

An International Journal on Grey Literature



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‘GREY MATTERS FOR OAI’

GreyNet

The Grey Journal

An International Journal on Grey Literature

COLOPHON

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About TGJ

The Grey Journal is a flagship journal for the grey literature community. It crosses continents, disciplines, and sectors both public and private. The Grey Journal not only deals with the topic of grey literature but also is itself a document type that is classified as grey literature. It is akin to other grey serial publications, such as conference proceedings, reports, working papers, etc.

The Grey Journal is geared to Colleges and Schools of Library and Information Studies, as well as, information professionals, who produce, publish, process, manage, disseminate, and use grey literature e.g. researchers, editors, librarians, documentalists, archivists, journalists, intermediaries, etc.

Grey Literature is defined as "information produced on all levels of government, academics, business and industry in electronic and print formats not controlled by commercial publishing *i.e. where publishing is not the primary activity of the producing body.*" (Luxembourg 1997; expanded in New York, 2004)

About GreyNet

The Grey Literature Network Service was founded in 1993. The goal of GreyNet is to facilitate dialog, research, and communication between persons and organizations in the field of grey literature. GreyNet further seeks to identify and distribute information on and about grey literature in networked environments. Its main activities include the International Conference Series on Grey Literature, the creation and maintenance of web-based resources, a moderated Listserv, The Grey Journal, etc.

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"GREY MATTERS FOR OAI"

Last December, delegates from sixteen countries worldwide met at GL7 in Nancy, France to address the principles of open access as they apply to grey literature. Information professionals from sectors of government, academics, and business presented results of research projects intended to facilitate open access to grey resources. These results no doubt will allow for the further assessment of information policies both within and outside their respective organizations.

While there was general consensus on the benefits of open access, there were clear differences in how the principles of OA would be implemented. This ranged on a broad continuum between the position of The Royal Society www.royalsoc.ac.uk/page.asp?id=3882 on the one side and that of the Wellcome Trust www.wellcome.ac.uk/print/wtd002766_print.html on the other.

GreyNet seeks to remain in the forefront of this movement, but at the same time feels committed to keeping lines of communication open between these farthest positions. In this way, the entire grey literature community - both the public and private sectors - stand to gain. GreyNet continues to honor dialog as well as open choice, but has become very much aware of current statistics showing business and industry underrepresented in the field of grey literature. Open access is but one of the many important issues facing grey literature today; and, GreyNet believes that it is in the best interest of the entire field, if the private sector were now to become more visible. In the long run this strategy would benefit the public sector as well.

Since the relaunch of GreyNet by TextRelease in 2003, authors both in the GL Conference Series as well as those contributing to The Grey Journal (TGJ) sign-on to a "non-exclusive rights agreement". The authors remain free to deposit their own work in other online repositories, which they deem fit. This non-exclusive rights agreement further allows GreyNet to negotiate licensing and cooperative publishing exchange of the full text and metadata contained in its in-house content base.

In this issue of TGJ, a number of papers mainly from GL7 have been selected and brought together under the theme "Grey Matters for OAI". The views and initiatives are predominantly from the public sectors of government and academics. The first three articles are by European authors and researchers. Three articles then follow by their Asian counterparts. When reading these articles, I invite you not only to focus on the geographical emphases but also on the scope of topics related to OA *e.g.* peer review, self-archiving, migration of repositories, technical and organizational aspects, legal limitations, trends in subject areas, preservation, and other related matters that are covered here.

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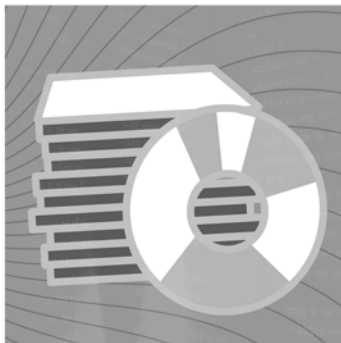
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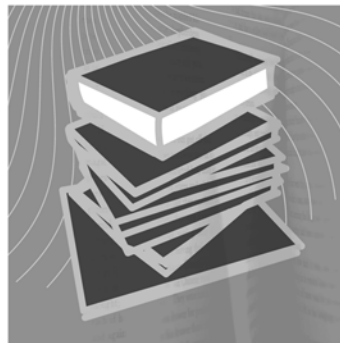
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Public funded research and Open Access: Perspectives and Policies*

Cees de Blaaij (The Netherlands)

Abstract

There are several arguments for promoting the necessity of Open Access (OA). Public funded research can be considered as a common good. From that point of view the accessibility of scientific information is crucial as a political instrument in strengthening a democratic society and to improve the knowledge driven society by efficient and effective distribution of scientific information. An important question is what are governments doing to promote OA? Do they consider OA as a priority on their political agenda? There is also the issue of accessibility of public funded research to improve existing systems of knowledge sharing among scientists. This article analyses and reviews these issues relative to the present situation in the USA and several European countries (UK, France Germany). Ongoing initiatives will be addressed that strengthen the OA movement in general. The last issue to be addressed is the impact of open access journals. An analysis will show that the "business-model" of OA is not a blind alley.

The issue

Advances in digital technology have radically reshaped the landscape of scientific publishing. Parties involved are commercial publishers, scientific communities and institutions, governments, libraries and the public in general. The phenomenon of Open Access with various publishing models is hotly debated as a viable alternative to the traditional "subscriber pays" model. The final outcome of the debate is not certain. It is within the setting of the issues of rising serials costs, industry concentration, and advances in information technology and the emergence of other publishing policies for the distribution of online scholarly research that the solution for an open and affordable access to scientific information has to be found for the good of society as a whole.

A key issue in the OA debate is the *public* accessibility of the results of *public* funded research. One of the most heard arguments to support this is the taxpayer's argument. For instance the Alliance for taxpayers¹ in the US support the principle that American taxpayers are entitled to open access on the Internet to the peer-reviewed scientific articles on research funded by the U.S. Government because they have paid for it. This argument has some validity but it cannot be the defining argument.² It even can be misleading. It seems to suggest that OA is required for taxpayers and not the world. It can locate the individual benefit or it can locate the benefit for the public interest. Arguments for OA should be multi focused. Also on a political level as democracies and networked societies evolve and citizens can be better informed or at least want to have the opportunity to access scientific information like medical literature.

An economic argument for OA is that free distribution of information is the essential tool for economic development and material well being in our age and in this way stimulates innovation. Jan Velterop has correctly observed "that freely accessible research optimizes the scientific process as well as its 'translation' into societal benefits."³

An important step to realize this was taken last year when the OECD issued a *Declaration on access to research data from public funding* on behalf of OECD Committee for Scientific and Technological Policy at Ministerial Level⁴ as an incentive to develop international and national policies for free access to public funded research.

Old wine, new bottles?

From a historical point of view the principle of OA is not a new phenomenon in itself, on the contrary. Already Greek philosophers debated their views in public lectures. Another early example of OA was when Martin Luther nailed his handwritten 95 theses to the door of the Castle Church of Wittenberg in 1517 as a means to publish his

* First published in the GL7 Conference Proceedings, January 2006

theological views. In the Middle Ages and the Renaissance, scholars publicized their ideas and discoveries by writing letters to one another. Later in the seventeenth century as scholars shifted their standard medium of communication from writing to print. In the 1660s, the first scholarly journals collected the latest letters and printed them for the convenience of a "mass" academic audience.

Actually we are talking about old wine in new bottles. One can see OA as a comeback of an old tradition in a new format. Different is the present setting in a knowledge based economy.

It is obvious that the distribution of scientific information including grey literature into the public domain needs to be efficiently and effectively organized to create surplus value.

Koyaanisqatsi

Unfortunately the market for distributing scientific information has become a disturbed one in the last decade caused by two factors. The first cause is the ongoing concentration of economic power of commercial publishers by merger transactions which destabilizes the competitive market for scientific publishing.⁵ This industry concentration heavily influenced the price of serials negatively. Secondly the introduction of new intellectual property laws to accommodate legal security of the networked world. The outcome was that newly introduced copyright legislation in the EU and US was more in favour of protecting the interests of publishers and not enough consideration for the interests of the public domain particularly in regard to the fair use principle.⁶

One can characterize this whole situation as one in which the Hopi Indians speak in their language about *Koyaanisqatsi*⁷, a concept meaning "life out of balance". On one side copyrights have been tightened on the other side access rights for scientists have not been redefined in the light of the serials crisis⁸ or as way to legally improve scientific communication on the internet. Instead journal titles are cancelled by librarians and as a result "it has become increasingly clear that this crisis extends past the library, into our classrooms and laboratories. Not only are whole lines of scholarship in danger of disappearing, but professionals in industry, government, and education are finding that the information that does remain available is too expensive to access."⁹

One remedy to regain the balance is to improve the access and availability of publicly funded research in the public domain.

Significance of publicly funded research

The significance of public funded research can be quantified. It has as a large part in the overall production of scientific information compared in a worldwide perspective. But in general governments funding is lower than what business enterprises are willing to spend to research and development.

Table 1 shows some indication on governmental R&D spending.¹⁰ Some conclusions:

- The government sector accounts for 30,5% of funding in OECD countries. The business sector also performs most R&D. Business accounted for 62%. Its contribution to the overall R&D effort increased in the second half of the 1990s and has slightly decreased since. According to the latest available data, it accounted for about two-thirds of total R&D expenditure in the OECD area in 2003.
- The governments' role in R&D funding differs sharply across the three main OECD regions continues. It funds only 17% of R&D in Japan and 31.2% in the US, and 34. 2% in the EU.
- In the United Kingdom, Canada, the United States and Ireland, the share of government funding of R&D has increased moderately since 2000.
- Government remains the major source of R&D funding in almost a third of OECD countries
- Foreign funding of R&D continues to be an important source of financing in many OECD countries.

Table 1: R&D Expenditure. By source of financing. Percentage share in national total, 2003 or latest year available

	Business enterprises	Other (other national sources + abroad)	Government
Mexico (2001)	29,8	11,1	59,1
Poland	30,3	7,0	62,7
Hungary	30,7	11,3	58,0
Portugal (2001)	31,5	7,5	61,0
Greece (2001)	33,0	20,4	46,6
New Zealand (2001)	37,1	16,6	46,3
Turkey (2002)	41,3	8,2	50,6
Italy (1996)	43,0	6,2	50,8
United Kingdom	43,9	24,8	31,3
Austria	43,9	21,3	34,7
Slovak Republic	45,1	4,1	50,8
Iceland (2001)	46,2	19,8	34,0
Australia (2002)	46,4	9,2	44,4
Canada	47,5	18,0	34,5
Spain	48,4	11,6	40,1
Norway	49,2	8,9	41,9
Netherlands (2002)	50,0	12,9	37,1
Czech Republic	51,4	6,7	41,8
France (2002)	52,1	9,5	38,4
EU-25 (2002)	54,5	10,6	34,8
EU-15 (2002)	55,1	10,8	34,2
Denmark (2001)	61,4	10,4	28,2
Total OECD	61,6	7,9	30,5
United States	63,1	5,7	31,2
Ireland (2002)	63,4	8,6	28,0
Belgium (2001)	64,3	14,3	21,4
Sweden	65,0	11,6	23,5
Germany	66,1	2,7	31,1
Switzerland (2000)	69,1	7,7	23,2
Finland	70,0	4,3	25,7
Korea	74,0	2,1	23,9
Japan	74,5	7,8	17,7
Luxembourg (2000)	90,7	1,6	7,7

The statistical figures from OECD¹¹ in the government and higher education sectors are often based on estimates by national authorities and methods of evaluations are changed periodically. Certain national characteristics may have a strong influence on R&D performance by the government and higher education sectors. US figures for these sectors are underestimated. Public-sector R&D covers only federal government activities, not those of individual state and local governments; and since 1985 figures for researchers exclude military personnel in the government sector. In the higher education sector, R&D in the humanities is often not included.

R&D spending: civil vs. defence

Another interesting figure is the ratio between spending on R & D for civil purposes and defence. Since the beginning of the early 1990s, the US government defence R&D budget has increased as a share of GDP and reached 0.63% in 2005. This is more than two and a half times the ratio for the United Kingdom and France, which have the second- and third-highest ratios in 2003 (about 0.24% of GDP).

In the United States, almost 57% of governmental R&D expenses are devoted to defence R&D in 2005. The United Kingdom is second with almost one-third. Spain, France and Sweden were the only other OECD countries for which the share of defence R&D exceeded one-fifth. Three-quarters of the growth in government expenditure in the United States between 2001 and 2005 can be attributed to defence R&D.

Table 2: Defence and civil R & D budgets as a percentage of GDP¹²

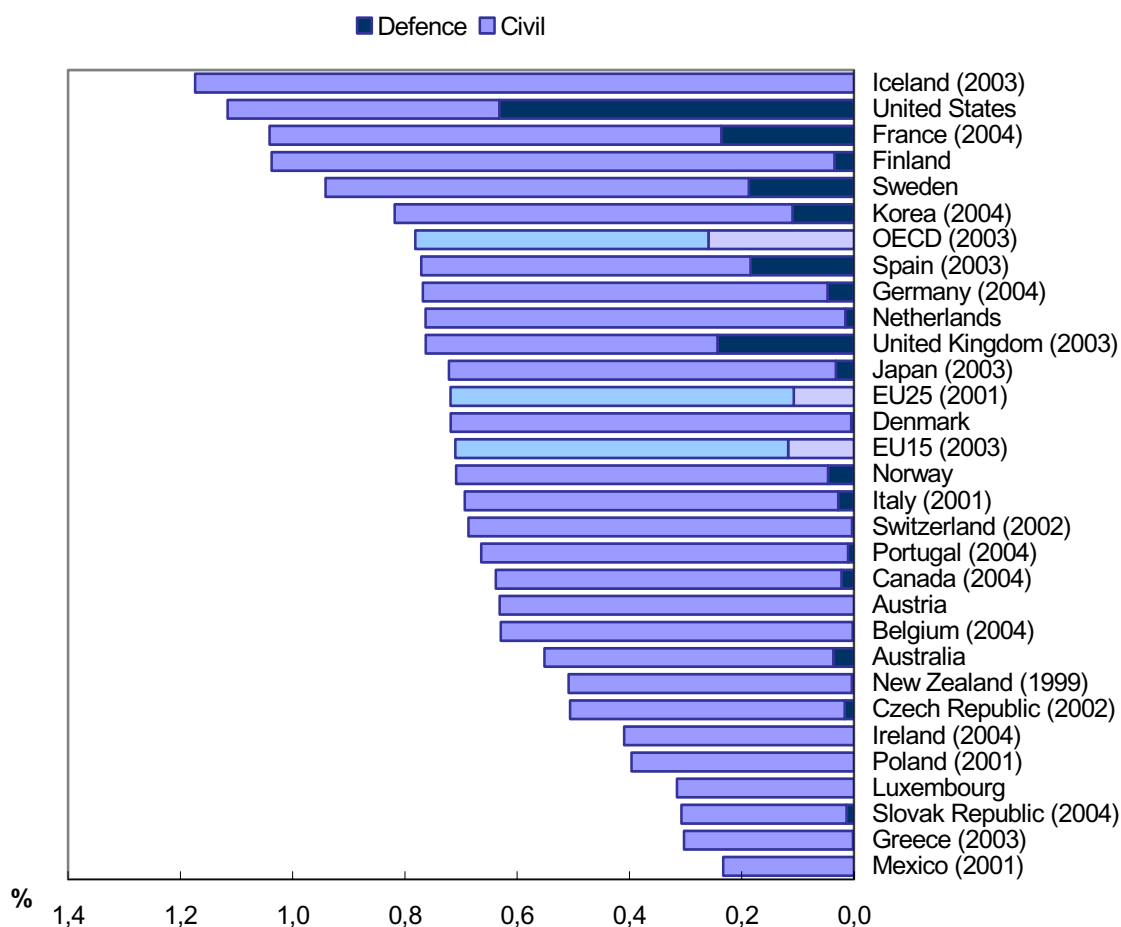
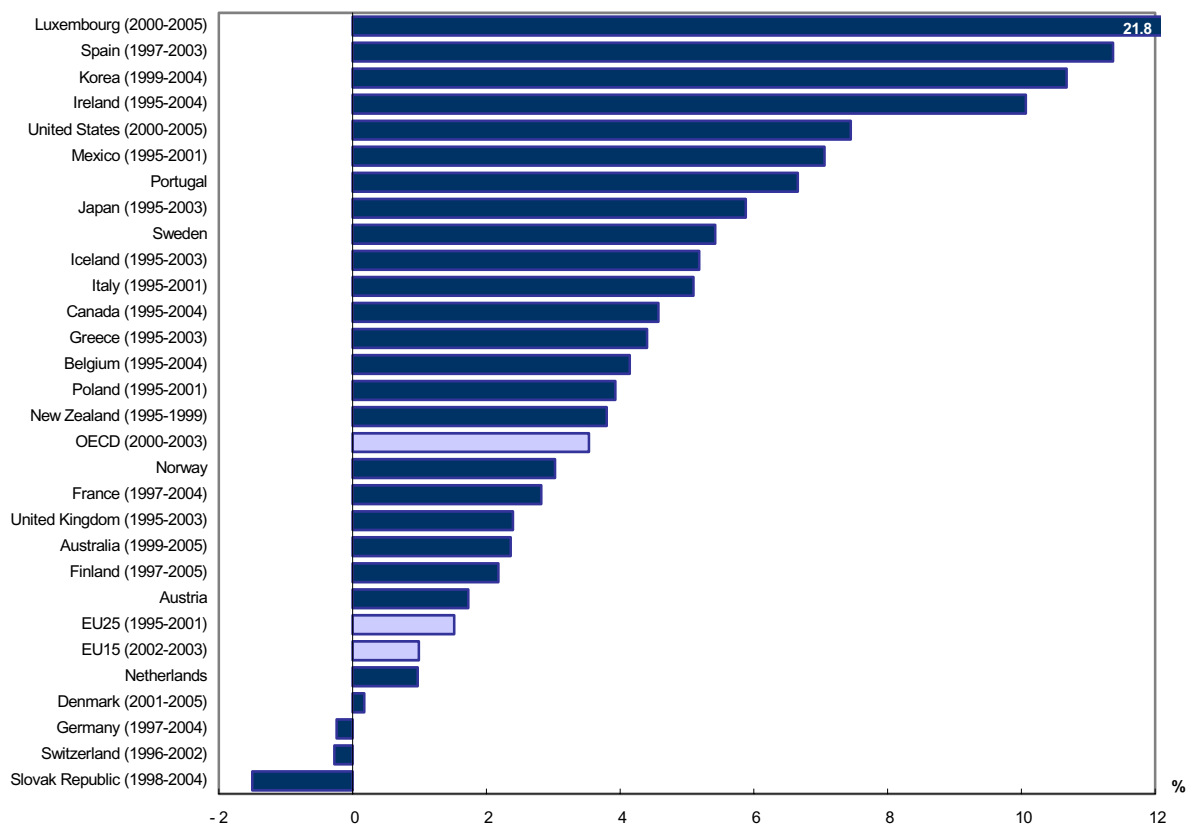


Table 3: Change in government R & D budgets



Since 2000, government R&D budgets have grown on average by 3.5% (in real terms) in the OECD area. Growth has been modest in the EU25, averaging 1.5% a year since 1995, compared to 6% in Japan and more than 7% in the United States. The Slovak Republic, Switzerland and Germany have all experienced slightly negative growth since the mid-1990s.

