de Jonge, H., Kramer, B., & Sondervan, J. (2025). Tracking transformative agreements through open metadata: method and validation using Dutch Research Council NWO funded papers. *Quantitative Science Studies*. Advance Publication. https://doi.org/10.1162/qss.a.24

Tracking transformative agreements through open metadata: method and validation using Dutch Research Council NWO funded papers.

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Abstract

Transformative agreements have become an important strategy in the transition to open access, with almost 1,200 such agreements registered by 2025. Despite their prevalence, these agreements suffer from important transparency limitations, most notably article-level metadata that indicates which articles are covered by these agreements. Typically, this data is available to libraries but not openly shared, making it difficult to study the impact of these agreements. In this paper, we present a novel, open, replicable method for analyzing transformative agreements using open metadata, more specifically the Journal Checker tool developed by cOAlition S and OpenAlex. To demonstrate the potential of the approach, it is applied to a subset of publications funded by the Dutch Research Council (NWO). In addition, we validate this open method by comparing with the actual publisher data reported to the Dutch university library consortium UKB. The results show a high precision rate of 89% and a more modest recall of 53%. The 11% false positives shed an interesting light on the limitations of the method. In the absence of hard, openly available article-level data on transformative agreements, we provide researchers and institutions with a powerful tool to critically track and evaluate the impact of these agreements.

Keywords

Transformative agreements; open access; open metadata; Journal Checker Tool; OpenAlex

1. Introduction

Transformative agreements, also known as ‘read and publish’, or ‘publish and read’ deals, have been an important strategy in the transition to open access over the past

Peer Review: https://www.webofscience.com/api/gateway/wos/peer-review/10.1162/QSS.a.24

decade. The term “transformative agreement” is an umbrella term describing those agreements negotiated between institutions (libraries, national and regional consortia) and publishers in which former subscription expenditures are repurposed to support open access publishing of the negotiating institutions’ authors, thus transforming the business model underlying scholarly journal publishing” (ESAC n.d.). The number of transformative agreements concluded has increased significantly from 2015 onwards. In 2025 almost 1.200 of such agreements were included in the ESAC-registry, 340 of which were current contracts (ESAC n.d.).

Although important steps have been taken to improve the transparency of these agreements, much remains to be desired. For instance, while many of the contracts are publicly accessible, the overall pricing structure of these contracts is often unclear: specifically, the costs associated with publishing and reading (European Commission, 2024). Also, none of the existing agreements provide article-level data indicating which articles are and are not covered by the agreements. This data is only made available to the libraries and/or their consortia, provided by the publishers but often not shared publicly. This lack of data and transparency makes it hard to analyse the impact of these agreements and to inform critical reflection on their role in the transition to open access (OA).

In this article, we present a method for estimating which articles have been covered by transformative agreements by using exclusively open metadata sources. The sources used are the Journal Checker Tool as developed by cOAlition S[1] in combination with corresponding institution data from OpenAlex (Priem e.a., 2022). The openness of this data allows everyone interested to determine from a given corpus of publications whether or not they were likely covered by a transformative agreement, without having access to the actual publisher’s data. To demonstrate the potential use of the method, we apply it here to a dataset of publications funded by the Dutch Research Council NWO and its sister council for health research ZonMw.

Additionally, we have been able to validate this method by comparing the figures obtained using it with those reported by publishers to the Dutch library consortium UKB. This comparison shows that our open method leads to reasonably reliable results: 89% of the publications that we attributed to one of the transformative agreements in place in the Netherlands were correctly identified as such. The false positive rate of 11% raises interesting caveats to our approach. While we know the Journal Checker Tool has been used before to study the impact of transformative agreements (Jahn, 2025), to our knowledge, this is the first time that this approach has been validated using actual publisher data on transformative agreements.

2. Transformative agreements

[1] www.journalcheckertool.org

A transformative agreement is a contract between a publisher and an institution, often a library or consortium of libraries, that aims to transition subscription-based scholarly publishing towards open access (Borrego et al., 2021; Bakker et al., 2024; Jahn, 2025). Transformative agreements can take many different forms and are also referred to as 'offsetting', 'read-and-publish' or 'publish-and-read' deals. While offsetting, R&P and P&R deals do not necessarily have the goal to achieve a full transformation to open access, this is the intended goal of transformative agreements. Under these agreements, institutions seek to negotiate reading access to the publisher's subscription-access publications, as well as open access publishing of works by authors affiliated with the institution. Typically, only corresponding authors from the institution in question are eligible to publish open access under transformative agreements (Schimmer et al., 2015; Jahn, 2025).

