

Open Access in Swedish Private Sector R&D

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National Library
of Sweden



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Abstract

Open Access (OA) is defined as the free, online, immediate, permanent access to scientific and scholarly material in full-text. Open Access practices have reached the universities and now nearly all university researchers report knowledge of OA. Statistics Sweden (SCB) has estimated that 75% of all money invested in research activities in Sweden is done by private companies. In spite of this, the private sector has been relatively absent from the Open Access discussion and development, in contrast to the universities.

The goal of this project was to study the advance of OA practices in the private sector. The method was to visit a number of Swedish companies and present the OA concept. After the presentations web-based surveys were distributed to measure previous knowledge of OA, publishing and readership practices, and views of the matter.

There is less knowledge and awareness of Open Access within companies than at universities, although it seems to increase with publishing practices and higher educational degree. The publishing practices, and to a lesser extent the reading practices, of scientific articles are less frequent within companies, which could lead to a skewed funding situation for a future Open Access-economy based on an “author-pays” model. When discussing how companies might pay for Open Access we therefore suggest that the flow of information is guarded so that access to scientific data does not become limited for companies and industry in a new way, as is already seen by some Open Access journals. How publications may be used differs depending on whether you work at a company or at a university. The researchers’ access to information should be the same irrespective of where you work.

Sammanfattning

Open Access definieras som fri, omedelbar, permanent tillgång till vetenskapligt material i fulltext. Redan idag använder sig universiteten av Open Access, och en stor andel forskare anger att de har kännedom om OA. Statistiska Centralbyrån (SCB) har gjort uppskattningen att nära 75% av alla pengar som investeras i svensk forskning kommer från privata företag. Trots detta verkar inte Open Access-diskussionen ha nått fram till den privata sektorn på samma sätt som den gjort på universiteten.

Projektet hade som mål att studera utvecklingen av Open Access-aktiviteter i den privata sektorn. Metoden var att besöka ett antal svenska företag och presentera OA-konceptet. Efter presentationerna skickades webbaserade enkäter ut för att undersöka tidigare kännedom om OA, strategier för publicering och läsfrekvens, samt attityder i frågan.

Kännedomen om Open Access är lägre i de privata företagen än på universiteten och verkar öka vid högre utbildningsexamen och vid högre publiceringsfrekvens. Publiceringsfrekvens och i mindre utsträckning läsfrekvens av vetenskapliga artiklar är lägre på de privata företagen, vilket skulle kunna leda till en sned betalningsfördelning i en Open Access-ekonomi som baseras på "author pays"-modellen. Vi föreslår att man slår vakt om informationstillgången i diskussionen om hur företagen kan bidra ekonomiskt, så att fördelarna med tillgång till vetenskapliga resultat inte begränsas på företag, vilket redan idag sker i vissa Open Access-tidskrifter. Forskarnas tillgång till information bör vara densamma oavsett om de arbetar på företag eller universitet.

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1. Background and purpose

1.1 About Open Access

A commonly used definition of Open Access (OA) is the free, online, immediate, permanent access to scientific and scholarly material in full-text, in particular research articles published in peer-reviewed journals.

For a researcher who wants to make his/her research freely available to anyone, there are different ways to accomplish this. Publishing articles in Open Access journals, the so called *Golden Road to Open Access*,¹ gives the end-user immediate access to research articles in full-text. The author also most often keeps the copyright to the work. Today, a large number of Open Access journals are available to the reader with no subscription fee. The service Directory of Open Access Journals, DOAJ,² gives an overview of Open Access journals that have either peer review or editorial quality control. The funding schemes of the OA journals differ. Some OA journals are funded by publishing fees, while others are free to publish in.

An alternative way of making research freely available is the deposition of a version of an article, either the pre-print (pre-referee) or the post-print (post-referee),³ in an institutional or subject-based repository. This is called self-archiving, or the *Green Road to Open Access*.

Some traditional journals offer a hybrid option, in which case the author or the author's research funder can opt to pay in order to get the article published with Open Access.

Many universities, funders and policy makers have now signed the Berlin Declaration⁴ and encourage their researchers to publish Open Access. There is also a move by national and international research funders to require free access to publications resulting from their funding.

1.2 Research money in Swedish R&D enterprises

Statistics Sweden (SCB) has estimated that 75% of all money invested in research activities in Sweden is done by private companies. In SCB's report, *Total expenditure for research & development*, the 2007 prognosis for research money invested by private enterprise was 83 billion SEK.⁵ Expenditures for R&D in universities and institutions of higher education amounted to around 23 billion SEK in 2007.

