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Opening Academics

Opening access in the academic world



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Opening access in the academic world

Scientific publishing in general

Scientific publishing has been dominated by a few larger publishers, who have been able to raise the journal prices faster than the inflation rate justifies. Especially in basic sciences journal prices have increased 60-98% between 1995 and 2001 (Valsiner 2006). The situation is referred as price crisis, because higher prices hinder journals' accessibility (McCulloch 2006). The dominance is easy to maintain, since journal with quality articles attracts more article submissions and thereby the probability of good article submissions increase. In small study areas the dominance is exceptionally solid, because there aren't enough quality studies.

In scientific publishing it is vital to have conformance within journal, and the review process is an important foundation for creating scientific information. Traditional publishing has still some problems, some of which are process slowness, excessive uniformity, falling in to editorial expectations, and power political playing (Rantanen 2007). Worst issues cause delays in the accumulation of scientific information and hinder the effect of new ideas (Valsiner 2006). However, the reference value of top journals gives publishers' power to neglect these issues.

In some universities publishing in top journals correlates very strongly with researcher's future incomes and career development. Therefore goal orientated young researchers can't neglect the A-list journals defined by scientific societies. When young researchers make sure their papers get published in a top journal, revolutionary ideas are best left out (Rantanen 2007). Senior researchers on the other hand are more likely to benefit from new publishing models. Usually they already have achieved enough reputation and a permanent position and thereby have less pressure to publish in traditional A-list journals.

There are several methods to rank journals, articles and authors, and these methods allow easy and fast identification of quality material. The most popular method is to calculate the journal impact factor (JIF), which constitutes how many citations the journal has received per article, usually on a recent two year's period. While this is the best method available, it still has many defects. Major problems in the method are the unequal coverage of databases and also the differences in geographical and study areas (Stenius 2003).

The impact factor method is also volatile for manipulation (on purpose or not). Many prefer to cite their colleagues or superiors to make impressions or favors. There aren't any indisputable studies that would state that citation correlates precisely with quality. For example when defining new concepts or study areas the article will more likely have a lot of citations (Rantanen 2007). Also new journals will not have a qualifying impact factor during the first two years after startup (Stenius 2003). Despite their deceptiveness, impact factors are a noticeable reason why new journals find it hard to disturb the existing dominance.

2 Open access and scientific information

There are two kinds of open access, green and gold. Green open access is not publishing, it is self archiving on author's or institute's homepage or alternatively into an institutional or subject based repository. Golden open access, on the other hand, is publishing, but its cost structure differs much from traditional. The basics are that all reviewing policies stay the same, but article processing costs (APC) are transferred from readers to authors or as in most cases to author's financier. The purpose of this transfer is to widen information availability making it free for public to read, print and distribute an article, which enables free access even without internet connection nearby. Open access model also removes the need for publishing queues between acceptance and publishing and it does not have any limits in article amounts. Implementing open access increases information's accumulation and gives poorer countries a better access to research findings (McCulloch 2006).

The first major step in open information sharing was an e-prints archive ArXiv.org, created by Paul Ginsprang in 1991, which contains papers from mathematics, physics, computing, etc. This collection of scientific papers contains now over 424

000 e-prints. Supporting this movement an Open Access Initiative (OAI) framework was constructed to unify electronic archiving standards. To make e-prints metadata handling more consistent an Open Access Initiative - Protocol for Metadata Harvesting (OAI-PMH) was also developed (Carpenter 2003). Following the ArXiv's example PubMed Central (over 700 000 biomedical e-prints) and RePEc (over 212 000 working papers and 263 000 articles in economics) were founded in 1997 (Suber 2007).

The first open access journal was published already in 1987, but it lacked a true business model. Since today open access (OA) publishing has developed a lot and feasible business models have been developed (Crow & Goldstein 2004). Today Lund University's Directory of Open Access Journals -database lists over 2 800 scientific and scholarly open access journals. It serves also as a centralized article search engine for open access journals. Many open access journals have been quite short aged, but some of them have developed rapidly and are rated among the top of its field (McCulloch 2006).

To support open access movement several lobbying and research groups have been established. Globally active SPARC (Scholarly Publishing and Academic Resources Coalition) has 800 member institutions and aims to correct the imbalances in scientific publishing systems. It focuses on endorsing new scholarly communication models and thereby expands the dissemination of research results and moves the financial pressure away from libraries. In order to gain more influence in Europe, local research libraries established a partner group, SPARC Europe. Members of SPARC Europe include many of the biggest universities in Europe and all the Finnish universities. Also an unofficial Finnish FinnOA workgroup is working on promoting open access scholarly literature. Their workshops are open for everyone and the discussed topics include open access publishing, institutional archiving and even open source development.

