

Identification of Influencing Factors Regarding the Decision for or Against an Open Access Publication of Scientists of Medical Informatics: Description and First Results of Group Discussions and Interviews

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Abstract

Open Access provides researchers another opportunity of publishing, besides the traditional publication in subscription-based journals. Providing higher dissemination and therefore visibility as well as better accessibility, among others, Open Access helps to fulfil changed needs of authors and readers in our information and communication society of today. Though this publication model provides a lot of advantages both for readers and authors, there are also some obstacles. In order to identify the incentives that can lead scientists of medical informatics to an Open-Access-publication, we conducted a study consisting of group discussions, interviews, and surveys. This tripartite evaluation starts in its first part with group discussions and interviews. First results of them show that, among others, the higher visibility, indexing, Impact Factor and better accessibility are factors for an Open-Access-publication.

Keywords:

Open Access Publishing, Motivation, Focus Groups

Introduction

Within the last decade, a creeping alteration in the publication landscape can be observed. Due to the changed needs of researchers, in the role of readers as well as authors, in regard to the modified information and communication society, a new publication model has been developed. Open Access (OA) seems to fulfill these needs better than the traditional subscription-based model [1-3]. The internet allows the publication of journal articles, whole journals, or books online and within the OA model without any barriers such as paywalls. This means that everyone with an internet connection can freely access content and depending on the license, distribute, use, and modify it. In recent years many governments, research funding organizations and universities have changed their policies demanding to publish funded research outcomes in OA [4, 5]. For financing this new publication model, a shift of costs from readers to authors can often be found. For publication of accepted manuscripts, they have to pay a so-called “Article Publication Charge” (APC).

Today nearly all journals offer their authors the option to publish their article in OA. There is also a growing number of genuine OA journals, though this depends on the discipline, in

which Medical Informatics authors can only choose from a small number of pure OA journals [6]. Another issue is that only a few authors make use of this publication model so far and only about 13% of research papers are published OA [7]. This is effected by concerns connected to OA. Besides the assumed positive characteristics of the publication model as, for example, better visibility and increased citation rates, there are also some significant barriers. An often-higher effort for authors, for example in terms of administrative tasks and the above-mentioned publication charges, is to refrain from OA publishing [8, 9].

The factors that influence researchers in their decision on where or how to publish their research results have not been sufficiently investigated yet. In order to identify them, among others, we are conducting the project “Trans-O-MIM” (full title “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*”) [10, 11], funded by the German Research Foundation (DFG). The results are intended to help traditional subscription-based journals transform successfully into OA-based journals. Within the framework of this project, we applied them on the concrete transformation of *Methods of Information in Medicine*.

Therefore, the goal of this study is the exploration of factors influencing researchers in the role of authors both positively and negatively in regards to OA publishing. For the construction of a successful and sustainable business model, it is essential to understand and consider the needs and wishes of authors. So the overall aim of the Trans-O-MIM-Incentives-Study (full title “Study on the Identification of Influencing Factors Regarding the Decision For or Against an Open Access Publication of Scientists of Biomedical and Health Informatics”) is to determine what lead researchers to publish their research results to be freely available in OA. The sub-goals are:

- The identification of incentives and/or incentive systems for scientists with regard to a publication in OA (motivators of the use of OA).
- Also of interest is the determination of obstacles and barriers for scientists relating to an OA publication (motivators of the disuse of OA).

- In addition, also the superordinate level needs to be discussed, namely how the scientific system should be shaped for OA and what or how publication service providers can contribute to the promotion of OA from the scientists' point of view.

In the subsequent sections, we described the research method for this study and its composition, its conduction and preliminary results with a special focus on the first phase of the Trans-O-MIM-Incentives-Study. Afterward, we discussed these first findings and future perspectives of the study followed by a conclusion in the last section.

Methods

The main focus of this paper is on the first phase of the Trans-O-MIM-Incentives-Study, though altogether it consists of three parts:

1. Qualitative phase with guide-based group discussions and interviews with selected scientists in the field of biomedical and health informatics.
2. Quantitative phase with a standardized survey of representatives of scientific organizations in the field of biomedical and health informatics.
3. Quantitative phase with a standardized survey of members of scientific organizations in the field of biomedical and health informatics.

All three phases of the study are run in close collaboration with IMIA, the International Medical Informatics Association.

In preparation of the study we designed a questionnaire regarding the incentivizing of OA publications for a short survey that was conducted at HEC 2016 (Health Exploring Complexity: An Interdisciplinary Systems Approach; GMDS & DGEpi & IEA-EEF annual meeting, Medical Informatics

Europe – MIE2016; 28 August – 2 September 2016, Munich, Germany), one of the main international conferences in the field of medical informatics, biometry and epidemiology [12]. Based on these not very productive and satisfactory results we decided not to choose mixed methods for the intended study in order to gather more detailed and in-depth information. This leads us to the previous explained study design consisting out of three phases with qualitative and quantitative methods.