A considerable amount of company-based research is done in large international collaborations and research programmes, and information needs are very similar to those of universities. In spite of the similar approach to research, the Open Access discussion has not penetrated the private sector in the same way as it has in the educational institutions. Rather, companies are commonly referred to in the Open Access discussion as possible obstacles, since they currently fund a considerable part of the research publishing through subscription and reprint costs, which may not be replenished in a future author-pays economy.

¹ http://en.wikipedia.org/wiki/Open_access_journal

² <http://www.doaj.org>

³ <http://www.sherpa.ac.uk/romeoinfo.html#prepostprints>

⁴ <http://oa.mpg.de/openaccess-berlin/berlindeclaration.html>

⁵ http://www.scb.se/templates/tableOrChart_242528.asp

1.3 Aim of the project

The aim of this project was to study what role Open Access can play, or plays, in a number of different Swedish industries' R&D departments, and how these industries might be able to contribute to publication costs in an Open Access model of scientific publishing. The following questions were addressed: Is the Open Access concept known to private sector researchers? Do companies with in-house R&D operations consider themselves to have adequate access to scientific publications today? To what extent are Open Access publications used? How is scientific information used by publishing versus non-publishing staff? How can companies contribute to the cost of a future Open Access research publishing? The project combined site visits to a number of private companies, during which presentations about Open Access were given, with two web-based surveys following the site visit.

Project participants were Håkan Carlsson, Helena Stjernberg, Ros-Mari Kristiansson, Per Sulg and Lars-Håkan Herbertsson. Håkan Carlsson, of Lund University/University of Gothenburg, has a scientific research background. He has also been responsible for the Scientific Communication and Electronic Publishing Department at Lund University Libraries' head office. Helena Stjernberg, currently at Lund University Libraries head office, earlier worked at AstraZeneca R&D and works extensively with Open Access related issues. Ros-Mari Kristiansson at AstraZeneca Mölndal has a large contact network via the Swedish Association for Information Specialists and a many years of experience from the library sector. Per Sulg and Lars-Håkan Herbertsson, also at AstraZeneca, work with journals, licensing and compliance, and each has had extensive work experience in both library and the private corporate environment.

1.4 The private enterprises in this study

For this study only larger global industries were invited to participate. They were chosen because of their considerable in-house R&D activities, and almost all selected sites employed their own information specialist or library function staff. Several of the participating companies are large enterprises with their own R&D research in Sweden. Others are large on a global scale, but only have marketing branches in Sweden.

The selected enterprises were:

AAK – Aarhus Karlshamn, Karlshamn
Active Biotech, Lund
AkzoNobel, Stenungsund
AstraZeneca R&D, Lund
AstraZeneca R&D, Mölndal
AstraZeneca R&D, Södertälje
Biovitrum, Stockholm
DuPont Chemoswed, Malmö
Höganäs AB, Höganäs
Nobel Biocare, Göteborg
Novartis, Stockholm
TetraPak, Lund

2. Methodology

All in all 14 presentations were held at 10 different companies in Sweden. A total of five presentations were held at AstraZeneca sites in Sweden. All companies are reported in section 1.4.

The on-site presentations focused on defining Open Access and self-archiving (self-archiving author versions of articles and Open Access journals) and explaining SHERPA/RoMEO and publishers' policies. The presentation provided information about how to find Open Access journals and articles, the function of peer review or editorial boards, and governmental policy decisions like the NIH mandate (the Public Access Policy).⁶

After the presentation, web-based surveys were sent to participants who had attended the presentation. One web-based survey was sent to researchers, and a separate survey was addressed to the information specialists and their work in relation to Open Access. Both surveys were web-based and sent in personal e-mails to the staff that partook in the presentations. The surveys are published as supplementary material to this report.⁷

Data was collected and later analysed in the statistics suite SPSS. A total of 110 responses were collected from researchers and 24 from information specialists.

As a control, a smaller survey was also conducted at Lund University and University of Gothenburg. The aim of this survey was mainly to check to what extent the concept of Open Access is known among researchers within academia and to see whether reading and publishing frequencies differ between university and industrial researchers. The control survey was answered by 67 university researchers and technical staff.