EU funded project SciX studied and demonstrated the benefits of free scientific publication

from February 2002 to April 2004. One of SciX goals was to trigger a political discussion of an EU directive to open the access to publicly funded research (SciX 2003). In January 2006 a European Commission study on the matter was indeed published. OACS (Open Access Communication for Science) project at Hanken (Swedish School of Economics and Business Administration) continues partly the SciX's research. OACS seeks also to change attitudes towards internet as an information facilitator and studies copyright agreements and their effects on information dissemination (OACS 2006). Finnish Ministry of Education has also made its own recommendations to promote open access in scientific publishing. These recommendations include that institutional repositories are established; researchers are encouraged to archive; funding agencies accept article processing costs as a part of their funding; journals and learned societies offer their publications openly as soon as possible and allow self-archiving; and libraries support institutional archiving movement (Karjalainen & Kuusela & Hormia-Poutanen 2005).

In addition to the open access groups, a lot of other supporting factors have been developed to facilitate the open access development. Several pieces of software have been developed by open source projects to show that developing internet archives and journals doesn't have to be expensive and hard. Public Knowledge Project has developed an effective open access journal management and publishing system, a similar conference system and an open access archives harvester. Most popular e-prints archiving systems (DSpace and Eprints.org)

are also developed on the basis of open source. Also to facilitate information spreading, Creative Commons (CC) has developed license models of customized copyrighting for authors named Science Commons (SC). With Science Commons the author can decide which rights to relinquish and which to retain. By using reduced copyrights author makes information's dissemination easier.

3 Structure, finance and impact of open access

Several studies have stated at least some increase in citation counts when open access is adopted, but an extensive all covering study is still yet to come. There are three main postulates that have been used to explain the citation increase of opened papers: Open Access, Selection Bias and Early View. Open Access states that authors are more likely to read and thereby cite open access articles. Selection Bias states that best authors, who also usually don't have to follow the A-list, are more likely making their articles open. Finally Early View states that earlier article revealing lets it accumulate citations earlier. Especially Selection Bias and Early View postulates have to be considered carefully when conducting citation impact research (Craig et al. 2007).

3.1 The Golden route

As stated before, one of the main benefits of open access is the fastened accumulation of information. The process chart for accumulation in traditional publishing is presented in Figure 1. Publishing

process starts from "Article" submission and ends at article and source indexing. Dissemination of the article starts from "Recognize need" and ends after new information

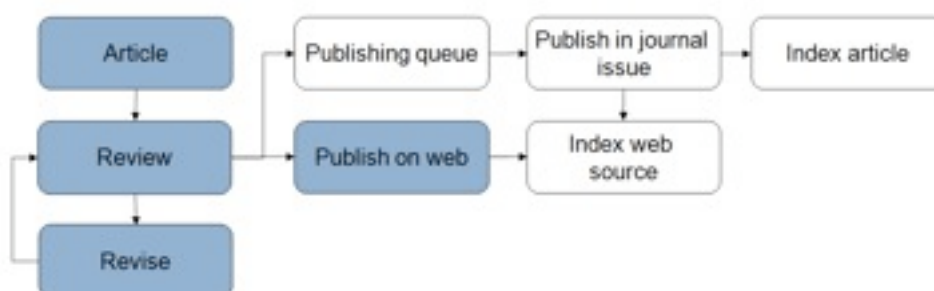


Figure 1.a – Traditional article publishing process

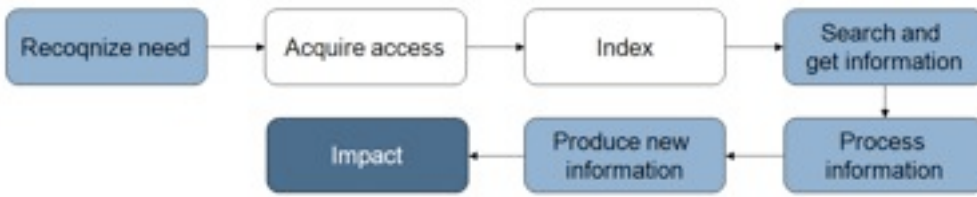


Figure 1.b – Traditional information dissemination process

is created on top of the previous research creating “Impact”.

Stages, which can be removed by implementing open access, were presented in white. In a publishing process the white stages cause queuing, journal size limitations and doubled indexing. When seeking information one can acquire access as an individual or through a library. As an individual you don’t have to index your acquisition, but when operating through a library indexing is usually required before public access. Instead in open access publishing, the chart presented in Figure 2, the process is a lot simpler, linear and essentially shorter. This enables faster publishing, easier access, faster proof of impact through citations and more efficient accumulation of information (Hedlund & Björk & Holmström 2004).

