

RESEARCH PAPER

Implementing the RDA Research Data Policy Framework in Slovenian Scientific Journals

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The paper aims to present the implementation of the RDA research data policy framework in Slovenian scientific journals within the project RDA Node Slovenia. The activity aimed to implement the practice of data sharing and data citation in Slovenian scientific journals and was based on internationally renowned practices and policies, particularly the Research Data Policy Framework of the RDA Data Policy Standardization and Implementation Interest Group. Following this, the RDA Node Slovenia coordination prepared a guidance document that allowed the four pilot participating journals (from fields of archaeology, history, linguistics and social sciences) to adjust their journal policies regarding data sharing, data citation, adapted the definitions of research data and suggested appropriate data repositories that suit their disciplinary specifics. The comparison of results underlines how discipline-specific the aspects of data-sharing are. The pilot proved that a grass-root approach in advancing open science can be successful and well-received in the research community, however, it also pointed out several issues in scientific publishing that would benefit from a planned action on a national level. The context of an underdeveloped data sharing culture, slow implementation of open data strategy by the national research funder and sparse national data service infrastructure creates a unique environment for this study, the result of which can be used in similar contexts worldwide.

Keywords: research data; scientific publishing; Slovenia; data policy; data citation; Research Data Alliance

1. Introduction

Raising awareness and generally adopting data sharing activities is understood as an important strategic development in the pursuit of more Open Science, and good scientific practice in general, and this trend can also be increasingly seen in scientific journals policies worldwide. However, the actual introduction of journals data sharing policies challenge the established practices within the research culture and can be observed through the reactions, doubts and solutions that are pursued when introducing changes. What motivations and norms are driving this adaptation process? How to implement a new data-sharing framework in an environment where researchers usually deal with lack of time and funding to prepare data and documentation (Childs et al. 2014) and where there is an absence of professional rewards for data sharing (Molloy 2011)? We may gain a deeper understanding of this process by entering into a dialogue with the journal representatives about the implementation of general data sharing policy framework, by monitoring the process of its implementation and scrutinising draft journal policy end-result.

The activities of establishing the RDA Node Slovenia, supported through the RDA EU 4.0 H2020 project, include the introduction of data sharing policies among selected Slovenian scientific journals. The Journals' Pilot was one of three main lines of activities of the RDA Node Slovenia project that generally addressed the government-approved open access strategy for research data (GovRS 2015, hereafter: Strategy) and the action plan for its implementation (GovRS 2017, hereafter: Action plan). The project started from observing the hesitation of timely implementation of the national Action plan points on both the national research founders' and the research communities' sides.

The Journals' Pilot first introduced the *Guidelines for the implementation of scientific publishing policies of research data citation in scientific publications and assuring access to primary data, used in publications* (Štebe, Bezjak, Dolinar 2020a) (hereafter: *Guidelines*), heavily inspired by the corresponding output of the RDA Data Policy Standardization and Implementation Interest Group: Research Data Policy Framework for All Journals and Publishers (Hrynaszkiewicz et al. 2020; hereafter: *Framework*). Adapted to the national circumstances, the *Guidelines* are intended for scientific publishers and editors of scientific journals as a starting point for the preparation of any journal-specific guidance about data sharing requirements and recommendations.

The paper aims to present the implementation of the RDA research data policy framework in Slovenian scientific journals within the project RDA Node Slovenia. By bringing forward the experiences of journals' editorial teams of drafting journal policies, our research aims to identify motivations for data sharing and expose the interests of data producers and users towards data sharing. The context of an underdeveloped data sharing culture, slow implementation of open data strategy by the national research funder and sparse national data service infrastructure creates a unique environment for this study, the result of which can be used in similar contexts worldwide. The paper consists of three main parts. Firstly we present a literature overview and develop our research question, secondly, we present the national research journals landscape regarding data sharing before the RDA Node Slovenia activities and thirdly, we present and analyse the four cases of implementing the *Guidelines*, following the methodology of Open Data Journal Policy and Research Data Citation Pilot (hereafter: the Journals' Pilot).

2. Data Sharing in Scientific Journals

2.1 Literature review and problem setup

Previous studies have identified barriers and drivers for data sharing, such as perceived career benefits, infrastructure development, the provision of data support services and training, data management skills, funder and journal mandates for data sharing, peer pressure (practices), reuse citation and metrics (EAGDA 2014, Sayogo & Pardo 2013, Tenopir et al. 2011 and 2015, Youngseok & Adler 2015, Youngseok & Stanton 2012). There is a discrepancy in journals data sharing requirements and motivations amongst scientific disciplines (Stuart et al. 2018; Resnik et al. 2019). Researchers are less motivated to share their data if they fear misuses of data, such as misinterpretation, commercial or ethically-inappropriate use or loss of expected publication opportunities (Stuart et al. 2018; Hrynaszkiewicz 2019) and more motivated to share when their scientific discipline, community, institution or research group directly supports data sharing (existence of data sharing cultural norms) (Van den Eynden and Bishop 2014; Teperek and Dunnig 2018; Wallis et al. 2013). Therefore, the motivation of individual data producer for data sharing may follow habits of a data-sharing culture, however, this depends on several enablers, such as the existence of data sharing support services, time and funds available for additional data curation activities and the introduction of evaluation and rewards mechanisms for data sharing (Van den Eynden & Bishop 2014; Van den Eynden et al. 2016). Journals data sharing policies and data availability statements formats increase article citations rates which in turn provides direct rewards to the authors (Christensen et al 2019; Colavizza et al. 2020). Scholarly publishers act as prominent factors in changing the data-sharing culture by raising awareness and introducing journal data policies worldwide (Hrynaszkiewicz 2019).