The concept behind transformative agreements is "that there is enough money in the system" to fund a full transition from subscription to open access publishing (Schimmer et al., 2015). Transformative agreements were thought to provide traditional publishers the time to gradually shift their business model from subscription to open access by gradually offsetting the "read" to the "publishing" income (Prosser, 2003). A key feature of transformative agreements, is therefore their time-limited, temporary and transitional nature (ESAC, Guidelines for transformative agreements. n.d.).

Although not named as such at the time, the first transformative agreements date back to the early 2010s. In 2012, the Royal Society of Chemistry (RSC) announced its 'Gold for Gold' model. In 2014 the Austrian library consortium Kemö negotiated its first transformative agreement with IOP Publishing. Having participated in Springer Open Choice's pilot programme from 2007 to 2012 (Schmidt & Shearer, 2012), the Association of Universities in the Netherlands (UNL) negotiated its first transformative agreement with Springer in 2014. This was later followed by similar deals with Wiley, Elsevier, and other large and medium-sized publishers (Borrego et al., 2021; IOP Publishing, 2014).

The concept of transformative agreements was highly supported by the OA2020 initiative which brings together the community of national and/or regional negotiation teams from many countries (https://oa2020.org/). Transformative agreements have also benefited from the support by cOAlition S, the consortium of funders including the European Commission behind Plan S. In their guidance to the implementation of Plan S they announced that a variety of "transformative arrangements" would be considered compliant with their policies, transformative agreements between publishers and libraries or their consortia being one of them (Coalition S, n.d.). More specifically they stated that publication in hybrid journals was not supported, except as part of transformative arrangements and only for a limited time (Schiltz, 2018).

The number of transformative agreements has increased significantly over the years. By January 2025, almost 1,200 agreements had been registered in the ESAC registry, which is the most comprehensive source of information on these agreements.[2] Whereas the majority of these agreements are from consortia in Western Europe, agreements are being negotiated in other parts of the world as well. Most notably the US, Canada, Australia, Japan, Turkey and Saudi Arabia. Recently, the first transformative agreements have been negotiated in Latin America by the Colombian library consortium (Muñoz-Vélez, 2024).

Challenges and gaps

Despite the growing number of transformative agreements being negotiated, controversies persist. Some have argued that continued reliance on big deal type deals with the bigger publisher perpetuates market concentration (Earney, 2017, Butler, 2023, Shu & Larivière, 2023, Rothfritz et. al., 2024, Jahn, 2025). Others have called into question whether transformative agreements are an effective way to control costs and actually lead to reduced pricing (Borrego et al., 2023, Schmal, 2024). Furthermore, it has been suggested that transformative agreements exacerbate inequity within the global scientific community, as they are only affordable by institutions in high-income countries (Ross-Hellauer, 2022; Else, 2024). Most importantly, the transformative nature of these deals has been called into question, as a substantial transition of hybrid journals to full open access has not been observed (Matthias, 2019; Momeni, 2021; Kiley, 2024). In Sweden, there are already calls to move away from transformative agreements (Widding, 2024).[3] JISC's large-scale review of transformative agreements in the UK concluded that, while these agreements have contributed to making more UK research open access, the transition is slow. Based on the current rates it is estimated that it would take the five big publishers another 70 years to flip all of their titles to full open access (Brayman et al., 2024). Also, cOAlition S has been reevaluating its support for transformative arrangements. The failure of publishers to meet their targets for transitioning their journals to full open access has already led cOAlition S to terminate its 'transformative journal' programme. Also, the financial support for transformative agreements has been discontinued in 2024, for those funders that contribute to these deals (COAlition S, 2023). Although publishing through a Read and Publish deal will continue to be considered a Plan S compliant.

As transformative agreements have grown in number, so too has the transparency of these deals. The ESAC initiative has played a significant role in this, most notably

[2] https://esac-initiative.org/about/transformative-agreements/agreement-registry/. See Rothfritz et. al. (2024) for a comprehensive analysis of all contracts registered until August 2024.
[3] https://www.su.se/english/news/ open-access-need-to-move-away-from-transformative-agreements-1.683787

through the ESAC Transformative Agreement Registry, a voluntary register of agreements. It contains basic information about a large number of agreements, and links to a fully publicly available version of the contract are provided for many of them (although certainly not all). However, even if a fully disclosed and published version of a contract is available, the financial information often remains patchy and in some cases by no means easy to trace. While many contracts do indeed disclose the total cost, far fewer include details of the split between reading and publishing costs and how this is determined (European Commission, 2024). In addition, there are varying models in use in these agreements regarding the number of publications covered, making an estimation of per-article costs for open access publishing especially difficult.

Another major gap in the information about transformative agreements is article-level data identifying which articles are covered by the agreement. While the contracts listed in the ESAC registry often contain lists of journals, information on which articles are covered by an agreement is not publicly available. Publishers report this data to libraries and/or their consortia, but data from these reports is not shared openly.[4] This lack of data makes it hard to analyse the impact of transformative agreements and leads to a persistent critical assessment of these deals going forward.

In the absence of hard, openly available article-level data on transformative agreements, we present in this article a method for estimating the number of articles that could have been covered by transformative agreements. We do that by using publicly available metadata sources. With this method it is possible to determine with a reasonable amount of certainty which publications from a given corpus were covered by a transformative agreement and hence which publications were likely paid under a transformative agreement. We will apply our method to publications funded by the Dutch Research Council (NWO) and the Netherlands Organisation for Health Research and Development (ZonMw). We will also assess the validity of this approach by comparing it with data provided by the Dutch Library Consortium (UKB). The UKB has been responsible for negotiating transformative agreements since 2015. These contracts include an obligation for publishers to provide reports on publications made available in open access under these agreements. By comparing data from these reports with data obtained using our open method, we can assess the reliability of this approach. Although this method has been used before, notably by Jahn (2025) in his large-scale study of hybrid journals in transformative agreements, it has never before been validated using actual publisher data.

3. Method

[4] Elsevier being a notable exception as it includes article-level invoicing metadata in its XML full-text. See Jahn et al. (2022).

Central to our approach of determining whether a publication could have been covered by a transformative agreement, is the Journal Checker Tool as developed by Coalition S.[5] Aim of this tool is to provide grantees funded by cOAlition S funders with information about whether publishing in a specific journal is compliant with Plan S. To that end, authors are requested to enter a journal name, the name of their funding agency and their affiliation. The tool then calculates the available compliance route for that specific combination. Using the ESAC-registry as a source, the Journal Checker Tool collects journal-level data about transformative agreements that are in place, which journals are included in these agreements and which institutions have subscribed to these agreements. Data from the Journal Checker Tool is made available via a publicly accessible API.[6] ISSNs are used to identify journals and RoR-IDs are used to identify institutions.

Typically, publication under a transformative agreement is only open to the corresponding authors affiliated with the institution subscribing to that agreement. Therefore, in order to determine whether a publication can be covered by a transformative agreement, it is necessary to identify the corresponding author. However, identifying corresponding authorship is associated with several challenges (Chinchilla-Rodríguez, 2024). Previous studies have therefore used the first author as a proxy to determine eligibility for transformative agreements (Haucap, 2021; Shu & Larivière, 2024; Zhang, 2022; Jahn, 2025). Recently, however, OpenAlex has enriched its open bibliographic database with the field "corresponding_institution_ids". It provides a list of institutions (identified by OpenAlex ID) for those authors that are listed as corresponding authors in the metatext of a work. According to the documentation, this feature is still under development.[7] Currently 44% of the journal articles with publication year 2023 in OpenAlex have corresponding_institution data.

Combining the various metadata elements for a given DOI makes it possible to determine whether a publication could have been covered by a transformative agreement. Figure 1 shows the workflow needed to enrich the metadata of a given DOI record and establish whether it could (should) be covered by a TA.