The faster process and easy availability generates more citations, but for example in social and business sciences there aren’t any viable studies that would prove a significant citation increase. But for example in electrical and electronic engineering and also in political science there are implications that



Figure 2.a – Open access article publishing process

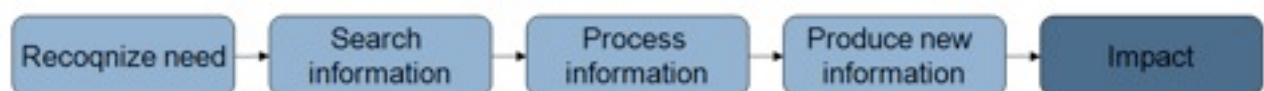


Figure 2.b – Information dissemination in open access publishing

citation count increases clearly by adopting open access (Antelman 2004). In biomedical sciences and basic sciences there are

clear indications of a greater citation impact, sometimes even by 100 %. Study conducted by Oxford University Press implicated that including some open access articles in the journal increased also the usage of non-open access articles (Nicholas & Huntington & Jamali 2006). The main subject of the study was NAR (Nuclear Acids Research) which has quite limited interest group and was made totally OA in 2003. In two years the usage of NAR increased 7-8% giving a larger focus on new articles. Also more full text articles were downloaded which by earlier studies is an indication of citation growth; assuming that the full texts were also read.

When considering a situation where all scientific journals would be openly accessible, the total cost for entire world is estimated to decrease. But all journals can’t adopt open access model without changing its contents model. For example Nature journal rejects approximately 90% of their submissions and has such a large amount of non-scientific articles (book reviews, etc.), that its article processing costs can’t be covered only by author fees (Weitzman 2004). Many larger publishers have included an optional open access model, because they don’t have the possibility to implement it fully. Processing costs per article with these publishers are for example: Blackwell Publishing 1950 €, Oxford University Press 1200-2250 € (depending on membership), Wiley Inter Science 3000 \$ and Springer 3000 \$. Unfortunately all the

journals of these publishers are not participating in optional open access. When implementing a full open access, processing costs should decrease. An open access publisher, BioMed Central, collects only 370-1775 € depending on the chosen journal. (Data collected on 26.06.2007)

In some cases the processing cost might be quite large, but for example Academy of Finland and Tekes accepts these costs as a part of their funding, however, the money isn't exclusively marked for the article processing cost. So the decision, whether to use it on article processing costs or not, stays in the hands of the authors. For developing countries some publishers (i.e. Blackwell Publishing, Oxford University Press and BioMed Central) offer altered prices. These countries are divided in two lists by poverty, from which A-list has no fees and B-list reduced fees.

Although open access is considered to be more effective than traditional publishing, it naturally has its own costs. Even without logistics and printing costs, technical costs might be noticeable due to maintenance, technical support and hardware costs, but this is a bigger problem with large publishers than small (Walport 2004). For smaller publishers there are very efficient and well developed software which is free of charge, developed and updated by open source basis. An example of quite developed software is Public Knowledge Project's Open Journal Systems (OJS), which assists in every phase of publishing from submissions to indexing.

3.2 The Green route

Some publishers are confronting open access movement in a different way, because they don't concur with its business models. For example Elsevier allows all authors to archive peer reviewed post-prints, which is the author's final version of the revised article. Publishers' policies concerning authors rights differ a lot, which has created a need for RoMEO by SHERPA (Rights Metadata for Open archiving by Securing a Hybrid Environment for Research Preservation and Access), which col-

lects the authors rights by journal and publisher. Some examples of the policies are: no self-archiving, only pre-print, post-print with an embargo time, immediate post-print or publisher's version post-print. The embargo time may alter from 6 to 24 months. Even if the publisher doesn't publicly allow self-archiving, many repositories have created a standard letter for requesting permission for self-archiving a particular article. Letter has to be from the original author and the publisher will make decisions usually one at a time.

At least five hundred institutions have set up institutional repositories using BePress, EPrints or DSpace, which are all OAI-PMH compliant. From these two DSpace is the most widely used, EPrints is said to be easiest to maintain and Be-Press is a commercial solution. Helsinki University of Technology (TKK) has also jumped on board with its own development, TKKDOC (also OAI-PMH compliant), and many other Finnish universities are joining the phenomenon mostly by using DSpace. By implementing institutional repositories, institutes can achieve many of the benefits of open access publishing (golden open access) without the article processing costs.

All OAI-PMH compliant repositories can be indexed effectively in OAIster, an 12 million e-print archive, and in continuously developing Google Scholar. OAIster has done a great development, but it is used best when searching a known article by its name or author. If search isn't aimed to certain article, the search results from 12 million documents may contain a lot of irrelevant and sometimes old information. There are also other issues with archives' interoperation, because new and better methods are developed all the time. For example, there are couple different protocols, like OAI-DC (Dublin Core) and OAI-AMF (Academic Metadata Format). Even when Academic Metadata Format is better suited for scientific articles, Dublin Core is still most widely used.