Arising from the literature review, we aim to explore how scientific journal policies are taking into consideration interests of individual researchers to share data along with the extremes of interests of data producers on one side vs. interested secondary users on the other side, in the intersection with the extreme of pure research-driven motivation vs. public benefit motivation of access to data (Borgman 2012). We will explore which elements of the general journals' data-sharing *Framework* will be defined more explicitly within a national setting of a poorly developed data sharing culture, lack of knowledge on data management and sharing (see Stuart 2018), and lack of enablers and incentives (e.g. partial absence of disciplinary data infrastructures, which, when present, can help in providing the missing knowledge) (Arzberger et al. 2004). The article proposes and tests the expectation that active collaboration of data infrastructures in the Journals' Pilot data sharing policy design will facilitate the process of implementation of the *Framework*'s principles. Data repositories are intermediaries between data creators and users, serving also funders, public and scientific communities' interests in preserving the long-term value of data. The missing function gap of the traditional publishing system of scientific journals can be filled in by agreements and relationships with data services' 'knowledge infrastructure' (Borgman et al. 2018). In addition to the traditional journal article functions, new facilities and services standards arise when collaborating with data infrastructures in managing research data to enable identification, citation and access (Plantin et al. 2018).

Additionally, we aim to demonstrate that despite the lack of explicitly enforced funders' data-sharing requirements, the scientific journal policy positions can move forward and gradually introduce such requirements themselves. Literature suggests that funder mandates alone without other incentives and enablers cannot change the data-sharing culture (Borgman et al. 2018) and even in situations where funders actively encourage data sharing, the journals' data sharing policies often lag (Sturges 2015). We aim to assess this complex relationship in the appraisal of the journal's draft policy cases and derive corresponding conclusions concerning the alignment of policy positions of journals and funders, even in the situation, where research funder is lagging.

Using the considerations established along the dimensions of motives and interests to share data (Borgmann 2012), we can expect that scientific journals, serving broader epistemic communities, lie in the intermediate position between data producers, authors of articles, their readers (consumers of scientific results) and the general public with demands for research integrity and promotion of open science in general – especially when this research is funded by public funds. Many journals act as 'disciplinary societies' and may consequently be more prone to arguments of public good and advancement of their research field, while they need to be aware of individual authors' barriers of data sharing, avoiding unreasonable demands and committing to share quality research results that support their readers and secondary users' interests (Grant and Hrynaszkiewicz 2018). The intermediate goals for sharing data are expected to be reproducibility and general transparency of the published results (Resnik et al. 2019), and in some scientific fields also replication (Rousi and Laakso 2020). On the other hand, research funders and national policy-makers are more entitled to support the public benefit motives (Borgman 2013). Realistically speaking, any effective public policy, hoping to change a data-sharing culture, needs to enable, reward and give credits for data sharing, which is primarily funders' area. Thus, we may anticipate that expectations will arise among the research community to change the provision of the rewards to give credit for data sharing. Wider data sharing generally advances research and innovation, which is a shared interests' area of funders, disciplinary communities and society at large (Borgman et al. 2018).

2.2. Assessment of the Slovenian situation before the launch of the RDA Node

The project of implementing the *Framework* among Slovenian journals dealt with the unevenly spread data sharing culture and habits among different Slovenian disciplinary research and publishing communities. Slovenian scientific journals are part of an extensive and fragmented landscape. Academic publishing is for the most part publicly financed by the central research funder Slovenian Research Agency and supported by the research institutions or academic societies. The scope of non-profit academic publishing is comparable to commercial publishing (Zule et al. 2019). The number of scientific journals is relatively large for the size of the Slovenian academic community: in 2019, the Agency co-financed 147 scientific periodic publications¹ (141 in the 2017-2018 period²). Since 2020, all the journals financed by the Agency must be available in open access, while data sharing is currently neither mandated nor recommended by the funder. The funder also sets several other conditions, such as the inclusion in international databases, bilingualism or multilingualism, the importance for science, contribution to informing the public, the importance for the development of Slovenian scientific and professional terminology.³

Equally, there are variations in the development of disciplinary data services.⁴ The ADP (as a data service for social sciences) has been established already in 1997, CLARIN.SI⁵ (as a support for research communities from language-related disciplines) and the History of Slovenia – Sistory (as an online system of Slovenian historiography) were established in the mid-2010s, while ELIXIR Slovenia (research infrastructure for specific biological domains) has started its activities only recently. The ADP as an already well-established data service has run several activities since 2010 onwards aiming to raise awareness of the need for open data policies among scientific publishers, targeting especially editors of social sciences journals. The social

¹ Representatives of two scientific journals, the funder, five research organizations and from the main national library took part at the workshop.

² <http://www.arrs.si/sl/infra/tisk/rezultati/16/rezult-zpp-17-18.asp>.

³ <http://www.arrs.si/sl/infra/tisk/razpisi/20/razp-ppp-21-22.asp>.

⁴ The state of data services in Slovenia is summarized in the conclusions of the national conference Open Research Data in Slovenia, which took place on November 14, 2019, in Maribor, Slovenia, and was organized by RDA Node working group for the coordination and development of research infrastructures together with other partners. Conclusions were published in a document with the title *Zaključki konference »odprti raziskovalni podatki« v Sloveniji*, available at https://www.adp.fdv.uni-lj.si/media/img/datoteke/Porocilo_Odprta_Znanost_Maribor_2019_v1.0.pdf.