⁶ See Supporting material 1

⁷ See Supporting material 2

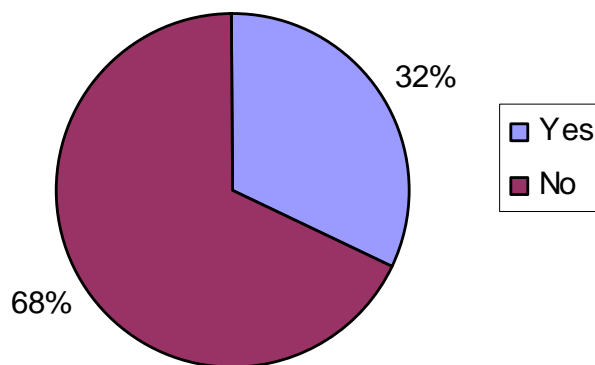
3. Results

3.1 Results from the web survey for enterprises' researchers

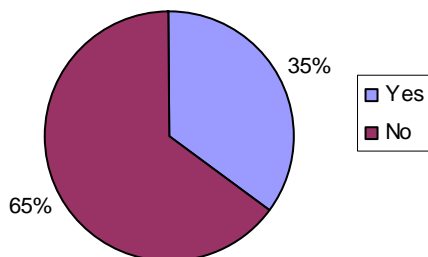
3.1.1. Knowledge of Open Access as a concept

There were 110 industrial researcher respondents to the web survey in this study. The quantitative data is summarized in figures 1a-e. Of the 109 respondents replying to the question, 32% claim to have had knowledge of Open Access before they heard our presentation, 68% had no prior knowledge of Open Access.

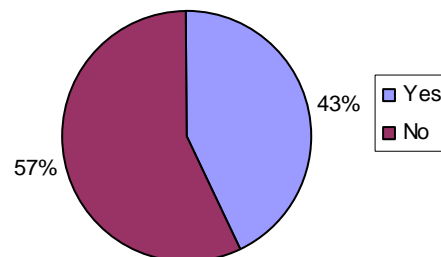
Fig 1a. Knowledge of Open Access among all respondents



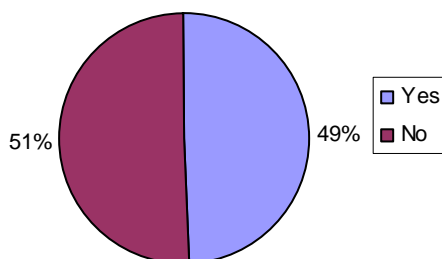
b. Knowledge of OA among persons with degree after 1995



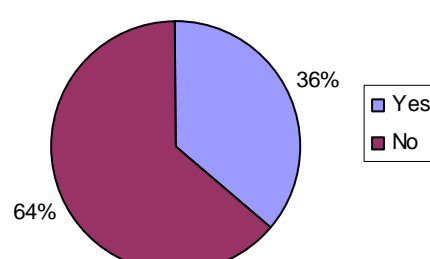
c. Knowledge of OA among persons publishing every year



d. Knowledge of OA among persons with at least doctorate degree



e. Knowledge of OA among persons in the medical field

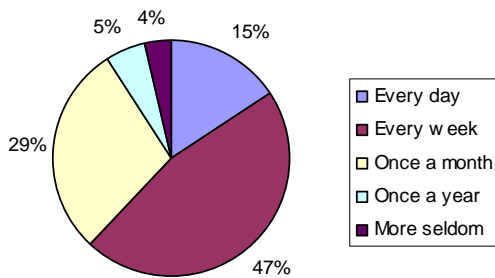


The knowledge of OA had some dependence on the age of the highest degree, publishing practices, final degree and field. This data is seen in fig. 1b-e.

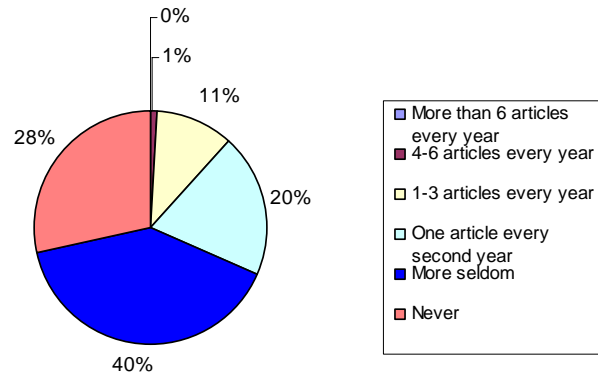
3.1.2. Scientific article reading and publishing practices

To find out more about the reading and publishing frequency for industrial researchers, they were asked how often they read scientific journals with original articles. The result is seen in Figure 2a. Of the 110 respondents, 62% read scientific articles every week, while 38% report lower reading frequency.