Institutional repositories are a good place to archive e-prints, but in fact their main disadvantage

has been their strong link to the entire institution. Universities may contain many different departments with relatively different study fields. It would be much more useful to create repositories in collaboration with other universities among related study fields. Combining similar study fields between universities gives a head start in categorizing. Global metadata harvesters would be much more effective, if they could harvest different study fields separately. Even though repositories should be divided according to study fields, their co-ordination and maintenance should be more centralized. At the moment there are already few institutional DSpace repositories in Finland, but they all have to face the same problems and maintenance times individually. University of Helsinki has at least four institutional repositories which are maintained separately: DViiikki at Viikki campus, Kata at Kumpula campus, Terkko TDS Meilahti campus and E-Thesis for thesis and series.

4 Attitudes towards the change

There is still quite profound resistance within scientific societies towards information dissemination and development via internet resources. Slowly but surely the change is happening when younger generations are replacing older. For the younger generations it is increasingly common to share and collect information via internet (Wikipedia, IRC and Forums) and in addition internet is forming strong sub-societies (Facebook and MySpace). Probably the greatest change in information society is yet to come, since like in industrial revolution the biggest change happened during the 50 years after the technological change. Already there are some efforts to bring scientific information (implementing peer-review and editorial processes) via open source, but these are still in very early stages of development (Zitocendium, Scholarpedia and Digital Universe).

Poorer countries are adopting open access attitudes faster, because it offers them a new more effective and cheaper access to scientific information. Even developed countries are beginning to have more interest in cheaper access, mostly because of increased journal prices and diminished library funding (Nicholas & Huntington & Rowlands 2005). The emergence of viable business model and the spreading of open access model attract continuously more publishers and institutional repositories. Along with the increase of open access material the assumption "all needed is online" becomes stronger. To gain noticeable attention in future, it might indeed be necessary to offer the information openly online. Also the indicators that open access might have greater impact, and the emergence of new repository harvesters, move us closer to open access models.

Among researchers there are varying attitudes towards open access (Nicholas & Huntington & Rowlands 2005). Open access journals are sometimes considered to be poorer quality and concerns about maintaining information in online service are stated. Still these journals follow the same peer review processes as traditional journals and some have even achieved the top quality level of their study field. When talking about institutional repositories, many researchers feel that their own web pages give them enough online features, but they don't see the benefits of centralized database. It can offer permanent addresses for e-prints and centralized maintenance and also disseminate the prints forward to search engines and other repositories. Authors are also frightened by diverse copyright policies concerning self-archiving, but as seen in recent years, younger generations are becoming less concerned about copyright issues.

The scientific and academic worlds are moving towards open access much faster in fields that produce vital information. Biomedical field has had the most effective drivers, which have given birth to BioMed Central and PubMed Central. In March 2006 Howard Huges Medical Institute (HHMI) end

Elsevier made open access even more effective. Howard Huges Medical Institute demanded that all publications under their funding must be made available at PubMed Central six months after publication. The institute agreed to pay compensation for Elsevier, who joined the arrangement. This decision improves the overall access to high quality information on biomedical sciences.

It could be stated that there is no time to archive or find out authors archiving rights. Thereby it is important to set up institutional repositories, where the archiving is more automated, information concerning archiving is centralized, development is continuous and data preserving can be done collectively (Weitzman 2004). In University of Helsinki at Viikki Campus there has been one person who collects copyright permission from publishers and conducts the DSpace archiving. Less work for authors means that participating in archiving is more tempting.

Pekka Kauppi, professor of environmental protection at Viikki campus, has had very positive experiences on their DSpace repository, DViikki, experiment (Kauppi 2007). In addition to the benefits of homepage archiving, students and fellow researchers are able to access the archived studies even from home. Openly viewable research papers are also good addition to researcher's curriculum vitae. Institutional repository enables easy evaluation of universities' quality or authors' competence, and competence between departments can also be compared more effectively. DViikki responds to the increasing demand of faster information dissemination in research and teaching. Utilizing open access shows interest towards openness and transparency in scientific research.

There might be very strong interest groups against open access movement, but there are also several actions to support open access. In January 2006 European Commission published the Study on the Economic and Technical Evolution of the Scientific Publication Markets of Europe, which offered an in-depth analysis of current scholarly journal publication market. The study recommended

several actions to be made, from which the most important was "Guarantee public access to publicly-funded research results shortly after publication". At the moment Key Perspectives Ltd is collection signatures to the European Commission petition in order to endorse the recommendations (www.ec-petition.eu). At the moment the petition has collected almost 26 000 signatures.

