Abstract: All research builds on former work and depends on scientists’ possibilities to access and share scientific information. The advent of the internet and electronic publishing have resulted in unprecedented possibilities for the dissemination and exchange of information. Institutional repositories (IR) aim to improve and promote the dissemination of knowledge, thereby improving the efficiency of scientific discovery and maximising return on investment in R&D. This article reflects a study about the institutional repositories: what, where, when and how to deposit? It formulates a solution about the functionalities and automatic modules such an IR should have and standards it should use.

Key-Words: institutional repository, European Commission, FP7, scientific publishing.

1 Introduction
The Berlin Declaration stated in October 2003 that “our mission of dissemination knowledge is only half complete if the information is not made widely and readily available to society. New possibilities of knowledge dissemination not only through the classical form, but also and increasingly through the Open Access paradigm via the Internet has to be supported”. Since then, 227 academic and governmental institutions signed this statement and made forward steps to put in motion its concepts.

The implementation of this declaration lead to two main forms, both of them focused on scientific journals:

- The “green road”: deposits of copies of already-published, peer-reviewed research articles in institutional repositories
- The “golden road”: either publishing in “financed Open Access publishers” (through publishing fees or public funds) or publishing in print for a fee and in an electronic version for free

On top of these fundaments, a new initiative comes from the European Commission (EC) who wants to ensure that the results of the research it funds under the EU’s 7th Research Framework Program (FP7) with more than € 50 billion from 2007 - 2013 are disseminated as widely and effectively as possible to guarantee maximum exploitation and impact in the world of researchers and beyond. The Commission launched on August 2008 a pilot project that will give unrestricted online access to EU-funded research results, primarily research articles published in peer reviewed journals, after an embargo period of between 6 and 12 months. In this respect, EC wants to ensure fast and reliable access to research results, especially via the Internet, and considers that advance scientific discovery and its dissemination supports the development of a strong knowledge-based economy.

2 Problem Formulation
Creating institutional repositories (IR) rises some important questions about what to deposit, where to deposit, when to deposit and (very important!) how to deposit in order to support not only knowledge dissemination but also the whole process of knowledge transfer. One big problem is “journal crises”.

The prise of journals increasing very much.
2.1 What to deposit?
This is an important decision, taken by the institution according with their initiatives regarding the scientific output. They can decide to deposit scientific articles, but they can do the same with patents, doctoral dissertations, conference proceedings, etc.

2.2 Where to deposit?
Strategic decision, this question is about creating its own repository of using an appropriate subject based repository.

2.3 When to deposit?
This is about having specific rules of timing the scientific output publishing, some of them being in line with EC recommendation and initiatives.

2.4 How to deposit?
Probably the most important decision, this is not only about functionalities an institutional repository has to offer, but also about the preservation methods.

3 Problem Solution

What to deposit?
The institutional repository may deposit scientific articles, patents, doctoral dissertations, theses, conference proceedings and laboratory protocols.

With regards to the scientific articles, either one of the following documents should be deposited in an IR:

1. Final published article: publisher’s final version if the paper, including all the modifications from the peer-review process, copyediting and stylistic edits. It is expected that a publication in an open access journal will result in a final published article being deposited an available upon publication.

2. Final peer-reviewed manuscript: final manuscript of a peer reviewed paper accepted for journal publication, including all modifications form the peer-review process, but not yet formatted by the publisher (also referred to as “post-print” version). It is expected that a publication in a non-open access journal will result in a final peer-reviewed manuscript being deposited within the specified embargo period.

Where to deposit?
Authors should deposit final articles or manuscripts into the institutional repository of the institution with which they are affiliated. If this is not possible, they should identify an appropriate thematic repository. In Europe, the Commision plans to provide a special repository fot the articles that can be stored neither in institutional nor in thematic repositories.

When to deposit?
From one institution to another, this will be decided differently. Still, there are some indications which can be taken into consideration. For example, authors which are in the area of 7th Framework Programm in Europe should deposit their articles of manuscripts in a relevant repository immediately upon acceptance for publication, to be made open access within six or twelve month, depending on their research area.