⁵ CLARIN.SI is part of the European research infrastructure CLARIN (Common Language Resources and Technology Infrastructure).

science data services throughout the world introduced quite early regular data sharing and citation practices (Gherghina & Katsanidou 2013, Zenk-Möltgen et al. 2018) and these are already widely established in the international research community.⁶

Within the »Open data« project (2010–2013),⁷ which was funded by the Ministry of Education, Science and Sport, the ADP interviewed stakeholders from different disciplines in the Slovenian research community.⁸ The results showed that researchers and leads of research institutes were rather sceptical about data sharing (Štebe et al. 2012). A follow-up workshop carried out in 2013 was focusing on the role of scientific journals. It has shown that there were no policies of data sharing, research data management, permanent identifiers and instructions on data citation available. The need to provide access and cite the data was articulated already on that occasion (Štebe et al. 2013). A recent article, reviewing the challenges and slowly emerging practices of citing linguistic data, showed that the main obstacles for data sharing are lack of knowledge about data management and fear of exposing data of low quality, little investment put into data management, and ephemeral data sharing support services (Fišer, Lenardič & Erjavec 2018). A study (Glavica et al. 2019) carried out in the neighbouring Croatia that shares similar research traditions to Slovenia due to common recent history, shows that the underdeveloped data culture is traditionally motivated on ethical grounds and facilitated with informal and semiformal means of exchange (article supplement for extended results, data provenance description, private sharing upon request etc.).

In 2017 the ADP organized a discussion with the editors of the social science journals and presented the role of scientific journals in fostering open data implementation in Slovenian scientific environment. Several of the editors expressed concern that the novelty might bring additional unpaid burden (cf. Grant and Hrynaszkiewicz 2018) and that the new rules might frighten potential contributors (cf. Rousi, A.M., Laakso 2020). It has to be taken into account that small national journals compete for articles with big international journals with higher visibility and citations factors. Based on the knowledge and experiences gained through different activities, the initiative eventually broadened to other disciplines and continued as one of the activities of the RDA Node.

3. Developing the Journals' Pilot and Involving Journals

The journals that cooperated in the RDA Node Pilot were selected based on the disciplinary background corresponding to the three established disciplinary infrastructures active in the RDA Node (**Table 1**). By using this approach, the journals' representatives were able to discuss and follow certain recommendations regarding the management of research data from their disciplinary infrastructures. To develop a realistic elaboration of the *Framework* principles and to demonstrate that the implementation of data policies is doable, we needed to enter into the process of a 'democratic deliberation' between the journals representing 'disciplinary societies' and corresponding disciplinary data 'knowledge infrastructure' representatives. A few other journals from the fields of social sciences, biotechnology and medicine were also invited to cooperate, yet did not find enough resources to actively participate.

Table 1: Journals participating in the Pilot and assisting disciplinary data services.

Journal	Discipline	Data Service Assistance
Slovenščina 2.0: empirical, applied and interdisciplinary research, https://revije.ff.uni-lj.si/slovenscina2	Linguistics	CLARIN.SI – Common Language Resources and Technology Infrastructure, Slovenia [Slovenska raziskovalna infrastruktura za jezikovne vire in tehnologije], http://www.clarin.si
Journal Social Work [Revija Socialno delo], https://www.revija-socialnodelo.si/	Social sciences	ADP – Social Science Data Archives [Arhiv Družboslovnih Podatkov], https://www.adp.fdv.uni-lj.si
Contributions to Contemporary History [Prispevki za novejšo zgodovino], https://ojs.inz.si/pnz	History	SiStory – History of Slovenia portal [Portal Zgodovina Slovenije], https://www.sistory.si/
Documenta Praehistorica, https://revije.ff.uni-lj.si/DocumentaPraehistorica	Archaeology	None

⁶ See Data Citation Resources at <https://iassistdata.org/community/data-citation-ig/data-citation-resources>.

⁷ See <https://www.adp.fdv.uni-lj.si/eng/spoznaj/projekti/pretekli/> for more information.

⁸ The main goal of the project was to design the national strategy of open access that was later adopted in 2015 (GovRS 2015) and its Action plan (GovRS 2017). (<https://www.gov.si/assets/ministrstva/MIZS/Dokumenti/ZNANOST/Strategije/National-strategy-of-open-access-to-scientific-publications-and-research-data-in-Slovenia-2015-2020.pdf>).

The Journals' Pilot project consisted of several steps. In September 2019 the coordinators of the RDA Node shared a first draft proposal for *Guidelines* with an example of instructions for authors, already containing the adaptation of the RDA *Frameworks* to the national setting presented in the next section. A discussion followed about the proposed *Guidelines* at the regular RDA Node meetings and suggestions for improvements were made. Next, the RDA Node coordinators arranged for introductory meetings with each journal editorial team representatives and the corresponding disciplinary data infrastructure. These meetings were a space to present the purpose of the journal data sharing policy, based on the first version of the *Guidelines*, to describe the elements of the policy, following the data infrastructure interpretation of the key features, and to address the issues foreseen. The formal agreement was reached at the end of each meeting about individual journals contributions to the draft policy by the end of the year. Draft implementation of the *Guidelines* in the participating journals amended policies was presented in December 2019 at the RDA Node meeting, gathering feedback among the participating journals themselves and RDA Node members. After the meeting, the next semi-final version of the *Guidelines* was prepared.

The participating journals further improved their data sharing policy statements and finalised them by the time of the main RDA Node conference. The conference⁹ took place at end of January 2020 and was dedicated to actively promote journals data sharing policies among other Slovenian scientific journals. The final version of the *Guidelines* (Štebe, Bezjak & Dolinar 2020a) was endorsed after the conference and made public.

3.1 Adopting RDA recommendations and outputs in the Guidelines

To respond to the Slovenian situation, the *Guidelines* (Štebe, Bezjak & Dolinar 2020a) link to the recommendations and other outputs of the various RDA Working/Interest groups, while referring also to the Strategy provisions and the resulting Action Plan points. The review of the prominent global journals and publishers that was made by the RDA Data Policy Standardization and Implementation Interest Group, provided a useful general framework (Hrynaszkiewicz et al. 2020).