Phase 1: Guide-based group discussions and interviews

The guide-based group discussions and interviews are intended to serve as a qualitative pre-stage of the subsequent surveys of scientific organizations and their members. The goal is to make participants narrate and create a discussion that develops its own dynamic in order to gain new and disregarded aspects pertaining to the wishes and needs of scientists in respect of OA publishing. In addition, it is to be reasoned which aspects should be taken into account in the subsequent survey of scientific organizations regarding country differences in OA. This first phase of the Trans-O-MIM-Incentives-Study started in July 2018 and was completed by the last interviews in February 2019.

Taking the results of the preparational survey into account, we created a guide for semi-structured group discussions. The guide serves as a framework and does not have to be followed rigidly, but rather provides the topics that need to be covered. It consists of six theme groups each containing one central question and several in-depth questions (see Table 1). The central questions serve as an introduction to different areas of interest and allow participants an unconfined statement of thoughts and opinions. In-depth questions are used if certain aspects need to be inquired, if answers are not sufficient or if the discussion has halted. The theme groups are the attitude towards OA, reception behavior at OA articles, publication behavior of scientists, motivators of the use or disuse of OA, positive/negative external influence and promotion of OA.

Table 1– Questions included in the guide

Central questions	Most used in-depth questions
What are the participants thinking about OA?	• How do participants define OA?
How do the participants read OA articles?	• Do participants advocate a change of the publication system to OA – and why or why not?
What is the participant's procedure for publishing their research results?	• Where do participants inform themselves about new articles and do they differ between subscription-based articles and OA articles?
What leads the participants to publish their research results in OA and what deters them from it?	• How do participants experience new functionalities and evaluation tools, as Altmetrics?
Whereby do publication service providers and the scientific system promote or impede OA in the participant's point of view?	• According to what criteria do participants choose a journal in which they want to publish?
With what or rather whereby can OA publications be promoted in the participant's opinion?	• Have the participants already published OA and how was their experience compared to a subscription-based publication? If not: why?
	• What do participants think about the licenses that are used for OA? Are they well versed in the various Creative Commons licenses?
	• To what extent do participants feel constricted by the OA policy of many funding organizations in terms of their publication freedom?
	• What offers of publication service providers have a positive/negative influence on the decision for/against OA?
	• In what way does the scientific system have any structures that support/deter participants in an OA publication?
	• What changes pertaining to the scientists are necessary to reach more OA publications?
	• How will OA develop within the next five years?

For the group discussions, the sample consists of single members of IMIA who are suggested by IMIA for participation. It was planned to include 36 scientists categorized in the IMIA regionalities (North America, Latin America and the Caribbean, Europe, Middle East, Asia and

the Pacific, Africa) and three seniority levels (scientists with long experience (e.g. department chairs), scientists with intermediate experience (e.g. postdocs), early scientists (e.g. Ph.D. students)), divided into six groups for discussions via video conference. Due to the difficulty of finding enough participants for group discussions we decided to conduct

additional interviews based on the same guide. Therefore corresponding authors of papers in *Methods of Information in Medicine's* OA track *Methods Open* were invited for interviews. Additional interviews were held at conferences as for example on APAMI 2018 (APAMI 2018 - 10th Biennial Conference of the Asia Pacific Association for Medical Informatics; 09 – 11 November 2018, Colombo, Sri Lanka).

For the video conferences and non-face-to-face interviews, we used the video conference software of DFN, the German National Research and Education Network, based on Adobe Connect. The discussions and interviews were scheduled to last for an hour each. For an exact evaluation, the soundtrack and video (where available) were recorded. A method of analysis for the group discussions and interviews, the qualitative structuring content analysis of Mayring is chosen. Their data is categorized in accordance to previously determined criteria by use and preparation of a coding scheme (containing e.g. values, variables, and dimensions) and a coding guideline (containing e.g. coding rules and a collection of anchor examples for orientation). After determination of the content-analytical analysis unit, i.e. the coding unit and context unit, the coding of all group discussions and interviews is conducted by marking the discovery points according to the variables [13]. Therefore a transcription of all data in a pure verbatim protocol in connection with special characters is conducted. As not all data is collected at the time of preparing this paper, a preliminary evaluation is based on a comprehensive protocol.

Phase 2: Survey of scientific organizations

This first quantitative phase of the study conduces to capture the various conditions of OA in individual countries. Though prerequisites for publications in OA are obviously heterogeneous, the differences are not yet known in detail. Therefore we want to ascertain them by means of a standardized survey of the respective scientific organizations.