[5] www.journalcheckertool.org
[6] Documentation on the API can be found here: https://journalcheckertool.org/apidocs/
[7] https://docs.openalex.org/api-entities/works/work-object/authorship-object#is_corresponding

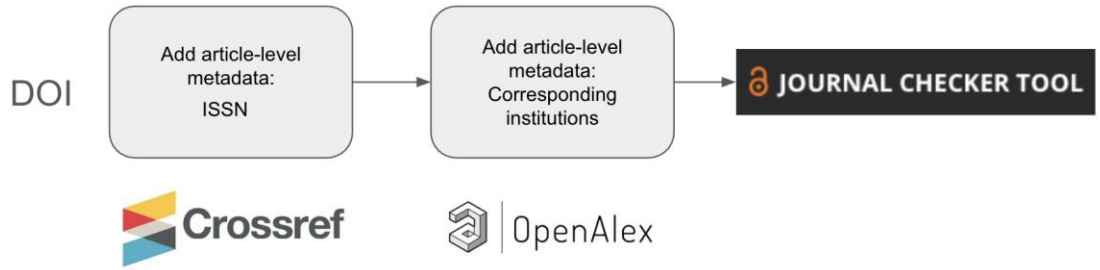

Figure 1: Workflow used to enrich a given DOI record.

The following important limitations of this approach must be listed. The Journal Checker Tool only provides journal-level information for the *current* transformative agreements, not for contracts that have expired. This is understandable for the specific purpose of the tool: authors seeking guidance on the compliance of the journal of their choice should be informed about the current valid or invalid options. Information on expired agreements is deleted, meaning retrospective studies such as this one will inevitably produce false positives and false negatives. Additionally, the information on participating institutions is not fully harmonised, and ROR IDs are not included for all institutions.

With regards to the use of institutional affiliation data from OpenAlex it has to be acknowledged that information on corresponding authors is relatively new, and might not yet be stable regarding coverage and quality (Zhang et al., 2024).

4. Use Case

Transformative agreements have been a central element of the open access strategy in the Netherlands (Bosman et al., 2021). These are negotiated by the consortium of Dutch university libraries and the Royal Library (UKB), in collaboration with the Association of Universities in the Netherlands (UNL). Some, however, are negotiated by individual institutions in the Netherlands. The first agreements date back to 2014. They have been regularly updated and renegotiated over the years. Currently, 22 agreements are in place, primarily serving researchers at Dutch universities.[8] Researchers employed by the 20 independent research institutes under the umbrella of NWO and the Royal Academy KNAW are usually excluded from these deals.

NWO is a founding member of cOAlition S and aligned its open access policies with Plan S in 2020 (NWO, 2020). Unlike some other European funders, the Dutch

[8] An overview of publisher deals can be found on www.openaccess.nl. Last accessed on January 28 2025.

Research Council does not contribute financially to transformative agreements. However, in line with the principles of Plan S, publications covered by transformative agreements are considered compliant with the open access policies of NWO and its sister council, ZonMw. Article-level data on which publications are covered by transformative agreements are not publicly available. This data is provided to the UKB consortium by the publishers, but it is not made available to the funders. This makes it challenging to assess whether publications comply with the funders' open access requirements. For the time being, therefore, all publications in hybrid journals under the correct CC BY licence (CC BY and CC BY-ND) are considered to be compliant.

From a policy perspective, it remains interesting to understand the impact of the transformative agreements negotiated in the Netherlands on the open access status of research funded by NWO and ZonMw. Do the agreements adequately cover research funded by NWO and ZonMw, or are there still gaps in their portfolio? What proportion of publications funded by both funders are covered by the transformative agreements? The above method was developed to answer these questions, at least in part.

In what follows, we will show how this method can answer the following research question:

- What is the share of publications published in 2023 and funded by the Dutch Research Council NWO and ZonMw that were (likely) covered by one of the transformative agreements in place in the Netherlands?

The first step in answering this question is to identify the corpus of publications resulting from NWO/ZonMw funding. For this use case, we collected and deduplicated publication data from three sources: Crossref (Hendricks, 2020), and the grant management systems of NWO (ISAAC) and ZonMw (MyZonMw).[9]

- data from Crossref were selected using the Crossref funder ID for both NWO (10.13039/501100003246) and ZonMw(10.13039/501100001826) and the funder IDs nested under this hierarchy. Additionally, we queried Crossref using NWO's and ZonMw's acronyms. Many more name variants are circulating but these cannot be easily queried using the Crossref API.
- To this corpus we added publications registered by grantees funded by NWO and ZonMw in their grant management systems ISAAC and MyZonMw. We only included publications with a DOI and publications with a publication date in 2023, based on Crossref.