Similar development is undergoing all over the world (Harnad 2007). In United States the Federal Research Public Access Act is to be reintroduced to the current Congress. The act demands that public communities will have access to publicly funded research at least after six months embargo (www.taxpayeraccess.org). A similar demand has also been made by Indian government. Canadian Institutes of Health Research has a draft policy to demand all funded researchers to archive their work into OAI-compliant repository with a maximum six months embargo. Australian Research Council states that research findings funded by them need to be disseminated as widely as possible. If a study is not archived for open access, reasons are to be brought out in the project's Final Report. Norway is implementing government-sponsored institutional repositories in universities, university colleges and other research institutes through the Project for Electronic Publications and Institutional Archives, PEPIA (Joki 2007).

5 Possible issues and problems regarding open access

Most discussed problem in open access publishing is the cost structure and how it will affect peer reviewing policies. When publisher receives fees from accepted articles it could have a temptation to accept poorer articles in pursue for money. Such a journal would not have a very long lifespan, because readers would stop reading its poor quality articles and authors would not want to be associated with

poor quality (Weitzman 2004). In order to accomplish stable place in the market, journals have to build a solid reputation. In addition, open access journals' transparency makes it even more vital to maintain the quality, since anyone can fully access it and thereby determine the quality of its contents.

What if poorer quality submissions were to increase and thereby cause article processing costs per accepted article increase? In order to cover increased costs journal should raise fees, but alternative solutions can also be developed. Nature publishing has faced its costly review processes by listing journals according to their ranking. If an article is dismissed, its review comments and editorial opinions are passed to lower quality magazines; thereby the decision of acceptance can be made more effectively and faster.

A very relevant issue in open access movement is how the transition phase is followed through. When using an optional open access model alongside traditional publishing, authors are likely to pay a larger article processing cost fees than in full open access journals. Optional model opens up information, but the large fees may hinder authors' willingness to participate. When moving forward with optional model, the paying subscribers will probably diminish. Diminished subscription revenues will fasten the price increase for remaining subscribers. Either way, optional model is likely to have large author fees or subscription costs (Gass 2005). The best way would be a full transition, in which case these problems could be avoided. Risk with full transition is poor planning and implementation, which could lead to decreasing submissions rate and lower quality.

Many are concerned about the permanency and usability of online articles, including problems like dead links and irrelevant data. Universities around the world are building institutional repositories to avoid problems just like these. By implementing the use of DOI (used with EPrints.org and DSpace) or URN identifiers, repository can supply fixed addresses to documents, even if the server moves (IDF 2006). The usability of online articles

may also suffer if the data is poorly indexed. But since the change is still in its early stages, the databases and indexes improve continuously. To avoid too large databases, the subject based archiving is going to be vital in future development.

We should not underestimate the meaning of online information, since for example most information searching for master's thesis are done online (Juni 2007). Still the same study noted that there was true lack of online information seeking skills. Also web pages are often made quite unstructured and without good planning, which leads to unnecessary work when revising their structure and difficulties to describe its contents. There are two ways to improve this situation: to actively teach better methods and / or make online information more structured and accessible.

6 The situation at the DIEM and TKK and actions for change

6.1 Situation

The Department of Industrial Engineering and Management (DIEM) has a quite good access to today's scientific information, so there is no profound need for open access development. A quick glance at the optional open access journals of the largest publishers revealed that they include only a few management and engineering journals. Also smaller publishers in the field (i.e. Academy of Management Review and AoM Journal) seem very uninterested in additional online possibilities for publishing. Even by implementing Public Knowledge Project's Open Journal Systems they could probably achieve significantly improved overall processes.

Since there are only few possibilities to publish with open access method within the study field of industrial engineering and management, we should keep following the golden open access development and start implementing green open access.

TKKDOC-archive can archive dissertations, licentiate and master's thesis, reports, articles, conference papers and images, but it has a few disadvantages. It is compatible with AOI-PMH, which links its material to OAIster harvester and Google Scholar, but TKKDOC can't be indexed to RePEc (Research Papers in Economics), since it includes so much non-economic research. TKK's main library has decided to concentrate on archiving dissertations and thesis, because article archiving rights are seen as too complicated. In fact, libraries see articles archiving too much as a copyright issue, when the main focus should be on dissemination improvement. In addition to that it seems that at the moment recourses for TKKDOC are not even capable of processing all the data that could be archived from the whole university.

6.2 Actions

Universities should understand that publishing development and information dissemination is not only in the libraries' interests. When considering university's reputation as a research institute, it is an important issue which should be addressed jointly. When discussing with library's staff at main and department's library, it came clear that information is not spread evenly and as effectively as it should be. Librarians were aware of the TKKDOC service but could not give clear instructions how to proceed with articles archiving. Actually it seemed that there weren't any decided procedures. Not saying that library's staff would be incompetent, but it seems that resources are divided unevenly inside the main library.

