INSTITUTIONAL REPOSITORIES FOR SCHOLARLY COMMUNITIES IN THAILAND

Wachiraporn Klungthanaboon [1], Teerapong Leelanupab [2] and Michael Moss [3]

[1,3] *Humanities Advanced Technology and Information Institute (HATII), University of Glasgow, Glasgow, United Kingdom*

[2] *Faculty of Information Technology, King Mongkut's Institute of Technology Ladkrabang (KMITL), Bangkok, Thailand*

Emails: [1] *w.klungthanaboon.1@research.gla.ac.uk,* [2] *teerapong@it.kmitl.ac.th,* [3] *michael.moss@glasgow.ac.uk*

ABSTRACT

Scholarship and scholarly communications have been changed by evolving technolo-gies. For decades, scholars and institutions have difficulties in sharing and accessing their research output. General academics or even research authors have to pay for access to their own published work due to copyright issue with commercial journal publishers or vendors. *Institutional repositories* may be an effective response to this problem. As a result, a number of academic institutions have established institutional repositories in order to manage and disseminate their intellectual assets. In Thailand, the concept of institutional repository has just emerged and is under development. This paper aims to indicate the potential benefits of institutional repositories for the Thai scholarly community. We discuss the current states of institutional repositories in general and particularly in Thailand. Research challenges and suggestions for the development of future institutional repositories in Thailand are presented.

Index Terms – Institutional Repository; Digital Archiving; Academic Authors; Thailand

1. Introduction

In scholarly communities, conducting research is a crucial way to exchange knowledge and develop subject disciplines. Academics share their research findings and contribute their knowledge for communal benefits. Traditionally, scholars publish their research findings in peer-reviewed journals with the assistance of for-profit commercial publishers. Thereby authors lose the controls of dissemination and accessibility to their own published works. Often institutions and research funders have to pay for access to their own intellectual outputs, even if they have financially supported the research

projects [1].

The advent of digital technology has made possible new mechanisms for scholarly communication [2]. In the digital age, access to and dissemination of scientific information have become easier and faster through the Internet. This is leading to a change in modern scientific research driven by online digital archiving and long-term preservation of scholarship and related library collections. New information and communication tools offer innovative ways to add value and enhance accessibility to research outcomes obtained from experiments and observations in the scientific process

Institutional Repository (IR) is a new type of digital information services built within an institution's cyber-infrastructure. IR offers a set of services for all digital materials created by individual institution members; these services include digital content submission, organization, access, distribution and preservation. One of the initiatives introduced by IR is an alternative publishing paradigm for scholarly works, promoting information accessibility and scholarly communication [3]. However, IR is a new concept, which requires careful consideration before implementation and a great support to ensure sustainability.

In this paper, we discuss the benefits of IR that can support research and education in Thailand. We identify potential obstacles to the setting up of IR in Thai institutions, such as colleges and universities. The remainder of this paper is organized as follows. In Section 2, we define the scope of IRs and provide its definitions. Section 3 describes related work and the current IR systems developed by other institutions. In Section 4, we outline the current state of IR in Thailand, followed by the potential benefits of deploying IR to Thai academia. In Section 6, we discuss the challenges in developing IR systems in Thailand. Section 7 discusses the future IR systems for Thai institutions. Finally, this paper is summarized in Section 8.

2. WHAT IS INSTITUTIONAL REPOSITORY?

From a wide perspective, IR is viewed as one form of digital online repositories, provided by academic institutions, colleges or universities for scholarly literature across many disciplines and sources, such as theses, books and articles. Formally, IR has been defined by several scholars with different focuses.

Johnson [4] defined an IR as a digital archive maintained by an institution for collecting, storing and disseminating intellectual products of its members, such as faculties, research staffs and students. The IR allows the accessibility of such products to all end-users no matter whether they are inside or outside the institution, with few if any barriers to access.

The most widely accepted definition of IR is commonly attributed to Lynch [5], Executive Director of the Coalition for Networked Information. He defined an IR as:

a set of services that a university offers to the members of its community for the management and dissemination of digital

materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distri-bution.