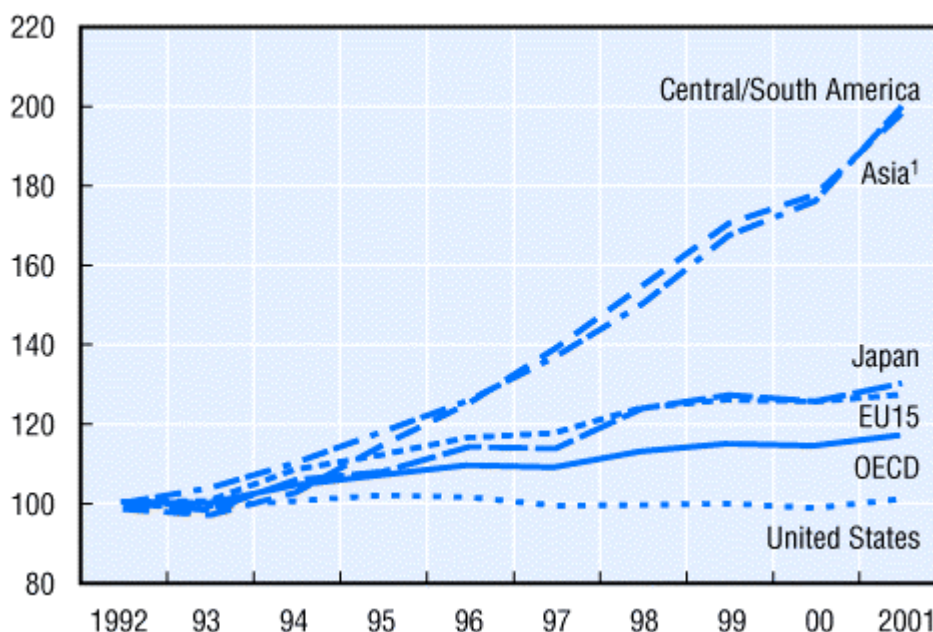
Output in scientific information

The output of scientific articles is measured by the OECD on basis of data from the Institute of Scientific Information.¹³ This indicates scientific production. The output of articles is heavily concentrated in a few countries. In 2001, 82% of world scientific articles were released in the OECD area and about 65% in G7 countries.

The United States are the leader, with over 200 000 articles. The geographical concentration of output is very similar to that of R&D expenditures. The production of scientific articles is usually greater in countries where R&D intensity is higher. In Switzerland and Finland, output exceeded 1100 articles per million population in 2001. The intensity is highest in the Nordic and the English-speaking countries, and is also high in the European Union (557). On the other hand, output of scientific literature remains low in Korea and Japan compared to their R&D efforts. A statistical bias towards English-speaking countries may be part of the reason.

Over the past ten years, the intensity of article output increased in almost all OECD countries. The development of scientific activity and increasing co-operation among researchers stimulated the increase in Science & Technology publications. But while output kept growing rapidly in Western Europe and Japan, the number of articles stabilized in the United States and even started declining in the United Kingdom and Canada.

Table 4: Growth of scientific articles by area, 1992-2001



Life sciences dominate the OECD data. Physical sciences are the main field of publication in Eastern Europe, Korea and Portugal, as in the emerging Asian economies.

The major producers of scientific articles, Switzerland and the United States, are also the most cited. Both have a strong reputation worldwide in biomedical research and physics. In fields such as Earth and space sciences for Chile, mathematics for Slovenia or psychology for Argentina, emerging countries also achieve world recognition.

"Raison d'être" for Open Access

OA is one solution for handling the output of the knowledge society but several commercial scientific publishers have repeatedly complained about OA as a real threat to scientific publishing in general.¹⁴ Mainly they criticize OA as being destructive for the quality of scientific publishing because of a lack of peer review. The other side of the story is that they followed the practice of exploiting scientific information as a commodity for a maximized profit. As a result journal prices have been escalating.¹⁵ Many research libraries weren't able to subscribe to journals anymore or had to cut in monograph purchasing in order to continue their journal subscriptions. The "eating disorder" from some of the commercial scientific publishers – some would call it greed – did consume the budgets of their *clientele*. Another unpleasant consequence was that monograph publishing became more difficult because publishers were unwillingly to produce special titles for a limited market and so the costs per monograph are also rising.¹⁶

The notion that commercial publishers can make big profits on the scientific results of public funded research triggered the awareness that scientific information has common good characteristics, is non-exclusive and is not competitive when it is consumed. It makes the economic nature of scientific information very different from other consumer products.

Scientific knowledge is not a scarce item, it comes in abundance when it is shared. This speeded the realization of OA journals and institutional repositories of scholarly research with free access by universities and research centers.¹⁷

Growth of OA

From the perspective of growth clearly the OA movement is pushing the market. There is a steady growth of the number of journals in the Directory of Open Access Journals. In February 2005 it stood at 1,463; double that of a year ago. In November 2005 1908 journals were available.¹⁸ Also the number of institutional repositories¹⁹ with OA policy is steadily rising.

Table 5: Growth of Open Access Journals & Repositories

	Feb. 2005	Nov 2005
Directory of Open Access Number Journals	1,463	1,908
OAIster (Number Institutions)	405	523

The number of organizations that have signed the Berlin Declaration has gone up to 134.²⁰

Governments and public policy towards scientific information

The present situation makes it clear that the serial crisis is a crisis of public policy. One reason for the continuation of this crisis has been the fact that central governments have been very hesitating or even reluctant to promote the interests of the public domain. But alas some ambivalence in the position of governments cannot be denied. As Larry Lessig has keenly noticed: 'the real problem lies with governments, which are too often disciplined by a market that is more interested in private rather than general welfare. The market that controls today's policy makers is keen to keep them from grasping obvious truths that would substantially add to the general good²¹.'

An affirmative and striking example has been the dismissive reaction of the UK government²² in 2004 to the report of the Science and Technology Committee concerning scientific publishing.²³

The committee had endorsed principles of open access and offered particular strategies. The UK government declined the recommendations that it would promote and enact OA. The Committee's answer was that the "Government has clearly decided against the author-pays model ahead of the further investigation that it was urged to pursue. This approach prejudices the issue."²⁴

One can see this as a victory for Reed Elsevier the world largest publisher. It is also a relief for a lot of scientific societies which are dependent on income derived from subscriptions by member and libraries. If the recommendations would have been accepted it would have put Britain into a leadership role in the OA movement.

Till up to now very few countries have carried out a national policy on OA although several OECD countries signed the Declaration on access to research data from public funding.

The conclusion must be that more governmental support for OA in a direct or indirect way is essential in finding an appropriate balance in access and intellectual property rights especially in regard to public funded research. The commercial publishing market will not solve these problems despite the fact that they are experimenting with OA-like tactics but in way not to endanger their investments.

So from the perspective of public interest and the taxpayer's point of view governments should feel warm-hearted to the promotion of Open Access.

Initiatives on national levels

So what are governments doing to promote open access to public funded research and do they consider OA as a priority on their political agenda?

Australia

The Australian Research Information Infrastructure Committee (ARIIC) prepared a statement outlining its support for open access in publishing.²⁵ They support institutional repositories

Denmark

A policy is encouraged by the Danish Electronic Library (DEFF) committee on electronic publishing.²⁶

Finland

The Open Access Scientific Publishing Committee has published a report. The committee was appointed to put forward recommendations for the promotion of open access to scientific and scholarly publications in Finland. The aim of the recommendations is not to change the traditional standards used for evaluating the quality of scholarly publications, but to improve access to and the availability of the publications. Institutional repositories are promoted.²⁷

France

The four major research institutions – who have signed the Berlin Declaration – CNRS, Inserm, INRA, INRIA declared their intention to move towards institutional repositories.²⁸ The central government has not yet ventilated her opinion.

Germany

The German Rectors' Conference is an advisory body to the federal government and the state governments. In their recommendation they make a direct connection between the serials crisis and the making of institutional repositories.²⁹ A lot of German research institutions have signed the Berlin Declaration also.

Italy

On November 4th-5th 2004 thirty-two Italian universities (more than 40% of the Italian universities) gathered in Messina, Sicily (Italy) to sign the "Messina Declaration", and committed to sign the Berlin Declaration.³⁰ A large number of Italian Universities have signed the Berlin Declaration. Institutional repositories are being implemented. A special Working Group is trying to get support for a national Open Access policy.

Norway

The Norwegian council for Higher Education has recommended its institution to establish Institutional Repositories³¹ Norway has not yet implemented the Berlin Declaration but are planning to do so not just endorse it.

Sweden

There is no national policy, but the foundations already are available in Sweden, as the Lund University Libraries³² has one of the largest and most active university eprint archives and programs for self-archiving university research output³³. It also hosts the Directory of Open Access Journals.

The Netherlands

No national policy is available but in practical sense a number of academic institutions and Dutch universities cooperate to set up a national infrastructure for electronic publishing and established a repository called DARE (Digital Academic Repositories).³⁴

United States

The United States do not have a national policy but there are many OA initiatives. An important step was taken by the National Institutes of Health for access to medical information. Other initiatives like the Public Library of Science and Biomedcentral are important for the access of journals.

In the US there are about 250 research universities. One conclusion from a survey from the Coalition for Networked Information (CNI) in the spring of 2005³⁵ is that it seems very clear that institutional repositories are becoming well-established as campus infrastructure components. Interesting is it to note that there is a growing interest among research funding agencies in data management, curation and archiving that is not necessarily closely coupled to the open access debates.

Another conclusion is that research libraries in the US are leading the way in policy formulation and operational deployment for institutional repositories.

The most noticeable difference in approach to OA between the US and Europe is the level of policy deployment: Less centralized and more oriented towards the needs of individual organizations.

Impact of open access

It is difficult to estimate the size and the nature of the impact of OA because of a lack of satisfying analysis. Another problem for assessing the impact of OA is the nature of OA.

OA publishing consists of different types of publishing not only journals but also individual articles on basis of author self-archiving or institutional archiving.

Some conclusions:

- The currently available journals are often more in the lower ranking journals
- Three of the four subject groups: Life Sciences, Medicine and Chemistry have one or more OA journals among the top 9% of the category
- High ranking OA journals are not evenly distributed. They are most frequent in the Physics, Engineering & Mathematics subjects.
- The number of OA journals that are covered in the Thomson ISI database continues to grow through the creation of new titles as well as traditional journals which choose an OA distribution model.

Open Access is well established in the subject areas of mathematics, physics and engineering because these scientific areas already had a long history of pre-print servers. These servers contained articles. It is likely that researchers with their experiences adopted OA journals more easily than researchers in the social sciences and humanities.

Other issues

It is curious but that the field of humanities has a very limited part in the Open Access movement. In this area the OA is moving slowest. Are there any reasons for this one may ask?

Here are some clues:

- Journal prices are lower. This reduces the urge to use OA a business model. According to the 2002 Library Journal pricing survey, the average subscription prices for journals in STM fields were 10-20 times higher than the average prices in the humanities.³⁶
- Humanities research receives overall less funding than STM research.
- On average, humanities journals reject articles more (70-90%) than STM journals (20-40%). So the cost of peer review per accepted article is higher in the humanities, lower in the STM fields.
- There is more public demand for OA to research on STM issues than humanities
- Preprint archives are very common in the natural sciences, rare in the humanities. The circulation and flow of scientific knowledge in STM is much faster due to the up-to-date demand from researchers.
- Demand for journal articles in the humanities drops off more slowly after publication than demand for articles in the STM fields. Humanities journals will be anxious to keep their income and most of them will not be inclined to put to their articles online according to OA. Of course there are some exemptions as the Directory of OA journals shows.
- Humanities are more book orientated than STM

This doesn't mean the OA future for humanities is not bright. It is probably also the law of the restraining lead. So why the rush.....

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- ⁵ A U.K. Office of Fair Trading investigation in 2002 concluded that "there is evidence to suggest that the market for STM (scientific, technical, and medical) journals may not be working well," but declined to recommend any market intervention at that time because "it remains to be seen whether market forces, perhaps enhanced by the use of new technology, will remedy the problems that may exist.", in: Office of Fair Trading. *The market for scientific, technical and medical journals*, London, September 9, 2002, p. 1.
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- ⁷ Koyaanisqatsi (1983), a documentary movie. The film questions whether, in our haste for technological advancement, humankind have progressed out of balance with nature.
- ⁸ Examples: strict conditions associated with access, which limit uses such as archiving the journal content locally, creating teaching materials, incorporating published information into databases, posting articles on institutional web sites.
- ⁹ Mike Sosteric, Freedom from the Press: Alternative Academic Publication Strategies and the True Potentials of Information Technology, Tech. Source, Apr. 1999, available at <http://ts.mivu.org>
- ¹⁰ OECD Science, Technology and Industry Scoreboard 2005 – Towards a knowledge-based economy, R&D expenditure by source of financing 2003 as a percentage of the national total, OECD, R&D database, May 2005
- ¹¹ OECD, Main Science and Technology Indicators database, May 2005 and OECD, Research and Development Statistics, May 2000.
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- ¹³ Source Thomson Scientific: <http://www.isinet.com>
- ¹⁴ Responses to questions posed by the Science and Technology Committee by Elsevier, from: http://www.elsevier.com/authored_news/corporate/images/UK_STC_FINAL_SUBMISSION.pdf
- ¹⁵ For a price overview: <http://www-us.ebsco.com/home/printsubs/priceoverview.pdf>
- ¹⁶ As library budgets are squeezed by expensive journals, the market for books is reduced. Today many scholarly books sell only 200-400 copies compared with 1500 copies a decade ago, source: <http://www.ala.org/ala/acrl/acrlissues/scholarlycomm/scholarlycommunicationtoolkit/faculty/facultyeconomics.htm>
- ¹⁷ Raym Crow, The case for Institutional Repositories: A SPARC (Scholarly Publishing and Academic Resources Coalition) Positioning Paper, from: <http://www.arl.org/sparc/IR/ir.html>
- ¹⁸ Directory of Open Access Journals, source: <http://www.doaj.org/>
- ¹⁹ Country Update on Institutional Repositories, source: <http://www.surf.nl/download/country-update2005.pdf> and OAister (collection of freely available, previously difficult-to-access, academically-oriented digital resources from University of Michigan Digital Library Production Service).
- ²⁰ Number of signatures, source <http://www.zim.mpg.de/openaccess-berlin/signatories.html>
- ²¹ Cit. "Do you Floss" from Larry Lessig, in: *London Review of Books*, 18 Aug 2005. Professor of Law at Stanford Law School and founder of its Center for Internet and Society.
- ²² UK Government's Response to the Committee's report, source: <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/1200/120006.htm#a1>
- ²³ UK House of Commons Science and Technology Committee Report: Scientific Publications: Free for All, source: <http://www.publications.parliament.uk/pa/cm200304/cmselect/cmsctech/399/39902.htm>
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- ²⁵ ARIIC's Statement on Open Access, source: http://www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/australian_research_information_infrastructure_committee/documents/open_access_pdf.htm
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- ²⁹ Zur Neuausrichtung des Informations- und Publikationssystems der deutschen Hochschulen, source http://www.hrk.de/de/download/dateien/Empfehlung_Bibliothek.pdf
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- ³² <http://www.lub.lu.se/headoffice/staff/larsbj.html>
- ³³ <http://lu-research.lub.lu.se/information.html> <http://eprints.lub.lu.se/>
- ³⁴ DARE, source <http://www.darenet.nl/en/page/news.list/show>
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Assisting scientists to make their research results world wide freely available: an experience begun in the 90s*

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Abstract

The ERCIM Technical Reference Digital Library service (ETRDL) was promoted by the European Research Consortium for Informatics and Mathematics (ERCIM) with the aim of managing grey literature produced by scientists working in the areas of information science and applied mathematics, making their research results immediately world wide available and also building a test-bed for their research activities. In this paper ETRDL is described and its future development presented. Section 1 traces the history of ETRDL from its conceptualization to the first experimental service given by the early ETRDL prototype. This was implemented to satisfy the requirements of the European IT scientific community, although realized as a part of NCSTRL (the US Networked Computer Science Technical Reference Library). Section 2 describes how further developments made ETRDL a system presently capable to manage DLs for very different types of literature. Section 3 discusses issues related to migration of ETRDL managed repositories to OpenDLib, an advanced digital library service system developed by ISTI-CNR. Advantages and difficulties of this migration are considered in the conclusions.