The main library at Helsinki University of Technology has been archiving doctoral dissertations for a while now, but the same model is not quite the right for articles which are originally published in order to make profit for journals. Archiving can be done by authors' self-archiving, but it has some disadvantages. If archiving is voluntary, the archiving rate may be quite low. If it is made com-

pulsory, it may generate negative impressions (Stanger & McGregor 2007). In order to make it attractive to archive e-prints, a person should be devoted to maintain the repository and archive the already existing e-prints. Still whether to make archiving voluntary as bottom-up or compulsory top-down is one of the most important decisions. At the University of Kansas ScholarWorks repository administrators have found that voluntary archiving requires regular communication among faculty and continuous community building. Because the uptake has been slow, variety of strategies has to be pursued to promote and encourage archiving (Mercer & Rosenblum & Emmett 2007). Voluntary archiving is best suited for repositories with so much content and success, that it no longer needs to be promoted. This level of content is usually referred as the critical mass.

The EPrints repository at University of Otago was implemented in ten days, from which the most time was spent on shaping the looks and collecting material (Stanger & McGregor 2007). There is so much information around us (i.e. DViiikki, Kata, Terkko, OAIster and RePEc administrators and also the main library staff), that it should be quite easy to establish new institutional repositories. If a new repository is launched right, the workload of archiving existing material could be quite intense. But after archiving old prints and resolving their copyright permissions, it should ease up. Overall the workload is quite small compared to the achieved results. When reading and discussing about experiences in implementing an institutional repository and its usefulness, there has been no signs of regret.

At the moment the open access understanding at Helsinki University of Technology main library is quite good but passive; information concerning open access is available, but very little is done to promote it. The launch of TKKDOC-articles has been quite nonexistent, because it is not seen as a main focus for the library's operations. TKKDOC already has categorized the archive, but the emptiness, lack of growth and information shortage dis-

courages authors from participating. In addition, implementing our research only in TKKDOC doesn't give us very large coverage. The most effective way is to go towards RePEc and OAIster, and there are few ways to do so. An individual author can archive personal work to MPRA (Munich Personal RePEc archive), which provides data to RePEc, and TKKDOC provides data to OAIster. Still this is not the most effective approach.

Figure 3 presents how different repositories distribute e-prints forward. Personally archived e-prints can be spread as well as institutionally archived. But it is very hard to get all authors registering, filling forms and submitting individually, especially if they are not interested in it. And if a new and better archive is developed author would have to do it all again. Establishing our own archive would give secure preservation, easy alternation and mobility. When using TKKDOC we save the trouble of an-

other archive, but it has great limitations. Material at TKKDOC doesn't have access to RePEc and archiving of articles is not in its priorities. By establishing a new archive we could define our own policies for the archived material and its copyrights. This way our data would have access to RePEc, Google Scholar and OAIster. OAIster is also listed in Thomas Scientific Current Web Contents and RePEc has its search indexes EconPapers and IDEA, which are also increasingly listed in Google Scholar.

Institutional repositories around the world have been quite successful. Nebraska-Lincoln University have found that their voluntary based self-archiving rate has been quite low, but still have managed to collect thousands of e-prints, including articles, e-books, papers, presentations and master's thesis. The archive was established in July 2005 and after the first year it included 2 397 e-prints, which had

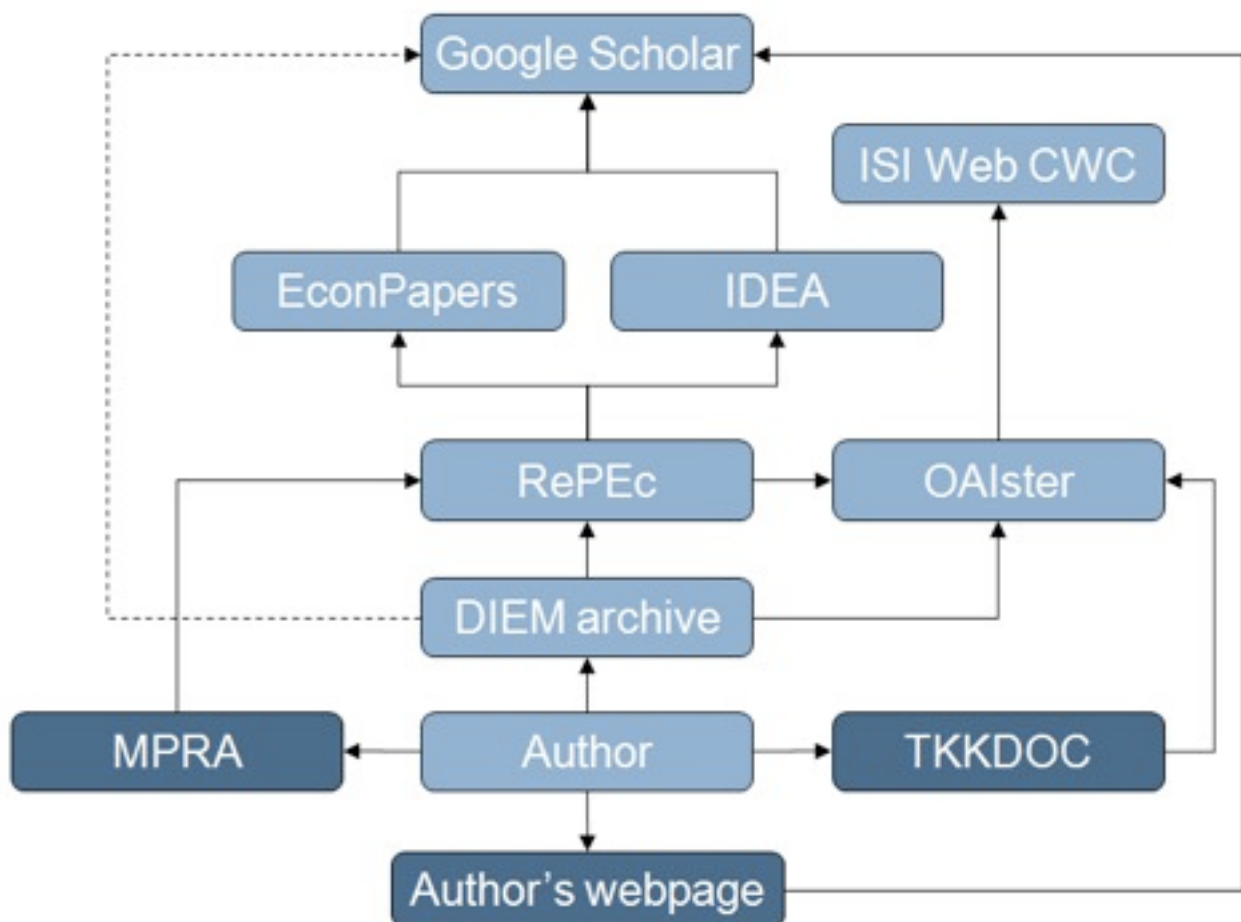


Figure 3 – The distribution of e-prints through different channels and repositories

been downloaded 58 743 times (Royster 2007). Today the size of the archive has grown to over 8 000 and one can just imagine what the current download rate is. Nebraska-Lincoln has also a separate archive for over ten thousand dissertation thesis, which had 34 862 downloads during the first year. Granfield University's Granfield QJEprints in United Kingdom has also had quite impressive download rates. Three years after establishing the repository, it contained over 1 000 items and received impressive 20 000 item views per month (Bevan 2007).

To avoid the increasing amount of very small repositories, we should conduct this project in collaboration with an institute close to our field, and establish "Helsinki Economic Studies Archive". If the archive would succeed, there is no reason why economic schools from the rest of Finland could not participate, creating database for Finnish economic studies. If the proposal for new super university comes through, the best partner would be Helsinki School of Economics (HSE). Hanken would also be a very interesting partner, which already has been studying the field of open access.

The demand for subject based access especially in economics has also been noticed in Central Europe. Since 2003, Nereus consortium has been developing information services to unlock new scientific content and to provide more effective access to existing research. The main drivers for the consortium are cost-effectiveness, co-operation, enhanced innovation and knowledge accumulation. Its core project has been Economists Online, which pilots a centralized access to the European institutional repositories in economics and has over 2 700 full-texts available at the moment. Participants in the pilot project are Erasmus University Rotterdam, Maastricht University, Université Libre de Bruxelles, Kiel Institute for World Economics, London School of Economics and Tilburg University. The follow-up project is NEEO, which aims to provide access to 500 top researchers in at least 20 of the member universities (Ayrís 2006). The overall Nereus consor-

tium is continuously growing and has 19 members at the moment (in addition to the previously named) e.g. German National Library of Economics, Sciences Po, Paris, University of Oxford, Vienna University of Economics and Business Administration and Monash University.

7 Conclusion

Helsinki University of Technology have all the possibilities to improve their information dissemination, but information of new possibilities and procedures doesn't reach the departments and researchers. Every department should increase their staff's awareness of open access publishing and archiving, but eventually this issue needs collaboration throughout universities and libraries. There is no reason why every one should have their own projects, instead Finnish institutes should collaborate.

At least for the Department of Industrial Engineering and Management, open access journal publishing doesn't seem to be an immediate issue since there aren't many possibilities to publish with open access. Still when optional or even full open access possibilities arise authors should be aware of the new possibilities, because publishers don't advertise this possibility very widely. Since the current publishing model still seems to work well in Finland, many researchers are tempted to use the open access fee for seminars or other costs. It should always be considered carefully, which publishing model gives the best overall result. If the researchers department has an effective repository and publisher accepts post-print archiving without embargo time, optional open access fees (i.e. Wiley's 3000 \$) might be too expensive compared to the extra value gained. Also pre-prints archiving should be done after journal's acceptance, because publisher may consider large number of pre-print downloads as publishing (Stanger & McGregor 2007).