From his viewpoint, the IR concept is focused around service provision and stewardship of digital archives rather than technology, i.e. hardware and software. As discussed in [5], Lynch argued that a key part of IR is the services that an IR offers, the management of technological changes and the feasibility of migrating digital content for providing repository services. In addition, he broadly determined the scope of IR as follows:

A mature and fully realized institutional repository will contain the intellectual works of faculty and students – both research and teaching materials – and also documentation of the activities of the institution itself in the form of records of events and performance and of the ongoing intellectual life of the institution. It will also house experimental and observational data captured by members of the institution that support their scholarly activities.

Crow [6], a senior consultant of Scholarly Publishing and Academic Resources Coalition (SPARC), considered that IR is "*a digital collection capturing and preserving the intellectual output of a single or multi-university community.*" He also suggested four essential elements that the characteristics of an IR's content should have. Those are:

i) *institutionally defined* – An IR cap-tures digital intellectual capital generated by institution members. These will represent their embodiment of the scholarship of institution;
ii) *scholarly content* – Content in IR varies, depending on the purposes of IR projects and institutions. However, it mainly comprises research output conducted by institution members. Further, it could contain any work depending on the collection management and institution-wide policy, including pre-prints, peer-reviewed articles, monographs and teaching materials;
iii) *cumulative and perpetual* –Intellectual assets deposited in IR should not be removed except in cases of plagiarism, or copyright infringement. The content itself is freely and widely accessible under the rules and policies. Furthermore, long-term access to digital objects is a significant goal. Planning, standards, and resource commitment are required to ensure digital preservation; and
iv) *interoperability and open access* – An IR's content should be publicly accessible with minimal barriers. In term of interoperability, an IR must provide access via search engines and other searching tools by managing and sharing metadata;

Chang [7] formalized an IR as "*a new concept for collecting, managing, disseminating and preserving scholarly works created in digital form by faculties and students in individual universities and colleges. An individual*

institutional repository can offer a set of services including digital content submission, organization, access, distribution, and preservation."

However, one can present the focus of IR on technology instead of services and commitment to the stewardship of digital contents. For instance, Whitehead [8] defined IR as a database, which has been developed with additional features – focusing on institutional boundaries, housing research output, providing web visibility and full-text availability, and preservation to provide long-term access. Briefly, the term IR has no single correct and perfect definition. It depends upon how institutions define it in their own way.

Several related terms have been proposed in literature. The most common terms used interchangeably are *institutional repository* and *digital repository*. Peter [9] justified his preference for the term, digital repository:

For me, the privileged adjective closest to the noun should be digital. The fact that the repository is digital is the important qualifying fact. Individual, discipline-based, institu-tional, consortial, and national digital repositories are the flavors. The fact that the repository is controlled by an individual, a department, a college, a university, a scholarly society, a for-

profit publisher, a consortium, or a nation state is less important.

Nevertheless, the adjective "institutional" infers the boundary of scholarly literature collected within an institution or campus. Therefore the content in IR is merely derived from institution members; however, it is available for all academics and external users.

Jones [10] also argued that the term IR presents only the repository of an institutions' research output. In fact, there are other related repositories with distinct needs such as Electronic Document and Record Management Systems (EDRMS), learning object repositories, collections of exam paper questions, and research data. The specific terms may convey more appropriate and easily understood meanings. It seems likely that the definition given by Jones may be more precise than that by Lynch.

Generally IR can be divided in terms of content into two groups: institution-based repositories and subject-based repositories. Institution-based repositories contain published or unpublished digital research output generated by institution members, regardless of material types and disciplines. On the contrary, subject-based repositories focus on research output in specific subject domains. Subject-based repositories were implemented earlier than institution-based repositories, especially in scientific disciplines [11]. Subject-based repositories tend to attract more attention and are more successful in attracting contributions from community members and scholars beyond the campus because of their particular information needs, research interests and alert information services [12]. On the contrary, institution-based repositories may face more difficulty in getting involvement from community members, even if they can play an

important role in the distribution and showcase of intellectual assets of institutions and their members, its assessment, and preservation [12].

3. CURRENT INSTITUTIONAL REPOSITORIES

Since 2005, a number of institutions have increasingly established IRs for managing their intellectual assets. According to the statistics from Directory of Open Access Repositories (OpenDOAR)[1] [13], the graph illustrates the growth of IRs from 2005 to 2012 (See Figure 1). In 2012, there are about 1,794 repositories implemented by 1,528 institutions from around the world.