1. ETRDL history: an experience begun in 90s

In the 1996 the European Research Consortium for Informatics and Mathematics (ERCIM) [1] recognized the importance of the digital library technologies and thus decided to establish an ERCIM programme for R&D in Digital Library (DL) sector. The Italian National Council of Research (CNR) [2] was appointed as coordinator of the ERCIM Digital Library Initiative (DLI)[3].

The aim of DLI was to promote the development of DL technologies in Europe. Such Initiative had three objectives: to support long-term research activities, develop large digital collections, collaborate with the US Digital Library Community. Since 1996, a series of research-oriented activities, mainly sponsored by the DELOS Working Group [4], were thus organized, e.g. workshops, conferences, collaborative studies on DL-related research issues. Within this context, towards the end of 1997, ERCIM decided to undertake an implementation activity by setting its own digital library up to provide open access to grey literature: the ERCIM Technical Reference Digital Library (ETRDL) [5][10].

During the preliminary meeting held in Budapest (1996) and in Pisa (1997), ERCIM Librarians and computer scientists decided to build a DL infrastructure that should satisfy particular needs of different European Institutions and contemporarily participate to the international research context. The first step towards the development of ETRDL was a survey of above requirements. Two main objectives were identified: (i) to implement functionality to satisfy specific local requirements regarding the language of the user interfaces; (ii) to assist ERCIM scientists to make their research results world wide immediately available by providing them with on-line facilities for a self-publishing service. The Project, funded by ERCIM and the Delos WG on DL - Esprit Long Term Research Programme - LTR n. 21057 5, was a collaborative effort among the following National Institutions: CNR-Italy, CWI-The Netherlands, CRCIM-Czech Republic, FORTH-Greece, GMD-Germany, INRIA-France, SICS-Sweden, SZTAKI-Hungary.

The system was developed by ISTI-CNR (Pisa) in the context of collaboration with Cornell University DL Group. This group had already realized an on-line grey literature distributed service in the Computer Science domain, called NCSTRL (the US Networked Computer Science Technical Reference Library) [6][9].

The system employed by NCSTRL was Dienst [7][8], an open conceptual architecture for digital libraries, an open protocol for communication in the architecture, and a reference software system implementing the architecture, an open system that provides internet access to a distributed, decentralized, multi-format documents collection. ERCIM DL should have become a node of the NCSTRL federation and adopt

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the infrastructure Dienst: in this way ETRDL would form part of an international collection of grey literature.

1.1. The Dienst Architecture and the ETRDL extended functionality

The Dienst architecture was built on the notion of individually defined services that when combined together create a distributed digital library. Services and resources in a Dienst digital library may be located anywhere on the Internet. The functionality of a Dienst digital library includes storage and access to resources, deposit of new resources, discovery and browsing of those resources.

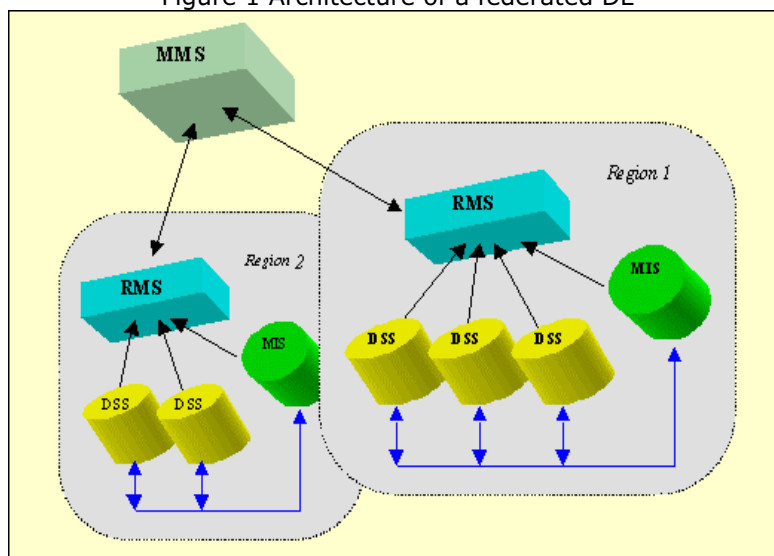
Communication with and among individual Dienst services takes place via an open protocol, which makes it possible to build other service layers on top of the existing basic Dienst services.

The services defined in the protocol are as follows:

- A *Repository Service* that provides the mechanisms for storage of and access to the digital documents;
 - An *Index Service* that accepts queries and returns lists of documents identifiers matching those queries.
 - A *Meta Service* that provides a directory of locations of all other services.
- Human interaction with these services and their protocols is mediated by a *User interface service*. Server implements a service.

A Dienst Standard Site (DSS) instances the functionality of the Repository Service, the User Interface Service and the Index Service for its own digital documents. The Meta Service functionality is instantiated by distributed servers: the Master Meta Server (MMS) and the Regional Meta Servers (RMS). In order to improve the overall connectivity by reducing the number of interconnections between servers DSS are partitioned into *regions*.

Figure 1 Architecture of a federated DL



A region comprises DSSs that have a good connectivity among them, an RMS and Merged Index Server (MIS) that act as back-up server.

A set of intercommunicating DSS, DLS, RMS MIS and a MMS constitute a *federated digital library* (see Figure 1).

The Dienst reference implementation released when the development of ETRDL begun was Dienst version 4.1.9. This version provides primarily a search service offering the user the possibility to perform a simple monolingual free-text search over the entire collection or to enter query terms in three fields: author, title and abstract. This primitive service did not satisfy completely the requirements of the ERCIM users. The main aspects lacking regarded: (i) subject classification; (ii) on-line document submission and deletion; (iii) multiple language indexing and search; (iv) on line documents administration.

In order to overcome these lacks, we implemented ETRDL by extending the Dienst reference implementation [11].

From the architectural point of view ETRDL consists of a federation of extended DSS belonging to the same region, adopting the same naming schema (ercim.xxx), and

enabling the same core set of functionality. Each ERCIM institution (publishing authority) that participated in the project instanced a modified DSS as a local server, managing one or more local collections, and also providing locally developed functionality. At the same time, however, each publishing authority member of ETRDL was also a part of the NCSTRL federated digital library.

The extended DSS instances the functionality of an Extended Repository Service, an Extended User Interface Service and an Extended Index Service for its own digital documents. It also instances the new functionality of a Submission/Withdraw Service and Administration Service. The extended and the new services are accessible via a Dienst protocol - by the way of a set of new services requests - that defines the public interface to the services. Great care was taken to maintain compatibility between NCSTRL and ETRDL. This means that an NCSTRL user can access the documents of the ETRDL collection by selecting the ETRDL local institutions and using NCSTRL-implemented functionality; similarly all the ETRDL collections can be queried simultaneously through the ETRDL services, or separately through the respective local services.

The functionality provided by the extended and new services are the followings [12][13]:

Multilingual common information access

- User interface localization (local language as well as English)
- Different character set manipulation (complete Latin-1 char. set -ISO_8859-1)
- Cross language search
- Metadata extensions (from RFC1807 vs. Dublin Core metadata set)
- Search and Browse
- Browsing extensions by subject (ACM, MSC, Free keywords)
- Search extensions by subject, date, language, type
- More complex query structures
- Publishing
- Submission, withdrawal
- Administration

1.2. A first experimental service

Many ERCIM scientists and technicians were involved in the setting up of the first experimental technical reference service. The operational DL service was released in 1998 after a one-year period of testing and refining by ERCIM Librarians and developers. Each project partner sets up its own pilot server with a local language user interface besides an English one.

The technical reference service was working for two years till the end of the project in 1999. Its collection consisted in all kinds of grey literature (technical reports, pre-prints, proceedings of conferences or workshops available free, theses, project deliverables, etc.).

2. ETRDL to day

The ERCIM Project finished in 1999, but the CNR decided to maintain the service working for the Italian partners. This implied the managing of the entire Dienst system infrastructure and the ETRDL digital library by the ISTI-CNR. However, ISTI-CNR proceeded in developing its software, so that ETRDL can today be considered a DL management system capable of different applications. Therefore, from this point on the name "ETRDL" will be used both to indicate the software for specific applications and the digital library of CNR.

At the present, the ETRDL system delivers a self-publishing service for some Italian CNR institutions. Its metadata are harvested to exchange information with other initiative as the centralized data-base of the CNR Grey Literature. Further, the CNR User Interface allows accessing to the new NCSTRL¹ [22] and to all Institutions currently working.

A special instantiation of ETRDL, named PUMA DL (Publications Management DL), was set up to allow the self-archiving of the published works by ISTI researchers. PUMA manages the access rights of the documents archived. Both ETRDL and PUMA DL

¹ NCSTRL has been re-implemented by the Old Dominion University Digital Library Research Group jointly with Virginia Tech and the University of Virginia, to an OAI-based framework. This moves NCSTRL from its previous Dienst-based distributed searching paradigm to one of the metadata harvesting. It has currently provided as a Public Service by ODU Digital Library Research Group and made still accessible by the user interfaces of ETRDL.

contribute in managing of a number of institutional repositories. Their metadata are harvested for delivering a set of bibliographic services.

Different instances of the ETRDL system, regarding different fields of science, with personalized extensions were developed by ISTI-CNR within collaboration with Vallisneri Library of the University of Padova, the Coastal Marine Environment Institute of CNR in Taranto. The aim was to make materials, that often remains unpublished and thus hardly retrievable, accessible by the scientific community engaged in the environmental study and conservation:

As a result of such a collaboration, two Digital Libraries [15] are today working in order to collect a wide amount of documents such as reports, technical reviews, graduate and undergraduate thesis, maps etc.

- The first, a digital thematic library called *LVDL Laguna di Venezia Digital Library*² [15], collecting published and unpublished documents arising from scientific studies about the Lagoon of Venice;
- The second, created following the example of LVDL and the prototype pattern, called *MeCME Mediterranean Coastal Marine Environment Digital Library*³ [16], collecting multidisciplinary documents concerning scientific studies in the Mediterranean Coastal areas and in particular the Southern one.

Both DLs cover up similar fields of interest and classify the documents according to the same semantic descriptors (ASFA Thesaurus, Library of Congress Classification).

Further steps in the collaboration will be: 1) to create a common web site and a common interface to access digital libraries concerning the area of marine biology in order to permit to different users an easy, integrated search and retrieval of the documents; 2) to make the DLs managed by the more advanced system software OpenDLib (described in the next paragraph); 3) to promote new collaborations with public and private partners in step with increase in number of collections.

3. ETRDL evolution: migration to the OpenDLib service system

In this paper, we have described the implementation of ETRDL developed as part of NCSTRL network, employing and adapting the Dienst infrastructure. Moreover we have described how we have extended and specialized this service in order to support different types of literature and how ETRDL is currently working in the context of many scientific Libraries.

However, as so often happens in the computer science world, the ETRDL system needs a more sophisticated user-oriented service in order to be compliant with current requirements. Such requirements are fulfilled by a new software system, OpenDLib [17][18][19], developed at ISTI-CNR. Thus ETRDL documents will migrate into this system.

OpenDLib consists of an architectural infrastructure and a federation of services customizable to meet the requirements of different communities. It allows either loading or harvesting the content to be managed and supports an innovative document model to represent multi-edition, structured, multimedia documents that can be disseminated in multiple manifestation formats.

OpenDLib provides a number of interoperating services that implement the basic functionality of a digital library, such as acquisition, description, storage, search, browse, selection and dissemination of documents, and other advanced services such as collection services. These functions can handle a wide variety of document types with different format, media and structure, as well as new types of documents that have no physical counterpart, such as composite documents consisting of slides, video- and audio recording, etc. The OpenDLib powerful document model, i.e., the DoMDL model, permits this. Further, OpenDLib implements user management services, such as registration, authorization and authentication, and personalization services, such as construction and dynamic modification of personalized virtual views of the information space.

The OpenDLib architecture has been designed to be highly interoperable with other libraries. In particular, an OpenDLib library can act both as an OAI-PMH [23] data and

² Partners: Vallisneri Library, Palazzo Grassi and Hydrobiological Station in Chioggia, Geology, Paleontology and Geophysics Library (University of Padova), Naturalistic Observatory of the Lagoon and the Natural History Museum of Venice, Department of Environmental Sciences of the Ca' Foscari University of Venice, Italy. <http://laguna.isti.cnr.it/>

³ Library of the Institute Talassografico "A. Cerruti"- Coastal Marine Environment Institute of CNR, Taranto Italy. <http://mecme.isti.cnr.it>

service provider. This implies that the metadata maintained by any OpenDLib digital library can be open to other libraries and, vice-versa, the OpenDLib services can access the metadata published by any other OAI-PPH compliant library.

The first step in migrating ETRDL repositories to OpenDLib was defining the metadata mapping from RFC 1807 format [20] to the Qualified Dublin Core [21] in order to reuse metadata and documents associated. The new DL was implemented using the standard base configuration of OpenDLib, however, we have to study the more appropriate configuration of the system from architectural and semantic point of view in order to meet the requirements of the ETRDL digital libraries that are currently working.

The new organization of ETRDL is now in an experimental phase. The following decisions are still under consideration:

1) Which collections and which services have to be implemented, 2) which additional metadata formats will be supported, 3) which document types with different format, media, structure and manifestations we are going to use; 4) which search options we need: google-like or fielded (with fields selected from a variety of known metadata formats); single or cross-language; with or without relevance feedback.

Conclusions

ETRDL is the result of a long lasting experience during which ETRDL staff, both researchers and librarians, became acquainted with all problems inherent in the conception, realization and development of very new library management systems. This process can be considered under various positive aspects.

First of all, European research people and technical staff, as well as librarians, began working in a very new field while exploiting advanced systems realized in the U.S. This event has given rise to the most advanced DL community in Europe, i.e., the Delos community. Another important result is that the ETRDL prototype has been continuously operational since its first installation, although it has been enriched with new functions during its life. This has offered, and is still offering meaningful advantages, i.e., all the documents published by the different authorities during the entire life time of ETRDL are still available; many authors and librarians have become acquainted with self-publishing and self-archiving functions, while research people can presently use the content of ETRDL repositories to experiment new DL prototypes.

In the future, the planned migration to OpenDLib will assure the OAI compliance, and a set of new advanced services. These services will preserve metadata and digital objects against changes in technologies that should make them inaccessible or meaningless.

The development of the ETRDL system software required a lot of work but its overall functioning presented no difficult problem. Most difficulties have been encountered, instead, in the administrative and social sphere. When the original project by ERCIM was concluded, the CNR staff began an activity, parallel to the activity for research and development, to diffuse information about digital libraries and related technologies through courses, seminars and demonstrations. Although most librarians proved to be very much interested, academic people opposed many objections against self-publishing and institutional open archives. This is the reason why most of the authorities presently managed by ETRDL are research institutions. As is known, the interest in the OA themes started in the academic field very few years ago. We hope that the consensus recently obtained by the Pleiade national project, and the interest in the DL technologies by industrial and commercial organizations will make the future of open archives easier.

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Open archives and SIGLE participation in Italy: Is there a subtle link between the two experiences?*

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Abstract

This paper proposes on the one hand to outline Italian initiatives regarding open archives, with a qualitative rather than quantitative analysis, focussing in particular on data providers and on organisation and initiatives that lead to integration that encourage the development of IRs. On the other hand, it proposes to analyse the 20 years of Italian input to SIGLE in order to verify if and to what extent the Italian producers participating in SIGLE have contributed to the fostering of new ways of sharing and diffusing information sources produced within their organisations.

1. Introduction

Why have we decided to verify the existence of the weakest of links between the creation of Italian open archives and the Italian participation in the European SIGLE system? There are numerous differences between the two documentation systems, including the date of their development, the methods used for data collection and the technology that has been employed.

The SIGLE project (System of Information for Grey Literature in Europe) got underway in 1980 and was funded and launched by the then European Community. EAGLE (European Association for Grey Literature in Europe) came into existence in 1985 when the database was fully operative [1]. SIGLE adopted an operational system that was cutting edge for its time, with the collection and indexing of GL in the hands of national reference centres. The data was successively collected and elaborated centrally by a technical unit that provided a fee-based access to the database. Nowadays this would be termed a distributed system with centralised access to data.

Open archives, on the other hand, were the initiative of individual researchers (the most famous being Ginsparg, Harnard, Krichel), who, in a brief period of time, managed to collect a large number of documents from colleagues and make them freely accessible via Internet [2]. This gave rise to a movement, a new philosophy for the diffusion of scientific literature, known as the Open Archive Initiative (OAI). In effect, one of the most significant results of the development of e-print archives has been the consensus received from scientific institutions and the support of libraries that belong to them leading to the establishment of the Institutional Repositories (IRs) [3]. In fact, institutional commitment to making available and preserving the scientific documentation produced by each institute along with the active participation of libraries and that of academics can create ideal conditions for access to scientific literature without economic and technological barriers.

However, the SIGLE initiative and open archives - IRs in particular - have some elements in common. These can be traced above all in their common objectives, but extend to initiatives to guarantee the success of both documentation systems. Looking first at the objectives, the open archives - and in particular the Institutional or disciplinary repositories - aim to make available the internal documentation of an institute or a discipline. Similarly, the various national reference centres aim to provide a GL production framework that faithfully reflects the production in each member state. Setting aside the opportunity of a national information policy, historically lacking in Italy, conditions necessary for the successful performance of the two documentation systems are very similar. Both require the setting up of a network that is, particularly for the repositories, appealing to the various scholarly communities and that *convinces* them of the advantages of depositing their work in open archives. For the SIGLE national reference centres too, it was necessary to identify the GL producing institutes and either have them provide a constant stream of documents and/or make them actively participate in GL cataloguing. In order to do so, GL producers had to be convinced of the information value of GL and of the necessity for access to such documents via participation in the SIGLE European database. In both cases

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organisational and cultural changes are needed in order to assure the success of the initiatives.

A further common element of both documentation systems is precisely that both distribute GL. SIGLE only manages GL, while the open archives deal with GL together with conventional literature. While Gelfand [4] is correct in affirming that GL has found its home in the repositories, it is exactly because of the co-existence of GL and conventional literature that repositories provide an *ideal, complete coverage* of the research output of an institute or disciplinary community. It is in this way that repositories can become an alternative and/or complementary source to commercial publishers, responding to request for free access to scientific products.

In Italy, IRs are still in an initial phase, though several projects exist for the development of both data and service providers. The Italian backing for the OAI comes mostly from Universities [5], which almost unanimously adhered to the Berlin Declaration [6]. Support was co-ordinated by the Libraries Panel of the Forum of Deans of Italian Universities (Conferenza dei rettori delle università italiane - CRUI) and this is an important sign for future development of national initiatives.

As regard SIGLE, whose existence spans more than twenty years, the changes of information diffusion over recent years have certainly influenced both the Italian contribution and the composition of the entire European database from whom important countries, the UK and the Netherlands, have withdrawn.

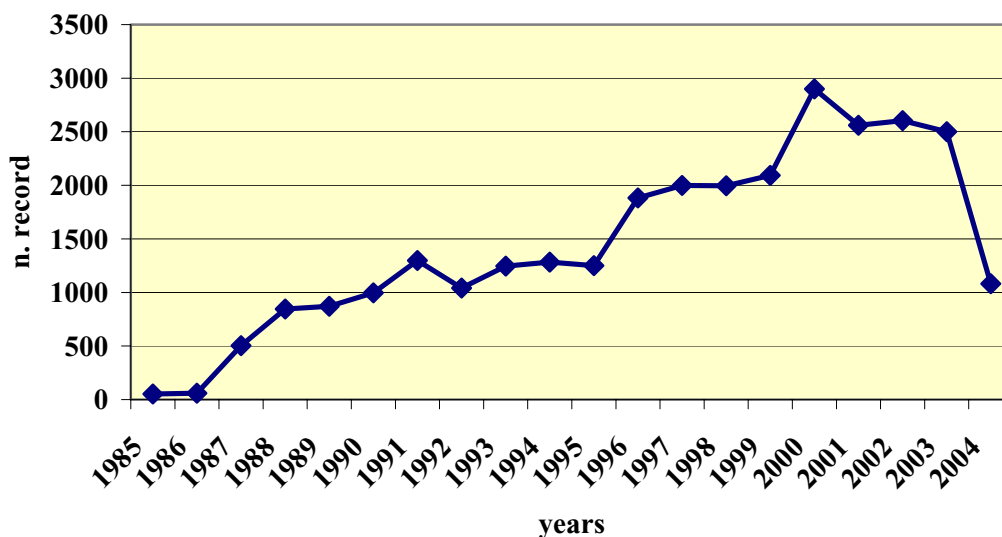
This paper proposes on the one hand to outline Italian initiatives regarding open archives, with a qualitative rather than quantitative analysis, focussing in particular on data providers and on organisation and initiatives that lead to solutions and integrations that encourage the development of IRs. On the other hand, it proposes to analyse the 20 years of Italian input to SIGLE in order to verify if and to what extent the Italian producers participating in SIGLE have contributed to the fostering of new ways of sharing and diffusing information sources produced within their organisations.

2. Italian participation in the SIGLE system

The SIGLE database was established in order to trace and make available GL produced in Europe. When, in 1985 the EC support came to an end, EAGLE was set up and to this day still handles the database via the National Reference Centres of the member states. The Italian National Reference Centre (INRC) is the Central Library of the Italian National Research Council (CNR), which joined SIGLE in 1985 [7].

The Italian GL producers in SIGLE constitute the reference point for observing analogies and/or differences with the recent establishment of Open archives. Consequently, this analysis firstly offers a synthetic view of the Italian contribution from 1985 to 2004, proceeding to focus on the characteristics of Italian producers; on the dimensions of their contribution and on the types of documents they produce. The data under analysis were obtained from the SIGLE CD-Rom, updated to December 2004 [8].

Fig. 1 - Italian input to SIGLE data base



The total Italian contribution to the SIGLE database amounts to 29,063 documents. Figure 1 shows that, after an initial increase, the rate of contributions stabilised. The number of documents sent to the database started to increase again in 1995, peaking in the year 2000 with an input of 2899 documents. Thereafter input declined, gradually at first, but falling sharply to a mere 1082 documents in 2004, the lowest figure for a decade.

2.2 The expansion of the database: from regular to occasional producers

The aims underlying the INRC policy are the result of twenty years' activity and elaboration in accordance with EAGLE members. This activity, in turn is the result of collaboration between the INRC and Italian GL producers. The contribution of the Italian Library Association (AIB), in backing the database should not be overlooked. In 1989 the AIB, amongst other things, promoted a survey on GL producers [9, 10], which revealed that the most prolific producers of GL were fundamentally public research institutes that were better organised in collecting and managing GL documents. These institutes constitute the historical nucleus of the Italian database and guarantee constant input (cf. Tab. 1). The initial work of the INRC was based on these institutes. Broadly speaking, this phase came to an end in 1995 [11, 12].

Table 1 shows the growth rate in the number of documents submitted to the Italian database and groups producers according to their activity and institutional mandate. The Italian contribution to the database increased by 1.7 from 1995-2004 compared to the previous decade. This increase refers above all to documents produced by universities (34.6), with a minor increase on the part of government institutes (19.0). Research institutes' contribution grew a negligible 0.2, but this has to be seen in the light of their contribution during the initial phase, when their input was higher than that of other institutes. The data for research institutes is not indicative of a *physiological decline* in their participation in the database; the explanation is to be found elsewhere and will be discussed further below.

Tab. 1 - Italian input by GL producers in the period 1995-2004 compared to 1985-1994

GL Producers	1985-1994	1995-2004	growth rate
Universities	306	10,906	34.6
Research institutes	7,702	9,450	0.2
Governmental institutes	39	781	19.0
Foundations and research centres	153	682	3.5
Associations & Societies	423	413	0.0
Total	8,196	22,303	1.7

Tab. 2 - Italian input by GL range of documents and producer types

N. of documents	Univer-sities	Research institutes	Governmental institutes	Associations & Societies	Founda-tions & Res. centres	Other	Total	%
< 10	10	20	93	78	32	29	262	71.8
11 -200	37	9	21	5	5	0	77	21.1
201-400	11	1	0	0	1	0	13	3.6
401-1000	6	1	0	0	0	0	7	1.9
1001-4000	1	3	0	0	0	0	4	1.1
> 4001	0	2	0	0	0	0	2	0.5
65	36	114	83	38	38	29	365	100.0

The database includes 365 Italian producers (Tab. 2) [13]. It is worth noting that both universities and research institutes contribute a significant number of documents. Combined, they distribute over 1000 documents via SIGLE. Nevertheless, the majority of institutes (71.8%) contribute less than 10 documents to the Italian SIGLE. This figure is to be attributed to the expansion of the database to include a larger number of producers and new categories. It is no coincidence that the period 1995-2004 (cf. Tab. 1) saw the INRC seeking new producers and sources of information. In accordance with the EAGLE policy, institutes' involvement in the database was encouraged. Turning to new sources of information, the INRC began to include data from bibliographies such as those in PhD theses that became available at that time. The INRC also made use of the web, which in that period became an important source of GL documents [14]. The results of this pro-active approach can be seen both in the expansion of the database to include new producers and in the considerable increase in the numbers of universities involved.

2.3 The network of Italian producers

Table 3 shows that in terms of GL producing institutes, the composition of the Italian database is predominantly technical and scientific. The contribution of research institutes and universities is significant (respectively 56.2% & 36.8%). All the same, these two categories participate in different ways. Research institutes were present in the initial phase and remained constant up to 1994. An inversion took place over the last five years, with the number of documents amounting to 30.9%. This is considerably fewer than in previous periods, such as 1985-1989 for example, when their contribution reached 99.1%. Conversely, in the initial phase, universities contributed little, but have since greatly upped their input, from approx. 5.1% in the period 1990-1994 to 62.2% from 2000-2004. As to the other categories of producer, their presence is greatly inferior to that of research institutes and universities. Government institutes and Foundations have the same figures (2.7%), while Associations and Societies account for less than 1%.

Tab. 3 - Italian input by GL producers (1985-2004)

GL producers	1985-1989		1990-1994		1995-1999		2000-2004		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Universities	5	0.2	301	5.1	2,892	30.7	8,014	62.2	11,212	36.8
Research institutes	2,315	99.1	5,387	91.8	5,465	58.0	3,985	30.9	17,152	56.2
Governmental institutes	13	0.6	26	0.4	347	3.7	434	3.4	820	2.7
Foundations & Research centres	0	0.0	153	2.6	471	5.0	211	1.6	835	2.7
Associations & Societies	2	0.1	3	0.1	202	2.1	211	1.6	418	1.4
Others	0	0.0	0	0.0	43	0.5	28	0.2	71	0.2
Total	2,335	100.0	5,870	100.0	9,420	100.0	12,883	100.0	30,508	100.0

Tab. - 4 Italian input by document types (1985-2004)

Types of documents	1985-1989		1990-1994		1995-1999		2000-2004		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Acad. /progress reports	2,001	85.7	5,319	90.7	6,005	65.1	4,649	39.9	17,974	61.8
Dissertations	2	0.1	31	0.5	1,678	18.2	6,363	54.6	8,074	27.8
Conference Proceed.	238	10.2	385	6.6	838	9.1	131	1.1	1,592	5.5
Miscellaneous	0	0.0	0	0.0	644	7.0	490	4.2	1,134	3.9
Others	93	4.0	129	2.2	54	0.6	13	0.1	289	1.0
Total	2,334	100.0	5,864	100.0	9,219	100.0	11,646	100.0	29,063	100.0

Data on the document type confirms the technical and scientific nature of the Italian contribution to SIGLE (Tab. 4). Academic or progress reports amount to 61.8% of the total documents present in the database. Nevertheless, these have declined significantly recently, falling from a peak of 90.7% in the period 1990-1994 to 39.9% in the last five years. As has been mentioned, this can be explained by the declining participation of research institutes in the database. Conversely, in the first five years, the proportion of theses to the total number of documents is negligible, but has grown progressively over time. This can be explained by the CNR making use of the Bibliography of PhD theses first published in 1995 [15]. It was in this period that a new norm made it obligatory to deposit PhD theses at the two national central libraries in Rome and Florence.

Tab. 5 - Italian GL producers with over 200 documents (1985-2004)

GL Producers	1985-94	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Ferrara Univ.	0	0	31	0	9	32	11	53	44	21	3	204
Bari Univ.	0	0	0	1	29	40	57	59	25	21	2	234
EUI	57	47	2	75	57	1	1	0	0	0	0	240
Turin Polytech.	0	8	0	1	14	8	37	41	65	50	15	239
Turin Univ.	0	0	0	1	19	47	62	63	29	33	7	261
Pisa Univ.	0	3	0	3	33	39	66	62	54	31	3	294
Enel	33	0	0	147	113	0	0	1	0	0	2	296
Palermo Univ.	0	0	0	2	29	23	34	26	49	67	67	297
Pavia Univ.	3	0	24	0	19	38	25	54	91	45	14	313
Milan Polytech.	0	0	3	0	16	11	60	27	136	65	3	321
Genoa Univ.	0	0	0	0	16	46	48	76	78	59	30	353
Bank of Italy	56	23	36	39	9	26	8	25	52	87	12	373
Catania Univ.	0	0	0	0	14	47	39	58	25	120	71	374
Naples Fed II Univ.	0		23	0	58	61	117	74	94	18	2	447
Florence Univ.	3	0	1	0	47	60	86	98	161	78	11	545
Siena Univ.	65	30	38	22	36	70	30	59	100	70	37	557
Padua Univ.	50	38	37	39	37	97	78	77	82	35	15	585
Milan Univ.	0	0	1	1	111	78	83	124	231	131	38	798
ISS	382	54	60	43	52	10	60	86	11	61	24	843
Bologna Univ.	102	27	34	20	111	111	147	102	120	149	74	997
Rome Sapienza Univ.	14	8	20	5	132	98	158	152	259	227	43	1116
INFN	700	92	86	185	69	74	67	113	0	0	0	1386
ENEA	755	29	43	77	48	37	69	75	99	149	33	1414
ISAS	941	77	103	91	67	110	1042	246	0	0	0	2677
IC	2807	395	274	229	187	261	26	303	116	160	108	4866
CNR	1889	243	785	678	332	186	129	156	261	160	131	4950

The list of institutes inputting more than 200 documents is included in Tab. 5, which seeks to:

- Compare overall input from the first decade (1985-1994) with that of the following period on an annual basis;
- Check whether and to what extent changes occurred in the database along with the development of the web;
- Outline the evolution of input from the year 2000, when various Italian institutes undertook OA initiatives.

We will consider first of all, the decline in contributions from research institutes which, broadly speaking applies to all institutes. The CNR and the International Centre for theoretical Physics (IC) significantly decrease their contributions (respectively from 243 in 1995 to 131 in 2004 and 395 to 108). Turning to the National Institute of Nuclear Physics (INFN) and the International School for Advanced Studies (ISAS), which are among the main Italian physics research institutes, we are looking at a total withdrawal from the database, given that no contributions have been sent since 2002. As will be seen in the following paragraph, in this period ISAS developed its own

repository and prior to this, internal documents had been deposited in arXiv e-print archive [16]. INFN too had contributed to the establishment of e-print archives [17], both at institutional and individual researcher level. As for the other research institutes, the decline is probably due to documents being made available on their own home pages. Considering the institutes that were original contributors to the database, such as Istituto Superiore di Sanità (ISS) and ENEA, it can be seen that there was no major variation in their contribution. This confirms their adherence to SIGLE, despite a change in GL diffusion policy with full text documents now available on the web.

The data for universities confirms that, in most cases, input is concentrated in the last few years. It is also worth noting that most of the universities with a significant number of documents reported in table 5 have, as will be seen, established their own IRs.

Concluding this section on Italian participation in SIGLE, it is important to stress the INRC contribution to the bibliographic standardisation of GL documents, to the identification of GL producers as well as their part in monitoring the difficulties in building network of producers.

3. The Italian Institutional repositories

As already mentioned, open archives started out with the e-print archives, an initiative from the base that was organised and developed by groups of researchers. The aim was to accelerate and expand diffusion of their work (aims shared in the production of GL). The automatic document archiving system designed by Ginsparg at the Los Alamos National Laboratory, is an autonomous and self-sufficient model that places emphasis on direct communication without intermediaries between authors and readers of scientific documents. This method of communication radically changed the traditional linear phases of the scientific communication chain by circumventing the role up to then played by commercial publishers as well as libraries. However, the e-print archives expanded with the consensus of the open access movement, culminating in the Berlin Declaration on the part of the scientific institutions and libraries involved in the archives. This led the way to new forms of co-operation and integration of information resources and specialised know-how and fuelled the development of the IRs, that constitute the institutional commitment needed for access to and preservation of the scientific documentation produced by each institute. Although still in the project phase, the active involvement of libraries points to the ever-greater integration of traditional library information sources (opac, metaopac, digital libraries) with those of the open archives [18]. The integration is further enhanced by the constitution of archives based on a common metadata schema that enables integration with external information sources by means of the Open Archive initiative protocol for metadata harvesting (OAI-PMH) [19, 20].

Compared to other surveys [21, 22], our analysis has been based on direct consultation of open archives that have been developed in Italy. The main information source for access to these archives was Pleiadi [23, 24, 25] (Portale per la Letteratura scientifica Elettronica Italiana su Archivi Aperti e Depositi Istituzionali), a portal for Italian electronic scientific literature on open archives and institutional repositories. The portal was developed by the Italian Universities consortia CASPUR (Inter-university Consortium for the Application of Super-Computing for Universities and Research) and CILEA (Italian Lombardy Inter-university consortium for automatic elaboration). They are active promoters of the open archive movement and provide technical and scientific back up for the development and implementation of new systems. As can be seen, we started from a valid, constantly updated source, a service provider that operates as a link between the Italian initiatives and which provides useful information on international developments. Consequently, it was not necessary to select or check whether archives could be included in the definition of repositories [26, 27]. The emphasis was on organisational and operational models, the roles played by different actors and on the initiatives and projects that are both characteristic of the situation in Italy and merit attention. The systems were consulted in depth and this at times threw up incongruence in data or in their presentation and malfunctions but also revealed innovative and efficient ways of displaying and distributing the scientific output of an institute or a given discipline. As a result, the survey does not provide a quantitative analysis of the data, but seeks to stimulate reflection with a view to encouraging the development of the still young but promising open access initiative.

3.1 Italian data providers

There are 18 open archives operating in Italy, 14 of which are Institutional repositories, and 4 are disciplinary repositories. These initiatives are promoted by 10 universities, including one international university at Florence; three state research institutes (the CNR research area at Bologna, the National Institute of Geophysics and Volcanology and the Institute of Social Medicine); one management studies institute (Istituto di studi per la direzione e gestione di Impresa); and one international disciplinary repository, to which Italy is an active contributor. Considering that there are 77 universities and over 40 state research institutes and that the number of deposited documents fails to reflect the scientific output of each institute, it is clear that the situation in Italy is embryonic. Data for the expansion of the archives is not available and is difficult to verify. Nevertheless, our experience shows that since the initial consultations in the period from April-June, the number of documents has grown significantly [28]. Furthermore, as will be seen in following paragraph, some archives have concentrated so far on the collection of a single type of document.

Considering the quantity and type of documents, the situation is fairly heterogeneous. Although still in their early stages, the archives to be found range from those that already resemble genuine institutional archives, to those that have without doubt implemented systems following OAI criteria, but that still lack adequate visibility within their institute.

