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The DRIVER project: the socio-economic benefits of a European Scientific Commons

Abstract: The European DRIVER project (the Digital Repository Infrastructure Vision for European Research) builds a repository infrastructure combined with a search portal for all the openly available (Open Access) European scientific communication. The goal is to aggregate all the Open Access materials into one knowledge infrastructure or scientific commons, with collections, scientific communities and customized portals. For the infrastructure, the DRIVER open source software package D-NET v.1.0 (http://www.driver-repository.eu/index.php/D-NET_release) has been developed. The DRIVER project chose to include only open access full-text materials, which means it does not retrieve reference-only materials, in order to promote the Open Access movement with the readers and authors. Specific studies (Mossink, W., 2007. Intellectual Property Rights, in: Weenink, K. et al., (Eds.), A DRIVER's guide to European repositories: Five Studies of Important Digital repository related Issues and Good Practices. Amsterdam University Press, Amsterdam, pp.103-112) about copyright for digital repositories have been issued, and the DRIVER project partners keep advocating an Open Access mandate for all the publications funded by the EC, in parallel with geographically-based or subject-based mandates. The last couple of years have seen a rise in 'self-archiving' mandates issued by major research funders and institutions, both in Europe as well as in the USA, which is a favorable evolution for authors' rights as well as for the greater public. Since authors are 'obliged' to retain some rights to their work, this allows them to put articles online, which enhances their readership and impact (Piwowar, H. A., et al., 2007. Sharing Detailed Research Data Is Associated with Increased Citation Rate. PLoS ONE, vol. 2 (3): e308). This, in turn, accelerates science because of the timely and free availability of the publications. The more articles, proceedings, raw data and research results become available, the more DRIVER can build on these data with services for both readers and authors, who will be encouraged by the positive effects (enhanced readership and impact) and deposit more articles. The 'V' in the DRIVER acronym embodies this strategic Vision: a Scientific Commons for Europe and the rest of the world.

Article:

1 Open Access to scientific communication

1.1 A brief history of Open Access

Although the birth of Open Access is often rooted in the *serials pricing crisis* (Guédon, 2001; Panitch, Michalak, 2005), or the disproportional rise in scientific journal prices during the last decades of the twentieth century, open access is not just a libraries' solution to financial issues, it is also one that concerns the whole scientific community, and the movement is rooted within the disciplines themselves. It were the physicists with their *arxiv.org* (1), who started putting up pre-prints from journal articles on-line, because they felt

the peer review and publishing process took too long and they wanted faster access to research results, in order to build on these results, not just because they were freely available. After ten years, the movement became more and more institutionalized and got the famous 'BBB' Statements (Budapest, 2002, Bethesda, 2003, and Berlin Declaration, 2003, reference 2-3-4) as official statements of principles for the open access movement. These have been signed by over 250 rectors, ministers and research directors worldwide.

Nowadays, Open Access advocates try to establish institutional and funders' open access mandates, because the spontaneous self-archiving rate of 15% (Swan, 2006) needs incentives in order for the researchers to execute the few keystrokes needed to self-archive their articles. Although the concept of a mandate seems unattractive to researchers (it is a top-down obligation), it is in their own interest (visibility, research impact and storage) and also advantageous for the whole scientific community. The first implementers of OA mandates (Proudman, 2007; Swan, 2006), such as the University of Minho and CERN have proven the advantages for their institutions, and were followed by big funding agencies (5) such as the NIH (US) and the ERC (Europe) and universities such as Harvard in the US and in Belgium, the University of Liège. After last year's recommendations by the ERC and the following mandate, as well as the major EC petition for Open Access, this will hopefully lead to a generic mandate from the European Commission. This goal is not easily achieved because of the high-level publishers' lobbying with the EC and the refusal of the European Commission to take a stand in the discussion, because of the perceived added economic value the publishing industries offer. Thus far, only 'strong recommendations' and plans for investments into OA experiments have been published (6), but none included a very pragmatic approach to the problem of low spontaneous self-archiving rates with European researchers.

1.2 Defining Open Access

Many different 'flavours' of Open Access exist, and there's been a lot of criticisms both from within the community and from without, but we will stick here with the definition of the last Berlin Declaration (2003), since that is the most established and wide-spread document for the OA movement (4):

Open access contributions must satisfy two conditions:

1. The author(s) and right holder(s) of such contributions grant(s) to all users a free, irrevocable, worldwide, right of access to, and a license to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship (community standards, will continue to provide the mechanism for enforcement of proper attribution and responsible use of the published work, as they do now), as well as the right to make small numbers of printed copies for their personal use.