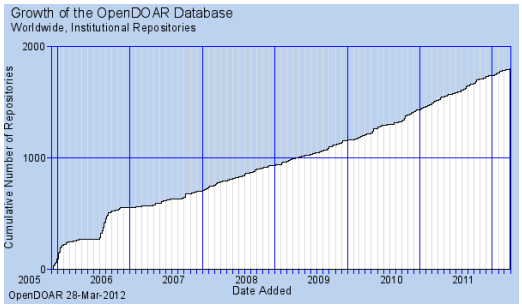

Figure 1. The growth of institutional repositories registered in OpenDOAR Database from 2005 – 2012 [13].

Considering the proportion of repository organizations by country, United States, United Kingdom, Japan and Germany are the top four countries which establish IRs (See Figure 2). As can be observed, these leading research countries tend to establish IRs because

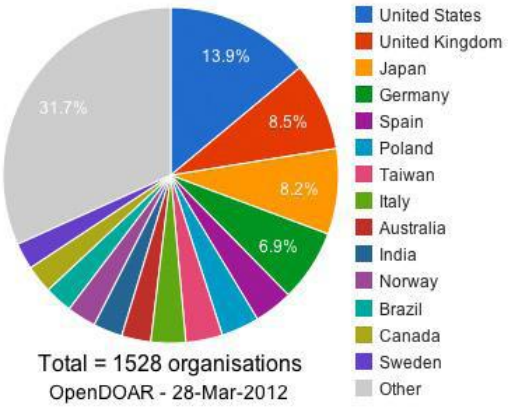

Figure 2. Proportion of repository organizations by country [13].

they appreciate the significance of intellectual asset management. Figure 2 also suggests that developing countries except India are likely not to play an active part in IR implementation. They possibly do not adequately pay attention to this new approach to information management.

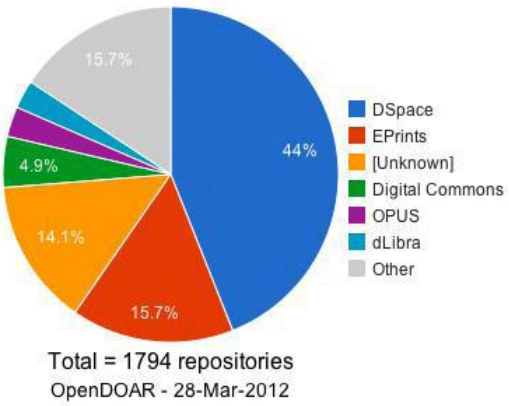

Figure 3. Percentage of usage of open access repository software worldwide [13].

Figure 3 presents the percentage of open access repository software employed by academic institutions worldwide. As we can see,

[1] Last time accessed on 28 March 2012

there are three prevalent repository software applications - DSpace, EPrints and Digital Commons.

It is interesting to note that all mentioned repository applications are open source software developed by different institutions or organizations. For example, DSpace was developed by the collaboration between Hewlett Packard Corporation (HP) and Massachusetts Institute of Technology (MIT). EPrints was developed by University of Southampton and widely used in UK universities, such as University College London and the University of Glasgow. Digital Commons was invented by bepress (Berkeley Electronic Press).

An increasing number of universities and higher education institutes in many countries have implemented and developed IRs. Definitely, a number of prestigious universities have recognized the IR values and implemented IRs for their own intellectual assets. For instance, Harvard University[2], Massachusetts Institute of Technology (MIT)[3], and Cornell University[4] in United States have developed IR projects. In United Kingdom, three world's best universities, namely University of Cambridge[5], University of Oxford[6], and Imperial College London[7] provide IR services for their community members. However, it might rush to conclusions identifying the successful IR projects, as its success depends on several factors, such as quantity of materials, faculty participation rate, or number of hits[14][15][16].

4. CURRENT STATE OF INSTITUTIONAL REPOSITORIES

In Thailand, IR is a new strategy for the scholarly community which has recently been introduced. Chulalongkorn University was the first university in the country to build an IR in 2005 with DSpace open source software. The Thai version of DSpace was developed in cooperation with faculties by the Department of Computer Science. Later it was distributed to other institutions and universities.

