Bulletin of the *Transylvania* University of Braşov • Vol. 3 (52) - 2010
Series IV: Philology and Cultural Studies

OPEN ACCESS IN GERMANY

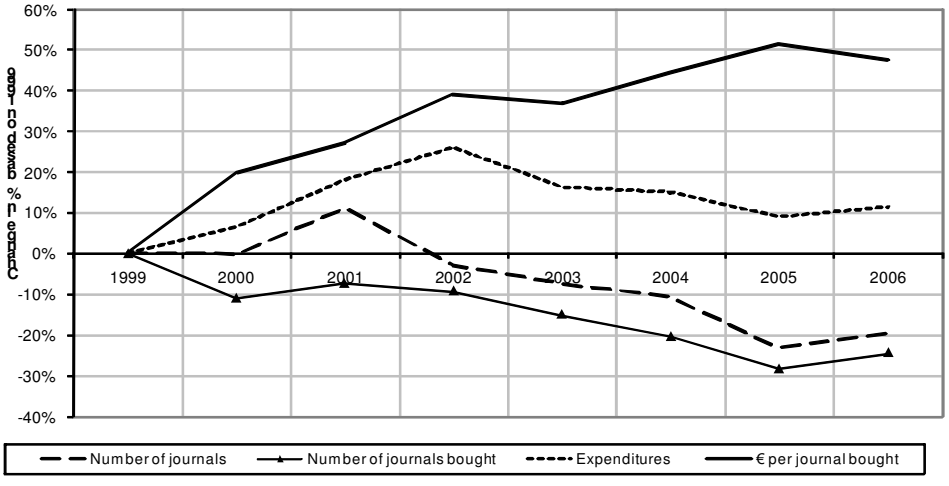
Svenja HAGENHOFF*

Abstract: *The market of scholarly journals has experienced massive price increases, at a rate that is several times higher than the general inflation rate. Libraries are no longer able to adequately provide scientists with the required literature. As this jeopardizes scientific progress, the system of scientific communication is in need of new models. The journal crisis has generated a movement that demands Open Access to scientific results. This article attempts to highlight the role of Open Access in Germany on the level of research policy and sponsoring.*

Keywords: *open access, scholarly communication, open access repositories, open access journals, open access policies, open access financing models.*

1. Journal Crisis as Motivation

For several years the market of scholarly journals has experienced massive price increases, at a rate that is several times higher than the general inflation rate (Woll 2005, p. 14, Seidenfaden/ Ortelbach/Hagenhoff 2005, p. 26).[1] The Association of Research Libraries, for example, has established that there was an increase in the average costs per journal of 188% for the American market between 1986 and 2004. During the same period of time the general price increase with respect to the American Consumer Price Index was only 73%. On average, the prices increased by 6.3% per year.



* Institute for Information Systems, University of Göttingen, Germany.

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The following figure (Hagenhoff 2007) presents data from 202 German scientific libraries (data: German Library Statistics).[2]

These show that the average expense per journal bought has increased by 45% within seven years, whereas the average number of journals acquired per library has decreased by 20%. The total stock of journals per library has fallen by 35%. During the same period, the prices for all commodities in Germany have increased by 11%, and the prices of consumer goods have increased by 25%. Other worldwide analyses show similar results (e.g. Griebel/Tscharntke 1999, Bergstrom 2001, Orsdel/Born 2003).

The literature refers to this phenomenon as the journal crisis (e.g. Woodward/Pilling 1993, Bargheer 2006, Meier 2002). It is argued that libraries are no longer able to adequately provide scientists with the required literature. As this jeopardizes scientific progress, the system of scientific communication is in need of new models (Woodward/Pilling 1993, Bargheer 2006, Meier 2002).

2. The Idea of Open Access

The coincidence of the journal crisis with electronic publishing has generated a movement that demands Open Access to scientific results. The Berlin Declaration, for instance, formulates as its primary aim that new forms of knowledge dissemination should not only be supported in their classical form, but more and more according to the principle of "open access" via the internet (Berlin Declaration 2003).

The Budapest Open Access Initiative proposes two ways of reaching the aim of open access. The approach of **self-archiving (green road)** follows the idea that the authors themselves archive scientific articles on their homepages or in (subject-specific) repositories or archives. As the individual scientists do not necessarily have the technical and organizational skills required for the ongoing and sustainable archiving of digital scientific knowledge, the research institutions prefer organized and standardized archiving in institutional repositories (IR) to this rather unorganized form of archiving. These archives often reside with the respective research institutions' libraries, and are maintained by them (e.g. GoeScholar of the University of Göttingen). In Germany, the so called DINI-certificate of the *Deutsche Initiative für Netzwerkinformation* (German Initiative for Network Information) has been awarded since 2004. It describes the quality standards of the technologies used, the organizational embedding and the use of IR, as well as the associated services (www.dini.de). Within Germany, the DINI-certificate requirements are the foundation of the connection of single and local IRs. The German Research Community, for example, supports the project Open-Access-Network, which aims at connecting German IRs, thus improving the national and international perception of the publications offered on a local scale, and, at the same time, of the research contribution in general (Malitz 2009).

The original approach to self-archiving does not include a review of the deposited contributions (Hanekop/Wittke, p. 224 und BOAI 2010), as it is the rule with established journals. This mode of publishing is rather unattractive for authors, as a scientist's reputation is exclusively derived from certified publications in accepted journals. The **Open Access journals (golden road)** approach therefore demands that articles are published in journals with a review-

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process which support the idea of open access. Examples of German Open Access journals are the German Risk and Insurance Review, the Bucerius Law Journal or the Journal of Psychology. Agencies of such journals can be both commercial or non-commercial publishers and Learned Societies who do not seek profit through their publishing functions but only aim at cost-covering. Thus, the question arises how publications in Open Access journals should be financed.

3. Financing Options for Open Access Journals

Several alternative revenue models for Open Access journals have been developed.

In **author-financed models** the author pays a publishing fee (article processing charge, APC). While in some disciplines (life sciences, geosciences) authors have always had to pay part of the publishing costs (e.g. for color printing or photographs), this approach is unusual in others (humanities and social sciences). According to a survey of 1,600 scientists in Germany done by the German Research Foundation (*Deutsche Forschungsgemeinschaft* - DFG) in 2005, 393 scientists had had to pay author's fees for their publications. Out of these, only 14 had paid for publishing in an Open Access journal. The remaining fees were paid to conventional publishers. The scientists came from the areas of life sciences (6 persons), natural sciences (5 persons) and engineering sciences (3 persons). Humanists and social scientists had never paid for a publication in an Open Access journal, even though the numbers of publications in Open Access journals do not differ between the sciences in relation to the total number of journal publications (DFG 2005). It is to be expected that the acceptance of author-financed publication media will differ between the disciplines, as practices are different. A survey of 1,000 German scientists done in 2008 shows that the majority of the respondents were not prepared to pay for their articles (Weishaupt 2008). Furthermore, not all German scientific facilities have budgets for author's fees. The Max-Planck-Society, for example, has set up a budget and concluded special contracts with publishers with regard to publishing conditions (Schimmer 2006). The Göttingen State- and University Library has an agreement with Springer publishers in the context of the Springer-Open-Choice approach. All articles accepted for publication written by authors of the University of Göttingen are automatically Open Access articles. They are published on the publishing platform SpringerLink, in the respective print journal and on the Institutional Repository of the University of Göttingen (GoeScholar; SUB 2010). An analysis of empirical data shows that missing arrangements between facilities and publishers can result in author's fees, which can generate a publishing crisis for the system of science communication. This means that Open Access journals would hardly contribute towards improving the supply of scientific information under the condition of restrained budgets (Hagenhoff et al. 2008). In comparison to the approaches of the facilities mentioned above, Open Access-Publication and its financing is not a topic discussed at many universities. Therefore scientists are left on their own devices when it comes to financing their publications.

Nowadays, *funding agencies* support authors publishing in Open Access journals. Funds for financing Open Access publications can, for example, be requested from the German Research Foundation. The funding agency expects "that the research results funded by their resources (…) are published digitally where possible and made available free of charge on the Internet (Open Access)" (www.dfg.de). Grants for the publishing of

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projects funded by the German Research Foundation can be requested on an annual basis.

Another approach to financing OA-journals is for the research institutes to become *institutional members* of the respective publishing houses. Depending on the size of the institute or its past publishing activities, they pay an annual membership fee that allows scientists to publish in the publisher's journals. Examples are the journals BioMed Central or PLoS. The Max-Planck-Society, for example, is member of PLoS.

The *Community-Fee-approach* entails that OA-articles are financed jointly by authors and readers of a certain field of expertise, for example by an association raising publishing funds through membership fees. These associations are often the journals' publishers; the scientists are generally both readers and authors. This leads to an almost closed publishing value-chain cycle within the community. An example for this approach is the journal *Documenta Mathematica*. It was founded by the German Mathematics Association, which has been supporting it until today. Other examples are the Journal of Psychology and the forum Community Psychology. Both are supported by psychological associations and have developed from print media into open access journals.

Some research institutes have started special *funds* to finance their scientists' publications. An example is the university library of Bielefeld whose fund covers the costs if the scientist did not find other means of financing.

Another way of financing scientific knowledge are *national licenses.* Funding agencies obtain licenses for media, which are then used free of charge by all the scientists of a German federal state's public research institutes. The access is IP-based. National licenses are not a financing approach for Open Access journals as such; however, they provide free access to the required contents for the scientists. In Germany, the German Research Foundation provided nearly 6 million Euros in 2004 for the purchase of national licenses of major, preferably closed, online data-bases in the areas of humanities and cultural sciences (www.wikipedia.de).

4. Conclusion

Open Access on the level of research policy and sponsoring plays an important role in Germany. Major research institutes and associations (Frauenhofer-Society, Helmholtz-Society, Leibniz-Society, Max-Planck-Society), infrastructure facilities (German Library Association), as well as funding agencies (German Research Foundation) and other organizations (Science Council, the German Rectors' Conference) have signed the Berlin Declaration. Many major universities have become active in the reformation of the scholarly communication system by founding university presses and similar initiatives. At the same time, awareness has to be raised with respect to scientists as authors. The survey of the German Research Foundation of 2005 showed that the majority of scientists in the disciplines concerned had never heard of either concrete Open Access-initiatives or Open Access journals. Even though the overall attitude towards the idea of Open Access is positive (DFG 2005), a study conducted in 2007 in several states showed that the majority of the 1,433 respondents will not publish using Open Access in the near future (disciplines Information Systems, German Literature, Medical Science; Hess et al. 2007).

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Notes

[1] See Ortelbach et al. 2008 for a differentiated analysis of this phenomenon.

[2] Figure 1: Development of costs for acquiring prices and the number of journals (average of 202 German scientific libraries).

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