Introduction to the *Guidelines* deals with the topic of Open access to research data. Readers are briefly informed about the challenges of open data and about the role that the journals can have in increasing transparency in science. The *Guidelines* themselves consist of seven main sections. The first three sections deal with the definition of research data, possible exemptions for data sharing in full open access mode and the embargo. The *Guidelines* mainly follow the general definitions from the Strategy and the Action Plan and provide perspectives on a full spectrum of reasons and motivations of all stakeholders (authors of articles, data producers, users etc.) from which the participating journals may choose their specific emphasis (public vs. research-driven). The general definition of data, for example, includes arguments about the traceability of data construction, the metadata and documentation that allow for independent secondary use – which in turn demand greater effort from data producers.

In the fourth section, we discuss the issue of where and how to publish research data. Following both the Strategy and the RDA Framework, we suggest giving priority to disciplinary data centres, archives or repositories for specific types of data, over general repositories. We emphasize the minimum requirements that a repository must meet to be deemed as trustworthy in the eyes of its users, funders and other relevant stakeholders. These are appraisal and selection of data based on reusability potential, the existence of minimum metadata and related search capability, the definition of licenses and possible access restrictions, funder and project information, and information for understanding the origin and content of data. Repositories should aim for certification of their services. Following the Framework recommendations, we referred to another RDA IG result, namely the RDA/WDS Certification of Digital Repositories Interest Group output the Core Trust Seal as basic certification standard.¹⁰ Also related to the RDA Data policy standardisation and implementation IG we suggested contributing authors to consult the FAIRsharing review to standards, databases, and policies on data and metadata when searching for the appropriate data repository.¹¹

Finally, an example of instruction for authors was short and explicit in naming the existing national data services:

The data must be submitted to a data repository, a data centre or a data archive. This may be disciplinary, institutional or general. Preferably, the research data should be submitted to a central

⁹ See <https://www.adp.fdv.uni-lj.si/dogodki/znanstvene-revije-slovenije-raziskovalni-podatki/>.

¹⁰ See RDA/WDS Certification of Digital Repositories IG: <https://www.rd-alliance.org/groups/rdawds-certification-digital-repositories-ig.html>.

¹¹ See <https://www.FAIRsharing.org>.

disciplinary national or international data centres. Examples of central disciplinary repositories are Sistory, CLARIN.SI, Slovenian Social Science Data Archives, (...). An example of institutional repositories is the University of Ljubljana Repository, which is part of the national open-access infrastructure. An example of a general repository is Zenodo. In the event of uncertainty, the authors should seek advice in the Authors' Support (Section 2.7).

The key component, important for tracing reuse and reproducibility, were instructions about the citation of data described in the fifth section. When developing the guidelines we followed the established recommendations for citing research data sources, both RDA WG Recommendations and other sources: *Joint Declaration of Data Citation Principles* by FORCE11 and RDA (Martone 2014), *The Tromsø Recommendations* by the Linguistic Data RDA IG (Andreassen 2020), *Data Citation of Evolving Data* by the Data Citation RDA WG (Rauber et al. 2015), *Data Citation Guidelines for Earth Science Data* (ESIP 2019), and other.¹²

The sixth section deals with licences and other restrictions on access. Here the main reference again is the Strategy that expects the use of open access licenses. We also referred to the *Legal Interoperability of Research Data Principles and Implementation Guidelines* (RDA-CODATA Legal Interoperability IG, 2016).

The RDA Node *Guidelines* end with recommendations on how to support and advise the authors of scientific articles in sharing and citing research data. Recognising that journals' staff and editors may not have the capacity to support the authors, we offered that the RDA Node will keep the extended set of instructions for the authors to which editorial boards may direct authors for independent explanations to understand the policies of scientific publishers (Štebe, Bezjak, Dolinar 2020b). The RDA Node membership, consisting of data experts from data centres and other open science experts, will also continue to keep the help desk and answer the queries of both authors and journal's representatives.

The conclusion points out that the journal may, depending on the circumstances, choose to have a more or less strict data sharing policy, adapting the text of the guidance to include specific provisions as an obligation or as a recommendation, as suggested in our main references, the Research Data Policy Framework (Hrynaskiewicz et al. 2020). In doing so, they should also take into account the propositions set by the National Strategy and the Action Plan when enacted, which expects to set more strict demand regarding data.

3.2 Results of adapting and implementing the Guidelines in the draft journal policies cases

Generally speaking, the scientific journals landscape in Slovenia is characterized by the following limitations, that became visible during the Pilot's activities and at the final conference:¹³ the journals are under-financed and cannot afford extensive technical and administrative support staff; most activities are run voluntarily by the academic staff, often formally related to some professional societies or universities and faculties' departments. Even if open access is considered as one of the future orientations, the journals ranking systems and open access to publications is more thoroughly considered than the data citation and access to research data underlying publications. Introduction to the principles of data sharing was in some cases perceived as an additional burden for both journal teams and journal authors, due to a low level of a data-sharing culture: the exact situation that we identified already before the launch of the RDA Node. At the same time, participation in the pilot was seen as a contribution to educating a new generation of scholars regarding conditions that are becoming common in the international publishing world.

The insights from the journals, participating in the Pilot, follow the titles presented in **Table 1** and are summarised in **Table 2** at the end of the chapter.

3.2.1 Journal case 1: Revija Slovenščina 2.0

The *Slovenščina 2.0* is an online journal publishing empirical studies of Slovene and other languages. It is published by the Faculty of Arts, University of Ljubljana. Within the *Pilot* the journal drafted a data policy and stressed in the introduction the importance of sharing data, arguing that in the spirit of open science both the reproducibility and reuse potentials are increasing. The journal policy elaborated two points from the *Guidelines*, in particular the rules regarding data citation, and the importance of choosing a data repository for publishing data that enables review and evaluation of data deposits and provides persistent citation

¹² E.g., Cousijn et al. (2018); COPDESS Suggested Author Instructions and Best Practices for Journals, <http://www.copdess.org/copdess-suggested-author-instructions-and-best-practices-for-journals/>.

¹³ A short report in English is available: <https://www.rd-alliance.org/blogs/research-data-and-slovenian-scientific-journals-January-2020.html>.

reference.¹⁴ We can assess that the motivation that they put forward for a data policy was the advancement of science by using valuable community resources.

The editor noted that any new instructions for authors must allow for a gradual transitioning period. The draft policy, as for other journals, takes the position that the contributing author can choose either to follow or not to follow the recommendation about data sharing. Exceptions to data sharing are allowed. The consideration is that eventually, certain reasons for not sharing data will arise, including if very little or no data is used, in which case the explanations and direct quotes in the article text may suffice. The instructions did not specify detailed reasons for exceptions that the journal would consider legitimate. Instead, they ask the contributing author for a short explanation to the Editor at the point of article submission.

The data-sharing culture was sparse before the draft policy formulation, as became clear in discussions with the linguistic science community. The advent of the computational approach of digital humanities brought change to the traditional humanities' approach in terms of the habits of sharing both data and code.

The journal's data policy does not include the definition of what constitutes research data. The elaboration of this is implied in the references to the CLARIN.SI repository, which is said to be the "reference point for linguistic data sources", able to provide the data resources for secondary analysis and instructions about how to cite the used data. For the original data used in the article, the CLARIN.SI repository service is said to accept the linguistic data that satisfy the "conditions articulated in the editorial policy for being published in the repository."

As mentioned, the Journal *Slovenščina 2.0* cooperated closely with CLARIN.SI, the research infrastructure for language resources and technology. CLARIN.SI was also identified as the journal's target repository as a service that can keep and evaluate the community data resources. Self-archiving options are allowed for smaller and more occasional data sets, i.e. based on the *Guidelines*, Zenodo is mentioned as an example. The editorial team also wondered about the suitable national or institutional repository in such a case. Here we can see the involvement of the data producer interests, as instructions warn that one needs to allow enough time to prepare data for publishing at the repository. The main motivation of the policy is the advancement of research, involving researchers both as data producers and users, and expecting additional effort from producers to prepare data for deposit.

Proper data citation is set by the journal as a strict requirement without exceptions. It requires that authors cite existing data sources and data acquired from user interfaces, such as online concordances. If the research is based on the authors' data, they are encouraged to publish it. A particular challenge addressed in the instructions is the citation of dynamic data, like the use of results of a search expression applied over the reference language corpus, which is a frequent type of usage in the domain. To allow for reproducibility, the instructions recommend using the URL of a search expression, possibly shortened by the <http://shortref.org/> service that provides a persistent dynamic link to the resource.

The editorial team representatives later asked the RDA Node Slovenia coordinators to allow access to the extended example of the general instructions document, for authors of the journal to be able to gain additional information regarding data sharing. This would allow the journal's instructions to remain short and concise by emphasising the specificities of the disciplinary field.

3.2.2 Journal case 2: Social Work

Socialno delo (Social Work) journal is issued by the Faculty of Social Work, University of Ljubljana. Since 2014 the policy of the journal has been renewed with the long-term goal to become an open-access review, included in international bibliographic databases. Lately, since 2017 they have been working on redesigning the editorial policy, guidelines for authors and citation rules. The journal staff and editorial team were open to learning about good practices in open access and happy to take part in the initiatives, such as the *Journals Pilot*. The journal followed the initiative and soon established an internal working group to implement data citation rules and instructions for authors.

The specific challenge was to present the idea of data sharing among the researchers of social work, whose work is often related to sensitive personal data based on researching small and often vulnerable groups. Therefore, the implementation of *Guidelines* was not only a technical issue but mainly a challenge to explain data sharing while considering ethical and legal questions about the confidentiality of personal data.

¹⁴ Draft data policy that was formulated within the Pilot was presented at Scientific Journals and Research Data Conference (organised by the RDA Node Slovenia) in January 2020. Presentation from the conference is available at https://www.rd-alliance.org/system/files/documents/Arhar_Holdt_Gorjanc_Erjavac_Revija_Sloven%C5%A1%C4%8Dina_2.pdf.

Journal's new policy¹⁵ recommends depositing research data in repositories which comply with legal and ethical standards. They recommended solely Slovenian repositories. The policy strongly recommends for authors of Social Work to deposit their data in a trustworthy data repository before they submit the article, referring also to the corresponding national Strategy statement. The ADP as a domain repository is explicitly mentioned as eligible, owing to that it has elaborated data access regimes suited for the protection of sensitive data. General or institutional data repositories are also allowed if suited to the research data at hand. Here we have an example of how the journal balanced research motivations to access data for secondary use with general public personal data protection motivations and leveraged the difficulties in sharing data that negatively influence researchers' interests with appropriate data service support options. The journal is explicit in motivating the researchers as data producers mentioning as an incentive that organised data sharing is rewarded as an independent research output in addition to the journal article.

They also designed instructions and examples about citing the data. During the pilot, the Journal team stressed the importance of ADP's support, which was agreed to be offered to the journal and its researchers, in particular in providing the model data citation including persistent identifiers, management of sensitive research data, and pre-access regime to data for double-blind peer review.