How to deposit?
Building an institutional repository is a key aspect of the institutional strategy. A well designed repository will attract more authors and readers. The most important modules of a IR are described bellow:

Authentication Module. Although the IR is an Open Access initiative, it is recommended to implement an authentication module which will create the possibility of customizing works and areas for each users (like customized searches, alerts, etc). The authentication will be made via username and password. It will be no difference in term of content between an authenticated user and a non-authenticated one.

Search Module. This will contain two functionalities: basic search and advance search. Running a basic search will do a search of specific term (or terms) within the
title, authors, keywords and abstract of the document. If a user is running a basic search using more that 1 keyword, the Boolean operator between these keywords will be “OR”. Running an advance search will let the user decide where to search for keywords and what kind of limitation to use (time period the article has been released, author’s affiliation, type of article, etc).

**Browse Module.** This is an important module which will allow users to perform an investigation within the repository. In case he or she decides not to go for a search, it is still possible to obtain the desired results by browsing topics like subject area, title by title or author by author.

**“My Shelf” Module**. This is a customized module in which authenticated users can create their own partition of the repository. Through this module, a user can save his/her preferred searches, set up alerts, store preferred articles, save comments and recommend articles to his/her colleagues.

**Author proofing module.** By this module, authors may create easier proofs for their articles, using a pre-print management system. It is recommended to integrate and customize an already existing pre-print management system inside the repository, instead of creating one.

**Peer-review module.** This module is very important for the cases in which the institution which holds the repository is also involved in creating its own journals. In this case, the editors can use the same peer-review system integrated within the institutional repository. The peer-review management system will be accessible only for the registered users.

The peer-review management system will be a collaborative tool between authors, editors and reviewers and will store versions of the articles submitted for this process. It will be the institution’s decision to open access to different versions of the article before or after the final decision from the editor.

Some institutions will prefer to publish within their repository even the non-reviewed articles among the dissertations, theses, patents etc.

**“Additional Web Materials” Module** will allow authors to improve their article with materials which cannot be published in the original article (either because of the paper format limitations or because of nature of the additional material). Example of additional web materials are: higher quality images, media files, multiple case-studies, etc.

Other considerations about the institutional repositories:

**DOI.** All the objects (articles, books, theses, etc) included into the IR will be assigned with a Digital Object Identifier (DOI). By its definition, a DOI “provides a system for persistent and actionable identification and interoperable exchange of managed information on digital networks”. This will allow the repository decision-makers to manage the information in any digital environment.

The institutional repository will use the **Z39.59 client-server protocol** for searching and retrieving information. Using this protocol will allow import and export of information with other databases.

Another important key aspect is about the **usage statistics.** These should be COUNTER compliant and will reflect the number of working sessions, number of searches, number of articles downloaded, etc.

### 4. Comparative study

Comparative study with free software open source. Universities and research centers throughout the world are actively planning and implementing institutional repositories. This activity entails policy, legal, educational, cultural, and technical components, most of which are interrelated and each of which must be satisfactorily addressed for the repository to succeed.

The software systems discussed here satisfy three criteria:

- They are available via an Open Source license—that is, they are available for free and can be freely modified, upgraded, and redistributed.
- They comply with the latest version of the Open Archives Initiative metadata harvestin protocols—this OAI compliance helps ensure that each implementation can participate in a global network of interoperable research repositories. And,
- They are currently released and publicly available—several new systems are currently being developed. As these systems become available for public release, we will revise this guide to include them.

The systems presented in this guide—Archimede, ARNO, CDSware, DSpace, Eprints, Fedora, i-Tor, MyCoRe, and OPUS—meet these criteria and allow an institution to implement a complete framework for an OAI-compliant repository without resorting to in-house technical development. While this guide describes these solutions, it does not attempt to identify the “best” system or to recommend one system over another. In each institution’s case, the best software will be that which aligns well with the institution’s particular requirements.
4 Conclusion
An IR is becoming more and more important in today’s scientific world. It is the responsibility of each institution to build, maintain and promote institutional repositories through the scientific community it represents. Results depend on policies you decide for such an important system of actions. The way we build repositories will give us the freedom (or not) to share knowledge, to increase scientific visibility and create progress. These repositories will increase the chances of transferring technologies to the society and return the investment. Is part of the “contract” between science and society in which each part has its own responsibilities. Equally important, IR should face now new regulations, as for example the European Commission pilot programme on FP7 activities.

References:


