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LITERATURE REVIEW

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LITERATURE REVIEW

3.0 Introduction

The first input to any research is a detailed literature search on the topic concerned revealing the work already done, current trends and future research. Literature Review is a critical summary of article/s scanned on the proposed research topic. The purpose of literature review is to study the past work. Review of literature helps to measure the quality of work and is useful to conduct the research efficiently and effectively. For the sake of convenience the review is arranged under various headings keeping in mind the flow of information from general to specific aspects of Open access and Institutional repositories.

First and foremost to know more about the design and the development of Institutional Repositories (IR), the first step was to go through articles/papers written in various journals, conferences and websites/portals dedicated to the designing of IR's. Since IR is an evolving concept for the last 7-8 years, there has been good number of literature published, though not too many. The different aspects of designing IR revolves around the different types of resources available within the institution, infrastructure provision, software used, scholarly communication, policy framework, individual institution’s case studies, different IR models, archives and so on. Searches made on ‘Google’ and ‘Google Scholar’ search engine and scanning a good number of library and Information Science journals like ‘Library Journal’, Emerald published journals such as ‘Library
HiTech, and OCLC Systems & Servers’, ‘Digital Library’; ‘Online’; ‘Information outlook’ and papers presented in number of International/National Conferences/workshops yielded in few core and relevant literature.

3.1 General

*Lynch (2003)* emphasizes the importance of building an Institutional Repository (IR) while depicting the facilities and the dissemination capabilities offered by the Institution’s network. One of the main benefits of going in for an IR is the encouragement and adoption of new forms of scholarly communication that exploit the digital medium in fundamental ways.

*Drake (2004)* highlights causes for building an IR at academic/research institutions. Repositories provide services to faculty, researchers, and administrators who want to archive research, historic, and creative materials. The open access and open archives movement, the need for changes in scholarly communication to remove barriers to access, and the increasing awareness that universities and research institutions are losing valuable digital and print materials have begun driving the establishment of institutional repositories. Using open archive models [http://www.openarchives.org], established metadata standards, and digital rights management, important new information sources are seeing the light of day and becoming more generally available.

*Soo Yung Reih et al, (2007)* discusses how five key components of IRs – leaders, funding, content, contributors, and systems – are perceived by IR staff at
academic institutions where IRs have been implemented, pilot-tested, and planned.

Yeats (2003) opines that repositories are key to the ability of institutions to respond to future needs for more dynamic cross-boundary communications services.

In an influential position paper on behalf of SPARC (the Scholarly Publishing and Academic Resources Coalition), Crow (2002) firmly places institutional visibility and prestige as a major rationale for IRs. Instead of a diffuse pattern of publication across thousands of scholarly journals, the IR concentrates intellectual product, "making it easier to demonstrate its scientific, social and financial value".

Crow (2003), writing the position paper for the American Research Libraries, argues that increasing access to the literature is but one goal of institutional repositories. He feels that, by taking at least some control over the dissemination of scholarship, repositories can increase competition in the marketplace and reduce the monopoly power of journals. Crow believes that there is no reason that institutional repositories cannot provide all of the functions of traditional publishing (registration, certification, dissemination, and archiving), in effect taking the role of scholarly publishing out of the hands of third-party publishers and placing it back in the hands of the academy.
According to Prosser (2004) if the increased visibility is associated with high quality, the results may be tangible benefits to the institution in the form of continued or new public and private funding, and increased applications from potential students and staff.

3.2 Journal Publishing and IRs

McLendon (2005) states that the Institutional Repository (IR) concept has gained momentum as universities begin to question the logic of buying back its research, as libraries drop journal subscriptions due to publisher fees outstripping resources, and as taxpayers question paying for research twice by funding the research itself followed by purchasing journal subscriptions to discover the research findings. IRs can preserve and provide access to a university's unpublished material, establish alternatives to the high costs of traditional publications, and contribute to a university's prestige. As information and knowledge resources are increasingly digitized and distributed by local and global networks, those facing the above issues are exploring alternatives to the preservation and distribution of information.

Rowlands and Joint (2005) feel the journal publishing sector is facing enormous challenges and opportunities as content increasingly migrates to the web. The value of this research is that it provides an objective, non-partisan, assessment of the attitudes and opinions of more than 5,000 senior researchers, a key stakeholder group, and thus contributes both to the development of public policy as well as more realistic commercial.
Crow (2002) in his paper on ‘The case for Institutional Repositories: A SPARC position’ paper talks of the economic, market, and technological foundations that sustained this symbiotic publisher-library market relationship have begun to shift. Several coinciding factors are forcing change in the structure of scholarly journal publishing. Bergman (2006) predicts that commercial journals, OA journals and digital repositories will continue to co-exist as information resources for the scholarly community for the foreseeable future. Key elements which have created pressures for change in the scholarly communication system are reviewed: the development and expansion of the Internet and networked technologies, and rapidly increasing journal costs due to consolidation, pricing structures and title aggregating in the commercial journal publishing industry.