[9] https://www.nwo.nl/en/grant-application-system-isaac

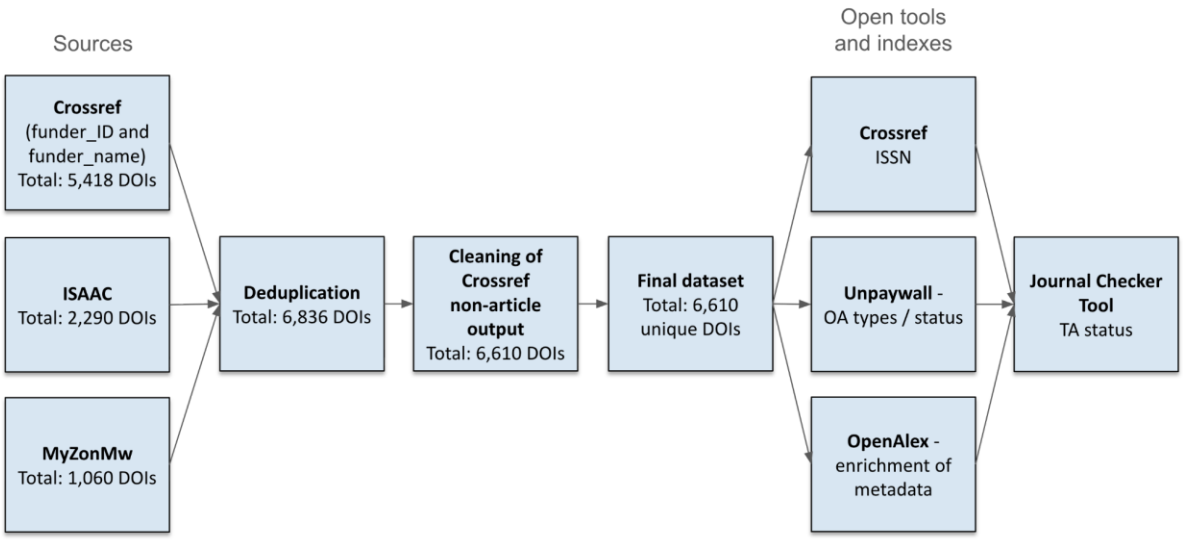

Figure 2: Methodology of deduplication of (open) metadata sources and open indexes used for analyses.

After deduplication and exclusion of non-article material we ended up with a dataset of 6,610 articles. Using a script written in Google Apps Script this dataset was further enriched with metadata from Crossref, Unpaywall and OpenAlex:

- Basic metadata of all records, including ISSN and publisher information from Crossref.
- Information about the open access status for all records was retrieved using Unpaywall.[10]
- OpenAlex was used to add the number of corresponding institutions, their names and ROR-id's for all records.

Finally, a Google Apps Script (De Jonge, Kramer & Sondervan, 2025) was used to parse all records through the Journal Checker Tool using the ISSN and ROR-ID variables to determine whether the publication was covered by a transformative agreement.

5. Results

A total number of 6,610 articles were identified as being published in 2023 as the result of NWO/ZonMw funding. Using the information from the Journal Checker Tool 2,304 of these publications (or 34% of publications from our dataset) could potentially have been covered by one of the existing transformative agreements.

Validation

[10] www.unpaywall.org

Using the above method, we were able to estimate the number of publications covered by transformative agreements with a reasonable degree of certainty. Because it makes use of metadata from open APIs, this method is available to anyone interested in studying the impact of transformative agreements on a given corpus of publications. In what follows, we will demonstrate that this method is indeed reasonably reliable. We will do this by comparing the figures obtained via our 'open method' with the actual publisher data for these publications, as provided to the Dutch library consortium UKB. This comparison shows that 89% of publications that we attributed to one of the transformative agreements in place in the Netherlands were correctly identified. While the underlying data of the Journal Checker Tool has previously been used to study the impact of transformative agreements (Jahn, 2025), this is the first time that this approach has been validated using actual publisher data on transformative agreements.