2. A complete version of the work and all supplemental materials, including a copy of the permission as stated above, in an appropriate standard electronic format is deposited (and thus published) in at least one online repository using suitable technical standards (such as the Open Archive definitions) that is supported and maintained by an academic institution, scholarly society, government agency, or other well-established organization

that seeks to enable open access, unrestricted distribution, interoperability, and long-term archiving.

These two conditions ensure that all the materials can be accessed and re-used in an appropriate way, thus accelerating research and facilitating a worldwide scientific commons (7).

1.1.3 The practical side of OA

The two main roads to Open Access are either the *green road* (self-archiving of papers in institutional repositories, vehemently defended as the only way by 'archivangelist' Stevan Harnad) or the *golden road* to Open Access (through publishing in Open Access Journals, reference 8). Both have their positive and negative sides, but the most important is that they offer free, immediate and permanent access to scientific communication, the essential principles of Open Access.

1.3 Copyright issues

One of the biggest concerns of researchers who want to self-archive their articles in a digital repository, is the fear of copyright restrictions and possible measures by the publishers. To accommodate these researchers, the UK-based Sherpa/Romeo (9) website lists many scientific journals and publishers with their journal copyright policies. Different categories exist, such as green (allow self-archiving), yellow (only preprints can be self-archived, blue (only post-prints) and white (no self-archiving allowed). All the different conditions and possible embargoes are listed on the Sherpa website, and it appears that 67% of all the listed publishers are so-called 'green publishers', who allow authors to self-archive their final version of a refereed paper. Wilma Mossink (Mossink, 2007) thoroughly explains these issues and their solutions, such as the Copyright toolbox (10) by the Dutch SURF foundation, or Sparc's Scholarly Copyright Addendum Engine (11).

2. The DRIVER project: accomplishments and future goals (12)

2.1 Results from DRIVER I

2.1.1 Europe

DRIVER (I) was a project with ten partners from eight countries, funded by the European Commission's Information Society and Multimedia DG, and was included in the i2010 strategy, which promotes the positive contribution that information and communication technologies (ICT) can make to the economy, society and personal quality of life (13). The i2010 strategy has three aims:

* to create a Single European Information Space, which promotes an open and competitive internal market for information society and media services,

* to strengthen investment and innovation in ICT research,

* to support inclusion, better public services and quality of life through the use of ICT.

To achieve those aims there are various actions such as regulation, funding for research and pilot projects, promotion activities and partnerships with stakeholders.

DRIVER I established a European network of digital scientific repositories, accompanied by a test-bed that aggregated a first list of fifty-one repositories from Germany, France (HAL – reference 14), the Netherlands (DAREnet- reference 15), the UK and Belgium. This can be interpreted as the accomplishment of the first goal: creating a single European Information Space for scientific communication. Through the DRIVER search portal, researchers were able to get a first glimpse of the benefits of open access to research materials, through the aggregation of multiple European resources. This way, investments in ICT and innovation (repositories) strengthened the accessibility and visibility of European Research (goal number two). They could, as readers of scientific communication, access all the full-text materials from these fifty-one repositories through a few mouse clicks: this way, DRIVER tried to make the researchers-as-authors enthusiastic to contribute to the collections of Open Access materials. Because this was only a test-bed phase, usability studies were carried out (Van der Graaf, Van Godtsenhoven, 2007) in order to optimize the services and benefits for researchers in DRIVER II. The long-term goal of extending the network and building more services on top of the first content base fits neatly into the third goal of i2010: improving quality of life (by facilitating scientific progress) and better public services (by opening up the outputs of publicly funded research results).

On the political side, the strategy of DRIVER was to advocate the establishment of more Open Access repositories throughout Europe, and to inform the scientific and greater community of the benefits of Open Access. An informative and interactive website has been created for that goal (16), and support services for repository managers and scientific authors were built on this website. On a higher level, a few DRIVER partners co-initiated the 'Petition for guaranteed public access to publicly-funded research results' (17), handed over to Janosz Potoçnik, the European Commissioner for Research. The petition got over 12, 000 signatures from institutions, research funders, individuals and even publishers in no more than two weeks. The counter now stands at 27 280 signatories. This proves that the academic community is ready and willing to conform to an Open Access mandate by the EC. As stated above, the EC's recommendations have not (yet?) been turned into a mandate, possibly hindered through high-level publishers' lobbying (18). The European Research Council, another major European research funder, has set the example and released a mandate in Dec 2007 (19). DRIVER keeps lobbying on a high level in order to convince the EC of the importance of a mandate for Europe, whilst extending the network of European repositories into a Confederation with international bonds (see 2.2.1).

DRIVER also issued technical guidelines for repository managers and three open access books concerning practical and political issues for repository managers, university administrations and scientific researchers.

2.1.2 Belgium

The Belgian DRIVER partner, the University Library of Ghent (20), established a national network of institutional and subject-based repository managers, supported by a national community website (21) with intranet and mailing lists. This group of content providers met every two or three months, but very soon, it appeared that, although the repository managers (often librarians) were very enthusiastic about the Open Access cause, their management did not allocate enough resources to the establishment and maintenance of the repository (the most pressing problem was man-hours, not so much the servers or technologies). In order to make the repositories more of a priority for university administrations, DRIVER lobbied with the university librarians and rectors by means of fact sheets and information sessions, until all-but-one (fourteen out of fifteen) university rectors

agreed to officially sign the Berlin Declaration on Open Access to Research in the Sciences and Humanities during a national conference (22). The two Ministers of Research and Education from Flanders and the French Community also agreed to sign the Declaration, and the two main research funders (FWO and FNRS) already signed it before. This was a major turning point for the Belgian Open Access landscape: mainly in a strategic sense, since it led to two Open Access mandates: one by the FWO (23) and one by the University of Liège (24). The rector of Liège, Prof. Bernard Rentier, gave an inspiring speech at the national conference and became a very vehement Open Access advocate and founded the European Open Access initiative for university rectors: Europenscholarship (25). Over the course of one year, Belgium turned from a blind spot in terms of open access and repositories, into a country bustling with activity and enthusiasm. Through the distributed responsibilities and difficulties in the Belgian political landscape, there is not one administration responsible for research which could provide a national network like HAL in France and DAREnet in the Netherlands, but through the goodwill of many involved parties, the national repository community is still extending and getting closer to becoming a real network of content providers.

2.2 Plans for DRIVER II

2.2.1 Europe

The follow-up project of DRIVER, DRIVER II, financed under the DG Research of the European Commission, sets out to take the accomplishments of DRIVER I a few steps further: in many ways, the project goals are being extended:

- Geographically: the DRIVER consortium is extended with three extra partners: Denmark for Scandinavia, Portugal for South-Western Europe, and Slovenia for Eastern Europe;
- Strategically: the DRIVER Summit meeting in January 2008 (26) kicked off the 'European Confederation of Scientific Repositories', a broad European network which liaises itself with many other open access projects and sets an example for similar projects in other continents;
- Semantically: apart from textual resources, DRIVER II will integrate enhanced publications, which means articles extended with raw data files, images, web resources, chapters,…
- Technically: in DRIVER II, the search and services portal moves from a testbed to a state-of-the-art, production mode system using GRID structures such as Géant. The system consists of tools and services for end-users (search portal) as well as for repository managers (validator tools), accompanied by new releases of the open source D-NET software, which enables a larger community of service providers to 'plug and play' with the DRIVER tools (27).

This four-fold extension of the DRIVER vision and ambitions fits into the European Commission's vision of the 'European Research Area'(28): a unified, strong European research community, which can compete with greater powers such as the US or China. This way, DRIVER II creates an economic advantage for Europe: because it is the only infrastructure in its kind, Europe is one step ahead by bringing together its scientific resources in a unified way.

2.2.2 Belgium

The Belgian activities with repository managers and open access advocacy continue in DRIVER II, and Ghent University Library will also be more involved in the technical

workpackages of DRIVER II, with technical tests throughout the country. A distributed project as DRIVER in a divided country like Belgium is no sinecure, but the latest developments have been favorable: many subject-based repository managers have joined the Belgian DRIVER community, and with the new release of the D-NET software package it will be possible to build a national network of repositories. The only things lacking are political and hence also financial support for the infrastructure (servers and staff), without which a long-term vision cannot be accomplished.

3. Conclusion

Both DRIVER I and II fit into the European Commission's vision of an open, inclusive and integrated knowledge society for Europe, with the socio-economic benefits being the establishment of a unified, robust, state-of-the-art scientific e-infrastructure (economical advantage for Europe as a continent because of increased research impact), and the opening up of a qualitative science commons to all researchers and readers worldwide (social benefit: developing countries are no longer cut off from vital information, and the greater professional public, e.g. a specialized doctor or lawyer, can now also freely access the latest evolutions in their field). The benefits of an open knowledge society are multiple and both benefits (social and economic) have a positive effect on each other: the more a country invests in R&D and innovation, the more it reaps financial rewards, which can in turn provide a better education system resulting in a stronger economy. The DRIVER projects also contribute to the vision of a worldwide open knowledge society by establishing contacts with other repository networks and exchanging best practices with developing nations and continents.

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