Joint (2006) suggests that libraries and librarians are well placed to give input to the metadata and digital preservation activities inherent in building institutional repositories.

Foster et al (2006) says that the future of IR may lie in its connection to larger publishing programs that are themselves undergoing disruptive changes. A disciplinary repository would provide the scholarly society with a place for grey literature (including preprints and versions of articles from 'green journals) and for non commercially published journals.

Garfield (2005) cautions the need to distinguish between readership and downloading and actual citations, but acknowledges that web use may be a
harbinger of future citation. OA dramatically increases the number of potential users, by providing access to users who individually or institutionally do not subscribe to the journal in which the article appears. A growing number of journals are giving the “green light” (www.sherpa.ac.uk/romeo.php) to author self archiving partially because journal impact factors benefit from increased article impact factors.

Some feel the introduction of IR and the consequent easy access to scholarly publications will cause the cancellation of subscriptions to journals published by learned societies and commercial publishers and therefore force changes in the whole scholarly publishing paradigm, not just in the ways that people access information. Also IR may influence change in other newer aspects of scholarly information such as digital theses repositories (Lafferty and Edwards, 2004; Lafferty, 2005).

3.3 Policy Matters

De Beer (2005) workshop on IR policy matters, presents an overview of types of policies, as well as guidelines on constructing own institutional policies to promote the establishment of Open Access Institutional Repositories.

Drake (2008) opines that in establishing repositories there are a variety of decisions to make. Policies, systems architecture, and other elements will depend on institutional context and the scope and purposes of the repository. The flexibility of an IR creates new challenges for policy makers. For example, as
academics move from one institution to another and collaborate with members of other organizations (both public and private), their needs must be accommodated through clear policies on deposit, accessibility and other issues (Drake 2004). Drake (2004) feels librarians both use and create institutional repositories. In establishing repositories there are a variety of decisions to make.

Policies, systems architecture, and other elements will depend on institutional context and the scope and purposes of the repository. Policies appropriate for an academic institution may not work in a corporate setting. The author has set up some of the key issues to consider when developing repositories: the institutional culture, the scope of the repository, content, access levels, legal aspects, standards, sustainability and funding. Other policies will be necessary on document type and format, preservation, submission and accession procedures, intellectual property rights and metadata quality standards (Pinfield 2003).

According to Joint (2006) attitudes and policies need to be clarified so that a coherent approach to a range of different but related intellectual property (IP) matters such as plagiarism, self-archiving on research repositories and respect for commercially owned copyright material is uniformly developed.

The university at Exeter Research and Institutional Content archive (ERIC) ERIC has defined policies for all the features of an IR Metadata Policy, Data Policy, Content Policy, Submission Policy and Preservation Policy.
Sale (2007) in his paper analyses the content of seven IRs in Australia and shows that a requirement to deposit research output into a repository coupled with effective author support policies works in Australia and delivers high levels of content. Voluntary deposit policies do not, regardless of any author support by the university. This is consistent with international data.

3.4 IPR and copyright issues

Material placed in an IR will be subject to intellectual property rights. These may be owned by the institution, the author or, in the case of a post print, a publisher (Gadd et al. 2003). Despite the fact that “over 90% of journals already officially support self-archiving” (Eprints.org 2004), concerns over intellectual property rights are a major deterrent to authors considering posting their work on IRs (Hunt 2001, Heery and Anderson 2005) and this has resulted in several repositories being populated with bibliographic records rather than full text. Pinfield et al. (2002) note that it is important that authors are discouraged from signing away their copyright to publishers.

From another point of view, authors may wish to attach conditions to their work. Their sponsors may require confidentiality, their data may have commercial value or their documents may require a restricted circulation. There must be appropriate rights management mechanisms in place to allow or restrict access to content (Crow 2002). The RoMEO project (2003) has extensively considered the rights issues of OA publishing. They recommend the use of Creative
Commons licences to express the rights attached to individual research papers (Gadd et al. 2004).

As part of the RoMEO project, Gadd et al. asked authors what their main concerns were about making research papers freely available on the web (Gadd et al. 2003). Of the six options offered, the largest group of respondents had no concerns, the next largest group was concerned with future publication, and the third largest group worried about breaking agreements with publishers. Authors had fewer concerns over the use and potential abuse of their work (i.e. plagiarism, integrity and commercial use) (Gadd et al. 2003).

Exploring author attitudes further, Gadd et al. observed that “most academic authors are primarily interested in preserving their moral rights, and that the protection offered research papers by copyright law is in excess of that required by most academics” (Gadd et al. 2003).

This fairly relaxed attitude toward copyright is replicated in other surveys. Swan and Brown (2005) noted that authors are not always aware of the full copyright implications of their work; while Rowlands et al (2004) concluded that “authors’ views on copyright may be characterized as a mixture of indifference, ignorance and principled resentment aimed primarily at commercial publishers (“information should be free”).” (Joint (2006) opines that attitudes and policies need to be clarified so that a coherent approach to a range of different but related intellectual property (IP) matters such as plagiarism, self-archiving on research repositories and respect for commercially owned copyright material is uniformly
developed. Debate must be differentiated from policy which in turn must be implemented via the information literacy (IL) syllabus. Cohen (2007) recounts the development of DigitalCommons@ILR and examines local policies and procedures. In addition, the paper addresses the issues of choosing an institutional repository platform, creating partnership with stakeholders, and addressing staffing needs.

One way of avoiding copyright problems is to deposit a unique version of a piece of work, for example a copy produced following feedback from peer review but prior to final publication in a journal. (This is the ‘Harnad-Oppenheim’ strategy (Pinfield et al. 2002)). Such an article may well be of sufficient quality to serve as a substitute for the formally published item. The difficulty arising from this is that multiple copies will then be in circulation (the ‘many-copy problem’ (Suber 2004)) and there may be confusion over which should be the ‘version of record’ (Pinfield 2004). The problem is exacerbated in the case of collaborative authorship when one article may be posted to several repositories.

Nicholas Joint (2006) says attitudes and policies need to be clarified so that a coherent approach to a range of different but related intellectual property (IP) matters such as plagiarism, self-archiving on research repositories and respect for commercially owned copyright material is uniformly developed. Holmes (2004) “looks at the development of copyright levies, the way in which some key countries apply copyright levies and the digital debate currently taking place” His article conveys the complexity of “private use” internationally. Jackson (2004) writes a useful piece on the fair use of electronic reserves in the USA.
These reserves are growing in importance as the amount of material available electronically continues to grow rapidly. Croft (2004) provides an extensive discussion of the difference between “the electronic delivery of interlibrary loan articles” and “traditional physical delivery” as well as electronic reserves. Joint (2006) opines that the current culture, especially in higher education towards intellectual property rights, remains both confused and confusing, above all for the “information illiterate” starting out on degree-level programmes. Attitudes and policies need to be clarified so that a coherent approach to a range of different but related intellectual property (IP) matters such as plagiarism, self-archiving on research repositories and respect for commercially owned copyright material is uniformly developed. The author also suggests that information literacy programmes be promoted as a way of enhancing students' understanding of intellectual property issues. This paper brings together different IP issues which are not normally considered together, such as institutional research repositories, student plagiarism and commercial IP entitlements. It points out ways of unifying these in a single coherent philosophy of information society rights and ownership. This philosophy should form one of the mainstays of the information literacy syllabus.

3.5 Software

Hey (2004), as part of her work on the TARDis Project describes how user needs have influenced the evolutionary development of 'e-Prints Soton' as the University of Southampton Research Repository. The work of this programme has been inspired by the success of the Open Archives Initiative - a simple
mechanism that allows metadata about resources to be harvested into services that can be searched by staff and students.

Gutteridge, et al (2003) in TARDIS: Report on the technical issues of using GNU EPrints Software for the development of an institutional e-Print repository at the University of Southampton mentions that GNU EPrints.org software supports the creation of archives metadata, and is the most widely used software of its type in terms of the numbers of archives that are using it.

Tennant (2002), opines that for an institution wishing to implement a repository, there are now implementation models to consider and software decisions to make From E prints& D Space (Open source), Bepress (Berkeley electronic press commercial solution). The software platform is but one essential step to creating an institutional repository.

Academic libraries do not have to follow an involved, idealized process to create an institutional repository based upon open-source software. Systems already at hand, even if proprietary, may be adapted and real-world limitations surmounted to create such a resource (Kelly 2007).

Organ and Mandl (2007) present an overview of the environment leading up to the decision to select Digital Commons over an open source software solution. The paper also outlines subsequent experiences during a one-year period in operating the outsourced solution. Outsourcing is an appropriate digital
repository option for higher education institutions when costs are considered and compared with open source solutions, and especially when on-site IT support is limited. Outsourcing allows local staff to concentrate on liaison with faculty in promoting and populating the repository.

*Cervone* (2004) says that a major difference among institutional repository solutions is whether the software is commercial or open source. Commercial software is purchased and, in most cases, is not open to local modification. The programming code of open source software is freely available for users to look at and modify. In most cases the software itself is provided without a licensing fee.

### 3.6 Infrastructure

*Lynch* (2003) in his article on Institutional Repositories: Essential Infrastructure for Scholarship in the Digital Age emphasizes the importance of building an Institutional Repository (IR) while depicting the facilities and the dissemination capabilities offered by the Institution's network. One of the main benefits of going in for an IR is the encouragement and adoption of new forms of scholarly communication that exploit the digital medium in fundamental ways.

*Hunter and Day* (2005) introduce collection development issues from two different perspectives. Firstly, it highlights issues that may need to be addressed by IR as OAI data providers. For example, repositories may need to make decisions on the type, quality and format of content, on submission workflows,
rights management, access, sustainability and evaluation. Secondly, the report tries to explore the possibilities of considering similar issues from the perspective of third party service providers like ePrints, UK that harvest selective metadata from IRs.

3.7 Archiving

*Prosser* (2004) shows that by harnessing the power of the internet, authors will be able to distribute their work to all interested readers – not just those lucky enough to have a subscription. It also describes how institutions can take responsibility for archiving their intellectual wealth and making it more widely available. Finally, the paper shows how the adoption of IRs and OA journals could bring about a change in the financial model of journal publishing, bringing cost savings to society and improving communications, while still preserving the functions of peer-review.

*Pelizzari* (2004) reports on a survey of the academic staff of the faculties of economics and law of university of Italy, Boscia. The survey sought to determine knowledge and use of OA archives and to verify the conditions faced by the staff for their participation in an institutional OA initiative.

The paper by *Crow* (2004), a SPARC position paper on Scholarly Publishing & Academic Resources Coalition mentions that under the print journal system, librarians have traditionally supported the archiving function of scholarly communication by physically maintaining and preserving the printed literature.
With the advent of digital distribution, the publishers themselves asserted control over the digital versions of their publications, assuming responsibility—though seldom in clearly defined terms—for the preservation of digital content. At present, there are no universally-accepted archival standards for ensuring the longevity and preservation of digital formats. Rather, an evolving and fluid set of technical best practices guide most digital preservation planning. The long-term retention of digital objects requires proactive management and considerable resources.

Waugh (2007) describes that during the design and implementation of The Public Record Office Victoria (PROV) commissioned a digital archive, considerable attention was paid to the ingest function that accessions digital objects into the archive. In particular, the archive was designed to process large transfers, and particular care was taken to support archivists in managing the transfer and handling the inevitable errors.

Joint (2006) suggests that libraries and librarians are well placed to give input to the metadata and digital preservation activities inherent in building institutional repositories. They should be resourced to give more attention to such tasks. Joint (2006) tries to make a strong case for librarian-mediated deposit rather than pure self-archiving as the future of building institutional repositories.

Encouraging authors to self archiving to the IRs assure that the institution’s intellectual assets are being collocated in an environment which will
assure future access and increase the opportunity for preservation. (Crow 2002; Wheatley 2004).

A number of studies look at what motivates scholars to publish research and to go on and self archive in IR (Swan and Brown, 2005; Houghton et al., 2003; Swan et al., 2005). Most scholarly authors state their motivations for publishing such as communication with peers, enhancing career prospects, building their CVs, gaining prestige and funding for future work. Authors select journals in which to publish after consideration of the journal's reputation, impact factor, coverage by abstracting and indexing services, and increasingly by the journals availability online.

A recent study (Foster and Gibbons, 2005) has looked at faculty work practices, their research and their perceptions of IR, and proposes strategies to overcome misperceptions by faculty and to assist faculty with IR self archiving, so that it becomes a clearly useful, and therefore happily performed, task and which will also encourage growth in IR content.

Some feel the introduction of IR and the consequent easy access to scholarly publications will cause the cancellation of subscriptions to journals published by learned societies and commercial publishers and therefore force changes in the whole scholarly publishing paradigm, not just in the ways that people access information. Also IR may influence change in other newer aspects of scholarly information such as digital theses repositories (Lafferty and Edwards, 2004; Lafferty, 2005). Lafferty and Edwards opine that self archiving
in open archives IR may therefore play the role of a disruptive technology predicting that existing organizations and industries can be made obsolete (or sustained) by changes in the paradigm within which they operate. Xia and Sun (2007) proposes a group of factors that may be used to assess the success of open access self-archiving. It concentrates on self-archiving in institutional repositories. The authors emphasize the importance of examining content materials, particularly the availability of full text versus abstracts and the deposits archived by authors versus by others.

### 3.8 IRs and Librarians

To properly implement these repositories, libraries will need to recruit librarians who possess digital collection management and Open Archive Information System (OAIS) management skills. In addition, training faculty and students to use OAIS, helping them prepare their digital products, involving them in institution-wide policy making, and setting repository goals would be some of the new tasks that libraries will face (Chang 2003). Chan (2005) illustrates how the roles of reference librarians are changed in the process of building the institutional repository. There are extensions of existing roles in terms of system evaluation, advocacy and reference services.

Joint (2006) suggests that libraries and librarians are well placed to give input to the metadata and digital preservation activities inherent in building institutional repositories. They should be resourced to give more attention to such tasks. The paper tries to make a strong case for librarian-mediated deposit rather than pure self-archiving as the future of building institutional repositories.
Bailey Jr. (2005) orients reference librarians, library administrators, and others to IRs and open access, providing a context for understanding how reference librarians' jobs may be transformed by the emergence of IRs.

Beckett and Inger (2006) show in their survey librarians are very sensitive to quality, content cost, the version of the content and how immediately the content is made available. Overall the survey shows that a significant number of librarians are likely to substitute OA materials for subscribed resources, given certain levels of reliability, peer review and currency of the information available.

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3.9 Technology

The implementation and maintenance of an IR require technical support. Some argue that the free open source software upon which most IRs run is too restrictive in its functionality and its future is too uncertain (Heery and Anderson 2005, p.28).

Leung (2005) notes that it is important to have an exit or migration strategy. It is generally agreed that the technical challenges and the costs of installing IR software are relatively minor issues when compared with the time
and effort required to persuade users to populate it with their work (Foster and Gibbons 2005, Genoni 2004, Horwood et al. 2004).

Cultural rather than technological factors limit the use and development of IRs (Hubbard 2003).

Suthradhar (2006) provides guidelines to assist those in setting up an IR. Appropriate staff are required to administer and run the IR smoothly with proper hardware, software and sound infrastructure.

Cox (2005) describes appropriate technologies to create knowledge bases and institutional repositories, and to deliver government information in more consistent digital formats; compatibilities with course management software, distance delivery platforms and other larger technology-based services should be the main criteria for setting up of IRs.

Krevit and Crays (2007) opine that the success of the institutional repository depends on appropriate communication with faculty, a deep understanding of the publishing process, identifying appropriate partners, designing a flexible technology infrastructure, and engaging in active collaboration with key players.

Hulse (2007) finds that while a shared implementation of an institutional repository does present significant challenges that would not be present for a single institution, the collaborative approach also presents significant benefits in
drawing on the breadth of expertise available among the consortium and utilizing a shared information technology infrastructure.

3.10 Open Access

Drake (2004) in his paper on Institutional Repositories: Hidden Treasures in Information highlights the open access and open archives movement, the need for changes in scholarly communication to remove barriers to access, and the increasing awareness that universities and research institutions are losing valuable digital and print materials have begun driving the establishment of institutional repositories. Using open archive models [http://www.openarchives.org], established metadata standards, and digital rights management, important new information sources are seeing the light of day and becoming more generally available.

Hey (2004) as part of her work on the TARDis Project describes how user needs have influenced the evolutionary development of 'e-Prints Soton' as the University of Southampton Research Repository. The work of this programme has been inspired by the success of the Open Archives Initiative (OAI) - a simple mechanism that allows metadata about resources to be harvested into services that can be searched by staff and students.

Pelizzari (2004) reports on a survey of the academic staff of the faculties of economics and law of univ of Italy, Boscia. The survey sought to determine knowledge and use of OA archives and to verify the conditions faced by the staff
for their participation in an institutional OA initiative. The study illustrates the crucial role that authors play in the process of diffusion of OAI. The study illustrates the crucial role that authors play in the process of diffusion of OAI.

*Lynch and Lippincott* (2005) feel that along with the institution-specific case studies, there has been a good deal of speculation about the viability and importance of institutional repositories and particularly about the imputed relationships of institutional repositories to the open access movement (and thus the extent to which the success or failure of institutional repositories provides evidence of either the success or failure of the open access movement).

*Suthradhar* (2006) gives an idea that setting up interoperable IRs among the same type of institutions in a particular state or country enables data to be transferred through OAI-PMH protocol from one IR to another.

*Bergman* (2006) says that the OA movement has gained momentum and appears to be meeting with some success, with worldwide efforts to make federally funded research available to taxpayers and the largest science, technology and medicine journal publishers revisiting pricing structures.

The majority of authors felt that journals’ publishers should make articles available electronically for free (Swan and Brown 2003,). Later, they found that 92% of OA authors were saying that the ‘principle of free access for all readers’ was an important reason for publishing in OA journals (Swan and Brown 2004,). Even among authors who published in a traditional journal, it was found that
“almost all authors supported the concept of open access publishing” (Schroter et al. 2005).

McCulloch (2006) says the open access initiative is dramatically transforming the process of scholarly communication bringing great benefits to the academic world with an, as yet, uncertain outcome for commercial publishers.

3.11 Models

Raym Crow, (2002) states that Institutional repositories can provide an immediate and valuable complement to the existing scholarly publishing model, while stimulating innovation in a new disaggregated publishing structure that will evolve and improve over time. Further, they build on growing grassroots faculty practice of self-posting research online. While institutional repositories necessitate that libraries-as their logical administrative proponents-facilitate development of university intellectual property policies, encourage faculty authors to retain the right to self-archive, and broaden both faculty and administration perspectives on these issues, they can be implemented without radically altering the status quo. Moreover, they can be introduced by reallocating existing resources, usually without extensive technical development.

Christopher Gutteridge, et al. in TARDIS: Report on the technical issues of using GNU EPrints Software for the development of an institutional e-Print repository at the University of Southampton mentions that GNU EPrints.org software supports the creation of archives metadata, and is the most widely used
software of its type in terms of the numbers of archives that are using it. Despite this, there is no standard model for managing an institutional archive. The TARDis Project (Targeting Academic Research for Deposit and Disclosure), funded by the JISC FAIR Programme, was established to investigate the technical, cultural and user issues that might shape and inform a typical institutional archive within an academic establishment, and thereby increase the uptake of archives by more institutions and by authors depositing papers.

*Simpson and Hey* (2006) in their paper on A case study of the University of Southampton research repository (e-Prints Soton) route to a model for sustainability is explored with a description of a new project that will contribute to e-research by linking text and data.

*Tennant* (2002), opines that for an institution wishing to implement a repository, there are now implementation models to consider and software decisions to make. From E prints& D Space (Open source), Be repro (Berkeley electronic press commercial solution) MIT uses a distributed model, championed by Southampton's Stevan Harnad and others as 'self-archiving,' whereby individual faculty upload and manage their own scholarly output. DSpace has the widest focus of any repository described here; it explicitly welcomes any scholarly object.
The University of California's eScholarship uses a semidistributed model that assigns management responsibility to organizational units (research units, departments) that then assist faculty with uploading their papers. CalTech uses a semicentralized model, wherein repository sites can be set up for any university unit, but the library uploads the papers on the faculty's behalf.

*Rieger* (2007) says the repository model selection process involves several essential stages including stakeholder analysis, needs assessment, service definition, and identification of use cases and governance-related matters. The ultimate success of a repository implementation is often determined by how well it supports organizational procedures, policies, practices, and collaborations. Carr and Brody (2007) feel the key to a successful repository is sustained deposits, and the key to sustained deposits is community engagement. Hockx-Yu (2004) in her paper on digital preservation explores different models for the provision of digital preservation services for institutional repositories. These models may be a way forward to tackle collectively the issue of long-term preservation within the setting of institutional repositories. Depending on the outcomes of the projects, further investigation and implementation could be undertaken to test the models.

*Mercieca* (2006) suggests that in instances where universities are exploring new models for dissemination of their scholarship, collaboration between institutional projects may assist in the ongoing development of content and in the provision of access to this content.
Hulse (2007) suggests a consortia model that draws on the experience and expertise of multiple institutions to achieve a common goal.

Foster et al (2006) opines from their experience that scholarly societies lack the resources to host disciplinary repositories and in turn approach universities or institutions to host for them which will ultimately entail many challenges, including developing funding model and forging new partnerships and collaborations.

3.12 Scholarly Communications

Johnson (2002) clarifies in his paper on Institutional Repositories: Partnering with Faculty to Enhance Scholarly Communication what strategic roles institutional repositories serve for colleges and universities by describing their role in scholarly communication, defining the essential elements of an institutional repository, and explaining what needs they serve for faculty and researchers.

The paper by Crow (2004), a SPARC position paper on Scholarly Publishing & Academic Resources Coalition examines institutional repositories strategically, from two complementary perspectives: 1) as a natural extension of academic institutions' responsibility as generators of primary research seeking to preserve and leverage their constituents' intellectual assets; and 2) as one potentially major component in the evolving structure of scholarly communication.
Bergman (2006) predicts that commercial journals, OA journals and digital repositories will continue to co-exist as information resources for the scholarly community for the foreseeable future.

3.13 Issues and concerns

If the benefits of an IR were incontrovertible, then every institution would have one. Perhaps this will happen. However, in the meantime, there are some concerns to address.

3.13.1 Cultural change and diversity

The biggest challenge facing IR managers is that of generating content. Some authors suggest that ingrained behaviours, inertia, indifference and resistance to change hamper the adoption of the working practices needed to support the IR (Hubbard 2003 and Ware 2004). Add to these a lack of awareness about self-archiving and concerns over quality control, copyright, plagiarism and the disruption of the existing scholarly communication system (Pinfield 2004), and it is not surprising that content may be slow in building. One option is to insist that researchers deposit their work (De Beer 2005). However, despite evidence of its acceptability, most institutions have resisted taking this step. Only the Queensland University of Technology in Australia has so far required authors to self-archive their work if publishers' copyright agreements permit it (Pinfield 2004). In some universities, students' theses are subject to mandatory deposit.
These are usually governed by university regulations so the requirement can be relatively easily enforced.

In a very recent development, the Research Councils UK (RCUK) have produced a position statement proposing that from October 2005 output from all funded projects must be deposited in openly available repositories (Research Councils UK 2005). If accepted, this is likely to have a major impact on the quantity of material being deposited in IRs.

Davis and Connolly (2007) state that if the goal of institutional repositories is to capture and preserve the scholarship of one's faculty, institutional repositories will need to address this cultural diversity.

3.13.2 Sustaining support and commitment

“In order to guarantee success it is vital that repositories meet the short term need of users as well as underpinning the longer term strategic objectives of funders and institutions” (Heery and Anderson 2005).

An IR is a long-term commitment. Maintenance of content, software and accessibility will require funding in perpetuity (Drake 2004). If it is to fulfill expectations, the maintenance of the IR must be an institutional strategic goal. The consequences of failure (whether through lack of funding, policy change, technical difficulties or poor management) may be disastrous. Unlike libraries and other information providers, the IR may hold unique copies of material.
Under these circumstances, failure of the IR will mean permanent loss of work and loss of confidence in digital scholarship (Lynch 2003). (Of course, if repository content is mirrored elsewhere, as suggested above Crow (2002), Lynch (2003)), this could be avoided.