2a. Reading practices of scientific articles



2b. Publishing practices of scientific articles

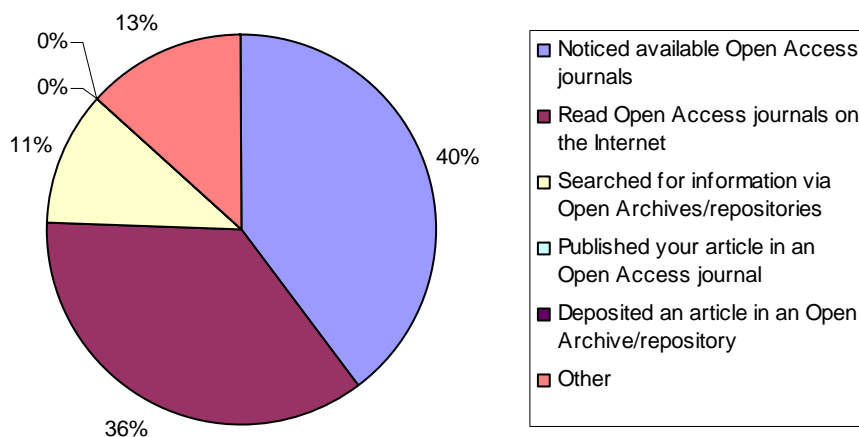


When it comes to publishing of articles, 32% claim to publish a scientific article at least every other year. There is a close correlation between the yearly staff publishing rate and high readership. All researchers in the 32% most publishing staff also reported daily or weekly readership.

3.1.3 Industrial researchers' present and future usage of Open Access

For the most part, industrial researchers have noticed and read Open Access journals available on the Internet. None of the respondents has published an article in an Open Access journal or deposited an article in a repository.

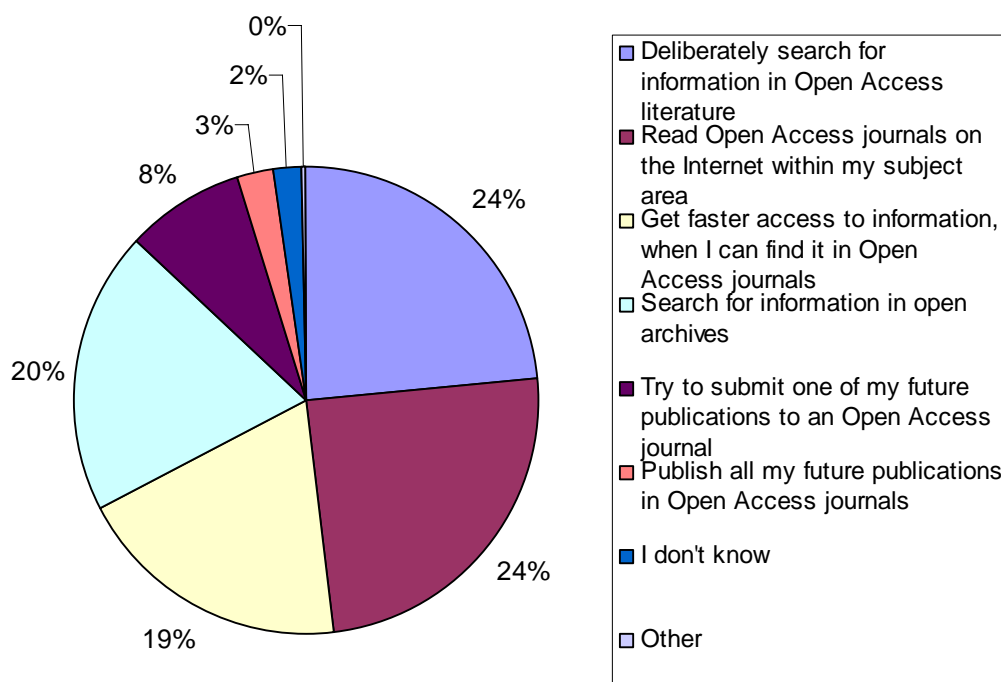
Fig. 3. Reported use of Open Access



3.1.4 Value of Open Access

When choosing from a number of alternatives, increased access to literature is what industrial researchers consider Open Access's most valuable asset. Searching for information and reading OA journals are the most highly valued alternatives.