Recognizing the value of IR for scholarly communities, approximately fourteen universities have gradually implemented IR since 2006. These include:

a. Burapha University
b. Chiang Mai University
c. Chulalongkorn University
d. Kasetsart University
e. KhonKhan University
f. King Mongkut's University of Technology Thonburi
g. Mahidol University
h. Prince of Songkla University

[2] DASH – Digital Access to Scholarship at Harvard http://dash.harvard.edu/

[3] DSpace@MIT http://dspace.mit.edu/

[4] eCommons@Cornell http://ecommons.library.cornell.edu/index.jsp

[5] DSpace@Cambridge http://www.dspace.cam.ac.uk/

[6] Oxford University Research Archive (ORA) http://ora.ouls.ox.ac.uk/

[7] Spiral – Imperial College Digital Repository http://spiral.imperial.ac.uk/

i. Rajamangala University of Technology Phra Nakhon
j. Shinawatra University
k. Sripatum University
l. Suranaree University of Technology
m. Thaksin University
n. Thammasart University

According to an independent study on the Management of Institution Repositories in University Libraries [17], academic libraries are responsible for implementing and maintaining IR to serve their community members, commonly with DSpace open source software. Most IR projects in the study employ the Dublin Core Metadata Element Set as a cataloging standard for their collections and allow self-depositing and mediated depositing. Further, the fulltext accessibility is serviced for only institution members when accessing content across the university network.

It could be inferred that Thai universities have realized the importance of IR in scholarly communication as they tend to improve the management and dissemination of their intellectual property. Nevertheless, an IR project's success depends on many factors, including the contribution of institution members, collaboration with other institutions, and institutional commitment to the project. Copyright is one of many factors that hinder the success of IRs. This is because research authors are usually concerned about the unauthorized use of their work, which may infringe the copyright previously assigned to publishers.

Apart from these universities, other academic institutions have also developed IRs for managing their intellectual properties such as the National Science and Technology Development Agency (NSTDA), and the Health Systems Research Institute and Alliances.

However, the endeavor to provide the portal to fulltext thesis and research reports has been initiated with a consortium of academic libraries in Thailand, named "ThaiLIS" (Thai Library Integrated System)[8]. ThaiLIS launched the project "Digital Collection Management System – DCMS" in 2004 for sharing digital fulltext thesis, research publications, journal articles

and rare books among members. However, certain goals and characteristics of DCMS project may be different from the concept of IR in some details, according to the above-explained definitions of IR.

5. BENEFITS OF INSTITUTIONAL REPOSITORIES

5.1. General Benefits of IR

A number of academic institutions have increasingly established an IR as a new strategy to handle the changes in scholarship and scholarly communications because of the perceived advantages for the institution itself and its members. Generally IRs enhance the visibility and dissemination of scholarly work, open access to scholarship, and the preservation and long-term access to

[8] http://www.thailis.or.th

institutional scholarship. Further IR offers a great opportunity for institution members to realize the significance of their work [18].

First, an IR assists in compiling, managing, and storing institutional intellect-tual assets. Typically scholarly works are produced by different publishers and recorded in various formats. With the IR, institutional publications can be collocated in one place and systematically organized by assigning metadata. Further, it allows end-users to discover the scattered university members' researches with ease from the centralized storage [19]. The well-organized collections of institutional intellectual assets will increase the effectiveness of scholarly communication within and beyond campus.

The second benefit of IR is the enhancement of dissemination and accessi-bility. An IR enables end-users to access the institutional output in both the short and long term. For long-term accessibility, IRs ensure that end-users will be able to access the digital research output in the future, if the institution is committed to providing preservation mechanisms [20]. Based on the study on motivations of faculty self-archiving in IRs, digital preservation is reported as a primary consideration for participation [21]. The accessibility to research work may increase the recognition of institutions and individuals.

The next advantage is research visibility. IR software has a basic publicity

feature. The items held in IRs are discoverable through both IR's own publicity features and other scholarly search engines such as OAIster[9], IEEE Xplore[10] and Google Scholar[11]. Moreover, institutions are able to exploit information in IR about the research authors, such as research grants and relevant publications. Such information may be subsequently used to support marketing activities to attract high-educated staffs, students and funding [19]. Furthermore IRs present the overview statistics of institutional scholarship highlighting the portion of research units in a university and the statistics of item downloads and views by country [22]. Therefore, IRs can be individual and institutional showcases. The increased visibility of research work is one of the most important measures for professional recognition [21].

Finally IRs function as a measure of academic recognition and reward both internally and externally. The quantity and the quality of research output can indicate the academic performance of universities and their members. IRs facilitate information gathering and highlight the overall statistics representing the portion of research units for proper consideration of academic reward [10], [20].

5.2. IR Benefits to Thai Academia

As supported by literature, we posit that IRs could be beneficial to three main groups in Thai academic institutions - individual authors, libraries and the institutions per se.

[9] http://www.oclc.org/oaister/
[10] http://ieeexplore.ieee.org/
[11] http://scholar.google.co.uk/

5.2.1. Benefits to Individual Authors

The potential benefits that can be obtained by the use of IRs are:

- scholarly communication and collabora-tion, leveraging knowledge development and intellectual transfer across and between institutional and national boundaries;
- increased professional visibility as an alternative source to distribute researchers' publications;
- higher value services, e.g. citation facilities, bibliometrics, reference manager, and comprehensive search and navigation on research library;
- assistance to internal users for managing, making available and preserving intellectual properties.
- expansion of the range of knowledge that can be shared to external users and especially within local scholarly communities;
- central archives of researchers' work, facilitating professional assessments for use by steering committees;
- opportunities to increase dissemination and impact of Thai scholarship, being acknowledged internationally; and
- enhanced accessibility of domestic publications, particularly written in Thai.

5.2.2. Benefits to Libraries

IRs can benefit libraries in the following ways:

- IRs change libraries to become *active* disseminators rather than *passive* receivers of intellectual outputs for academic institutions [23].
- The development and implementation of IRs in Thai institutions could allow librarians to deploy their skills, expertise and professionalism for this increasingly important area in Thailand. Further, as IRs become more valuable, the status and standing of librarians will become better recognized and appreciated [24].
- By virtue of being subject specialists, IRs provide a great opportunity for librarians to work more closely with academics from other areas [25].

5.2.3. Benefits to Academic Institutions

The advantages offered by IRs may include:

- purchase cost reduction for the right to access intellectual assets owned by Thai institutions. This is, in particular, high-cost subscriptions to international journals;
- increased visibility and prestige of colleges and universities in Thailand;
- enabling of statistical data to keep track of and analyze research performance;
- long-term curation of all types of scholarly output, including unpublished literature;
- assistance to human resource manage-ment for making strategic plans, training programs and institutional performance assessment;
- the increment of academic credibility to domestic journals, in particular newly introduced ones; and
- an instrument to standardize institutional records in the form of an institutional

curriculum vitae (CV) with the links to the full text of articles.

6. CHALLENGES FOR IR PROJECTS

Institutions invest resources and time in establishing IRs with the expectation that their target users will benefit the most. However, it would appear that community members might not be aware of the benefits of IRs and fail to contribute. In the context of IR, community members play important roles as research owners and end-users. Self-evidently IR projects will not be successful if there is no content contribution from academics by self-depositing their research output or librarian-mediated depositing. The phrase "If you build it, they will come" may not be applicable to IRs, even though there are several benefits for scholars in institutions [26]. The low contribution of community members possibly results from several potential factors. In addition, some issues should be critically considered to sustain IR projects.

6.1. Time Consuming Process

The depositing process seems to be complicated and likely demands time and effort from research authors, who simply regard it as a chore. Differing from other digital projects, work owners voluntarily deposit their work by themselves and assign metadata by themselves. The pure self-archiving seems to be less preferred than librarian-mediated deposit [27]. Even if metadata templates are provided and librarians assist authors to deposit their work, the difficulty in using IR may still remain from the authors' point of view. As a result, it is claimed that IR contributions simply represent extra workloads. Then academics tend not to participate in this service. The context of IR raises questions about information professional's role in metadata management and metadata quality control for digital assets.