The Journal's team decided to start implementing the new policy as a recommendation rather than an obligation. Editors wished to foster examples of good practice and expect to gradually adjust their policy. They plan to publish and implement the new policy beginning in 2021.

3.2.3 Journal case 3: Contributions to Contemporary History

The Contributions to Contemporary History journal presents the recent research of historiography for the period of the 19th and 20th. It is published by the Institute of Contemporary History, Slovenia. Editors of *Contributions to Contemporary History* pointed out that there are specifics of the field that impact the implementation of the project's guidelines regarding access to data and data citation. Humanities, and historians in particular, predominantly use documents from the past that are stored in cultural heritage institutions as their research data. Therefore the draft data policy specifically delineates categories of authors' collected data as opposed to using existing archival sources and proposes different workflows hereafter.

The draft data policy¹⁶ recommends rather than requires open access to data. Authors are under no obligation to provide access to digitalised archival sources, printed sources, manuscripts, visual materials etc., if those sources are kept in designated archives, libraries, galleries or museums. However, if authors use or produce digital surrogates of existing resources with an added value which consist of extended metadata, transcriptions, conversions to different formats or integration of different data sources, they should strive to provide access to them. The main motivation of the journals' policy thus is the advancement of science and allowing for new research discoveries by reuse.

The policy provides a list of recommended repositories and intends to be updated periodically, responding to the development of the national repository landscape. The SiStory as one of the online data centres of the DARIAH national consortium was suggested as the support service for authors in offering expertise in processing the 'digital surrogates', also accepting certain types of data or publications. It is also recommended to use existing data services from social sciences and linguistics, depending on the type of data, either as numeric and quantitative or predominately textual respectively. Certified repositories should be used before uncertified, Slovenian repositories before international ones, and disciplinary before general ones. Depositing data to the Open journal system article supplement is mentioned as a last resort if none of the remaining options proves suitable. Authors must provide the data during the editorial review on request. Data citation is obligatory.

3.2.4 Journal case 4: Documenta Praehistorica

The main focus of the Documenta Praehistorica journal is interdisciplinary research based on Neolithic studies of the Eurasian area. The journal is oriented towards international audiences, is completely open access and does not charge APC. About one-quarter of the articles are published together with a data supplement, even though Documenta mainly publishes case studies and reviews rather than articles based on primary research data.

Even before joining the Pilot, editors of Documenta had been treating data as an integral part of the articles, reasoning that it enables an evaluation of the hypotheses presented. It was already an established

¹⁵ Policy was presented at the Scientific Journals and Research Data Conference. Presentation is available at https://www.rd-alliance.org/system/files/documents/Kerec_Grebenc_Revija_Socialno_delo.pdf.

¹⁶ Draft was presented at the Scientific Journals and Research Data Conference. Presentation is accessible at https://www.rd-alliance.org/system/files/documents/Pancur_PNZ.pdf.

practice that in some cases a data file was attached to the article as a supplement with its persistent identifier (DOI). During the discussions organised by the RDA Node Slovenia, the Editors were inclined to continue with this practice whenever a lack of a suitable repository will prevent the authors from storing the data elsewhere. As a consequence, no repositories are listed or recommended in the new data policy.¹⁷ In presentations and discussions, the representatives of the journal recognised that domain-specific (international) data repositories do exist, such as the Archaeology Data Service, The Digital Archaeological Record or the Open Context which they would consider as valid for accepting data related to the journal articles.

Renewed journal guidelines require authors to report original research accurately and objectively, with enough detail and references to permit replication. The motivation for sharing data is, in this case, put more narrowly at the side of researcher-driven motivation. During the editorial review, editors may ask for raw data. Authors are obligated to keep the data for a reasonable period after the publication of the article, if not shared institutionally. They must also accurately cite all sources they use.

Documenta's data policy recommends data sharing but does not enforce it. It mentions public access to data, though this is not defined in detail, leaving the editors to champion open access in individual cases. The policy does not define research data and does not offer any specific instructions regarding data citation, but rather follows the established data supplement references practices. The policy reflects the current state of research communication in archaeology, where open access to publications is a standard while sharing of underlying data (other than referenced in the article supplement) and data reuse is only emerging.

3.3 Finishing the Pilot and attracting new journals

The Pilot project was presented at the Scientific Journals of Slovenia and Research Data conference¹⁸ that was organised by the RDA Node Slovenia in January 2020. The Node coordinators introduced the premise and results of the project, representatives of all four above-mentioned journals discussed their cases, and a lively debate emerged at a round table, showing the diversity of opinions on open research data in the Slovenian scientific publishing sphere. Over 60 journal representatives from all disciplines participated in the conference. Several editors reached out to the Node with an interest to join the project.

The three journals that did join the Pilot after the conference (CEPAR, Les/WOOD, Acta medico-biotechnica) felt that they had sufficient prior knowledge, access to an appropriate infrastructure within their respective research fields, and a motivated community of editors and authors. They welcomed the support of the RDA Node Slovenia project. They also wanted to raise reputation for the journal and their authors, proving that they are aware of open science trends. As a result, two of the latecomers' journals have already started implementing the *Guidelines*. CEPAR – Central European Public Administration Review, was the first that, concisely following the *Guidelines* and refereeing to the FAIR principles, published its renewed Submission Preparation Checklist.¹⁹ The Les/WOOD journal publishing topics related to the studies of wooden materials, on the other hand, already started to experiment with data availability in its most recent issue by depositing data (Škrk et al. 2020b) related to the article (Škrk et al. 2020a) in the University of Ljubljana repository.