Fig. 4. Future benefits of Open Access



The accessibility to scientific resources at the companies is by a number of researchers considered as a general problem. Of the respondents, 25% considered that the access to information was very good, while 35% regarded it adequate or lacking. This might increase the value of OA as an information source.

When given the option to write freely about worries or concerns regarding Open Access ("What disadvantages/problems do you see with Open Access?"), 45 out of 110 persons answered the question. Four areas of concern became apparent:

- Despite the fact that we, in our presentation, gave information on the number of Open Access journals with peer review or editorial boards that are available via e.g. DOAJ⁸, and how the process of self-archiving with author version works, many of the responses expressed concerns to the review process in Open Access journals. One person responded that "There are actually no disadvantages apart from the fact that knowledge of Open Access is still limited and the most common argument that one hears is that these journals do not have peer review".

⁸ <http://www.doaj.org>

- Other comments had to do with merits in Open Access journals, i.e. that many Open Access journals still have low impact factors and that the researchers feel uncertain of the assessment of qualification (validation of research quality) that the journals can give you in contrast to publishing in already recognized, non-OA journals.
- Another area concerned the selection of Open Access journals – within certain subject areas there are simply not any journals available to choose from according to the respondents.
- Two comments regarded payment models, and particularly the “author-pays” model. It is seen as a disadvantage that the author has to pay for publishing his/her article.

3.2 Results from the web survey conducted at Lund University and University of Gothenburg

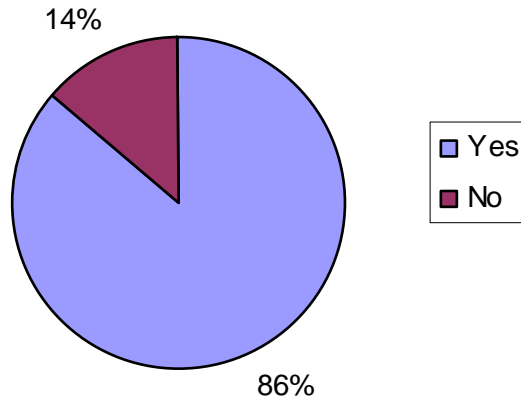
As a reference, a smaller web survey was also conducted at Lund University and University of Gothenburg. The survey was distributed through the library homepage, with the assumption that that would attract a similar group of people as the one attending library presentations of Open Access at the companies.

Out of a total of 109 respondents, 67 identified themselves as researchers. The rest were students, library staff and others. The presented results are based on the 67 researchers only.

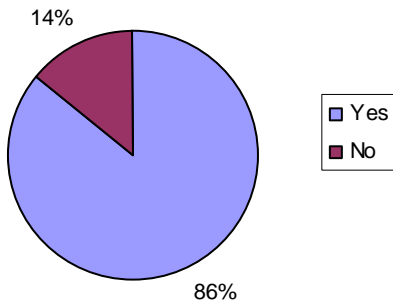
3.2.1. Knowledge of Open Access

Of the 67 respondents, 58 answered the question about knowledge of Open Access. Of these, 86% were familiar with the concept of Open Access. The information can be seen in figure 5a.

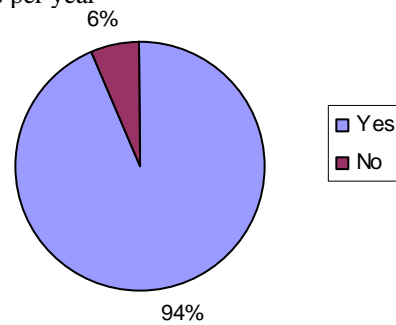
5a. Knowledge of Open Access among all respondents



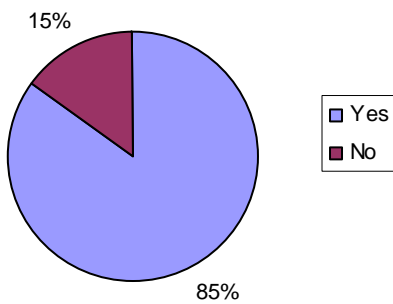
b. Knowledge of OA among persons with degree after 1995