One of the most successful IR has been developed by the University of Bologna [29]. It is one of the first Italian universities that have implemented an institutional repository, divided in three separate archives. One of these specialises in the diffusion of didactic programmes and materials (AMS Campus), the second specialises in the collection of "contributions deriving from the university's research activity" (AMS Acta) and, the third collects "cultural contributions on a variety of subjects, deposited and distributed directly by the authors". Taken as a whole, this archive is the nearest to Lynch's broad definition of a repository [27], who distinguishes "two views" of IRs, and sees the second "as broadly housing the documentation of the intellectual work - both research and teaching - of the institution, records of its intellectual and cultural life" and which therefore includes datasets, video, learning objects, etc. among its documents.

Among those considered, the repository, which differs most from the others, is E-Lis [30]. This has been included in the list of Italian repositories as the Italian contribution is considerable, both technically and in terms of contributions. It is an international disciplinary repository on librarianship, information science, and technology, and has evolved from ReLIS/DoIS (Research in library and information science and documents in information science), the library science portal run by the MIMAS consortium of Manchester [31, 32]. It is supported by Spanish Ministry of Culture and is hosted by the AEPIC team CILEA. E-Lis has been running since 2003 and enables the self-archiving of electronic documents from 32 countries, not only from Europe and North America, but also from Asia, Africa, Central and Southern America and Oceania. The documents can be written in any language, but must include abstracts and keywords in English.

3.2 Archive consistency and type of documents

Data on the size of repositories provides useful insight on the extent to which the archive is representative of institutional research output and the degree of self-archiving. The number of documents deposited (Tab. 6) confirms that the Italian repositories are still in the initial phase. Even focussing on the larger repositories, the data are not encouraging. The two with more than 2000 items are an international university based in Italy [33] (European University Institute) and the E-Lis disciplinary repository that operates at international level. Worse, the former provides bibliographic descriptions but not the full text. Turning to E-Lis, the positive news is that more than 500 of the 2000 documents are self-archived by Italian personnel or directly inserted by researchers. ISAS [34], another international institute based in Italy, has a repository with over 1000 documents, but the link to the full text often connect to the publisher's homepage where papers can be accessed on subscriptions basis or charged singly. For a while ISAS and its researchers have been active in a wider diffusion circuit of internal documents via the e-print arXiv.gov. Consulting the repository one can often find two report numbers, which indicate that documents are deposited in both archives.

Tab. 6 - Documents contained in repositories

Number of documents	No. of Repositories
< 60	5
60 - 200	3
201 - 400	3
401 - 600	3
601 - 900	0
901 - 2000	2
> 2001	2

In all likelihood, the repositories with a medium number of documents (from 200 to 600) are the ones that have developed efficient organisational models and are fully operative. As elsewhere, the Italian situation is undergoing constant evolution. Since the international survey [21] and our first phase of data collection, the number of documents has increased in more than one institution. Moreover, two new repositories have recently been instituted (University of Pisa [35] and the National Institute of Geophysics and Volcanology [36]) which have a small number of documents, but which represent an important development as they have only been operative for a few months.

Clearly the validity of a repository depends not only on the number of documents it contains, but also on the extent of self-archiving carried out directly by the authors. For the latter it is difficult to obtain reliable data consulting the repositories themselves. In the recent international survey [21, 22] the percentage of authors personally depositing documents was not estimated to be very high. Consulting the repositories, we noticed that when this information was available, the name of the author frequently did not correspond to that of the person who had deposited the document. This would seem to be the repositories' weak point. In Italy and elsewhere repositories need to advocate the advantages of academics and researchers practising self-archiving.

The type of document is a complex and fundamental issue. Every institute can decide on the type of document to be included in its archive. This is possible both with Dspace software, with which each community selects what collections to make available, and with GNU e-print software, which allows the inclusion of various document types along with the corresponding bibliographic descriptions. In the latter case there is clearly a difference between the type of document envisaged in a single repository and that, which is effectively used. Furthermore, GNU e-print software requires contributors to specify whether the document has been published, whether the document is in print or submitted and whether it has been peer reviewed. These are significant options which can provide useful insight on the extent to which repositories consider themselves free access channels, operating separately from commercial publishing, and the extent to which they reflect the quantity of GL produced inside the institute. Nevertheless, not all the repositories use or make this information mandatory. Consequently, it is often the case that when consulting an archive, no correspondence can be found between the data displayed and the real number of items contained in the archives. We consider this to be significant given that the challenge faced by repositories and their chances of success depend both on the presence of GL and conventional literature. A prevalence of GL would, on the one hand, further marginalize this types of document, on the other, fail to live up to the free access expectations of the published scientific literature.

Tab. 7 - Types of document held in Italian repositories

Repositories	Monogr./ b.chapters	Journal articles	Conference Proceed.	Reports	Pre- print	Thesis	Didactic materials	Others	Total	
									NO.	%
Bologna University Ams campus	--	--	--	--	--	--	94.6	11.5	464	5.7
Bologna University Acta	50.0	0.1	41.9	--	10.7	0.3	--	--	990	12.3
Bologna Univ. Miscellanea	0.2	0.1	0.3	0.4	3.6	--	--	5.2	25	0.3
Florence University	23.9	4.0	2.9	14.4	1.8	8.6	--	17.7	497	6.2
Messina University	--	6.4	1.9	--	--	--	--	--	269	3.3
Naples Federico II Univ.	1.1	--	0.1	--	25.4	--	--	--	49	0.6
Trento University	0.8	1.1	0.6	70.4	0.6	2.6	--	5.2	583	7.2
E-Lis	9.7	48.3	48.5	10.9	57.4	7.6	2.9	43.8	2,952	36.6
CNR Bologna research area	--	--	1.0	0.1	0.6	0.1	--	1.0	22	0.3
Institute of social medicine	13.8	2.5	2.2	--	--	--	2.5	15.6	222	2.8
STOA'	0.4	0.1	0.7	3.6	--	1.4	--	--	52	0.6
ISAS (two communities)	--	37.4	0.1	--	--	8.3	--	--	1,434	17.8
Padua University	--	--	--	--	--	42.9	--	--	309	3.8
Pisa University	--	--	--	--	--	7.2	--	--	52	0.6
Rome La Sapienza University	--	--	--	--	--	20.8	--	--	150	1.9
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	8070	100.0
%	5.8	45.5	21.7	8.8	2.1	8.9	5.9	1.2	100.0	

Note: the National Institute of Geophysics and Volcanology, the University of Parma and the European University Institute are excluded from the list of repositories as data was not available in the archives.

Archives using GNU e-print contain an average of 10 different document types, with a maximum of 25 different types for E-Lis. In the archives which specialise in didactic, as is the case for the Bologna AMScampus, specific document types are identified and included such as programmes and bibliographies, handouts, notes, lessons etc. In order to give an overview, the data in Tab. 7 has been elaborated by grouping similar types of documents [37]. Once again the results show considerable disparity between one archive and another. Articles from periodicals are above all to be found in the E-Lis (48.3%) and ISAS (37.4%) repositories. Otherwise, considering monographs and book chapters along with articles only Bologna University (50% of monographs and book chapters) and Florence University (23% and 4% of journal articles) provide a significant number of published documents. Proceedings constitute a significant type above all in the E-Lis archive and in that of the University of Bologna. Three universities (Padua [38], Pisa [35] and Rome [39]) have implemented their repositories by including only theses.

Considering the different types of GL, (reports, preprint, theses e didactic materials), along with a part of the data for proceedings, not always commercially published, it emerges that GL is significantly present and tends to be equally distributed among the different archives.

3.3. Technical and organisational aspects

Similarly to IRs in other countries, Italian libraries play a central role in the development and management of open archives and, in some cases, avail themselves of the collaboration of interuniversity information technology units. In addition, CILEA

and CASPUR are the two interuniversity consortia that in Italy provide technical backup for the launching of numerous initiatives. It may seem obvious that libraries are the main actors, particularly considering that user-friendly and open source software is used, yet the difficulty above all for IRs, is not so much in adapting the software to institutional situations, but more in supplying the repository so that it sufficiently represents the scientific activities of the institute. This implicates the selection of the documents produced and of potential interest for open access, encouraging researchers to submit their work, where necessary providing support for the submission of documents.

The library service running the depository is usually responsible for checking the accuracy of the metadata that are inserted in order to obtain a standardised bibliographic description that facilitates harvesting and seamless archive interoperability. The E-Lis disciplinary repository makes use of an editor, who manually checks the submitted documents "to confirm they fit our policy" and "ensure that inappropriate papers are not included". In this context too, there will probably be developments of new professional profiles and librarian specialisations. Consulting the archives, in cases where the identity of the person submitting the work is provided, confirms that library staff is involved in the submission of documents. This is clearly dependent on repositories still being in an early phase and the filling of a new archive can incentive authors to insert their documents directly.

As regard software, the majority of repositories, normally those established first, use the free GNU e-print software, whereas another four repositories use the MIT's Dspace. Rome University uses CDSware, Pisa NDTL. To shift from one repository to another encountering similar interfaces with similar search options and comparable help and instruction pages is user-friendly. This gives an impression of standardisation that suggests a combined initiative regardless of variations in operation.

3.3 Outlook for developments in evaluation and integration of data resources.

The development of IRs encounters difficulties in various fields connected with the ongoing uncertainty regarding intellectual property and copyright as well as peer-review and evaluation of self-archived publications. In this paragraph we briefly mention a few initiatives, some of which are still not beyond the planning phase, that address these issues. Some elements deserve a lengthier consideration that would be beyond the aim of this paper. These considerations could be taken as examples of good practices that would be useful for the growth of IRs.

Trento University is establishing the Polaris database [40] that is run by university library staff and that enables academics and researchers to input their own curricular data along with bibliographic descriptions of the work produced. The aim is to enable evaluation of scientific output by the competent bodies (Ministries or external refereeing bodies). GL is included among the types of document that academics can upload and in this way takes its rightful place among the evaluated scientific documentation of an institute or researcher.

Other universities envisage faculty committees or linking with external referees. Bologna University has signed an agreement with the Florence National Library for the voluntary depositing of its electronic scientific and didactic publications evaluated by a specific scientific committee. In this way the University is ahead of the new law on copyright, and, at the same time provides an extra, certified channel for the distribution of its publications.

Other examples of evaluation of publications concern projected or implemented electronic university publishing systems, which is significant above all in Italy, where there is no consolidated tradition of University Presses comparable to that found in countries such as the UK and the US. This could encourage the distribution of electronic, scientific-academic publications freely available and/or at low cost, thereby reducing the problems connected both with the "journal crisis" and the "permission crisis" [41]. The recent establishment of the Florence University Press [42] constitutes a successful example of just such an initiative and, in addition, is closely connected to the university repository that, amongst other documents, distributes its output. Similar initiatives are underway in other universities, usually those that are more sensitive to the question of open access. Some of them are jointly developing projects aimed at the creation of national quality electronic periodical platforms with free access [43].

A final consideration concerns the service providers that gather and index metadata enable the retrieval of documents spread across different data providers. Currently in

Italy, the already mentioned Pleiadi system is operative. There are other projects and prototypes that are usually run by research institutes (CNR with Cyclades [44] and Sail-eprint [45]; ISAS with the Torrii project [46]) that are developing systems and services that apply OAI-PMH and in the process give greater visibility to the various data providers.

4. Concluding remarks

Results of this analysis show that there is a certain connexion between the Italian participation in SIGLE and the setting-up of IRs, despite specific characteristics. Apart from the common technical-scientific content, both document systems share the same information producers. These are mainly universities and research institutes that from time to time have used different channels to distribute internally produced documents. This can be seen in the changes to the Italian SIGLE database, that above all concern the period when GL began to be distributed on the web and when open archives began to be developed. These changes are more evident in the case of research institutes that used to contribute a large number of documents to the Italian SIGLE. Universities are present thanks to the indexing of theses, which constitute a nucleus of documents for IRs too and which have often formed the starting point for the filling of new archives.

As in other countries, Italian IRs are in the growth phase. The number of documents in each repository is not conspicuous and the process of involving departments and academics is still only just underway. Nevertheless, considering the expansion of the Italian SIGLE database, it could be said that the IRs are starting from a favourable position, given that in less than three years they have already made more than 5000 documents available (excluding the large scale producers), with the majority of these being accessible in full texts. GL forms a significant part of the IRs and retrieval not only of bibliographic data, but also of full texts is one of the winning features of IRs. All the same, given the nature of IRs and the request for free access to scientific literature, it is essential that they give equal coverage to both conventional and non conventional literature.

What is the future for SIGLE in the light of the changes affecting the distribution of information on the web and the growth of IRs? We feel certain proposals can be made so as not to lose the documentary and organisational heritage that has been built up over the last twenty years. It is clear that, OAI compatible formats must be used to enable harvesting of data on GL. Furthermore, national reference centres could, for example, promote open access to GL produced by small institutes and occasional producers, and could exploit their knowledge networks of GL producers to stimulate the collection of GL following OAI standards.

We would be happy if these conclusions were to stimulate debate among information specialists leading to common and fruitful solutions for the freest and most openly accessible distribution of scientific information.

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A Survey of Open Access Barriers to Scientific Information: Providing an Appropriate Pattern for Scientific Communication in Iran *

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Abstract

Serial pricing crisis and permission crisis restrict scholars to their scholarly findings. Scientists as a vital component of scholarly communication are losing their control on it. These crises along with library budget cutback interrupted the free flow of scientific information. This case study investigated academics' views of Shiraz University (Iran) on open access publishing and its four channels. Findings showed that in spite of their low familiarity with open access materials 92% of them had positive view on open access movement. 70% of respondents chose open access journal for their publishing model and the second vehicle is self-archiving (62.5%). Majority of academics knew pricing crisis and permission crisis as an obstacle to their scholarly information.

Introduction

With the advent of Internet and WWW, three components of scholarly communication, i.e. publishers, authors and libraries confronted with rapid changes in scholarly publishing. The new opportunity brought about by journal pricing crisis and new information technology. The Association of Research Libraries statistics (ARL, 2003) showed that the average annual increase of the serial unit cost was 9% since 1986 and the consumer price index for this period increased 64%. Spiral pricing levels of scientific journals and library budget cutback restrict institutions in providing needed journals. Consequently, great numbers of scientists in the world, especially in developing countries, are unable to access the research findings they need. Basically, there is a gap between the large amount of the scholarly materials that libraries can provide and the literature that scientists need. According to ARL's statistics this gap has widened over 1986 to date.

Scholars are losing their control on a system that they created. Journal spiral prices on the one hand and library budget cutback on the other hand interrupted free flow of scholarly information. Scientists' findings are given away to commercial publishers. Publishers, then sell them back to their libraries at unjustifiable prices. Consequently, A: university scholars and their peers in different countries have access to less and less scientific materials published in their fields, B: scientists haven't professionally many incentives to work and C: at least, this affect science at national level. As a result of the problems described above many scholars and their institutions, in a global attempt, decided to make literature freely available (BOAI, 2002).

This study intends to survey academics of Iran universities on their attitudes toward open access publishing and providing an appropriate pattern for scholarly communication. There are some research studies which are close to this goal. A large-scale survey of journal authors' opinion was carried out on 4/000 senior researchers from 97 countries (Rowlands, Nicholas, and Huntingdon). This survey investigated authors' views on current journal system and open access publishing. Low awareness (82%) of research community of open access, in spite of their positive attitudes toward open access movement, revealed the urgent need to raise awareness of them to this issue. A survey of journal authors on behalf of the JISC and OSI has been carried out by Key Perspective Ltd. (2004). According to this survey authors' awareness of open access is high. The reason for publishing in open access models is the principle of free access to research findings (90%).

A series of studies (RoMEO Projects) funded by UK JISC investigated the intellectual property rights issues relating to open access movement. The aim of study 1 (Gadd, Oppenheim and Proberts, 2003) was to examine the attitudes of three parties (academic staff, universities and publishers) towards copyright ownership and the impact of copyright ownership on the open access movement. Findings showed that "self-archiving is not best supported by copyright transfer to publishers". Respondents from self-archivers and non-archivers are compared in RoMEO studies 2 (Gadd,

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Oppenheim and Proberts, 2003). The main purpose of this study "was to ascertain how authors wanted to protect their self-archived research papers in order to develop the right metadata." Study 3 (Gadd, Oppenheim and Proberts, 2003) wanted to ascertain how academics expect to use others' papers and also investigated if there was any significant difference between the attitudes of two groups (academics-as-authors and users) towards using and protecting research papers. 99% of academics-as-users expected to display and print open-access materials either freely or under limits or conditions. The findings showed that academics-as-users do not perform all the activities (excerpt, aggregate and annotate) with open-access research papers that academics-as-authors would allow. The study indicated highly significant differences between the two groups on all permissions except display, excerpt and save. In general, academics-as-authors are more liberal on using their works than academics-as-users.

Objectives

This study seeks to determine the following regarding open access movement:

- Academics' attitudes toward open access
- Academics' awareness of open access
- Academics' attitudes toward self- archiving
- Academics' attitudes toward institutional repository
- Academics' attitudes toward subject-based repository
- Academics' attitudes toward open access journal
- Academics' attitudes toward pricing crisis
- Academics' attitudes toward permission crisis
- Academics' reasons for not publishing via open access channels
- Academics' views on the usage of open access materials as-users and authors

Methodology

This is a case study that presents the findings of a survey of academics' views on the open access issues. The survey population consists of Shiraz University academics. According to statistics of Ministry of Science, Research and Technology of Iran entitled **Faculty Members in Iranian Higher Education Institutes, Year 2003**, 377 doctoral faculties were employed in Shiraz University. The subject disciplines chosen for study include Humanities (116 faculties), Science (85 faculties), Engineering (98 faculties) and Agriculture & Veterinary (78 faculties). The sample size is calculated from a preliminary sample population variance, which is estimated 0.05 ($s^2=0.05$).

According to the formula $2 Z_{\alpha/2} S/\sqrt{n} = 0.129$ the sample size is 50 by using 95%

confidence level and 12.9% confidence interval (The sample size can also be calculated using the software designed by Custominsight.com). The respondents were randomly chosen from the above source. The same number of respondents was chosen for each discipline. The survey instrument was a questionnaire, which was sent to the respondents' address and 41 returned. Gathered data which present in figures and tables analyzed through descriptive statistics (demographic) and inferential statistics (Chi-square test) to investigate academics' views and awareness of open access and its four channels (Self- Archiving, Institutional Repositories, Subject- based Repositories, Open Access Journals), their attitudes toward copyright law, and the reasons for not publishing through an open access outlet.