6.2. Copyright Management Issues

Another important factor of low IR contribution is copyright concerns. A breach of copyright permissions from publishers makes research authors worried about depositing research output in IRs. Disregard for IR contribution is chosen as a means of avoiding copyright infringement. However, according to the research on motivation of faculty self-archiving in IRs by Kim [21], indicates that academics having more copyright concerns tend to contribute to IRs. It is probably safe to assume that clear copyright management and communication may increase the IR participation.

6.3. Commitment

An IR is a long-term service that requires continuous support from colleges or universities in terms of budget, staff and time. In recognition of the need for sustained effort in maintenance and management, institutions have to make commitments for the long term. Even the cost of implementing IR project might not be high, the sustainable support and commitment are

demanded for ongoing costs such as maintenance, digitization, IR marketing, documenting and training [28]. Further, the support from key stakeholders which are academic authors, publishers, university administrators, etc will be a key to achieve ultimate goals. It is important to bear in mind that the costs are not insignificant and represent a long-term overhead.

6.4. Digital Preservation

Apart from the depositing process and copyright issues, institutions should pay attention to digital preservation issues. The cumulative digital materials in IRs raise concerns about digital preservation strategies across the higher educational sectors. How can academic libraries preserve and ensure long-term accessibility to digital research output in an IR? Although there have been several attempts to design archival standards and strategies for preserving digital objects, these remain inconclusive. Nevertheless proactive management and best practice guides are essential, along with funding for data migration and storage [6].

7. THE FUTURE OF INSTITUTIONAL REPOSITORIES IN THAILAND

IR in Thailand currently is work in progress. Academic libraries are attempting to establish and raise awareness and contributions from university community members. Successful IRs will increase effectiveness and efficiency of scholarly communication and academic information sharing. Consequently, support from internal and external institutions is demanded.

Office of National Research Council of Thailand (NRCT), which is responsible for the national research policy making, the promotion of research work, and research information sharing among researchers, seems to be a critical institution to draw up a national research master plan, manage national research works, and disseminate research output. Consequently, universities and other institutions ought to be able to manage IRs in accordance with both a national and institutional research master plan in order to serve researchers' information needs effectively.

Thai National Research Repository (TNRR) is an initiative to provide access to research output and academic work created by scholars in government offices, universities, and foreign institutes. Even if this project became a research repository, instead of IR; it could raise awareness of the management and dissemination of national research output. Accordingly the concept of IR tends to be more implemented and improved to serve new scholarly communication rather than as a repository of conventional outputs.

In addition to aligning with national research master plans, universities should collaborate with publishers in Thailand and aboard in terms of copyright management issues and publication policy. For example, academic authors and institutions can verify publisher copyright policies from RoMEO [29] online database before depositing journal articles on the web

and in Open Access repositories. However, there might not be any central databases of available copyright policies' publishers in Thailand. This seems to be a major challenge for institutions. The collaboration between publishers and scholar communities in Thailand will almost certainly increase more content contributions to IRs, research output availability, and accessibility. This will support information sharing for further research and development.

The interoperability of IRs is another issue for future IR development. After collecting intellectual assets, individual institutions are required to provide facilities to search, retrieve, and share research work across the academic community. IRs could play an essential role to support information exchange and to prevent any repetition of depositing and searching processes. Additionally, an overview of research information in Thailand can be made available to the general public and will be beneficial for strategic planning and policy-making.

Finally, clear communication and policies from relevant administrative offices enhance better understandings and increase IR contribution and usage. Therefore, academics and relevant institutions can optimize benefits from compliant, well-structured, and accessible research works in IRs.

8. SUMMARY

As a new strategy of research information management, IRs offer enormous benefits to scholar communities. IRs have been recognized as the central tenet of the academic profession. They are also deemed the vital tools for scholarly collaboration worldwide, the viable sources for knowledge management and the key methods for enhancing institutional prestige and visibility. Furthermore, IRs are useful not only for academic institutions, but also for institutional stakeholders (e.g. librarians, academic staffs, researchers and students). As a result, several institutions around the world have increasingly implemented IR projects for managing their own intellectual assets, including Thailand.

In Thailand, IRs have been developed for almost a decade; however, many challenges arise when applying IRs. These challenges include the contribution, usage, and maintenance. The possible solutions may be to establish clear communication and to enhance collaboration between institutional stakeholders. As a result, the successful IR projects could shape the promising future of Thai academia.

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