White (2008) in his paper on developing a sustainable IR provides an assessment of the factors involved in the development of sustainable platforms and processes for institutional repositories, drawing on the experience of the team at the University of Southampton and from project initiatives in the UK. It will look at the fundamental integration of repositories into the cultural, financial and technical structures of institutions to promote healthy repository growth. A good number of questions have been posed. How do we effectively link repository development to institutional strategies, develop value-added services to meet the needs of users and contribute to an interoperable global infrastructure? Can we develop supportive policies to breed user-confidence and promote open access whilst recognizing the importance of intellectual property and copyright issues?

Stakeholders are becoming more aware of the global challenges and are using their power to exert pressure on companies. Increasingly, construction clients are demanding that their business partners submit their corporate sustainability policies with tender packages to demonstrate their performance in dealing with opportunities and risks stemming from economic, environmental and
social aspect of sustainability. However, the lack of understanding of the concept and its practical application has been a recurrent problem. The conceptual confusion; its vagueness and ambiguity, the complexity of the myriad of challenges and fluidity of the sustainability concept, compounded with the myopic attitude of the industry, lack of clear-cut and practical framework are causing frustration in the construction industry. Consequently, a number of sustainability management frameworks have been proposed. There are probably more than one hundred frameworks for sustainable business strategy. (Matthew 2001)

3.13.3 Responsibility and control

Lynch (2003) is concerned that IRs may be exploited by senior management to exert institutional control or ownership over what has previous been the responsibility. Baudoin and Branschofsky (2004) describe how the DSpace teams at MIT were approached regarding the deposit of a single 30-terabyte dataset. Lynch believes that it is imperative that management should accept responsibility for the IR without exerting control, and that the IR should not simply become a strategic tool. Yeates (2003) also notes that the balance of institutional power might be affected as departments adopt IR services at different rates.

3.13.4 Awareness

Levels of awareness of OA issues are variable. Authors may support OA scholarly communication, but lack awareness of specific OA initiatives (De Beer
2005). Even in their most recent survey, Swan and Brown (2005) found that 39% of researchers were unaware of self-archiving as a means of providing access to their work.

3.13.5 Quality

The issue of quality is an important one for most researchers. Readers want to find high quality, peer reviewed articles in their field (Swan and Brown 2003). Harnad (2004) sees the peer review function as being independent of the OA function. He recommends that work should be submitted as normal to a refereed journal, then the postprint should be self-archived in a digital repository (Harnad 2003). Although alternative quality measures are possible in OA publishing – for example, post publication public commentary and citation analyses – Swan and Brown (2003) found that authors were overwhelmingly in favour of traditional peer review for guaranteed quality.

Davis and Connolly (2007) say that faculty/readers main reasons for not using repositories: redundancy with other modes of disseminating information, the learning curve, confusion with copyright, fear of plagiarism and having one's work scooped, associating one's work with inconsistent quality, and concerns about whether posting a manuscript constitutes "publishing".

3.13.6 Practical issues

Ideally, the practicalities of depositing an item in an IR should not deter authors from doing so. Swan and Brown (2005) reported that most self-archivers
had deposited their articles themselves and found the process became easier with practice.

*Carr and Hamad* (2005) measured the time taken to upload a paper and provide some simple metadata. The average time spent was about ten minutes per paper, but users became quicker as they deposited more items.

For the few authors finding self-archiving particularly difficult, some form of mediated deposit may be appropriate. This would have the advantage of enabling IR administrators to check and perhaps enhance user created metadata (Pinfield 2001).

### 3.13.7 Authors as readers

Authors as readers appear to be highly satisfied with their levels of access to the journals literature (Rowlands et al. 2004). Most respondents felt that current access was easier than five years previously. Increased availability of material in IRs is likely to improve access further.

The RoMEO group focused on the ways in which authors as readers expected to use OA material. They concluded that “academics-as-users do not expect to perform all the activities with open access research papers that academics-as authors would allow” (Gadd et al. 2003).
3.14 Continuing issues

For institutions or disciplines to set up open access repositories, there are a number of issues to be surmounted. These include technical issues, such as hardware and software selection, IT and human resources costs, preservation policies and also cultural issues. Institutions and authors need to research and understand the possible benefits and barriers and other outcomes. Further, the agreements that authors have with publishers are seen as a barrier to IR, although increasingly publishers are allowing authors to self-archive. There are the management costs and resources involved. Other OA issues which remain unresolved are: physical organisation of material, identification of material (i.e. what material is to be deposited in the repository), identification of versions of material, intellectual organisation, copyright and other legal issues, peer review, authenticity, and preservation and quality control.