Results of the Survey

• Subject discipline

Respondents were asked to name their subject discipline. The disciplines were divided into four categories: Engineering 24.39%, Science 31.71%, Humanities 31.71%, and Agriculture & Veterinary 12.2%.

• Respondents' academic status

Q4 asked respondents to name their academic status, which is divided into three categories: full professor 12.2%, associate professor 19.51%, and assistant professor 68.29%.

• Length of time as academics

Q6 asked how long had they worked in academia? Four options were given: 5 years or less (17.07%), 6-10 years (21.95%), 11-15 years (26.83%), and more than 15

years (34.15%). As such, 34 percent of respondents were long-standing members of the academic community, with over 15 year services.

- **Research papers published by academics**

Q7: How many research papers had you published in your career? Approximately half of the respondents (48.5%) had published ten or fewer papers during their careers; and 30% published between 11-30 papers. When comparing this with length of time in the academic community, 65 percent of respondents were members between 5-15 years and together they published 48.5 percent of papers.

- **Academics' attitudes to open access publishing**

Q18: Respondents were asked to indicate their attitudes toward open access publishing and its promotion. The responds were measured by Likert scale. 92% of academics supported to make their research papers available via open access publishing (agree 48.72% and strongly agree 43.59%). Interestingly, there were no negative responds (disagree or strongly disagree). Nearly 8 percent of academics responded "No comment".

- **Academic views on self-archiving**

Q20: Of the respondents, 62.5 percent "agree" and "strongly agree" on publishing via self-archiving. Humanities are more likely than other disciplines to self-publish: Humanities 40% compared to Science 20%, Engineering 24%, and Agriculture & Veterinary 16%.

- **Academic views on OA journal**

Q22 asked respondents whether they are willing to make their papers available via OA journals. Of the respondents 30% strongly agreed and 40% agreed to publish via an OA journal, while 7.5% disagreed and 22.5% had no comment. A high proportion the respondents who agreed and/or strongly agreed were from Science (35.7%) compared with Humanities 32.1%, Agriculture & Veterinary 17.9%, and Engineering 14.3%.

- **Academic views on institutional repository**

Q24: 55% of the respondents said that they would deposit their scholarly articles in an institutional repository; only 3% said they would not, while 42% had no comment. A higher portion of Science (38.1%) and Humanities (33.3%) compared with Agriculture & Veterinary (13.4%) and Engineering (13.4%).

- **Academic views on subject-based repository**

Q26: Almost 62% of the respondents "strongly agree" and/or "agree" on depositing scholarly materials in a subject-based repository, while less than 3% disagreed and a little more than 35% had no comment. Science (37.5%) is more likely than other disciplines to deposit their work in a subject-based repository compared with Humanities 29.2%, Engineering 20.8%, and Agriculture & Veterinary 12.5%.

- **Familiarity with self-archiving**

Q19: 45% of respondents have a "very low" and "low" familiarity with self-archiving, while 30% have "no familiarity" with self-archiving. Only 25% had either a "very high" or "high" knowledge about it.

- **Familiarity with an OA journal**

Q21: 39% of respondents had a "very high" and "high" awareness of OA journals, while 29.7% had "no familiarity" and 26.83% had only a "low" familiarity with OA journals.

- **Familiarity with institutional repository**

Q23: While 26% of the respondents have awareness of an institutional repository, about 74% of them were "not familiar" with or had very little knowledge about an institutional repository.

- **Familiarity with subject-based repository**

Q25: While 33% of the respondents had either a "very high" or "high" awareness of a subject-based repository, 66% were either "not familiar" with or had a low awareness of a subject-based repository.

• Copyright law

Q40: Respondents were asked to indicate their views on copyright protection of scholarly papers. 51.28% of them were not familiar with the current copyright system. For 28.21% of the respondents, the current copyright system provides low expectations and for 7.69% very low expectations. Only 12.82% of the respondents were satisfied with the current copyright system.

• Views on copyright

Respondents were asked here to give their understanding of copyright law.

Q41a: Copyright law should protect large and open knowledge distribution. 54.06% of respondents "strongly agree" and "agree" with this concept, 29.73% had "no comment" and 16.21% "disagree" and "strongly disagree".

Q41b: Copyright law means restricted access to scholarly materials. Respondents were asked to indicate their attitudes on this part of the question and 44.12% of them disagreed, 41.18% had no comment, and only 14.7% strongly agreed and agreed.

• Copyright assignment to the publisher

Q46 asked respondents to indicate their attitudes toward copyright assignment to the publisher. 53.84% of them "strongly agree" and "agree" that copyright assignment to the publisher restricts access to scholarly articles, 33.33% had no comment, and only 12.82% disagreed.

• Open access materials usage comparison: academics-as-users and authors

Q33 and Q36 compare respondents' views on how they expected to use others' scientific materials (i.e., academic-as-users) with how academics expected others to use their works (i.e., academics-as-authors). This was performed by chi-square test (Fisher exact test) on the data collected from each group at the 0.05 level. The Table below shows the breakdown.

Table1: open access materials usage comparison

Open access material usage	As- authors		As-users		
	Agree %	Disagree %	$\alpha=0.05$ P=0.059	Agree %	Disagree %
View on screen freely	86.49	5.4		92.5	5
View on screen conditionally	34.29	42.86	$\alpha=0.05$ P=0.001	33.33	47.22
Print freely	83.33	13.89	$\alpha=0.05$ P=0.003	89.47	2.63
Print conditionally	39.39	42.42	$\alpha=0.05$ P=0.002	39.39	45.45
Anybody-Any purpose	40	42.5	$\alpha=0.05$ P=0.000	43.59	41.02
Educational & Research purpose	51.38	35.9	$\alpha=0.05$ P=0.000	55.26	36.84

Based on the Fisher's Exact Test to investigate the independence of data (in the nominal level $\alpha=0.05$) there is a very strong relationship between academics' attitudes on the two sides of the chain with respect to the above six options. The results show that 92.5 percent and 86.49 percent of academics-as-users and authors are fond of free availability of open access articles on-screen, respectively. Slightly more academics-as-users expected to perform this (6%) than academics-as-authors. The second option shows their views on reading articles on-screen with limits. 47.22% and 42.86% of respondents as users and authors disagreed respectively, but 33.33% and 34.29% of academics-as-users and authors agreed with limits, respectively. According to the third option in the table, respondents were asked to indicate their attitudes toward their articles allowed to be printed freely, 89.47% of academics (as users) and 83.33% (as authors) agreed. Academics-as-users and authors (45.45% and 42.42%,

respectively) disagreed for implementing limitations to copies that may be printed out. The fifth option shows their views on using freely open access materials for any purposes by anybody. 43.59% of academics-as-users against 40% of academics-as-authors agreed with no restriction. But 42.5% and 41.02% of respondents as authors and users disagreed, respectively. The last option indicates respondents' views on usage of open access materials for research and educational use only. 55.26% and 51.38% of them as users and authors agreed and 36.84% as users, 35.9% as authors disagreed, respectively.

• Pricing and permission crisis

Suber (2003) in his study showed that there are two barriers that limit access to research findings: 1- **serial pricing crisis**, 2- **permission crisis**. The latter arises from copyright law and the former arises from journal subscription fees. Accordingly, respondents were asked to indicate their views on pay-per-view (PPV), site-license (SL), journal subscriptions and journal spiral prices. The majority of them believed that pricing and permission crisis restrict access to their articles. Table 2 shows the breakdown.

Table 2: percentage of respondents' views on journal pricing and permission crisis

	PPV %	SL %	Subscription fees %	Journal price increase %
Strongly agree	13.16	7.89	10.81	25
Agree	55.26	55.26	54.03	60
Disagree	10.53	13.16	10.81	5

• Reasons for not publishing in open access models

Q49 presented a list of possible reasons for academics not publishing in open access models. The results indicated that the most common reason for not publishing in open access vehicles is quality of works- I believe that OA materials have poor peer review procedures. The second reason concerning their familiarity with OA articles (36.1 %). Institutional promotion is in the third place that academics are concerning about. The fourth rank belongs to the factor that was: I perceive OA will reduce my scientific position. Less citations and small readership ranked 5 and 6, respectively. The breakdown is presented in Table 3.

Table 3: Academics' reasons for not publishing in open access models

Reasons	Strongly agree%	Agree %	Strongly agree plus Agree%	No comment %	Disagree %	Strongly disagree %	Strongly disagree plus disagree%
I am not familiar with OA scientific articles	13.9	22.2	36.1	30.6	27.8	5.6	33.4
I perceive OA will reduce my career advancement	-	23.1	23.1	30.8	38.5	7.7	46.2
I perceive OA will affect my academic promotion badly	5.3	26.3	31.6	28.9	31.6	7.9	39.5
I perceive the readership of OA to be smaller than traditional journals	-	5.1	5.1	25.6	59	10.3	69.3
I think OA articles may be less frequently cited	7.7	12.8	20.5	28.2	43.6	7.7	51.3
I believe that OA materials will have poor peer review procedures in place	15.8	23.7	39.5	23.7	28.9	7.9	36.8

Discussion

The overall purpose of this study was to ascertain the views of academics of Iranian universities toward open access movement and finally provide an appropriate pattern for scholarly communication in Iran. To do this a preliminary study was conducted on academics of Shiraz University which is one of the most famous universities in Iran.

• Open access movement

At the beginning the discussion is concentrated on academics' views and awareness on open access and its four channels: i.e., self-archiving, institutional repository, subject-based repository and open access journal (Bjork, 2004). 92% of respondents had positive view on open access publishing and its promotion. This brought about by their belief in the principle of open access (Swan & Brown, 2004). The subject discipline chosen for this study compiled of Engineering, Science, Humanities and Agriculture & Veterinary (A&V). The results presented that Sciences had the higher portion to open access publishing (33.3%), the Humanities has the second place (28.2%) , Engineering is in the third place (25.6%) and A&V the last place (12.8%).

Table 4: Academic views on four channels of open access publishing

Four channels Subject disciplines	Self-archiving 62.5%		Institutional repository 55%		Subject-based repository 60%		Open access journal 70%	
	Agree %	Rank	Agree %	rank	Agree %	Rank	Agree %	Rank
Humanities	40	1	33.3	2	29.2	2	32.1	2
Science	20	3	38.1	1	37.5	1	35.7	1
Engineering	24	2	13.4	3	20.8	3	14.3	4
Agriculture & Veterinary	16	4	13.4	3	12.5	4	17.9	3

According to table 4 open access journal is a vehicle for publishing that had the most acceptance (70%) by the academics. The reason behind this is a cultural issue because it is more than 300 years that print-based journals have been the only vehicle for publishing and metrics for evaluating scholarly materials. In addition the results showed that academics are more familiar with open access journal than the three other channels. Self-archiving had the second rank (62.5%) and subject-based repository and institutional repository gained the 3rd and 4th ranks, respectively. Among the disciplines, academics of Humanities are more willing to publish via self-archiving (40%), but those of Sciences are more willing to publish via institutional repository (38.1%), subject-based repository (37.5%), and open access journal (35.7%). Respondents' familiarity with these four channels was not satisfactory. Table 5 shows the breakdown.

Table 5: Academics familiarity with four open access channels

Four channels	Very high %	High %	NO familiarity %	Low %	Very low %
Self-archiving	7.4	17.6	30	37.5	7.5
Open access journal	9.75	29.27	29.27	26.83	4.88
Institutional repository	5.26	21.06	36.84	31.58	5.26
Subject-based repository	5.13	28.21	26.64	38.46	2.56

The results showed that there is a lack of awareness of open access movement among academics. In spite of this, the majority (92%) of them are willing to choose such vehicles for publishing their works. These findings point to an urgent need to raise academics' awareness of four open access channels.

• What do academics think about copyright?

The results indicated that 51.28% of respondents are not familiar with copyright law and 30% of them were not satisfied with current copyright regime. Academics' views on copyright showed their opinions were that copyright law should protect "large and open knowledge distribution" (54%) and act against access restriction to scholarly materials (44%). Finally they believed that copyright assignment to the publisher restricts access to research findings (54%). Their attitudes revealed that in spite of their ignorance (half of them) of copyright law they believed that current protection offered by copyright law exceeds the protection required by most academics (the same result showed in RoMEO studies; 2).

• Open access materials usage comparison

The majority of academics-as-users (92.5%, 89.47%) and authors (86.49%, 83.33%) expected to display and print open-access material freely. It is what has been shown in RoMEO studies (RoMEO studies 3). Table 3 showed that near half of academics-as-users and authors disagreed to display and print open-access works under limits. Two groups showed that they are slightly liberal about free display (3.16%, 3.03%) than free print. This indicates that academics are still a little bit concern about printing a work. In general academics-as-users are more liberal than academics-as authors. A chi-square test was performed to test the null hypothesis that whether there is any difference between academics' views in two groups on the six options in Table 3. The results showed that there was no significant difference between the attitudes of the two groups.

• Serial pricing crisis and permission crisis

Association of Research Libraries has indicated that journal pricing crisis put pressure on library budgets that led to more title cancellations and budget shifting from monographs to serial acquisition. Consequently, more title cancellations, less access to journal articles (serial pricing crisis). The survey examined academics views on serial pricing and permission crisis which is the result of legal and technological barriers (arise from copyright law and licensing agreements and digital rights management),(Suber, 2003). The results showed that majority of academics considered pay-per-view (68.42%), Site-license (63.15%), Subscription fees (64.84%) and journal price increase (85%) as access barriers to scientific works. Accordingly a new pattern of publishing except printed-base journal is needed.

• Academics' reasons for not publishing in open access models

Respondents' reasons for not publishing in open access channels presented in table 3 showed that quality control of open access materials was very important for them (39.5%). The second reason was that they were not familiar with open access scientific articles. Accordingly, academics' urgent awareness on open access is badly needed. Academics believed that the readership of open access articles will not be smaller than printed-based journal and the same as frequency of citations. Their first reason for not publishing in open access models is because of poor peer review procedures of open access materials. This view rooted in the fact that it is more than 300 years that printed-based journal is used so dominantly in measuring academics careers. So, there is a misconception that the only criterion is traditional journal and open access materials have lower standards of peer review. They should understand open access does not mean that peer review is bypassed.

Conclusion

The results of this study proved previous findings concerning open access movement. Academics of Shiraz University (Iran) in spite of their low awareness of open access movement significantly agreed to use open access vehicles for their publications. Their first choice in new pattern of publishing is **open access journal** and the second one is **self-archiving**. **Subject-based repository** and **institutional repository** are at the third and fourth place, respectively. It seems that universities should think more about the last two choices. The lack of awareness of copyright law is an important issue that should be considered in the near future by academics and their institutions. What is clear is that academics current view on open access is strongly rooted in the world of print, and we still have quite a long road ahead.

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Patterns of Research Output Produced by Scholarly Communities in Korea*

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Abstract

Open Access is a new trend in the scholarly communication. The purposes of this study are to identify this new trend, to aid in the development of an open-access-based knowledge and information flow model organized by subject areas, and to further seek ways to facilitate the communication process in scholarly communities in Korea. To this end, types of research output that are produced as a result of R&D activities are reported here. As well, research patterns and levels of understanding of information sharing are investigated. Data are collected through surveys. The survey population consists of registered KISTI customers. The major areas of analysis include the types of research output, publishing objectives, awareness regarding copyrights, information sharing, preservation of information, and the respondents' opinions of and experiences with trusted-digital archives.

I. Introduction

Background

Internet has provided people with a lot of benefits. New forms of digital information such as primary research data have become available for researchers with access to a personal computer. This aids them in doing their own data interpretation, and reduces their reliance on the published interpretations of others. As a result, research behavior is changing. Researchers are demanding immediate, direct access to information and increasingly expect to be able to access that information in its raw as well as its interpreted form (Brindley, 2005). Meanwhile, with the ever-increasing journal subscription charges, many academic libraries cannot afford to buy all of the titles appropriate to the needs of the research staff in their organizations. As a result, users cannot often access papers that are pertinent to their research topics. Over the past two decades, the so-called 'serial crisis' has become more and more acute. Journal prices have risen faster than both the rate of inflation and the rate of increases in library budgets, exacerbating the problem (Oppenheim, 2005). The concept 'Open Access' emerged in 1990's in an effort to overcome this situation. Open access involves the use of scholarly materials without a subscription charge. There are typically two kinds of open access movements: open access journals and electronic repositories (Falk 2004). In 1992, just five journals offered open access to the material they published. Today, that number has grown to approximately 1,900 journals. As well, the number of the repositories has increased to about 350.

The Situation in Korea

The situation regarding the Korean scholarly journal market is somewhat different from that of more developed countries. Although there are many scholarly journals published in Korea, researchers whose work is related to science and technology subscribe to more foreign journals than they do domestic ones. However, the need for an electronic repository may not differ from that of foreign countries. Accordingly, it will be meaningful to investigate the attitudes of Korean scholars toward a repository without restrictions on access.

Problem definition

The trend toward open access has different characteristics according to the different academic fields or specific local fields. Some authors have emphasized the importance of considering these differences among fields when developing a scholarly communication model (Kling 2000; Joung 2004).

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Purpose and method

The purpose of this paper is to identify this new trend, to aid in the development of an open-access-based knowledge and information flow model, and to further seek ways to facilitate the communication process within and among scholarly communities in Korea. To this end, types of research output that are produced as a result of R&D activities are reported here. In addition, research patterns and levels of understanding of information sharing are investigated. The data are collected through surveys. The survey population consists of registered KISTI customers, and the major areas of analysis include the types of research output, publishing objectives, awareness of copyrights, information sharing, preservation of information, and the respondents' opinions of and experiences with trusted-digital archives.

II. Related Works

Overseas

A project sponsored by JISC (Joint Information Systems Committee) is ongoing at Loughborough University in the UK. Termed the RoMEO (Right of Metadata for Open Access) project, it is focused on a copyright problem that could be raised when researchers deposit their research output into their institutional repositories. The respondents in this project were authors, publishers, data providers, and service providers around the world. 60% of the respondents agreed with the concept of free use of their products if protection of the moral rights of authors, and a non-commercial purpose by users can be guaranteed (Oppenheim 2003).

A research team at the University of Rochester in the USA undertook the IMLS (Institute of Museum and Library Services) Dspace project to investigate the research patterns of professors so as to observe how the institutional repositories should best be used by these and other professors. The project team concluded that how the professors perceive their work practices should be the most important consideration before the development of an institutional repository (University of Rochester 2004) is undertaken. Key Perspectives Ltd. conducted a study of authors who had published their work in open access journals, and compared and contrasted those authors to authors who had not done this. The report showed that many authors want both self-archives as well as open access journals to be available (Swan & Brown 2004).

The University of Southampton in the UK maintains a sustainable multidisciplinary e-Prints archive, called TARDIS (Targeting Academic Research for Dissemination and Disclosure). They performed an environmental assessment of research publication activity and related factors impacting the development of an institutional e-Print repository at the University of Southampton (Hey 2004).

Domestic

Joung (2003) performed a survey on copyright awareness and the publication motives of agricultural field researchers to explore the feasibility of an overseas information-sharing archive model. Based on the survey results, she proposed a scholarly communication model adopting an information sharing license that permits free use for academic and/or non-profit use.

III. Definition of Research Output

Types of research outputs

Scientific research is performed mainly in universities and research institutes by students, professors and researchers. In this paper, research output is defined as all types of information resources produced from these scientific research activities. These are divided into four phases: learning, proposing, performing and publishing. The research output produced in each of the phases is shown in Table 1. The learning and proposing phases do not include any research activities, but the output from those phases are used, and considered as very important materials in performing research.

The output of the performing phase comprises presentation materials, technical memos, drawings of apparatuses, data sets, meeting records, questionnaires, data sheets, and travel reports. These types of output are almost always included in the grey literature.

Researchers produce theses, papers, posters, articles, books, technical reports, patent specifications, as well as standard specifications, guide books of products and

technologies, and program source codes in the publishing phase along with some forms of these output types in the performing phase.

Table 1 Research outputs by research phases

Research phases	Learning	Proposing	Performing	Publishing
Research output examples	Syllabus, text books, reference materials, assignments, term papers	RFP, Proposals, Presentation materials	Presentation materials, Technical memos, drawings of apparatus, data set, data sheets, meeting records, questionnaires, travel reports	Theses, papers, posters, presentation materials, articles, books, technical reports, patents specifications, standard specifications, guide books of products/technologies, and program source codes

IV. Survey Results and Data Analysis

Overview of survey

To collect data, a questionnaire was constructed, which included questions related to the types of research output, publishing objectives, awareness regarding copyrights, information sharing, preservation of information, as well as the respondents' opinions of and experiences with trusted-digital archives. It consisted of 14 items, grouped into 6 sectors, in addition to 8 separate population statistical items. 4,792 customers were selected from among the total pool of registered KISTI customers as a candidate survey population. They were all believed to be active researchers. The questionnaire was sent to them primarily using e-mail; some were sent by regular mail. The total number of answered questionnaires after one month was 250, representing a 5% response rate among the recipients. The data was analyzed using SPSS, a software program specializing in statistical analysis. Even though a comparably small number of answer sheets were collected, some meaningful results were obtained.

Basic results

Table 2 shows the composition of the respondents with respect to job, and major of their final degree. Chiefly, 53.6% of the respondents were academic researchers who work at universities or in governmental institutes. The incidence of researchers working in industry was 34.8%. For the major of the final degree of these researchers, engineering was most commonly reported among the respondents. The rate for this was approximately 60.0%. The second most common reply to this question was science, at 23.6%.

Table 2 Composition of the respondents

Classification	Types	Occurrences	Rates (%)
Job	Academics	159	63.6
	Industry	87	34.8
	Others	4	1.6
Major of final degree	Engineering	148	59.2
	Science	59	23.6
	Medicine	9	3.6
	Humanities/Social	23	9.2
	Others	11	4.4

Number of production by types of research output

Table 3 shows the numbers of respondents who answered 'yes' to the question asking whether they produce at least 1 output in recent three years. If a yes answer was received, these were then organized by type of output. The most common output type was a technical report, and the next most commonly reported was presentation material. A peer-reviewed paper, a conference paper, a proposal, a patent, and a conference poster follow successively. This means that many Korean researchers are involved in projects sponsored by the government or other funding organizations requiring technical reports and presentations.

Table 3 Number of Research Output by Type

Research Phases	Types of Research Outputs	Producing more than 1 in 3 yrs.	Rates (%)
Publishing	Technical reports	163	65.2
Publishing/Performing/Proposing	Presentation materials	158	63.2
Publishing	Peer reviewed papers	141	56.4
Publishing	Conference papers	129	51.6
Proposing	Proposals	125	50.0
Publishing	Patents	108	43.2
Publishing	Conference posters	104	41.6
Performing	Experiment Material	100	40
Performing	Questionnaire	67	26.8
Publishing	Book	66	26.4
Publishing	Thesis	60	24.0
Performing	Drawings of apparatus	59	23.6
Performing	Statistics Data	54	21.6
Performing	Experiment Equipment and System Explanation	50	20
Performing	Data sheets	45	18.0
Publishing	Program source codes	45	18.0
Performing	Software	36	14.4
Performing	Multimedia	36	14.4
Performing	Data set	34	13.6

Comparison of output patterns of engineering and science fields

Table 4 represents a comparison of output patterns for two research fields: engineering (mechanical and metal) versus science (physics and chemistry). This set of data shows that researchers in engineering fields produce more than those in science fields in the case of peer-reviewed papers, conference papers, patents, technical reports, and proposals; while researchers in science-related fields are more productive in terms of conference posters, presentation materials, and experimental materials. It was unexpected that the total rate of peer-reviewed papers and conference papers from those in engineering fields was greater than the rate from those in science-related fields. In terms of more than 10 articles produced, science researchers were dominant with respect to the number of output per researcher.

Table 4 Comparison of Output Patterns of Research Fields

Type of outputs	fields	Producing in 3 yrs.					Rate (%)
		1-3	4-6	7-9	10>	Total/no. respondents	
Peer reviewed papers	Eng.	16	6	4	3	29/42	69.00
	Sci.	1	5	5	6	17/29	58.60
Conference papers	Eng.	11	8	2	4	25/42	59.50
	Sci.	3	3	6	3	15/29	51.70
Conference posters	Eng.	8	3	1	2	14/42	33.70
	Sci.	1	7	2	4	14/29	48.30
Patents/Utility Model	Eng.	10	4	3	4	21/42	50.00
	Sci.	6	4	1	1	12/29	41.40
Technical reports	Eng.	15	6	3	2	26/42	61.90
	Sci.	7	3	5	2	17/29	58.60
Presentation Materials	Eng.	8	2	10	2	22/42	52.40
	Sci.	4	2	10	2	18/29	62.10
Proposals	Eng.	10	3	4	3	20/42	47.60
	Sci.	3	1	3	2	9/29	31.00
Experiment Materials	Eng.	7	3	4	4	18/42	42.90
	Sci.	3	2	7	3	15/29	51.70

Motive for Publishing

It was identified that Korean researchers have the same motivations as those in other countries where similar surveys had been performed (*Gibbon 2004*). According to the current survey, Korean researchers publish their research output mostly in order to meet the requirements of their affiliations (65.2%), secondly to bolster their academic reputation (61.2%), and thirdly to share their work (52.0%) with others.

Copyright holder

Korean researchers think that the primary copyright holders of their research output should be themselves (68.0%) according to the survey results. According to them, the next most important holders were, successively, the organizations who employ them (24.0%), sponsors providing research funds (9.2%), and the publisher disseminating their output (2.0%). The primary copyright holder rate of the researcher added to his or her affiliation together becomes 82.0%. This strongly suggests the need for institutional repositories exist.

Table 5 Awareness of Researcher on Copyright Holder

Entity	1st	2nd	3rd	4th	others
Researcher	170(68.0%)	50 (20.0%)	20(8.0%)	4(1.6%)	6(2.4%)
Organization	60(24.0%)	116(46.4%)	53(21.2%)	9(3.6%)	12(1.2%)
Sponsor	23(9.2%)	67(26.8%)	126(50.4%)	9(3.6%)	25(1.0%)
Publisher	5(2.0%)	8(3.2%)	23(9.2%)	154(61.6%)	60(24.0%)

Intention to Open-Use of Research Output

88.4% of respondents are reportedly willing to provide open access to their research output. 91.0% from among these are willing to allow non-profit use. 63.3% would even allow to their outputted works to be modified. These findings are similar to the findings of the RoMEO project (Oppenheim 2003). 75.2% of Korean researchers think that sharing their research output with colleagues before publication is helpful. The method of sharing that Korean researchers prefer is off-line (29.7%). E-mail (17.2%) ranked second. Online sharing, including personal homepages (5.7%), communities on the Internet (13.5%), the affiliate's homepages (11.7%), and in-company intranets (9.9%) were suggested as possibly widely used; however, these rates represent very low levels compared to those of a similar MIT survey (*Barton & Walker 2002*).

Preserving Research Output

Korean researchers preserve their research output mainly in the hard-disc memory of their personal computers (48.3%). The next most commonly reported methods were, successively, a CD-ROM (21.2%), followed by USB memory devices (13.9%). The rate of an intranet, which is a similar concept to an institutional repository, takes a very low portion at 6.5%. This means that Korean researchers are reluctant to practice their intention of opening their research output to outside view on an intranet. We are in the early-stages of sharing research output through the institutional repository. Concerning a trusted-digital archive, it is shown that 23.2% are willing to submit all of their research output to this type of archive; 56.8% would submit all except for what they deem very important output. Taken together, this suggests that 80.0% of Korean researchers feel a need for institutional repositories for reserving at least some of their research output.

Finally, Korean researchers prefer themselves or governmental organizations (39.6% and 34.0%, respectively) as having authority over a trusted-digital archive.

Table 6 Candidate Authority of Trusted-Digital Archive

Candidate Authorities	Occurrences	Rate (%)
Organization that employs researcher	99	39.6
Governmental organization	82	34.0
Researcher	35	14.0
Community researcher participate	27	10.8
Others	2	0.8
No Response	2	0.8

V. Summary of Results, Conclusion, and Directions for Future Study

Summary of Results

The most commonly reported research output is a technical report (65.2%), followed by presentation materials (63.2%).

- 1) The main objective of publishing research output is to satisfy the requirement of an author's affiliation (65.2%).
- 2) The awareness of copyrights regarding research output should be managed first by themselves (68.0%), and secondly by the organization where they are employed (24%).
- 3) Having Open Access while producing research output would be helpful and beneficial for improving the research process (75.2%).
- 4) The preferred method for sharing among Korea researchers is off-line (29.7%).
- 5) A majority of researchers in Korea prefer personnel computers as a preservation tool (48.3%).
- 6) In the opinion of TDR, the majority of researchers want an IR (Institutional Repository) primarily operated and managed by their organization (39.6%), or managed by a governmental organization (34%).

Keywords: Open Access, Scholarly Communication, Research Activities, Publication, Trusted Archive

Conclusion

The purpose of this study was to identify the intention of researchers and suggest some strategies for an open access-based scholarly information service in Korea. To this end, a survey was given to a group of researchers registered as KISTI customers. The major areas of analysis included the types of research output, publishing objectives, awareness of copyrights, information sharing, preservation of information, and the respondents' opinions of and experiences with trusted-digital archives.

In summary, the most common output type among Korean researchers was found to be technical reports, and the next most common was found to be presentation material. Researchers in engineering fields produce more peer-reviewed papers, conference papers, patents, technical reports, and proposals than do those in science fields, while science researchers produce more conference posters, presentation materials, and experiment materials. However, in terms of both peer-reviewed and conference papers (more than 10 articles), science researchers were dominant with respect to the number of output per researcher.

Korean researchers' main reason for publishing their research output was found to be that it was a requirement of their affiliations. They think that the primary copyright holders of their research output should be themselves or the organizations that employ them.

Most Korean researchers think that sharing their research output with colleagues before publication is helpful. The preferred method of sharing for Korean researchers is off-line. Diverse online sharing tools are also used, but the rates are at very low levels compared to the rates of other countries.

Korean researchers preserve their research output mainly on the hard-disc memory in their personal computers (48.3 %). The low rate of the use of an intranet means that Korean researchers are reluctant to put into practice their intention of openly sharing their research output. Concerning trusted-digital archives, many Korean researchers want institutional repositories for reserving some of their research output. Korean researchers prefer their own, or governmental organizations over other entities as an authority of a trusted-digital archive.

Directions for Future Study

This is primarily an initial study to tap into the possibility of developing an open access archive in the Korean scholarly environment, especially in the science and engineering fields. A more specific study can follow with an aim to discover these same possibilities in more specific academic fields such as nano-technology, IT technology, bio-technology, as well as others.

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Open Access to Grey Literature: Challenges and Opportunities at the Banaras Hindu University in India

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Abstract

Grey literature includes an extensive range of material that cannot be found easily through conventional channels such as publishers but which is frequently original and usually recent. It is produced more quickly and has greater flexibility. Grey Literature comprises newsletters, theses, project reports, bulletins and so on. It has tremendous importance in all fields of the universe of knowledge but it is particularly significant in the fields of science and technology. It provides an essential complement to peer reviewed findings [1]. It serves the scholarly community with research summaries, facts, statistics and other data that offer a more comprehensive view of the topic.

In India, there are over 2900 research and development organizations and many of these organizations have several laboratories under them. It has 310 universities, which have more than 73,000 teachers; the student community includes 60,516 researchers; 816,335 postgraduates; 7,862,588 graduates. Every year an amount of fifty billion rupees is spent on research and development in India. It is the third largest scientific and technical manpower in the world. It accounts for 3% of the world's publication output. It is also estimated that there are 3,000-4,000 active scientists in India working in about 2000 laboratories [2]. These organizations generate a significant number of internal research publications including technical reports, manuals, progress reports, presentations etc. Such documents contain very valuable and often detailed information such as observations, conclusions, analyses and primary data, which at times constitute the key research output and intellectual capital of the laboratories. These publications are not accessible to the researchers outside of that particular organization.

Objective of the paper

The objective of this paper is to suggest a working model of interoperable online institutional digital repositories of Grey Literature, generated in the form of research reports, theses, dissertations, and project reports from Banaras Hindu University, Varanasi, India. This will facilitate the effective capture and preservation and will provide legitimacy and accessibility to grey literature across all the academic and research organizations. The Internet will be used for the hosting and delivery mechanism.

Background Information

Banaras Hindu University is one of the reputed universities of Asia. It was set up in 1916. It has three institutes, 14 faculties, 124 departments, 14 disciplinary centers, and a constituent College for women. Education and training is imparted in a vast range of subjects pertaining to all branches of Humanities, Social Sciences, Technology, Medicine, Natural Sciences, Fine Arts and Performing Arts. It has six centers of Advanced study, ten departments under Special Assistance Programmes and a large number of specialized research centers. It has 15000 students and 2000 teachers [3]. The University generates voluminous amounts of grey literature. Out of these, only theses and dissertations are catalogued and physically maintained in the Central Library of the University.

Collection of the Central Library, Banaras Hindu University, Varanasi.

The Library has a collection of 8,39,920 books; 1,09,186 (bound volumes) journals; 1362 current journals; 9250 Ph.D Theses; and 7201 manuscripts. In addition, it has United Nations, Government publications, staff publications, rare and out of print books, and local history collections [4].

Limitations of the system

1. The system has many limitations. The Catalogue provides only minimal access to the contents; contents of these documents are not immediately accessible, without the user visiting the library to browse the contents of each identified publication.

2. The user has to physically visit the library.
3. Only one user can use the document at a time.
4. Maintenance and upkeep of hard copies of documents and space management is also a formidable problem.
5. Other academic and research organizations can not access the central pool of grey literature generated internally[5].

The inability to efficiently capture, preserve and access the output of grey literature (and internal research) has serious repercussions on the academic and research community of the country.

It is being suggested that accessibility to and legitimacy of grey literature (or internal research output) can be provided by effective capture and preservation of the thought contents of the documents. In this context, the following steps should be taken:

1. The Central Library should set up an online digital library system for handling all internal grey literature-in the form of dissertations, research reports, and unpublished theses.
2. The system should support online capture and content management (by researchers themselves) for adding and updating different types of research material.
3. The system should provide a powerful web-based search and retrieval interface for staff to access the metadata and the actual document.

Purpose of the Institutional repository to be developed at the Central Library

The purpose of the repository will be to capture, organise, preserve and disseminate grey literature generated at the University. In connection with this purpose the repository will support the following tasks:

Registration of institutional users (authors)

- 1 For document submission and other privileged use.
- 2 User authentication.
- 3 Profile set up.

Document Submission

Scientists and researchers will be asked to submit their research reports, papers, theses, and dissertations in electronic form. The collection of Grey literature which is not in electronic form can be scanned with an OCR (Optical Character Recognition) system. It can be stored in different file formats (like PDF, JPEG, GIF, or HTML). The contents should be properly formatted and cross-browser compatible.[6]

Archiving

It will include date stamping- a unique number will be provided to each document. Indexing will also be done.

Accessibility

Access will be provided to the documents over the Web, anybody can access grey literature through a browser such as Netscape or Internet Explorer.

Administration and Maintenance

Administration and Maintenance functions will need to be supported too. The metadata of the contents should be reviewed in order to maintain the quality of the records. Metadata will be shared with other institutional repositories through OAI compliance.

