

Exploring Possibilities for Transforming Established Subscription-based Scientific Journals into Open Access Journals

Present Situation, Transformation Criteria, and Exemplary Implementation within Trans-O-MIM

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Keywords

Scientific journals, open access, subscription, journal transformation, journal conversion, journal flipping, journal transition

Summary

Background: Based on today's information and communication technologies the open access paradigm has become an important approach for adequately communicating new scientific knowledge.

Objectives: Summarizing the present situation for journal transformation. Presenting criteria for adequate transformation as well

as a specific approach for it. Describing our exemplary implementation of such a journal transformation.

Methods: Studying the respective literature as well as discussing this topic in various discussion groups and meetings (primarily of editors and publishers, but also of authors and readers), with long term experience as editors and/or publishers of scientific publications as prerequisite.

Results: There is a clear will, particularly of political and funding organizations, towards open access publishing. In spite of this, there is still a large amount of scientific knowledge,

being communicated through subscription-based journals. For successfully transforming such journals into open access, sixteen criteria for a goal-oriented, stepwise, sustainable, and fair transformation are suggested. The Tandem Model as transformation approach is introduced. Our exemplary implementation is done in the Trans-O-MIM project. It is exploring strategies, models and evaluation metrics for journal transformation. As instance the journal *Methods of Information in Medicine* will apply the Tandem Model from 2017 onwards.

Conclusions: Within Trans-O-MIM we will reach at least nine of the sixteen criteria for adequate transformation. It was positive to implement Trans-O-MIM as international research project. After first steps for transforming *Methods* have successfully been made, challenges will remain, among others, in identifying appropriate incentives for open access publishing in order to support its transformation.

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1. Introduction

Based on today's information and communication technologies the open access (OA) paradigm has become an important approach for adequately communicating new scientific knowledge (e.g. [1–4]).

However, there is still a large number of well-established journals with high scientific reputation, which are subscription-based. Successfully transforming such publication organs is of relevance for timely and widely communicating new scientific knowledge, which is original and relevant.

Defining suitable requirements and elaborating appropriate strategies as well as models with associated evaluation metrics to assess transformation success could play an important role, in particular in the context of exemplary transforming publication organs such as scientific journals.

2. Objectives

In this report we want to

- summarize the present situation for transforming established subscription-based scientific journals into open-access-based journals (in section 4),
- present criteria for adequate transformation as well as a specific approach for it (in section 5), and
- describe our exemplary implementation of such a journal transformation (in section 6).

For summarizing the present situation on open access transformation in section 4, we need to make some introductory statements on open access and on its current state. As excellent reports on open access have already been published, we will primarily refer to the respective references. The section is, however, still needed, as the following sections are partially based on section 4.

Our specific implementation will be done in the context of the Trans-O-MIM project. The full title of this research project is 'strategies, models and evaluation metrics for the goal-oriented, stepwise, sustainable and fair transformation of established subscription-based scientific journals into open-access-based journals with *Methods of Information in Medicine* as example'. Details on Trans-O-MIM and some information on the journal *Methods of Information in Medicine* (or *Methods* for short) will be given in section 6. The two names, however, have to be mentioned already here.

Synonym terms for journal transformation, found in the literature, are journal conversion, journal flipping, and journal transition.

3. Methods

Our results, presented in sections 4, 5, and 6 are based on

- intensively studying the respective literature on open access and open access transformation as well as
- extensively discussing this topic in various discussion groups and meetings (primarily of editors and publishers, but also of authors and readers).

In addition, the

- long term experience of authors of this manuscript as editors and/or publishers of scientific publications

has been an essential prerequisite for doing this research and for being able to present these results.