UKB is the Dutch Library consortium consisting of the thirteen Dutch university libraries and the National Library of the Netherlands (KB). Since the 1990s, it has been responsible for negotiating collective licence agreements for Dutch universities. From 2015 onwards, many of these agreements have included elements relating to open access publishing. By 2023, a total of 20 transformative agreements were in place. To support these negotiations the UKBsis datahub was developed, containing data from more than 400,000 journal articles from Dutch institutions published since 2018 (Schalken, 2022). UKBsis combines data from a variety of sources, including Scopus, Crossref, OpenAlex, OpenAIRE, Unpaywall, DOAJ, OpenAPC and OASwitchboard.[11] Most importantly, it also collects article-level metadata on articles published as part of transformative agreements negotiated by the consortium. This data is provided by the publishers according to the specific requirements set out in their contracts with the consortium. Comparing the data presented in the previous section with the actual publisher data allows us to evaluate the reliability of this method. Figure 3 shows the results of this exercise.

[11] https://ukb.nl/en/programmes/ukbsis/

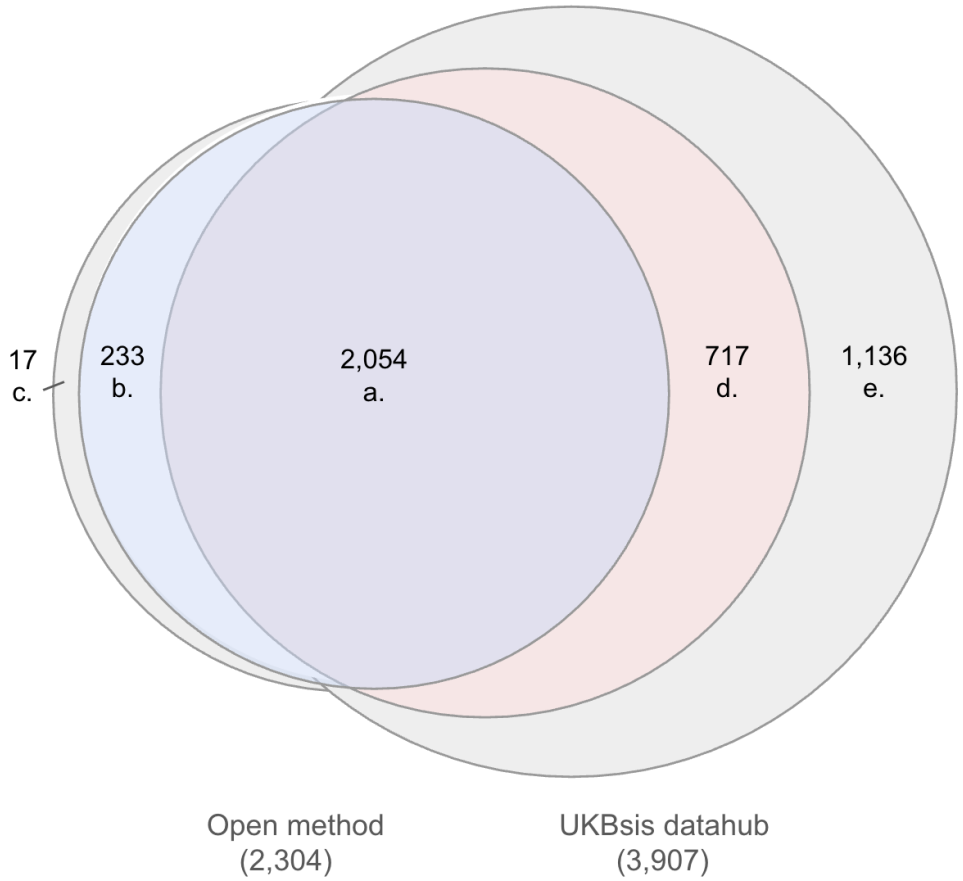

Figure 3. Venn diagram showing the overlap (a.) between publications found to be covered by a transformative agreement using our open method (n=2,304) and actual figures as provided by publishers obtained from the UKBsis datahub (n=3,907). Explanation of categories: a. overlap, b. publications wrongly ascribed to a TA using our open method but available in UKBsis, c. wrongly ascribed to a TA and not available in UKBsis, d. publications that in reality were part of a TA but missed by our method because of lacking affiliation data, e. publications that were part of a TA but were missed because funding information connecting these papers to NWO/ZonMw was lacking.