3.15 Summary of Literature Review

Scholarly research output is also often used as a performance indicator and criteria for distribution of funding for both individuals and institutions. Any financial profit to be made from the journals is made by the publishing companies and their shareholders in return for the services they offer such as peer review, marketing, dissemination etc. While both paper and electronic paradigms are still in existence, publishers' revenue is from subscriptions to the paper titles, and increasingly from site licences (to both institutions and on-sellers or aggregators to electronic titles, or collections of titles locked behind firewalls. Costs to readers
are spiraling increasingly higher and universities and other research organizations can afford to purchase increasingly smaller percentages of available scholarly journals and so what was previously a distribution network, is now in fact acting as a barrier to reader. In addition to escalating costs, publishers and aggregators concerned about their revenue stream use copyright legislation and licensing agreements (contracts) to limit what libraries may do with the licensed electronic journals they pay for, limiting the access to electronic journals way beyond the limitations that were placed in the print paradigm. For example some licences restrict access to electronic journals for inter library loan/document delivery and/or to walk-in users in libraries. It has been argued that these cost and permission barriers work against the interest of researchers and the organizations to which they belong, which share the rewards of research impact.

As the OA movement grows it attracts the interest of research funders, such as universities and other research institutions. Benefits of OA for authors are clear – it lowers access barriers and disseminates research quickly (peer review can take upwards of six months). For readers access is also quick and easy from their desktop via common search tools or even from some repositories email alerts. The OA movement through the Open Archives Initiative (OAI) has developed protocols that enable data providers (repositories) to expose structured data to the internet, so that it can be harvested by service provides (such as specialised repository search engines, and even more general ones such as Google) to expose the information in repositories to people searching for
information. OAI allows service providers to provide more than just search services such as citation analysis. Citebase (www.citebase.org) provides an early example of this.

Open access literature is free of charge to the user, but someone has to pay the costs for the infrastructure and maintenance and the copyright holder consents to unrestricted use. It is argued that as many disciplines are not in a position to set up repositories such as arXiv, institutions are ideally placed to do so. Institutions have the resources and infrastructure to set up, support and fund repositories. They can mandate or encourage self archiving and they can benefit from the enhanced profile. If such open access archiving were mandatory, further benefits to institutions would accrue, such as keeping track of research output, research reporting, and eventual online global access to all research. Benefits to researchers include increased readership and citations, and therefore higher research impact. So there are incentives to publish in OA electronic journals (known as the "gold road" to OA) or to self archive eprints in institutional or discipline-based repositories (known as the "green road") which utilise free open source or even proprietary software.

In the past, libraries within research institutions have been responsible for the preservation of the content of journals for the future. In the current model, as most electronic journals are only licensed to libraries, the preservation is up to publishers. There is concern that the imperatives of the commercial world will mean that there is no proper concern for preservation archiving. While some
argue that the IR movement is about access not preservation others argue that preservation is one of the key issues that could define an IR.

There is also opposition to IR and other forms of open access from commercial journal publishers who see that OA might harm their business and therefore their profits. There is further opposition from some of the scientific societies for whom sale of publications can form a significant part of income and subsidies their other activities. It is also recognized that commercial and scholarly society publishers play a key role in scholarly communication, being largely responsible for organizing the refereeing and review process among other things. For the moment the scholarly publishing position includes traditional (electronic and paper) for-fee journals, OA journals and OA repositories. In many cases institutions through their libraries are paying for access to the same article in all three ways.

Installing the software will just be the first step in establishing an IR, but it is a necessary first step. Different institutions will want different inputs and outcomes from their IR, but most are agreed that at least one of the key content layers of an IR should be the refereed research output of an institution. Implementing IR in an incremental way may allow institutions to speed up their IR implementations and learn from their own (and others) implementations. Similarly, conducting research into the needs and requirements of users will assist us in building knowledge to understand and resolve the issues regarding the slow building of content and slow growth of self-archiving practice among academics, despite the demonstrable impact effects. The brief examples in this
paper indicate that research can build on existing knowledge already gained by IS researchers to enhance our understanding of IR and their users. Research can also lead to learning to create more successful IR implementations and therefore the more successful dissemination of refereed research output and other intellectual and research contributions of institutions such as universities.

References:


2. Carr, L and Brody, T, Size isn't Everything Sustainable Repositories as Evidenced by Sustainable Deposit Profiles, D-Lib Magazine, 13(7/8), July/August 2007


5. Cohen,S and Schmidle, D, Creating a multipurpose digital institutional repository, OCLC systems and services, 23(3), 2007


17. Hulse, B et al., ALADIN research commons: consortial institutional repository, *OCLC systems and services*, 23(2), 2007


21. Krevit, L and Crays, I, Designing Digital Commons@ the Texas Medical Center, a multi-institutional repository, *OCLC Systems and Services*, 23(2), 2007


30. Pinfield, S. Self archiving publications.


41. Ware Consulting Ltd. *Pathfinder Research on Web-Based Repositories*, Mark Ware Consulting Ltd Publisher and Library/Learning Solutions (PALS), Bristol, 2004, available at: www.palsgroup.org.uk.

42. Ware, M, Institutional repositories and scholarly publishing, *Publisher and Library/Learning solutions*, 2004.