With respect to (b) we want to mention the round table discussion of Deutsche Forschungsgemeinschaft (DFG, [5]) on transforming renowned e-journals in open access in May 5, 2013 in Bonn, Germany, discussions between editors and publishers of *Methods* on this topic since 2012, discussions in the Core Editorial Team of *Methods* (Editor-in-Chief, Associate Editors, Senior Consulting Editor) since 2013, and discussions with key persons (presidents, officers responsible for publications, journal editors, ...) of the International Medical Informatics Organization (IMIA, [6]), of the European Federation for Medical Informatics (EFMI, [7]), and of the German Association for Medical Informatics, Biometry and Epidemiology (GMDS, [8]), also since 2013. Within IMIA this topic has in addition been treated and discussed during its Board and General Assembly meetings in 2015 and 2016, and within GMDS in its Council and General Assembly meetings in 2015. Since 2015 the topic has also been integral part of the annual Editorial Board meetings of *Methods*.

4. Present Situation for Transforming Journals into Open Access

Scientific progress is closely related with adequately communicating new knowledge. Adequately means, among others, that this knowledge is original and relevant (e.g. [9], p. 260), that it has been gained according to rules for good scientific practice (e.g. [10]), and that it is available timely and widely (e.g. [11]).

The properties of being relevant, original and of good scientific practise are usually verified through scientific publication organs. After having successfully passed a reviewing process, new knowledge

will be published in and disseminated through these organs.

Reputation of such publication organs is often related to the fact that such organs are included in renowned publication collections. For biomedicine and the health sciences this usually means that publication organs are preferably internationally recognized journals. They should be referenced in MEDLINE/PubMed [12] and gain an Impact Factor, preferably already for many years. For readers and authors a journal's reputation is often also related to being published for a long time by a recognized publishing house and being edited by internationally renowned scientists.

Even during the second half of the last century new scientific knowledge has mostly been communicated through manuscripts in paper-based journals, having been subscribed e.g. by individuals, research institutes and/or university libraries. Since then through progress in information and communication technology and information processing methodology – with the Internet as an important and highly visible outcome – the possibilities for communicating scientific knowledge have continuously changed, offering nowadays substantially new opportunities for disseminating research results.

With this change the open access paradigm has become an important approach for adequately communicating new scientific knowledge. The recommendations in the Berlin Declaration to support “the transition to the electronic open access paradigm”, published in 2003, is exemplary for this development in order to access new knowledge timely and widely [11]. In particular from political institutions and funding organizations there is meanwhile a broad consensus on recommending to publish new scientific knowledge in open access (e.g. [13, 14] for Germany, [15–19] for Europe, and [20] for the world).

Scientists themselves had different views. Besides positive opinions to gold or green open access publishing (e.g. [4], [21–22]), there were also reluctant views (e.g. [23–26] as comments to [4, 27], reply in [21]). In addition there were critical views (e.g. [28, 29]), mainly because, with the possibility of open access publishing, new publishing organizations and new pub-

lishing organs were launched, which on the one hand offered scientists the opportunity of fast publishing of their results, but which on the other hand raised doubts concerning their seriousness, with terms like predatory open access being coined [30]. Double dipping, i.e. paying article publication charges (APCs) for manuscripts, being published in subscription-based journals (so-called hybrid open access), was another critical aspect. This was in particular the case, when large international publishing houses forced universities to pay steadily increasing subscription fees, by having, at the same time, restrictive copyright regulations for scientists, having published their research in journals of such publication houses. Nevertheless, as it has been argued before, there is both a certain consensus as well as a certain evidence on the following: Open access publishing can be of great advantage for researchers as authors or readers (and not only for them) for adequately communicating new scientific knowledge and so for scientific progress.

Successfully transforming “a majority of today’s scholarly journals from subscription to OA publishing” [18] is therefore of relevance for helping to improve timely communicating new scientific knowledge. Such journal transformation into open access is now taking place [31–35]. However, although political and funding organizations supported or even forced this transformation, it turned out to be more difficult and took place slower than expected ([32]).

To summarize: Meanwhile there is a clear conviction, particularly of political and funding organizations, that open access is nowadays an (if not the) appropriate approach for timely and widely communication scientific knowledge. In spite of this, there is still a large amount of knowledge, being communicated through other publication organs, in particular through subscription-based scientific journals. Reasons for this are, as outlined before, among others, the negative sides of some open access activities and difficulties in successfully transforming subscription-based journals into open access journals. Defining suitable requirements for successfully transforming well-established subscription-based journals with high scientific reputation and elaborating appropriate strategies as well as models with associated

evaluation metrics to better understand and assess transformation success, in particular in the context of exemplary transforming journals, could be of relevance.

5. Criteria for Adequate Journal Transformation with the Tandem Model as Approach

5.1 Introduction

In this section we will present criteria, which we are regarding as being adequate for transforming subscription-based journals into open access journals as well as a model for transformation. The criteria can be applied for publication organs in general, too, i.e. is not only to journals. To be clear and straightforward: Although, as mentioned, we intensively studied the respective literature and extensively discussed this topic, the suggested criteria remain to some extent subjective. We nevertheless are convinced that they are worth to be presented here, if only because of discussing them.

We will focus our reflections on transforming subscription-based journals into gold open access journals. This also means that we are not considering green open access here, although this could also be an option for timely and widely communicating new scientific knowledge. We are aware that there might be regional differences in preferring either the gold or the green open access approach. It seems that e.g. within Europe gold open access is preferred (most of the recommendations of political institutions and funding organizations, quoted here, are from European institutions) whereas e.g. in North America the green open access is mostly used.

5.2 Suggestions for Criteria for Adequate Journal Transformation

Transforming subscription-based journals into open access journals should in our opinion consider the following criteria: to be (g) goal-oriented, (st) stepwise, (su) sustainable, and (f) fair.

Goal-oriented transformation means that (g.1) all journal articles should finally be published in open access and so timely and widely available. Availability should include both, to be ‘actively available’ for readers, as well as to be ‘passively available’ for theme-based or problem-based automated search procedures. Having both options will help potential readers to have better chances for accessing new knowledge, relevant for their own research.

(g.2) there is a potential to reach out for new forms of adequately communicating scientific knowledge. This means that transformation should be not just a financial one. Purely shifting publication costs from subscribers to authors is not regarded as sufficient. Attempting new approaches in communicating and debating new scientific knowledge, based on advanced information and communication technology and information processing methodology, may lead to added value.

(g.3) there should be no risk (at least no significant risk) for a journal to undermine or even loose its scientific reputation through such a transformation. This implies, e.g., that for journals in biomedicine and in the health sciences a journal’s existing MEDLINE/PubMed referencing and Impact Factor listing should not be put at risk.

(g.4) strategies for journal transformation should enable an improved competitiveness in publishing new scientific knowledge.

Stepwise transformation means that

(st.1) an appropriate transformation strategy should serve as important base for deciding whether and when a transformation should be started.

(st.2) by transforming journals stepwise and by making use of evaluation metrics (as controlling tools) the risk of losing quality of publications as well as its financial base of publication organs should be kept as low as possible.

(st.3) in case of a positive prognosis a journal transformation should be able to converge fully to open access. A stepwise transformation should therefore in case of positive evaluation indicators clearly converge and lead to a complete

abolition of a journal's subscription based part.

(st.4) in case of a critical prognosis slowing down, pausing, or even backtracking of transformation must be possible.

Sustainable transformation means that

(su.1) existing quality standards for reviewing and publishing should remain or even be improved. This means in particular that transformation strategies, where finally authors will finance a journal, should preserve (and should not have to decrease) its existing criteria for originality, relevance and good scientific practise.

(su.2) there should be no or at least limited financial risks for journals. This should hold for both phases, the transition phase as well as the final phase where a journal is fully in open access.

(su.3) established criteria for a journal's reputation should not have to be modified and may even be further extended. This includes that there should be no

risk for a reduced reputation for publication organs, for editors or for publishers by transforming journals into open access.