The questionnaire asked for various aspects regarding OA in the country of the respective scientific organization with the main focus on the current situation. Taking into account the findings of the group discussions and interviews, the survey will mainly cover the following aspects:

- In which countries the scientific organization operates
- If they mainly follow the green or gold road to OA and how the sentiment of scientists is
- If the government has provided guidance or recommendations concerning OA and if funding organizations have provided regulations or requirements
- If research institutions (e.g. universities) have OA policies
- How the development of OA is predicted in the next five years

The sampling frame for the survey consists of all scientific organizations that are member societies of IMIA. The target group has already been informed about the upcoming survey during a presentation at APAMI 2018. For convenience, we will conduct an online survey by using the software tool "eSurvey Creator" [https://www.esurveycreator.com]. The online survey is in preparation (see Figure 1) and will take place in April and May 2019. For participation, an e-mail containing a link to the survey will be sent to representatives of several scientific organizations. Upon the data received a quantitative evaluation will be conducted.

Phase 3: Survey of members of scientific organizations

This third part corresponds to the second quantitative phase of the study and builds on the guide-based group discussions and interviews. Herewith it is intended to complete the picture of wishes and needs of scientific authors with regard to OA publishing. While the first phase provides comprehensive and deep insights into the subject, the survey will reach the broad mass of scientists of biomedical and health informatics.

The image shows a screenshot of an online survey page. At the top, there are logos for PLRI (Peter L. Reichertz Institut für Medical Informatics) and DFG (Deutsche Forschungsgemeinschaft). The survey title is "Open Access in Member Societies of IMIA". The question is: "How would you describe the sentiment of scientists in biomedical and health informatics regarding open access in your country?". Below the question is a Likert scale with six options: positive, many positive, indifferent, many negative, negative, and n.a. There are three rows of response options corresponding to different scientist groups: "Early scientists (e.g. Ph.D. students)", "Scientists with intermediate experience (e.g. postdocs)", and "Scientists with long experience (e.g. department chairs)". Each option has a radio button. At the bottom, there are "Prev" and "Next" buttons, and a "(Test answers)" link.

Figure 1– Exemplary page of the online survey

The questionnaire will partially use conjoint analysis to implement various scenarios from which respondents can choose the preferred ones. The questions are divided into various question complexes, according to the guide for group discussions and interviews.

The sampling frame for the standardized survey consists of all members of scientific organizations, who are member societies of IMIA, which currently corresponds to approximately 60,000 people. For greater reach, it will also be conducted as an online survey in May 2019.

Results

This analysis includes the data from 34 participants and was gathered in

- six group discussions with 18 participants suggested by IMIA representatives
- eleven interviews with participants also suggested by IMIA representatives
- five interviews with corresponding authors of a paper in *Methods Open*

Altogether 93 scientists of biomedical and health informatics have been invited for group discussions and interviews, so the participation quote is 36,56 %.

Attitude towards OA

The knowledge regarding OA is very heterogeneous but the whole sample has already heard from it. Most of the participants have a positive and open meaning regarding OA. The broad majority also welcomes a change of the publication system to OA. Thereby many mentioned that a complete

change seems unlikely and that they prefer the coexistence of the traditional system and OA. In this context also the freedom of choice between the publication models was stated as important.

Reception behavior at OA articles

The general tenor of responses to the question about possible differences in the way the participants inform themselves about new print or OA articles is that they do not exist. Some only annotated that OA articles are mostly not included in the subscribed table of contents or alerts, that is a popular information source. Others also outlined that they generally prefer OA articles as they are easier to access even if institutional subscriptions are available. In the way, articles are read no differences have been discovered. The opinion on new functionalities and evaluation metrics is divided and often these tools are still unknown. While some welcome it as a necessary innovation others describe it as insignificant.

Publication behavior of scientists

Asking the participants according to what criteria they choose a journal to publish in following key determinants have been discovered: a suitable scope of the journal to reach the targeted audience, a fast processing time, a high-quality

review process and the Impact Factor. Also often mentioned was the cost of publication. The copyright issue by the use of Creative Commons is of little relevance and knowledge to scientists.

The question if participants in the role of authors have already published a paper in OA was affirmed by about half of the sample. Though it needs to be mentioned that only very few differentiated between Green and Gold OA, while about a third knew about the hybrid model. A previous non-publication in OA was often explained with missing funds or experience in publishing.

Motivators of the use or disuse of OA

The answers with respect to the motivators of the use and also the disuse of OA as a publication model show the previously anticipated factors but also new and unforeseen aspects, as presented in Table 2.

Relating to a constriction in their publication freedom due to OA policies of many funding organizations and universities the participants consistently stated that they do not feel restricted. They endorse these policies if existent and do not see any disadvantages.