Precision

Based on the data presented here, we can conclude that the **precision** of our method was 89% - 2,054 out of the 2,304 articles that we identified as being part of a transformative agreement were indeed part of such an agreement according to UKBsis data. For the remaining 250 articles, the attribution could not be validated using UKBsis data: according to the publisher data provided to the consortium, these publications were actually not published under an agreement. Of these publications, 233 (category b) could be retrieved from the UKBsis datahub, enabling a closer examination of these publications.The most important reasons why these publications were not published under a transformative agreement were as follows:

- A publication had multiple corresponding authors, not all of whom were eligible for publication under the agreement, or corresponding authors had multiple affiliations, but used one that made the publication ineligible for the

agreement. It should be noted that in most of these cases the open metadata provided by OpenAlex correctly matches the affiliations in the paper, however, the UKBsis datahub appears to have had more detailed information regarding eligibility.

- A transformative agreement was in place, but the authors apparantly chose not to use it, perhaps because they were not (made) aware of the possibility. Articles in this category were published closed or via the green or bronze open access route.
- A transformative agreement was in place, but it was capped, meaning that authors could no longer use it at the time of publication.
- A transformative agreement was in place at the time of analysis (2024), but not at the time of publication (2023).
- The article type (e.g. letters to the editor) is not eligible under the deal.
- A transformative agreement was in place, but was negotiated at the institutional level rather than the consortium level. Publisher data on these agreements are not included in the UKBsis datahub and are therefore not recognised as covered by any of the national deals.

It should be noted that a subset of publications (n=176) that we identified as having NWO- or ZonMW funding and a publication year of 2023 either lacked funding information in UKBasis or had a different publication year in UKBasis. We included these publications in categories a or b in the figure above, depending on whether they were listed as being part of a transformative agreement in UKBasis.

A very small set of publications (category c, n=17) were wrongly ascribed to a transformative agreement and could not be retrieved from the UKBsis datahub at all. Manual checks revealed that any of the reasons given above could explain why none of these were published under a transformative agreement.

Recall

While our method showed relatively high precision (89%), the recall of our method was more modest. UKBasis identified a total of 3,907 publications in 2023 for which funding from either NWO and/or ZonMw was acknowledged, and which were published as part of a transformative agreement. Of these, our method correctly identified 2,504, resulting in a recall of 53%.

Therefore, 1,853 publications were ‘missed’ (category d. and e.) using our open method. Two main reasons can be mentioned for this:

- 717 publications (category d.) were part of a transformative agreement, but were not picked up by our open method because the corresponding author was not recognised by OpenAlex as being affiliated with a Dutch institution.

- 1,136 publications (category e.) were published as part of a transformative agreement, but were not included in our original dataset as they were not identified as being funded by NWO or ZonMw. This can be explained by the fact that the UKBsis data hub has richer funding metadata, not only from Crossref but also from Scopus and OpenAIRE.

In summary, 89% of the publications that we attributed to one of the transformative agreements in place in the Netherlands were correctly identified, demonstrating the validity of this approach. For a significant proportion of false positives, a transformative agreement was in place but not used for various reasons. With a modest recall of 53%, a relatively large proportion of publications identified by UKBsis were missed by our open method, primarily due to unrecognized author affiliations in OpenAlex and gaps in the availability of funding metadata in Crossref on which two of the authors have reported before (Kramer & De Jonge, 2020).

6. Concluding remarks

Transformative agreements play an important role in the transition to open access in many countries. Although research has demonstrated the impact of transformative agreements on the increase in open access publications in certain countries (Pinhasi, 2020; Jahn, 2022; Jahn, 2025), these agreements are not without controversy. In recent years, significant progress has been made in increasing the transparency of these agreements. Many of them are now open and publicly available on the ESAC register. However, what is seriously lacking is openly available article-level metadata identifying the articles covered by these agreements. Without this data, it is very difficult to determine which publications are covered by these agreements and which are not. This renders all kinds of follow-up research impossible, including research into the uptake and impact of transformative agreements in specific countries and the costs associated with transformative contracts (Jahn, 2025).