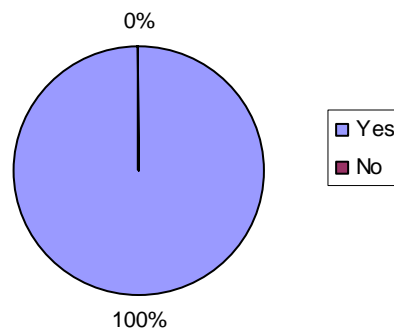
c. Knowledge of OA among persons publishing at least 4 articles per year



d. Knowledge of OA among persons with at least doctorate degree



e. Knowledge of OA among persons in the medical field

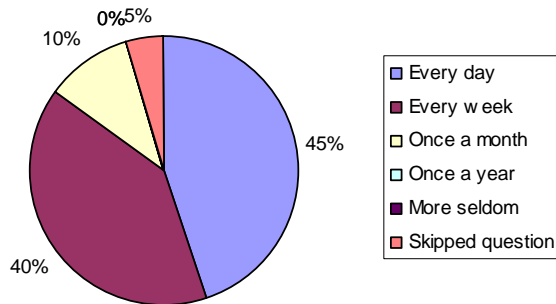


The knowledge of OA has some dependence on the publishing practices and field. This data is seen in fig. 5b-e.

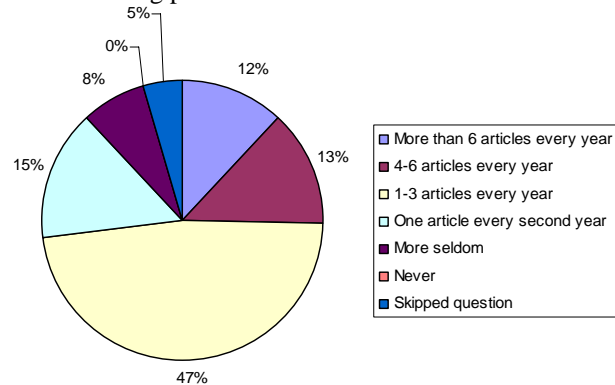
3.2.2. Reading and publishing practices of scientific articles

To find out more about reading and publishing frequency for university researchers, they were asked how often they read scientific journals with original articles. The result is seen in figure 6a. Of the 67 respondents, 85% read scientific articles every week, while 15% report to do it less frequently than once a week.

6a. Reading practices of scientific articles



6b. Publishing practices of scientific articles



When it comes to publishing of articles, 87% claim to publish a scientific article at least every other year.

3.3 Results web survey to information specialists

The industries' access to research results and scientific information is by the information specialists generally judged as good or very good, and if there are any obstacles to reaching this kind of information, they are due to lack of time and because of the expensiveness of the information resources.

Many of the companies in the study have over 100 electronic journals on subscription and they pay more than 100 000 SEK for this every year. They also have access to databases, which they subscribe to.

Several of the industrial information specialists claim that the enterprises have a need for reprints. 8 out of the 18 information specialists who responded to the question said that the company uses over 100 reprints every year, but almost as many, 7 out of 18, were unaware of the number of reprints used or could not answer the question.

Almost all of the information specialists are aware of the concept of Open Access and have included Open Access search tools and resources in the corporate information systems. To the question if there are reasons to increase the knowledge and the usage of Open Access at the company, some of the positive responses emphasized the time aspect ("faster access"), the cost aspect ("Reduce subscription costs") and competitive aspect ("necessary to be updated on what is written within the Open Access area").

When asked whether they see any disadvantages or problems with Open Access, some of the comments from the information specialists were:

”No disadvantages, but the traditional publication models with journals with high impact factors are still firmly established [...]”

”Changing the researchers’ behaviour will not be easy [...]”

“[...] problems getting copyright cleared reprints for Open Access articles”

”[...] difficult to know what is quality controlled and what is not”

“Prestige, Impact factors are generally low”

” [...] One question regards the aspect of patents – what sources are approved and which are found when patent offices are looking for prior art?”

4. Discussion

The project yielded a lot of interesting information, both based on the survey results but also based on discussions with presentation attendees and within the project group. Below we have highlighted some of these discussion topics.

4.1 Statistic significance

The survey results are based on a rather small sample. Our goal in the project was to visit 12 company sites, and from the number of presentation attendees and based on the answering rate of the surveys we had a limited number of resultant complete surveys. Therefore it is important to primarily look at trends in the data and therefore we have tried to focus our attention to large and significant differences. It should also be pointed out that the data is weaker where only a part of the answers were used, such as 1b-e and 5b-e.