The Institutional repository will be using the OAI-PMH protocol for establishing interoperability among the different repositories in India. Indian Institutes of Technology and the Indian Institute of Science have already set up their institutional repositories, and others are in the process of developing. The OAI-PMH protocol operates on the principle that each repository exposes its metadata as per the basic 15 element Dublin Core Metadata set prescribed by the Dublin Core Metadata Initiative (DCMI <http://dublincore.org/documents/dces>). The exposed metadata from different repositories is harvested for providing central indexing and search services by service providers.[7,8]

Some important benefits of the institutional repository are:

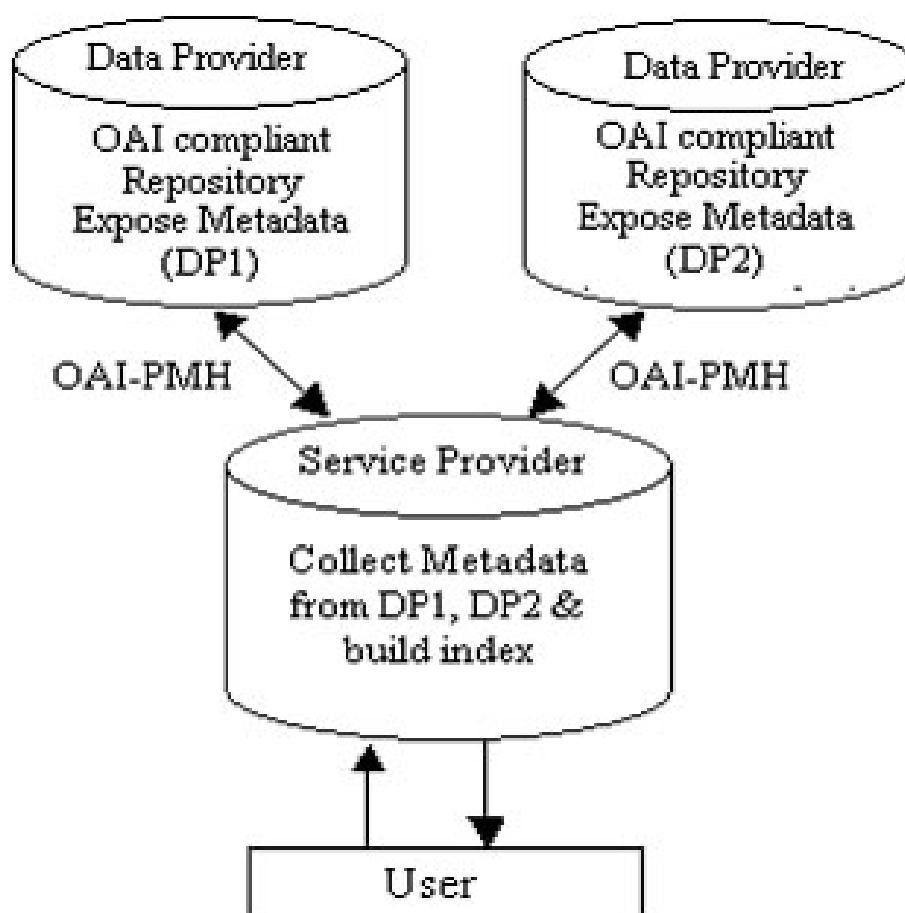
- 1 It brings together research output of the institution.
- 2 It provides accessibility and visibility to the institution's research output.
- 3 It provides accessibility to important raw data, preliminary findings-grey literature which is otherwise difficult to obtain.
- 4 It facilitates instant global communication of research work done at the institution.
- 5 It facilitates preservation of grey literature and research results for posterity.
- 6 It bestows improved Research and Development(R&D) productivity.

Technology required for establishing the Institutional Repository

We require the following for setting up an institutional repository:

- 1 Intel/Pentium server
- 2 Leased line 512KBS for internet connection
- 3 Open source DL/repository software
GSDL, eprint.org, DSpace, CDSWare (OAI compliant)
- 4 Open source software for online journals and conference publishing
OJS of PKP project (OAI compliant)
- 5 Metadata schemes, name spaces, vocabularie
- 6 OpenArchives - Interoperability framework (OAI-PMH Protocol for metadata harvesting)
- 7 XML - information structuring / exchange.[9]

Example: Institutional eprint archives .[10]



Cost of the Project

It is estimated that on an average every year an expenditure of \$12,400 (US) will be involved.

Suggestions for future

1. Different academic, research and development organizations should set up their own institutional repositories and all technical reports, laboratory reports, project reports, theses, dissertations should be submitted to them (they should be hosted online).
2. Institutional repositories should be OAI compliant; they should make themselves available for metadata harvesting.
3. The library and information professionals have a significant role to play in this context. They ought to undertake awareness campaigns for the academic community (researchers, scientists and teachers). They must impart the importance of availability of grey literature at the right time to the right people.

Conclusion

Grey literature has lot of significance for the academic and research community; its value should be properly understood because at times it can significantly contribute to the quality of research output. Sincere efforts should be taken by the library and information professionals to acquire, organise, preserve and disseminate grey literature for researchers. Setting up institutional repositories and providing open access to grey literature can really be a significant and productive step in this direction.

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On the News Front

SEVENTH INTERNATIONAL CONFERENCE ON THE GREY LITERATURE OPEN ACCESS TO GREY RESOURCES

GL7 Conference Review

Aurélié Cordier, LORIA-SITE and Nancy-2 University (France)

On December 5-6, 2005 the Seventh International Conference on the Grey Literature: Open Access to the Grey Resources was organized at INIST-CNRS (Nancy, France). This was the first time this conference series was held in France. The topic was Open Access, a key issue for a few years considering the current context of scientific publication, particularly on the level of costs, copyright and scientific evaluation. The scientific community is becoming more aware of the importance of this movement with regard to journal articles, but what about grey literature? The conference interventions point out an expansion of open archives, which seem to be a new and efficient means for enhancing the value of grey literature.

I was able to participate in this conference as a student in Information and Communication Sciences and as a trainee with INIST-CNRS. My interest for this conference was largely within the framework of my studies for a master's degree, where I work on the open repository project for grey reports with INIST-CNRS. Christiane Stock, the person in charge of the project, presented it in detail at the conference. Information specialists were present at call, and came from all around the world: Norway, Spain, France, USA, Germany, Switzerland, Italy, Netherlands, South Korea, Iran, United Kingdom, Luxembourg, Austria, India, Japan, and the West Indies. From my observation, the assembly came primarily from universities, laboratories, institutes, and libraries. The audience was mainly scientific and academic.

Thirteen presentations were given in plenary sessions and three topics were proposed for afternoon roundtables. The conference was opened by Joachim Schöpfel, GL7 host and sponsor, followed by Laurent Romary in charge of the policy of scientific and technical information in CNRS. After an introduction on the policy of Open Access for France and Italy the presentations that followed dealt with a variety of subjects: general aspects of open access to grey literature, problems, projects and the reality of the workflow. Lunch was organized in the restaurant of INIST-CNRS. The afternoon was reserved for three roundtables: Theses and Dissertations, Repositories and Collections of Grey Literature, and Quality Assessment of Grey Literature. I chose to participate in the roundtable on "repositories and collections of grey literature", since this closely deals with the project in which I work. Keith Jeffery and Gretta Siegel were the facilitators of this roundtable. Various experiences and projects of open repositories were shared during the two afternoons. This allowed me to become more familiar with the medium of Open Access and to position our project. The roundtable allowed each speaker to present his/her work and to share knowledge and difficulties. The exchange of experiences with the other participants filled the remaining time allotted. This experiment was very enriching. How better to advance in a project than by confronting one's work with others? For a student, attending such a meeting, it was indeed a learning experience. The second day followed much in the same way, presentations in the morning and roundtables in the afternoon. The conference concluded with the intervention by the facilitators of the roundtables, where a summary of the presentations and related discussions was outlined. Dominic Farace, the program and conference director closed GL7 by thanking the participants for having attended the conference and the speakers for the quality and the variety of their papers.

The examples of electronic projects and open repositories presented during the conference were quite enriching for students who are in the beginning of this profession. It enabled me to draw up a kind of panorama of the different initiatives throughout the world and of the various concerns of these countries. The opportunities offered by these meetings are important not only from the point of view of an increase of knowledge but also experience, whereby the student can begin to create his/her own relational network for future projects, working groups, etc. GL7 contributed to my personal knowledge, while reinforcing the belief in my projects and work as a trainee.

GL7 Conference Review*

Ulrich Herb, Saarland University and State Library, SULB (Germany)

GL7 focused on an en vogue topic par excellence: Open Access (OA). It was arranged by TextRelease, the Grey Literature Network Service GreyNet and the Institut de l'Information Scientifique et Technique (INIST-CNRS). The latter also hosted the conference.

OA to grey literature is – due to the absence of publishing houses – less affected by licence arrangements than OA to white literature. Indeed GL7 proved that issues of collecting and distributing information, visibility, long-term availability, issues of quality assurance and the development of policies remain important factors – irregardless of information being white or grey. GL7 also introduced initiatives focusing mainly on OA to white resources: Dr. Laurent Romary's inaugural address explicated the OA strategy of the Centre national de la recherche scientifique, CNRS. He presented a central multidisciplinary OA repository based on the system HAL (hyper article en ligne) and emphasized the advantages of the standardization a centralized model offers: simplified investigation of bibliometric data, implementation of citation counting and linking techniques, homogenous usage statistics and metadata, easy application of preservation technologies, and other aspects as uniform interfaces.

Daniela Luzi summarized the status quo of Italian OA efforts. Joachim Schöpfel's lecture "MetaGrey Europe, A Proposal in the Aftermath of EAGLE-SIGLE" focused on networking, meta search techniques and the transmutation of the grey literature database SIGLE to an Open Archive variant as OpenSIGLE. Keith G. Jeffery and Anne Asserson informed about approaches to compound the genesis of scientific information with its description and indexation by refining metadata incrementally during the process of editing the information and obtaining its lifecycle. Stefania Biagioni reported on the ERCIM Technical Reference Digital Library (ETRD), which will be migrated, to the software OpenDLIB. Through their explanation of the necessity of OA to public health information, June Crowe and Gail Hodge emphasized the importance of basal, technical OA from an apolitical point of view - far from copyright issues.

Repositories might relieve some problems but others still remain virulent: funding, policy development and sustainability. Mohammad Reza Ghane presented a survey about the OA acceptance of Iranian scientists while Hyekyong Hwang talked about research output and its distribution in Korea. Marcus A. Banks summarized the history of OA reconsidering a possible amalgamation of grey and white literature by OA activities. A focal point of GL7 was devoted to concrete projects. Mitsutoshi Wada informed about J-Stage, a publication platform for ejournals offering interfaces for databases and other ejournals. It provides COUNTER-compatible usage statistics and uses several linking techniques.

Toby Green from the Organisation for Economic Co-operation and Development (OECD) reported on a vast project in which 1000 working papers were re-published. In his presentation the value of pure accessibility took center stage. He gave insight into this project's challenges: Collection and sorting of information, the development of a metadata model, quality control, workflow and database development, implementation of interfaces and (partially) the digitalization of print objects. Moreover the author of this review gave a lecture about the disciplinary psychological repository PsyDok focusing on its integration into retrieval systems, long term preservation, quality control, the forthcoming implementation of a print on demand service, the usage of Creative Commons licenses, the intended use of new quality measurement techniques and other enhancements.

Christiane Stock informed about LARA, the nationwide, multidisciplinary repository for grey literature at INIST-CNRS. Before LARA starts the holders of copyrights must be elicited (and arrangements concerning copyright must be made), "born digital" information must be indexed retrospectively, printed material must be digitalized, a workflow and publication model must be developed and the software DSpace must be customized.

GL7 emphasized a longsighted view: firstly because of the importance of an essential and global OA approach; secondly because it specified which obstacles will have to be overcome when these debates might have vanished.

* Abridged and translated from the German text originally published in: IWP – Information Wissenschaft und Praxis, 57 (2006), 2, S. 119 – 121 <http://scidok.sulb.uni-saarland.de/volltexte/2006/560/>



Harnessing the Power of Grey

EIGHTH INTERNATIONAL CONFERENCE ON GREY LITERATURE

Lindy C. Boggs
International Conference Center
New Orleans, Louisiana USA
4-5 December 2006

Announcement and Call for Papers

To: Authors, Publishers, Librarians, Web Editors, Researchers, Policy Makers, Information Managers, Brokers, Vendors, Information Specialists, Intermediaries, Information Technicians, Information Professionals, Journalists, and Academia

The Eighth International Conference on Grey Literature offers a global platform situated and constructed for the R&D community. One that is focussed on the state of the art in grey literature with applications and innovative uses in and for science and technology. The past three conferences in the GL-Series have brought to the forefront grey literature in networked environments, works-in-progress, and open access to resources. GL8 must now harness all of this in an effort to demonstrate the power of grey to other information professionals as well as policy and decision makers, funding bodies and new investors.

GL8 provides a solid platform in a metropolitan city devastated by Hurricane Katrina. This city and costal region is now in the throws of reconstruction unprecedented in recent history. The grey literature community is offered a tiered challenge this December in New Orleans. They are asked to demonstrate the state of the art in their field. They are encouraged

to incorporate new and emerging areas in grey S&T. And, they are charged to address echelons within their own organizations responsible for the appropriation of material and human resources.

"Harnessing the Power of Grey"

is outlined here by four main themes dealing with

- Collection Development, Collection Policies, and Collection Rescue
- Metadata schemes, Repositories and Software, Standards and Quality Assessment
- The Economics of grey, funding sources, production costs, pricing, and investment
- Licensing, intellectual property, copyright, and other rights issues

GL8 will provide the R&D community with a variety of settings in the presentation of their research results. These range from plenary and parallel sessions to panels and roundtables. The Program Committee genuinely welcomes your content contribution in finalizing the GL8 Conference Program.

GUIDELINES FOR THE SUBMISSION OF ABSTRACTS

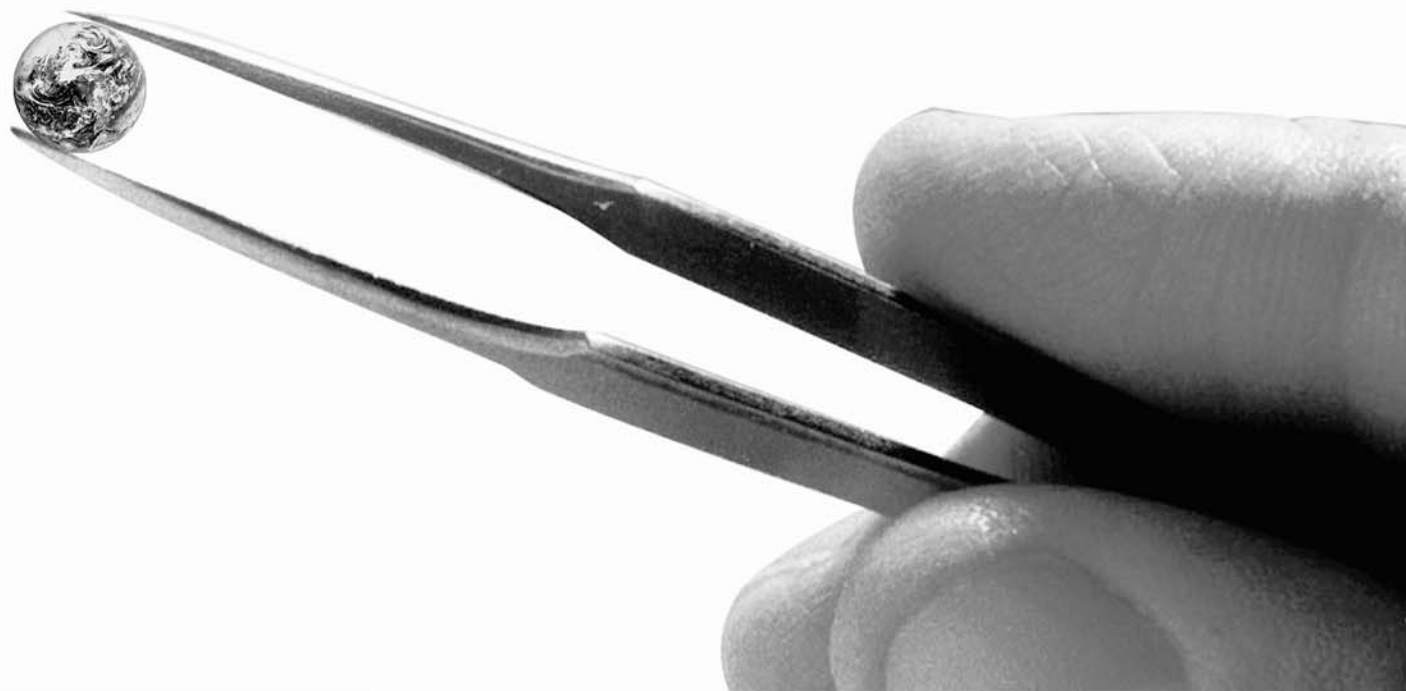
Participants who wish to present a paper at GL8 are invited to submit an English abstract between 400-500 words. The abstract should deal with the problem/goal, the research method/procedure, the costs related to the project, and the anticipated results/conclusions of the research. The abstract should include the title of the paper, the author(s) name(s) and organization(s), as well as address, phone, fax, and email. This data will be used to compile the GL8 Conference Program.

DUE DATE AND FORMAT USED FOR SUBMISSION

The abstract must be emailed on or before **May 1st, 2006** in MS Word. The author will receive written verification upon its receipt. The GL8 Program Committee will use these abstracts in order to finalize the Conference Program.

ABSTRACT OF YOUR PAPER

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DCMI, Dublin Core Metadata Initiative Home Page http://purl.oclc.org/metadata/dublin_core/

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An International Journal on Grey Literature

'GREY MATTERS FOR OAI'

SPRING 2006 – TGJ VOLUME 2, NUMBER 1

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