

Open Access Scientific Publications in Israel - Researchers and Librarians' Trends and Perceptions

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Abstract

Background

In the context of scholarly publishing, Open Access (OA) is a term widely used to refer to unrestricted online access to articles published in scientific journals. Over the last few decades, subscription costs have soared, and profit-oriented publishing houses have played a dominant role in the publication and dissemination of scientific works. While authors contribute their work to publishers and provide editing and peer-reviewing services without monetary gain, readers are required to pay a subscription fee to the journal. At the same time, organizations and academic institutions pay publishers through mega-agreements to allow researchers and students access to those articles. As a consequence, most of the publicly funded research is locked behind a paywall. Countries and research institutions across the globe have committed themselves to provide OA to their research output, and they have developed a clear policy on the subject. In addition, the grant conditions of funding organizations - many of whom support Israeli research - increasingly require peer-reviewed research outputs to be made freely available in OA journals and repositories.

OA publishing benefits not only the general public, but also provides potential benefits for individual authors. The most discussed potential advantage is related to the citation impact of OA articles. Open access to scientific publications includes subcategories and varying interpretations, which are the basis for the existing debate between those who support or oppose OA and among researchers. In the twenty years since the inception of OA, not only has the approach become a key principle in the policy of scientific publication, especially in the Exact Sciences, it has also become a commercial strategy for major scientific publishers. In addition, the polymorphic character of OA as well as its terminology create difficulties among researchers

and decision-makers at state and research institutions, both in Israel and around the world. The current study sought to examine trends, attitudes, and awareness of Israeli researchers, from various research disciplines, and librarians from academic libraries concerning scientific publications in open access journals and repositories. The study incorporated quantitative and qualitative research paradigms for in-depth understanding and exposing the motives and barriers underlying researchers' and librarians' perceptions regarding open access publishing.

Research Methods

This mixed methods research integrated data collection, analysis and inference techniques from several research paradigms:

In the **quantitative study** – the participants were 202 Israeli researchers from universities, colleges and research institutes in Israel. Among them, 106 (52.5%) researchers were from the Social Sciences and the Humanities, and 96 (47.5%) were from the Exact Sciences - STEM: Science, Technology, Engineering, Math. This study developed a survey instrument based on the Unified Theory of Acceptance and Use of Technology (UTAUT), as a tool to map the known factors which influence publication by researchers who published in OA. According to the model, and corresponding to scientific publications, researcher's perceptions are the determinants of behavioral intention or use behavior, and the behavioral intentions in turn have moderating effects on the degree of actual publicity in open access.

In the **qualitative study**, semi-structured interviews were conducted with 20 researchers, half of whom were from the Exact Sciences disciplines and the other half were from the Social Sciences and the Humanities. In addition, interviews were conducted with 10 academic librarians and administrators of academic libraries in Israel. The researchers and librarians expressed their perspective extensively regarding publishing using OA, about the challenges and the obstacles, the contributing factors and the essential requirements for promoting this approach in their institutions and in Israel. The researchers also detailed the considerations in choosing a journal using both the open and closed approaches, and the librarians described library's role in promoting OA. The study included one further interview with a policy-maker in the field who

provided information about the field of scientific publications in Israel and the open and closed approaches.

In the **bibliometric-altmetric study** - 40 researchers were selected from Israeli colleges and universities who were evenly distributed among the Exact Sciences, Humanities and Social Sciences. The study was based on researchers' publications using both the open and closed approaches from the Scopus database. In order to find available legitimate versions of the articles in the OA routes, we used the Unpaywall and Dimensions databases. The bibliometric study analyzed the yearly publication and citation trends between the years 2014-2019. The current study definition of OA article was: "OA articles are legitimately free to read online, either on the publisher's website or in an OA repository". We conducted an altmetric analysis investigation, extracted from the PlumX platform which provides altmetrics metrics, as a complementary study of our bibliometric analysis.

Main Findings

This study attempted to establish an empirical model in order to examine the factors which influence and predict the extent to which researchers publish using OA. Contrary to studies which examined the UTAUT model for the prediction of the information systems use, the OA publishing phenomenon is not linear, and requires a general overview of all of the pathways while referring to the model's theoretical and empirical structures. Based on structural equation modeling (SEM), we received a more complicated yet accurate picture of the influential factors which led to the establishment of an empirical model of the phenomenon. According to this model, indeed, researcher's behaviors are influenced by the positive perceptions regarding OA. Furthermore, there are additional factors which can directly and indirectly influence the level of publicity in OA. According to the observed model, an independently and voluntary decision to publish in OA has a decisive influence on the extent of publishing by researcher in OA. In addition, the variable of independently to publish does not remain unchanged. Researchers must believe that their research environment supports publishing in this manner, and they need to maintain supportive conditions which will influence their intentions and their autonomous decision to publish in this manner. Nevertheless, this type of predictive relationship exists in the disciplinary aspect whose origin is in the Exact Sciences and in researcher's tenure. The

bibliometric-altmetric results and the qualitative findings have shed light on matters of the self-choice of researcher's publishing via OA.

Researcher's autonomous decision and the disciplinary advantage of the Exact Sciences researchers in OA publishing emerged in every aspect of the findings of this study. The comparison of bibliometric indices and altmetric metrics between researchers' articles in open access and closed access did not uncover any significant differences. Such were found only when examining the data distributed between the publishing approach and the disciplinary attribution. It has been found that the articles of Exact Science researchers published in OA (journals and repositories) constitute 58% of their publication rate, compared to only 29% among the Humanities researchers. Both bibliometric indices and altmetric metrics of Exact Sciences researchers' OA articles are significantly higher than those of their colleagues in the Social Sciences and the Humanities. Surprisingly, although the altmetric measurements and the number of closed articles written by researchers from the Social Sciences are significantly higher than those of their colleagues in the Exact Sciences, the number of bibliometric citations and the altmetric citation metrics of the Social Sciences articles and the Humanities are not significantly higher than those of the Exact Sciences articles. The current research study found a *citation advantage* for the Exact Sciences researchers in the bibliometric indices as well as the altmetric metrics regardless of the type of publication – open or closed.