(su.4) long-term availability of publications has to be considered. This includes active and passive availability (cf. g.1) and long-term archiving.

Fair transformation means that

(f.1) after positive reviewing there is a broad availability and usability of publications for authors and readers. This includes appropriate copyright regulations being suitable for the needs of authors and readers.

(f.2) strategies should point out ways how, in spite of author-based financing, good publications can be published from all authors, not only from those having the respective finances.

(f.3) strategies should also consider fair financing. This, e.g., means that there is no double dipping for accepted journals articles.

(f.4) multiple world-wide usability and automated analyzability should be enabled and supported, which should also ensure copyright issues (i.e. correct quoting of authors).

5.3 The Tandem Model as an Approach for Journal Transformation

As base for transforming subscription-based scientific journals into open access journals we suggest to consider an approach, which will be introduced here and which we have denoted as Tandem Model.

When using the Tandem Model, a subscription-based publication organ adds to its existing subscription-based track an additional new open access track. Publications in the open access track strictly follow the gold open access way. The other, traditional track remains, as long as it continues to exist, strictly subscription-based.

When a journal follows the Tandem Model, authors will have to decide in which track their article will appear in case of acceptance. Reviewers should not know, into which track the manuscript is intended to be published. This excludes the risk of different review qualities and should prevent the risk of losing reputation of the publication organ. Subscribers' services will remain, at least in the beginning. In case of a reduced amount of publications in the subscription-based track, maybe because of an increasing amount of manuscripts will appear in the newly established open access track, a publisher will probably have to reduce subscription fees. This can be realized in a stepwise manner, depending on the amounts of manuscripts in the two tracks. With this approach, subscribers should have no disadvantages.

With the Tandem Model an immediate change from subscription to open access with all its risks in maintaining reputation and financing is avoided. As it remains one publication organ, MEDLINE/PubMed referencing and Impact Factor listing remains as it has been. By having one reviewing process and by not letting the reviewers know, in which track a manuscript might appear, the quality of reviewing should remain identical. By strictly separating the two tracks, double dipping can (and consequently should) be excluded.

Table 1 Criteria for adequate transformation of subscription-based scientific journals into open access journals.

g	goal-oriented
g.1	all journal articles should finally be published in open access
g.2	potential to reach out for new forms of adequate communication
g.3	no risk for a journal to lose its scientific reputation
g.4	strategies should enable an improved competitiveness in publishing
st	stepwise
st.1	a transformation strategy should serve as base for decision making
st.2	by using evaluation metrics the transformation risk should be kept low
st.3	in case of positive prognosis, transformation should converge to open access
st.4	in case of critical prognosis slowing down or backtracking must be possible
su	sustainable
su.1	existing quality standards for reviewing and publishing should be preserved
su.2	no or at least limited financial risks
su.3	established criteria for a journal's reputation should not have to be modified
su.4	long-term availability of publications has to be considered
f	fair
f.1	broad availability and usability of publications for authors and readers
f.2	good publications can be published from all authors
f.3	fair financing (e.g. no double dipping)
f.4	multiple world-wide usability, automatic analyzability

The intention of applying the Tandem Model should be, of course, that in the end the subscription-based track will disappear. However, in case of difficulties during transformation, an option to slow down transformation, to pause it or even to back-track remains. For assessing transformation progress appropriate evaluation metrics for transformation processes will be helpful.

5.4 Conclusion for Transforming Journals

A summary of the suggested criteria for adequate journal transformation can be found in ► Table 1.

As far as we can see, in our opinion the suggested criteria as well as the proposed Tandem Model are building a good base for transforming subscription-based journals into open access journals. In addition, elaborating appropriate strategies as well as models with associated evaluation metrics to assess transformation success could play an important role for adequately communicating new scientific knowledge, which is original and relevant.

Only when publication organs, e.g. scientific journals, will at least exemplarily be transformed with the Tandem Model as approach and by using such evaluation metrics, we will see whether such an approach is successful and whether requirements such as goal-oriented, stepwise, sustainable and fair can be achieved and are helpful with respect to timely and widely communicate new scientific knowledge. And it might be helpful, if at least some of these concrete transformations will be scientifically supervised, assessed and presented.

6. The Trans-O-MIM Research Project: Introduction and First Results

6.1 Introduction to Trans-O-MIM

This is why we started the so-called Trans-O-MIM project on ‘strategies, models and evaluation metrics for the goal-oriented, stepwise, sustainable and fair transformation of established subscription-based scientific journals into open-access-based

journals with *Methods of Information in Medicine* as example’ [36, 37], supported by DFG, IMIA, EFMI and GMDS.

Trans-O-MIM aims at developing and exploring strategies, models and evaluation metrics (as ‘controlling tools’) for the goal-oriented, stepwise, sustainable and fair transformation of established subscription-based scientific journals into open-access-based journals. As example for such a transformation the journal *Methods of Information in Medicine* will be used.

In being nationally and internationally visible, this project may help to elaborate new and important fundamentals, being used for other publication organs by publishers and by scientific organizations in making appropriate decisions for successfully transforming subscription-based scientific journals (or other publication organs) into open access. It also aims to point out, how small and mediate publishers (independent of their organization as company, self-publishing entity or scientific society) can better compete with, in particular, large international publishers in using today’s information and communication technologies for innovative, flexible publication services, oriented at the needs of authors and readers.

Work packages (WPs) of Trans-O-MIM are

- WP1 initial preparation of the stepwise transformation of *Methods of Information in Medicine* with the Tandem Model as approach;
- WP2 studies for online-surveys concerning motivation for or objections against open access publishing;
- WP3 elaborating a generic transformation model with evaluation metrics and its implementation as publicly available software product;
- WP4 incentives and new concepts for adequately communicating new scientific knowledge;
- WP5 use of existing expertise in the existing boards and teams of *Methods* and of its supporting medical informatics associations;
- WP6 organizing workshops;
- WP7 reporting of results and dissemination, Internet presentation.

After the project start we added two further work packages: WP8 on copyright and rights of use, and WP9 on new approaches for knowledge presentation and communication.

6.2 On *Methods of Information in Medicine*

Founded in 1962 *Methods* is the “longest running journal devoted to information in biomedicine and health care” [38]. The “journal stressing, for more than 50 years, the methodology and scientific fundamentals of organizing, representing and analyzing data, information and knowledge in biomedicine and health-care” [39] is official journal of EFMI and IMIA and official international journal of GMDS [38, 40]. From 1962 to 2016 *Methods* has been subscription-based with currently publishing six issues per year. Further information on *Methods* can be found in [41].

6.3 Implementing the Tandem Model

From 2017 on *Methods of Information in Medicine* will add an open access track, called *Methods Open*, to its subscription-based track. In implementing the Tandem Model and in trying to follow the criteria for adequate journal transformation, presented in section 5, authors can from 2017 onwards decide whether their manuscript will be published in the journal’s “subscription track that continues to publish its six print and electronic (non-open access) issues for journal subscribers, or the new *Methods Open* track that will consist of digitally published manuscripts (as gold open access)” [42]. *Methods* will in addition “introduce a double-blinded review process and reviewer assessment by the submitting authors” [42]. Further details can be found in [42], the editorial, announcing this step.

As *Methods* clearly remains one journal with consistent procedures we do not expect any risk of losing reputation. Also, there are no disadvantages for the journal’s subscribers. Furthermore, by having two tracks from 2017 on, double dipping can and will be avoided.

6.4 First Results

After preparatory meetings, mentioned in section 3, and after the positive funding decision of DFG in 2015, the Trans-O-MIM research project started.