4.2 Knowledge about Open Access

In the companies, 32% claimed that they had previous knowledge about the concept of Open Access before the presentation. This percentage is affected by publishing habits and highest achieved academic degree. In the comparative study in a university setting, the percentage is 86%. The concept of Open Access is generally much more widely understood in the academic research field compared to the industrial research environment. The dependence on highest degree in companies might indicate that people with a postgraduate education in the past have closer interactions with the publishing academic setting, and therefore are better informed.

The recent focus on undergraduate Open Access training through the deposition of diploma works and reports does not seem to have affected the outcome. Since the researchers primarily value OA as a way to access information, the importance of undergraduate exposure to the access discussion is valuable.

In general, the dependence on the age of the degree shows very little significance. The study suggests that the knowledge of Open Access in companies is mainly spread as a part of the publication practice. This should have favoured OA journal publishing and disfavoured the repository practice. The result in Figure 3 supports this and corresponds with the lack of institutional repositories at companies.

4.3 Reading and publishing articles

Figures 2a-b and 6a-b report the publishing and reading frequencies of scientific literature in companies and universities. When comparing the charts, results show that the reading frequency is somewhat higher in this study’s university researcher group than in the industrial

researcher group. The number of researchers reading academic papers every day is especially high at the universities. The university reading of scientific material averages an every other day pattern, while the industrial reader averages just a little more than weekly academic reading.

An even larger difference in behaviour is seen in the publishing practices. Here the university respondents average three publications per year, while the industrial researchers report one publication every 2-3 years on average. This means that the ratio between reading and publishing is 220 for company researchers and 70 for university faculty, a factor difference of 3.1. The fact that readership and publication activity correlates well may indicate that this ratio may be applicable to a range of company sizes.

Industrial researchers claim they are willing to use and search for Open Access material (around 70%), but only around 8% would like to make sure that all forthcoming publications are made Open Access. Every fourth scientist would consider submitting one of their future publications to an Open Access journal, which is comparable to the number of researchers that publish one or more articles per year.

Both the information specialists and the researchers at the companies are generally positive to Open Access, but still see obstacles for the Open Access development. Misconceptions about quality control in Open Access journals still exist, in addition to concerns that the availability of Open Access journals is not wide or specialized enough, especially considering certain quality criteria.

Even though most of the companies in this study were global, the existing publishing modes varied due to the different nature and level of research. Some of the companies publish mainly internal reports that are shared within the company only, while other companies have publishing agents who have control over where and when an article may be published in a scientific journal. This heterogeneity may affect the survey results.

The question whether companies will participate with article processing charges in the future remains unanswered, but the attitudes towards Open Access are positive both among information specialists and industrial researchers. We would not expect that a migration from a subscription model to an Open Access model would be more problematic for the companies than for the universities.

4.4 Company usage of Open Access articles in journals and repositories

As a result of the project and the discussion of Open Access and its relation to private companies, a special light has been shed on the issue of copyright and special arrangements for commercial entities. Normally when we speak of Open Access we mean free, unrestricted access to scientific literature. However, what different user groups are allowed to do with the publications differs. The usage of Open Access publications for companies is unfortunately not as straightforward as one might wish. When searching for publishers' policies in the copyright policies database SHERPA/RoMEO the restriction "*On non-commercial author's website or repositories*" or "*Non-commercial use only*" is very common. But what does non-commercial actually mean? The publisher Wiley clarifies that "On author or institutional server or e-print server (not for commercial sale)", i.e. that digital versions of the author's pdf must not be sold via the server. But can it sometimes also mean that author's versions should

not be uploaded on servers that belong to a commercial enterprise?

The NIH (National Institute of Health) Public Access Policy⁹ became US law in 2007. It requires that all published results from research funded by NIH must be made available to the public in the PubMed Central (PMC) archive¹⁰ no later than 12 months after the official date of the publication. The American Fair Use principles apply to these PMC manuscripts. Despite the papers being *open to download* for the public, they are not Open Access per se, which usually involves a license that allows more liberal use than Fair Use. Since private enterprises are not covered by Fair Use they cannot use the papers in any other way than reading on the computer screen. This confusing situation provides a challenging task for corporate librarians, who will need to educate end-users about the difference of the various levels of “free” content. In particular it is difficult that the Fair Use information is not indicated on individual manuscripts, only on a general info page in PMC.