The research findings in this work reveal a large range of scientific publications in the green route of OA. Israeli researchers deposit articles in open repositories. The qualitative findings shed light on the quantitative findings. Exact Sciences researchers mainly reported having uploaded articles to subject-based repositories (such as arXiv), in pre/post print versions, as an acceptable parallel alternative to publishing in open and closed access journals and in order to receive recognition, professional prestige and to claim priority for research innovation. However, researchers from the Social Sciences and the Humanities upload a printed version of their articles to Academic social networks (ASN) while dealing with copyright issues, where the goal is distribution and greater visibility.

Regarding publishing in journals, researchers from the Exact Sciences, Social Sciences and the Humanities all report that the most important consideration when publishing an open or toll

access article is the journal impact factor (IF). Researchers, especially in the first years of establishing their tenure, are limited by the method of their institutions based on researchers' assessment of the degree of publication of their work in journals with a high impact factor. Social Sciences researchers expressed negative perceptions about OA publication, and struggled to explain their considerations when choosing an OA journal due to their lack of experience with OA. On the other hand, Exact Science researchers have more experience in open access publishing. They have addressed the personal benefit with regards to promotion and tenure to be derived from publishing an open-access article, due to the journal's high impact factor and the rapid acceptance required for them or for the student under their guidance. On the other hand, they reported considerations as a requirement of research funders and research grants, which fund and require publication in open access. Although this finding does not indicate publication by researcher's self-choice, the requirement and funding serve as facilitating conditions that assist researchers in publishing in OA. The Article Processing Cost (APC) issue has been found in the research questionnaires to be a significant barrier that prevents researchers, especially those from the Social Sciences and Humanities who are affected by budgetary restrictions, from publishing in OA. Moreover, paying the fees for the article supports their fear that money is the only measure in the acceptance of articles into OA journals. Exact Sciences researchers have also expressed negative perceptions regarding OA journals. However, Exact Sciences researchers, with their personal experience, have reported that there are reputable peer review OA journals in the Exact Sciences disciplines, but that it takes time and publications to increase the IF of these journals.

The quantitative and qualitative findings indicate a lack of awareness, mostly by Social Sciences and Humanities researchers, with regards to copyright issues and OA routes. In addition, researchers' reports revealed a lack of a deeper understanding of the outlook of scientific publication and the open access publishing ideology; most researchers believe that the existing traditional publishing model should be preserved. However, librarians and library administrators in this study demonstrated knowledge and a deeper understanding of the scientific publishing field. Librarians claimed that the research findings which were financed from public budgets should be made available and accessible to the general public with no limits or obstructions.

Further, librarians see themselves as the spearhead, leading the change and the transition to OA in their institutions. However, librarians emphasize that they will lead the transition only once there is formal OA policy at the institutional and national levels, and along with the support and cooperation of the institutions' administrations. These conditions will give them support in their activities for promoting the approach.

Implications and Recommendations

Based on this study's findings and the discussions that emerge from them, the current study presents a number of applicable recommendations for the promotion of Open-Access in Israel. The overarching recommendation that is derived from this study concerns the need for regulated policies at the national level regarding scientific open access publications. However necessary it may be, "Top-down" policy is not enough. This study recommends integrating "Down-top" interventions: an association of research funders and academic institutions in Israel for the purpose of leveraging the power to negotiate transformative agreements with publishers; allocating resources to researchers publishing in OA; and the creation of a collaborative institutional repository for all academic institutions in Israel in which publications and research findings will be deposited. In addition, changing the promotion procedures and tenure of the institutions will help create a balance between the scientific disciplines and will allow researchers more flexibility in choosing OA journals where to publish their article. Moreover, in order to encourage researchers from Social Sciences and the Humanities to publish articles in OA journals and repositories, dedicated budgets should be provided for researchers in these fields, information about copyright must be made available to them, and they need to be referred to appropriate repositories. Librarians in this study proposed that the academic libraries should be responsible for assembling all of the knowledge regarding OA in the institutions. However, without regulated legislation and cooperation, the lack of interaction observed in the current study among the triangle - libraries, researchers and the administration of academic institutions - will continue. This rift harms the chances of promoting open-access in Israel.

The study's contributions

The integration of the methods has provided a comprehensive picture of the phenomenon under discussion, and a deeper and broader view of the field. The contribution of the present study is expressed in two main aspects: theoretical and practical. The first aspect, is a theoretical contribution – based on the research questionnaires and an empirical examination of the theoretical research model, a research model was achieved which reveals the complex but accurate picture of variables with direct and indirect structural connections. These connections have led to the establishment of a predictive model for OA publication. The bibliometric-altmetric research involved innovative tools in examining the indices, tools whose contribution to this field of research is examined in other research studies around the world. The second aspect is the practical contribution – this study presented multiple perspectives in academic, ideological, financial, legal and technological aspects with regards to scientific open access publication. The implications and recommendations that arise from the findings and conclusions of this study refer to the "Top-down" processes which are balanced through the "Down-top" processes. These recommendations have within their power the ability to lead to a practical contribution that will be expressed in laying out steps towards establishing a regulated policy for scientific open-access publication in Israel.

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