The criteria for adequate journal transformation and the Tandem Model as approach might be considered as first results of Trans-O-MIM. As they have been part of the project proposal, they were, however, presented before in section 5.

In 2016 the Trans-O-MIM Core Team at Peter L. Reichertz Institute for Medical Informatics (PLRI) could be completed (the authors of this manuscript with affiliation PLRI). Also, a Trans-O-MIM Steering Committee could be established, consisting of this Core Team and of specialists from Schattauer Publishers (the PLRI authors plus the authors of this manuscript with affiliation Schattauer). All major decisions on transforming *Methods*, made until now, have been prepared and discussed by this Steering Committee jointly with Olaf Gefeller (an Associate Editor of *Methods*, who was already involved in Trans-O-MIM since its planning phase) and with the journal's Editor-in-Chief.

Additional advice has been sought by institutions of TU Braunschweig (University Library and Institute of Information Systems) and from an International Advisory Board, consisting of key persons from IMIA, EFMI, and GMDS (see acknowledgment).

Major decisions taken until now, lead mostly to activities in WP1, e.g. on deciding on the name of the open access track, on its quotation and on copyright matters as well as on implementing the respective processes until 2017 [42]. We also started to prepare and/or conducted workshops, meetings and surveys, primarily on incentives for publishing in open access. Results will be reported later.

7. Discussion and Conclusions

As the Trans-O-MIM project and the transformation process of *Methods* is just starting, it is too early to report about our expectations on whether and, if yes, when

the transformation process will be terminated.

As already mentioned in section 5.1 the criteria for adequate journal transformation remain to some extent subjective and that, in addition to the gold open access way, chosen here, there are also other ways. In particular the green open access approach might also be promising.

We are aware that *Methods* as selected journal for exploring journal transformation and for elaborating strategies and evaluation metrics will not be representative for all subscription-based scientific publication organs, as, e.g., there are significant differences within disciplines on publication traditions. We are however convinced that doing such research with a concrete instance for journal transformation is relevant for adding new knowledge on this important topic.

With applying the Tandem Model as approach and with the way we implemented *Methods Open* as journal track, we will, as far as we can see, reach the following nine out of sixteen criteria on adequate journal transformation fully: g.1, g.3, st.2, st.3, st.4, su.1, su.3, f.1, and f.3. In our opinion we will, due to different reasons, only partially reach the four criteria g.2, g.4, su.4, and f.4. Concerning st.1, su.2, and f.2 we have to wait on our assessment, until the Trans-O-MIM project is further advanced.

It was very positive for us that we, as intended, could realize Trans-O-MIM as an international research project and not 'just' as a more or less technical, organizational, and financial implementation activity. This was in particular possible by the excellent support of IMIA, EFMI, and GMDS, and by the close collaboration between Schattauer, *Methods* (with its Editor-in-Chief and its Core Editorial Team) and PLRI (with its Trans-O-MIM core team). Also the discussions with and the support of DFG and of the mentioned institutions at TU Braunschweig were very helpful.

From a publisher's point of view, additional open questions remain concerning economic consequences. They are exemplarily mentioned in the following questions. When financing has been subscription-based, long term contracts with persons, being involved in publishing and/or editing journals could be made – will this

still be possible, when APCs build the major economic base? Or will other ways of reimbursement have to be chosen, e.g. based on a percentage share of APCs? And will this be counter-productive for reaching su.1? Who will finance APCs for authors from low income countries? Who will finance long-term archiving of publications? Who will finance the intended incentives, mentioned above? Without solving these problems by elaborating appropriate business models, considering these economic concerns, from a publisher's point of view a transformation model will remain incomplete and so pose a risk to the intended transformation.

Challenges will remain in elaborating the transformation model with evaluation metrics and in identifying appropriate incentives for authors to publish in open access. We are convinced that just offering the option for gold open access publishing with its technical, organizational and financial implementation is not sufficient for journal transformation, and that appropriate incentives are important in particular concerning criteria g.1 and st.3.

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