Table 2– Factors for or against OA publications

Motivators for OA	Motivators against OA
<ul style="list-style-type: none"> • Faster processing time and publishing of articles • Higher visibility and therefore more citations • Free accessibility and availability • Indexation in renowned registers • Better rights on personal use for authors • Fulfillment of requirements of funding organizations • Better publication opportunities for scientists from structurally weaker countries • Strengthening of the competition for traditional journals 	<ul style="list-style-type: none"> • High costs, for example, Article Publication Charges (APC) • Lower or initially missing impact factor • Missing reputation of (new) journals • The distinction between serious and untrustworthy or predatory journals is sometimes difficult • Financing problems, esp. in structurally weaker countries • Fixed/traditional publication structures in the departments • There are only a few pure OA journals in the subject area

Positive/negative external influence on OA

Most of the participants had difficulties in answering the questions what offer of publication service providers would have a positive/negative influence on OA and how the scientific system could enhance or impede it. With regard to publication service providers, no concrete ideas for desired offers have been mentioned while the financing policy has been broadly criticized. In this context, it was discovered that nearly no author has made use of waiver systems or even knew about them, though often provided by publication service providers. Identified demanding framework conditions are: facilitation of the financing of articles in OA journals, initiation of new ways/methods for peer review, orientation away from the Impact Factor, production of scientific journals away from commercial publishing houses, and guide to choosing the right OA journal.

Promotion of OA

Regarding the further promotion of OA, no more findings have been gathered. Asking what changes pertaining to the scientists would be necessary most participants responded that they think most researchers are ready for the OA publication model. Some mentioned that senior researchers tend to have more reservations compared to the younger generation.

On the question of how the near future for OA will look like the whole sample predicts a positive development. Most are

convinced that the proportion of OA articles will rise steadily but until the transformation is complete (if ever possible) it will still take a long time.

Discussion

The results show that OA has not yet reached the awareness of the majority of researchers of biomedical and health informatics. The findings regarding the attitude towards OA demonstrate accordingly that the topic is not considered in-depth and differentiated by many participants. Moreover, a missing distinction between OA and electronic publications is widely spread. Though a difference between young and senior researchers can be observed. While younger scientists often have only cursory knowledge and experience they are very open-minded on this still young publication model. Senior scientists, in turn, are often more focussed on political aspects of OA publishing.

The reception and publication behavior seems barely influenced by the underlying publication model. This corresponds with the findings that researchers in most cases are not very interested in publication issues and in consequence, are also not aware of them. Interestingly OA articles are not only preferred in structurally weak regions lacking of journal subscriptions but also by well-equipped researchers due to the generally easier accessibility and sometimes also due to the literature search methods. With

regard to the criteria for choosing a journal for publication, it is noteworthy that the scope of the journal is mentioned first and not the Impact Factor. Thereby young researchers often have or want to adhere to the specifications of their principals regarding the choice of journal, so finally, it is their stipulation where and how a paper will be published.

The most mentioned positive and negative motivators for OA are better visibility and accessibility/availability, indexing, more citations, faster processing time and on the downside costs, reputation, Impact Factor and lack of funding. Besides these factors, many participants also provided more detailed factors that can often be attributed to the respondent's seniority or origin. This can also be observed at answers on questions relating to the external influence on OA. On the other hand, only a few findings on further promotion could have been collected, which also seems to correlate with the often found disinterest in publication issues as thoughts regarding this topic have not been made yet.

Future perspectives

As already described in the preceding sections the group discussions and interviews will be followed by two online surveys to gain even deeper insights. The results show that a survey of scientific organizations is necessary in order to clear what influence the origin of participants has on their answers and opinions. A survey of members of the scientific organizations is important to gain a greater sample. This allows a check if the gained findings can be transferred to all scientists of biomedical and health informatics.

Limitations

A limitation to the in this paper focussed the first phase is that not all interviews are conducted yet and therefore a complete analysis and relative frequencies in the results section are missing. However, the sample size has nearly been reached what leads us to the conclusion that a comprehensive picture of factors regarding the decision for or against an OA publication can already be presented. A further limitation to the Trans-O-MIM-Incentives-Study is that this research can not or only limited be transferred to other fields as there are huge differences between several disciplines. Therefore further research for example in disciplines of the social sciences is necessary for comparison.

Conclusions

Through group discussions and interviews provided us with various new insights with regard to the incentives and obstacles of an OA publication, the answers also contain many well-known influence factors. The upcoming surveys will show if there are more, so far unconsidered, advantages and disadvantages of OA. It remains a question of why researchers seem prevalently disinterested in the conscious choice of a publication model. As factors for or against OA are now broadly discovered within this survey, in the next step it might be interesting to find out how researchers can be made aware of the OA publication model in general. This might round up the factors that need to be taken into account for a successful transformation of well-established subscription-based journals into OA-based journals.

Acknowledgments

This research has been supported by Deutsche Forschungsgemeinschaft under grant HA 1438/17-1.

We would like to thank IMIA and its members for supporting this study in various ways.

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