3.4 Discussing the achievements of the National Scientific Journals' Data Policy Pilot

The Pilot results show that the journal's editorial teams together with their respective research data infrastructure services have close connections and understanding of their scientific community and the disciplines they serve. Research data sharing needs to be introduced gradually to avoid negative reactions of the contributing authors. Each of the draft policies presents reasons and motivations for introducing new demands for the data submission and data citation by referring to increasing reproducibility and mentioning other benefits of data sharing such as ethical and research potential perspectives. All included journals provided instructions to authors on data depositing and citation with the incentives that support the data producer interests.

The summary of results in **Table 2** shows that even the definition of what constitutes research data, in particular for humanities, can already be problematic, owing to the changing culture from traditional to digital humanities. Each field has its specificities; linguists referring to outputs and resources of specialised data services (language text collection corpora, search expression results), social work emphasising specific aspects related to personal data, historians distinguishing between pre-existing documentary sources and newly arranged or collected data, and archaeologists avoiding to define data directly due to a variety of cases and already established practices of using supplementary materials sections.

¹⁷ Journal's data policy was presented at the Scientific Journals and Research Data Conference. Presentation is available at https://www.rd-alliance.org/system/files/documents/Mlekuz_Vrhovnik_DocumentaPraehistorica.pdf.

¹⁸ All the presentations are available through ADP's webpage (<https://www.adp.fdv.uni-lj.si/dogodki/znanstvene-revije-slovenije-raziskovalni-podatki/program/>).

¹⁹ <http://uprava.fu.uni-lj.si/index.php/CEPAR/about/submissions>.

Table 2: Comparing key aspects of the draft policies of journal cases.

Journal	Type of Data	Where to Publish	Specific emphasis
Slovenščina 2.0: empirical, applied and interdisciplinary research	By reference to the data repository criteria; Primary and secondary data distinguished	CLARIN.Si, Zenodo or other general repository	Result of search expressions dynamic data citation; DAS statement recommended in case of exceptions to data sharing
Social Work Journal [Revija Socialno delo]	Predominantly qualitative, sensitive data	ADP, other national general repositories	Double-blind peer review of data demanded; elaborated access regimes
Contributions to Contemporary History [Prispevki za novejšo zgodovino]	Primary data; digital surrogates of pre-existing resources	Priority are different disciplinary trusted data archives depending on the type of data; other repositories; journal article supplement	Existing resources in cultural heritage institutions are to be referred accordingly by original place; only digital surrogates of those are subject of data policy
Documenta Praehistorica	No definition	Continue with an established practice to attach the data in the article supplement; acceptable to use the established international disciplinary or other repositories	Explicit requirements about data citation and data sharing are not yet established

The data service, where nationally established, is recommended as an appropriate place for data publication. This is in line both with the Strategy and with the Framework principles. In some of the journal cases additional demands for data services are set, such as providing a model for citation of data by a unique reference, allowing for data protection and access regimes including specific access provision for reviewers and editors. They all allow for exceptions and additional explanations about data access, expecting many unique situations to be considered. Disciplinary data services are characterised as specialist services for particular types of data (e.g. linguistic data, historic textual data, sensitive data) and as enablers for surpassing the difficulties in sharing the specific types of data. They are referred to both as 'knowledge centres' about the data management, and specialist services for disciplinary-specific data, thus supporting the research interests and motives of data producers.

The case of Slovenščina 2.0 shows that there is an additional need to be considered in the next version of the Guidelines, regarding Data Availability Statement (DAS) recommendation. The original Research Data Policy Framework includes such a recommendation, however, it was omitted from the Pilot's *Guidelines*, considering it as a duplication of the information that ought to be contained in the data access explanations in the data repository metadata. Yet, as the example of the Journal Slovenščina 2.0 shows, the DAS statement could be a space for additional free text explanation about the data sharing situation that informs both journal editors and reviewers, and the readers of the article hereafter and could be introduced to the RDA Node Slovenia's *Guidelines* more explicitly.

4. Conclusions

The national scientific journals' pilot that was part of the RDA Node Slovenia activities proved that the research data sharing guidelines are highly demanded among the journal representatives willing to progress in following the proclaimed national open science policies and international trends. Concisely summarised in the *Framework*, the approaches of some of the world's biggest publishers help to articulate the first attempt to inform and encourage the authors to follow the established model in a specific national setting. The goal of the journals participating in the Pilot was to later check the gained experiences and gradually improve the articulation of the journal submission instructions and to raise the demand from recommendations to requirements of data sharing.

Most of the included journals in the pilot opted for soft new data-sharing rules by recommending and not obliging authors to share data. Specific reasons for the exemptions were elaborated by each journal separately, depending on the disciplinary background and data repository support services. The conclusion is that the journals policy position, by gratuity allowing for exceptions and full author flexibility about choosing the options where and how to share data, is mostly on the side of the researcher as a data producer, who is believed to be able to make an informed decision. This position is somehow inconsistent with the also

commonly recognised barrier for data sharing willingness on the side of researchers: a low data sharing culture. The expectation is that the adoption of data sharing habits needs to be gradual and that some unforeseen issues might arise regarding the selection of data that is relevant for sharing, and the implementation of the instructions in each case.

Increased support from the national science funding agency is expected in the future since it partially finances the scientific journals. The journals editing and management teams reported difficulties in sustaining the current organisational structure, let alone introduce new services. The expectations arose that the Agency will be influencing journal policies by conditioning support based on the enacted data sharing policies or even rewarding the journal's teams by covering eventual additional expenses. The main national research funder will hopefully fulfil its role foreseen in the *Action plan* and introduce Data management plan obligations for research projects to facilitate more data sharing. The RDA Pilot results show that even in a national setting of a mainly inactive funder, the journal policies can step forward and establish a data sharing policy, acknowledging the constraints that researchers as data producers are facing and referring to the values of particular research communities. The future wider uptake of the data management policies among the remaining national journals still depends on the funders more active and explicit position in support of data sharing as a default principle norm.