The highest ranked universities are well under way with institutional repositories. DSpace was

originally introduced by MIT Libraries in collaboration with Hewlett Packard. To mention a few of the top universities and their archives: Cambridge and MIT use DSpace; Caltech uses EPrints.org; Stanford, Harvard and Berkeley use their own solutions. Why aren't we truly on board with this development? We could argue that the mentioned universities are a lot bigger and have more resources, but DSpace and similar repositories are developed to be maintained without great amount of resources. Most importantly, libraries should have the courage to throw aside their own developments and implement solutions like DSpace, which has a large development force behind it.

Even though the top universities are establishing repositories that cover the whole university, it doesn't seem the wisest way to proceed. It seems extremely more effective to organize the repositories according to the major study fields. Especially at the Department of Industrial Engineering and Management the situation is very distinctive, because we don't have much in common with the rest of the departments at Helsinki University of Technology. Especially attractive would be collaboration with Helsinki School of Economics, Hanken or even with both of them. With collaboration we could have much more momentum and data inside categories. The emptiness of categories is in fact a major reason why researchers might not be interested to archive their work (Westell 2006). The best way to make an archive more attractive is to have a narrow subject area and a lot of contributors and also to categorize data by its type. Type categorizing (i.e.

pre-print, post-print, conference paper or report) makes it easier to identify material's scientific relevance.

Co-operation with another university would be very reasonable, since at the moment the Department of Industrial Engineering and Management doesn't possess the kind of knowledge needed to maintain DSpace. Implementing and maintaining DSpace isn't very demanding, but the person maintaining it should have some information systems knowledge. The amount of content and its growth at the beginning are the most significant indicators of the repository's future success (Stanger & McGregor 2007). Taking a non-example from the launch of TKKDOC, only establishing the repository isn't enough. Digital repository has to be promoted and developed, and also significant efforts have to be made to gather enough content.

Since thousands of e-prints might be too unrealistic even when collaborating with Helsinki School of Economics, the best example would be the University of Otago in New Zealand. They established a repository for the School of Business in 10/2005 by using EPrints software and currently the repository contains 628 items. The items are consisted mostly from 26 articles, 99 conference or workshop papers, 184 monographs, 273 thesis and 42 seminar or speech papers. Despite the small amount of material there were over 60 000 thousand full-text downloads and over 134 000 abstract views between July 2006 and June 2007 (University of Otago 2007). This is certainly the kind of attention that every researcher would welcome.

Appendix A: Additional reading

Information and conducted research

Public library of science, Publications on Open Access

<http://www.plos.org/oa/plosart.html>

Serials Review, Special issue: open access 2004

<http://www.sciencedirect.com/science/journal/00987913> (Full texts via TKK)

American-Scientist-Open-Access-Forum

<http://users.ecs.soton.ac.uk/harnad/Hypermail/Amsci/index.html>

Open access news

<http://www.earlham.edu/~peters/fos/fosblog.html>

Open access overview

<http://www.earlham.edu/~peters/fos/overview.htm>

Guide to the open access movement

<http://www.earlham.edu/~peters/fos/guide.htm>

Economic and Technical Evolution of the Scientific Publication Markets of Europe

http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf

Archives and technicalities

SHERPA RoMEO: Publisher copyright policies and self-archiving

<http://www.sherpa.ac.uk/romeo.php>

DOAJ: Directory of Open Access Journals

<http://www.doaj.org/>

OpenDOAR: Directory of Open Access Repositories

<http://www.opendoar.org/>

E-prints in Physics, Mathematics, Computer Science and Quantitative Biology

<http://arxiv.org/>

OAIster: OAI-MPH compliant harvester

<http://www.oaister.org/>

Citebase: experimental citation index

<http://www.citebase.org/>

CiteSeer: digital library and search engine in computer and information science

<http://citeseer.ist.psu.edu/>

TKKDOC: publishing archive at TKK

<http://www.otalib.fi/tkk/edoc/>

DViikki: University of Helsinki Viikki campus e-prints archive

<http://www.tiedekirjasto.helsinki.fi/dspace/>

Kata: University of Helsinki Kumpula campus e-prints archive

<http://kata.kumpula.helsinki.fi/dspace/>

Groups and projects

FinnOA: Suomen open access -työryhmä

<http://www.finnoa.fi/>

Openaccess.fi: Open access toiminta suomessa

<http://www.openaccess.fi/>

OACS: Study on the effects of the Internet on the scientific communication process

<http://oacs.shh.fi/>

PLoS: Public Library of Science (also a publisher)

<http://www.plos.org/>

SPARC: An alliance of libraries to correct imbalances in the scholarly publishing

<http://www.arl.org/sparc/>

SciX: Studied Internet publishing business models' time and cost effectiveness

<http://www.scix.net/>

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