As regards the usage of Open Access journal articles as reprints, Open Access publishers like Public Library of Science (PLOS) and BioMed Central state on their web sites how articles can be used. BioMed Central declares that “Authors also grant any third party the right to use the article freely as long as its integrity is maintained and its original authors, citation details and publisher are identified.”¹¹

PLOS uses the Creative Commons Attribution License (CCAL) for all works they publish. “Under the CCAL, authors retain ownership of the copyright for their article, but authors allow anyone to download, reuse, reprint, modify, distribute, and/or copy articles in PLOS journals, so long as the original authors and source are cited. No permission is required from the authors or the publishers.”¹² This, as compared to the example with the PMC manuscripts, is very helpful for corporations since there is clear information on each article or journal that the material is Open Access and exactly what it means.

In turn, the Directory of Open Access Journals (DOAJ) reports a large number of journals using the CC-BY-NC Creative Commons license. This license omits uses for commercial purposes. Whether this includes the commercial aspects of scientific products resulting from the use of scientific input from licensed publications is not clear. Careful companies interpret it that way, which already limits the use of the publications. The diverse nature of the smaller publishers in the Open Access arena may also make copy-clearing more difficult than in the normal case.

4.4 Open Archives for enterprises?

Would it be possible for a private company to start their own Open Archive so that industrial researchers could upload author versions of articles? Perhaps that is questionable due to the description above regarding non-commercial servers.

An ongoing project is the pharmaceutical company Novartis’s Open Archive.¹³ The solution this company has chosen is to give free access to peer-reviewed and published articles that have been cleared for Open Access.¹⁴

⁹ <http://publicaccess.nih.gov/>

¹⁰ <http://www.pubmedcentral.nih.gov/>

¹¹ <http://www.biomedcentral.com/info/about/copyright>

¹² <http://www.plos.org/journals/license.html>

¹³ <http://pubs.or08.ecs.soton.ac.uk/23/>

As this project is not aiming to clarify copyright issues, we will not go too deeply into these questions, but during the project we have noticed uncertainty from the researchers and librarians regarding usage of author versions in open archives/repositories. Can author versions be used as reprints? And what about uploading author versions in institutional repositories in relation to patents: will uploaded author versions be prior art in patent trials?

5. Conclusion

Open Access is known among industrial researchers, but they are not as familiar with OA as university researchers are. Researchers get acquainted with Open Access through the publishing process, which is more prevalent at the universities, where the university libraries in Sweden also make an impact. Open Access is mostly seen as a source for scientific material in the companies, but a large part of the publishing researchers would consider publishing in an Open-Access journal. Self-archiving is usually not an option for companies, as author versions in many cases can only be uploaded on author web pages or in institutional repositories.

It has been discussed in the Open Access community both whether and how private sector companies might be able to contribute to publication costs in an Open Access model of scientific publishing. There are questions regarding the risk that private corporations and companies might become free riders. We conclude that there is indeed a difference in the ratio of the number of read articles to the number of published articles between companies and universities. In the discussion of how this difference may be replenished economically, we would like to suggest that the information flow be left untaxed. The opposite is a turn back to something even more complicated than today's system. In a future Open Access model of scientific publishing, there are different options. Among these options we suggest that institutional memberships, which become more and more common, could be extended to companies at a higher fee. Perhaps a limit in the reproduction rights for companies, encouraging routine practice where companies pay publication costs for collaboration publications could be an alternative. Higher publication fees for companies might be an option, but considering that many publications have authors from both universities and companies, this might get too complicated. Membership programmes or sponsorship for companies who want to take part and create a sustainable financial foundation for the Open Access publishing environment might be a possible solution.

6. Future projects

Many copyright issues within Open Access and enterprises are to our knowledge still unresolved, or at least need further investigation and clarification. A project focused on these issues would be valuable and make it easier for the private sector to use Open Access, and provide more incentive to industry for paying Article Processing Charges.

¹⁴ According to e-mail correspondence with Christian Gumpenberger, formerly at Novartis

Supporting material 1:

PowerPoint presentation about Open Access (Swedish)

<http://luur.lub.lu.se/luur?func=downloadFile&fileOID=1272366>

PowerPoint presentation about Open Access (English)

<http://luur.lub.lu.se/luur?func=downloadFile&fileOID=1272368>

Supporting material 2: Survey results (in Swedish) from:

Company researchers: <http://luur.lub.lu.se/luur?func=downloadFile&fileOID=1272364>

Information specialists: <http://luur.lub.lu.se/luur?func=downloadFile&fileOID=1272362>

University researchers: <http://luur.lub.lu.se/luur?func=downloadFile&fileOID=1272360>