Data on publications published under transformative agreements is, of course, made available to libraries and/or their consortia, but is usually not openly shared. As we can learn from the study by Marques et al. (2019), there is also great diversity in the type of metadata requested by libraries from publishers, and reported by them.

This article presents a method for addressing the lack of metadata. We present a method for determining whether a given corpus of publications is covered, or likely to be covered, by a transformative agreement. To demonstrate its potential, we used this approach to analyse the proportion of publications resulting from NWO and ZonMw funding that were published under a transformative agreement. By comparing the results of this analysis with actual publisher data reported to the Dutch library consortium UKB, we confirmed that this open method is reasonably

reliable. Of the publications attributed to one of the transformative agreements available to researchers in the Netherlands, 89% were identified correctly.

The 11% false positives shed an interesting light on the limitations of this method. Most important reasons for misclassifying publications were:

- Publications had multiple corresponding authors not all of which were eligible, or authors used affiliations that made them ineligible for the agreement
- Authors had access to transformative agreements but did not use them.
- Publications took place after the publication limit of the agreement was reached
- The agreement existed in 2024 (time of the analysis) but not in 2023 (publication time)
- Ineligibility of publication types

Our method uses public APIs to collect the necessary information. The advantage of this method is that it can easily be replicated in other situations and contexts. For example, institutions or funders could use it to analyse how many of their organisation's papers have been published openly as a result of transformative agreements. In general, this would require two things: firstly, a reasonably complete corpus of publications from open data sources and/or institutional registration systems. Secondly, our method relies on transformative agreement data provided by the Journal Checker Tool, which draws from the ESAC registry. Therefore, institutions or countries wishing to use this method must ensure that their transformative agreement contracts are registered with ESAC.

If these conditions are met, the method presented in this paper can determine with a reasonable degree of certainty whether a publication was covered by a transformative agreement.

Of course, in line with open science principles and initiatives like the Barcelona Declaration (Barcelona Declaration, 2024), it would be better if article-level metadata about publications covered by transformative agreements were openly shared by the publishers and/or libraries that negotiated these transformative agreements. The Dutch library consortium UKB could set an example by opening up the data available in the UKB database.

In addition to national solutions however, we think it would be important to have these data collected on an international level to allow for aggregation and comparison. Given its central role as the most comprehensive source of information on transformative agreements, we believe that the ESAC infrastructure would be the most appropriate place to deposit this data. Libraries or their consortia would probably be the most obvious organisations to take responsibility for this. Alternatively, publishers could be requested to deposit this information as part of the

article metadata with Crossref, which would require an extension to their metadata schema, as it currently does not support the registration of this information. The requirement to deposit these data could form part of publishers' negotiations with library consortia. From ESAC or Crossref this metadata could then feed into discovery services like OpenAlex, Unpaywal or OpenAire, which would greatly improve the visibility and usability of this data.

In the absence of openly available article-level metadata on transformative agreements openly available, the method presented in this paper provides a reasonably reliable approach to track transformative agreements and critically evaluate their contribution to the transition to open access.

Acknowledgements

The authors wish to thank the Dutch Library Consortium UKB for their permission to use and share data from the UKBsis datahub and Arjan Schalken (Free University Amsterdam, program manager UKBsis) and Maaike Koperdraad (Utrecht University Library, data steward UKBsis) for help with the analysis.

Author contributions

CRediT: HDJ: Conceptualization, Data curation, Formal Analysis, Methodology, Software, Visualization, Writing – original draft; BK: Data curation, Formal Analysis, Methodology, Software, Visualization, Writing – review & editing; JS: Data curation, Methodology, Writing – review & editing.

Competing interests

The authors declare no competing interest. The authors write in a personal capacity and views they share in this article do not necessarily express the opinion of their employers.

Funding information

The authors did not receive any funding for the research reported in this paper.

Data availability

The data and code used in this study are available at https://doi.org/10.5281/zenodo.15000633 (De Jonge, Kramer & Sondervan, 2025):

- Data set of unique DOIs (*n* = 6,610) enriched with data from Crossref, Unpaywall, OpenAlex and the Journal Checker Tool.

- Google Apps Script for retrieving information from the Journal Checker Tool API.
- Data set of DOIs (n= 10,126) retrieved from the UKBsis datahub and used to establish the overlap with the original dataset.

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