Even if we conclude that the journals can lead the process of data sharing policy articulation, based on the experience of the journals pilot, there is implicit and often also explicit reference in the draft policies to the funder requirements about data sharing to be soon enforced in the context of publicly funded research projects (ex. journal Social Work). Thus, the journals participating in the Pilot were considered as forerunners, demonstrating from the bottom up that the uptake of the Strategy and the Action plan can be achieved, even if perhaps considered very ambitious and hard to realise from the upper down perspective. Funders and policymakers fear to be accused from the part of the scientific community of imposing another administrative form-filling requirement. The lessons learned from the Journals pilot shows the way how gradually, and by democratic deliberations with the scientific community, progress can be made. A gradual introduction of policy requirements, alignment of motives and monitoring of compliance can lead to cultural change in data sharing (Neylon 2017).

The main conclusion of the Journals Pilot regarding future implementations of the RDA *Framework*, both nationally and in other settings, is that the RDA *Framework* can play a major role in delivering awareness about the principles and examples of how to deal with data sharing. What worked best for the Journal teams was a list of practical tools and solutions for the processing of data that can be used in a particular situation. The resulting knowledge infrastructure in this way adds to the existing journal practices, preserves time and provides for better quality and usability of data during the research project phase and beyond. Often non-professional journal's editorial teams need to familiarise with the concepts of data sharing, and the RDA Framework can serve as a respectful and reliable source that can be followed. In a relatively isolated underdeveloped national setting, an international reference is seen as a more reliable source for guiding the decision about the progress. The interdisciplinary character of the RDA Framework also helps in moving forward as in some disciplines (for example, historiography) there are rare examples of international journals with an enacted data sharing policy.

The *Journals Pilot* study was designed to demonstrate that it is possible to prepare a journal policy even in circumstances of a poorly developed data sharing culture and lack of supporting policies by national funder and decision-makers. Nevertheless, there are several limitations to our study. First, the study was mainly bound to the social science and humanities disciplines. In the national setting, this is partially related to the absence of established disciplinary research data services in other disciplines. The gap was promised to be filled with the institutional and national general data services, and some other new disciplinary oriented ones like the advent of the ELIXIR national node covering the life sciences. As the case of the latecomer Les/Wood journal shows, there are already existing solutions where to store data even if no disciplinary national data service exists. Second, the participating journals were chosen purposefully where willingness to collaborate was expected. Third, the Journal Pilot was developed by using various resources provided by the RDA (e.g. recommendations, best practices, outputs etc.), since it was developed with the RDA Node Slovenia project and thus neglected other possible valuable best practices and examples by other (international) organisations and initiatives.

As we learned from our *Journal Pilot*, organised collaboration and active support of the process of implementation in each journal case and at the national level is of immense importance. Discussions and meetings between all included parties (RDA Node Members, journals representatives and infrastructure representatives) helped to clarify the process. The organisation of activities of drafting journal policies and the development

of the *Pilot* was covered by the RDA EU 4.0 H2020 project grant. As some previous efforts of the ADP team to engage more with the national social science scientific publishers show, without a concentrated, intensive and continuous collaboration the journal's teams are lenient to move forward. Therefore such activities must continue even after the end of the RDA Node Project if we wish to promote a data sharing culture within Slovenia. Since the project was limited in time and resources, we have not yet seen the effect of the newly implemented policies in the participating journals. This leaves room for further work and research in terms of how implemented open data journal policies stimulate and promote wider national data-sharing culture.

In the end, the role of the national data services providers needs to be reflected as well. In an environment of a low data sharing culture data service providers need to promote open data challenges and solutions. They should act as forerunners and mediators between infrastructural solutions and gaps on one side and various needs of different scientific disciplines on the other side. Active collaboration of data infrastructures in the *Journals Pilot* data sharing policy design facilitates the process of implementation of the framework's principles, firstly, by providing a realistic interpretation of the principles referring to the existing data infrastructure services, and secondly, by promising the availability of services to be able to render support to such new policies (e.g. metadata creation, data access, citation, data management support etc.). This helps to provide the translation of the principles about data management closer to the understanding of the disciplinary experts at the journal's teams, representing disciplinary community interests.

Acknowledgements

This work was supported by the members of RDA Node Slovenia. Special thanks go to journals' editorial teams and supporting data services representatives who contributed the draft cases of journal policies: Špela Arhar Holdt and Vojko Gorjanc from Slovenščina 2.0 and Tomaž Erjavec from CLARIN.Si, Jure Gašparič, Andrej Pančur and Mojca Šorn from Contributions to Contemporary History and SiStory, Vera Grebenc and Martina Kerec from Journal Social Work and Dimitrij Mlekuž Vrhovnik from Documenta Praehistorica.

Funding Information

This paper was supported by the RDA Europe 4.0 project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 777388. This work was developed as part of the Research Data Alliance (RDA) Europe Node Slovenia, and we acknowledge the support provided by the RDA Europe project, community and structures.

Competing Interests

The authors have no competing interests to declare.

Authors Contribution

Janez Štebe, Maja Dolinar, Sonja Bezjak prepared the introduction and review sections, all provided case descriptions and conclusions.

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How to cite this article: Štebe, J, Dolinar, M, Bezjak, S and Inkret, A. 2020. Implementing the RDA Research Data Policy Framework in Slovenian Scientific Journals. *Data Science Journal*, 19: 49, pp.1–15. DOI: <https://doi.org/10.5334/dsj-2020-049>

Submitted: 08 July 2020

Accepted: 16 November 2020

Published: 14 December 2020

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