions that grant free access to their employees. Projects are frequently based on collaborations where researchers from other institutions contribute material, data, and research results, which are then published on shared platforms. One researcher emphasized, "Usually our projects are based on collaborations, researchers from other institutions bring their material/data/research results, and we publish it on the platform." Coordination with other researchers is managed through various means, including personal visits to institutions where museal documents are kept, regular consultations, and email communications. The importance of these collaborations is underscored by another researcher who stated, "Collaboration is crucial, as I often need the special expertise of my colleagues."

"Are you an advocate for open access and open data? If applicable, tell us about your advocacy experience (mentioning projects/initiatives)"

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Advocacy for open access and open data is a recurring theme among researchers at the NSZL. One researcher actively engages in advocacy through several presentations and publications on the topic. Another researcher mentioned their preference for publishing in open access publications, demonstrating a commitment to the principles of open access. Additionally, involvement in initiatives such as Creative Commons and Rightsstatements.org indicates a focus on ensuring accessible and properly attributed research outputs. However, not all researchers are unequivocally supportive. One researcher expressed reservations, stating, "If you are asking about my sympathy, I have doubts, and if I see the point, I will use it, of course after considering the advantages and disadvantages." This highlights a critical view of open access, where the potential benefits and drawbacks are carefully weighed. Furthermore, concerns about the financial implications of open access are evident. As one respondent noted, "Today open access often means that private firms try to make the researchers or their institutes to pay all the costs of the publication process." This perspective reflects apprehensions about the economic burden that open access models can impose on researchers and their institutions. Overall, while there is significant advocacy for open access and open data among NSZL researchers, there are also nuanced views that consider both the advantages and the potential challenges associated with these practices.

"Could you share any specific obstacles you've encountered in your research workflow at the National Library and how you've addressed them?"

Researchers at the National Library (NSZL) have identified several specific obstacles in their research workflow. One researcher noted, "bureaucracy slows down procedures," which can hinder timely progress in research activities. Another issue is the lack of access to some databases considered to be important for some researches. Conducting necessary off-site archival and library research causes problems to some researchers as well.

"How could the NSZL better support and promote Open Science?"

" »Today open access often means that private firms try to make the researchers or their institutes to pay all the costs of the publication process.« "

To better support and promote Open Science, the NSZL should implement several strategic initiatives. Firstly, creating and implementing a comprehensive data management policy based on Open Science (OS) principles is crucial. This policy should also apply effective copyright exceptions and limitations. Enhancing staff capabilities through training and the development of online learning materials is another essential step. As one researcher suggested, "If you could provide training for staff or create online learning materials," it would significantly boost the adoption of OS practices.

Making the library's databases, especially those containing medieval and early modern content, more user-friendly and providing English interfaces would enhance usability and global reach. Organizing in-house training courses and producing guides would help staff and researchers navigate Open Science methodologies effectively. Developing and promoting Open Access platforms and catalogs is essential, as noted by a researcher: "Develop the Open Access platforms and catalogs, make more collections online available and promote these sites to make them visible to the researchers and general public." As one researcher highlighted, "Accessing resources online improves the situation a lot:

it makes mining fast and convenient and can be done in slippers." This convenience underscores the importance of a robust digital infrastructure. Publishing as much content as possible under Open Access should be a priority.

6. Challenges and limits of the study

During the survey conducted at the National Library of Hungary (NSZL), several challenges emerged that provide insights into the complexities of assessing Open Science awareness and implementing related policies. One significant challenge was the language barrier encountered among researchers, many of whom had English as a second language. This linguistic diversity posed difficulties in survey administration and comprehension, potentially influencing response rates and data quality. Another notable challenge was the limited timeframe available for data collection. The researcher overseeing the survey was a trainee at NSZL for only two months, which constrained the scope and depth of the survey methodology. As a result, the study primarily relied on questionnaire-based data collection, with limited opportunities for in-depth interviews that could have provided richer qualitative insights into researchers' perspectives on Open Science. In addition to these operational challenges, the study faced constraints in participant engagement. Not all researchers were able to participate due to their busy schedules and competing priorities, and their varied views about Open Science, highlighting the need for flexible and accommodating survey methodologies in future research efforts. Furthermore, the study's narrow focus on survey responses and open-ended questions limited the breadth of insights gathered, particularly regarding nuanced aspects of Open Science practices and attitudes among NSZL researcher.

7. Future recommendations

To foster a culture of Open Science within NSZL, ongoing support and education initiatives are crucial. Regular workshops, seminars, and training sessions tailored to researchers' needs can promote awareness of Open Science principles and best practices. Collaborative partnerships with external stakeholders and peer institutions can further amplify these efforts, fostering a collaborative and supportive environment for Open Science initiatives. By implementing strategic improvements, NSZL can enhance its capacity to support Open Science principles, empower researchers to adopt transparent and collaborative research practices, and contribute to the broader scholarly community's efforts in advancing scientific knowledge and innovation.

8. Conclusion

The survey conducted among researchers at the National Library of Hungary (NSZL) reveals crucial insights into the current state of Open Science awareness and data management practices. The findings indicate a moderate level of awareness about Open Science principles and highlight some gaps in the practical implementation of these practices. Researchers identified a need for clearer guidelines and more robust support to facilitate effective data management and sharing in alignment with Open Science standards.

Developing and adopting an effective Open Science-compliant data management policy will definitely promote best practices, ensuring systematic organization, preservation, and accessibility of research data for verification

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and reuse. The results have prompted the colleagues at the library to design and implement targeted Open Science training courses, equipping researchers with the essential skills and knowledge to adopt these practices effectively. Promoting Open Science principles and policies within NSZL remains critical. Institutional commitment to Open Science enhances the transparency, reproducibility, and societal impact of research while aligning with continental regulations and global movements toward more open and collaborative research environments. Libraries, as key stakeholders, play a vital role in advancing these initiatives. Their involvement is essential in providing the infrastructure, resources, and training needed to support researchers in embracing Open Science.

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