The Development of Open Access Repositories in the Asia-Oceania Region: A Case Study of Three Institutions

Jayshree Mamtora
Library and Information Access,Charles Darwin University,Casuarina NT 0811, Australia.
E-mail address: jayshree.mamtora@cdu.edu.au

Tina Yang
The University of Hong Kong Libraries,Hong Kong, China, P.R.
E-mail address: yangta@hku.hk

Diljit Singh
Department of Library & Information Science, University of Malaya, 50603 Kuala Lumpur, Malaysia.
E-mail address: diljit@um.edu.my

Abstract:

In recent years, open access models of publishing have transcended traditional modes thus enabling freer access to research. This paper takes a trans-regional approach to examining open access publishing in the Asia and Oceania region focussing on three institutions– Charles Darwin University in Australia, University of Hong Kong, and University of Malaya in Malaysia – reflecting on how each is rising, in its own individual way, to meet the range of challenges that its research communities are facing. Specifically, it focuses on open access and institutional repository development, and traces their development at each of the aforementioned institutions.

The study is based on interviews conducted with staff involved with the development of each repository, and the open access collection in particular, at each of the three institutions. The findings reveal that each of the three institutions is at a different stage of development, with the University of Hong Kong repository ranked at the top within Asia; each has used a slightly different approach toward open access, and used different software to develop their repository.

The authors collate the overall experiences of each institution in open access publishing and repository development, and highlight the successes and failures that each has experienced in reaching the level that they are at today. A series of guidelines, which will be of value to institutions in the region at various levels of development, are presented.

Keywords: Open Access, Institutional Repository, Asia and Oceania, Australia, Hong Kong, Malaysia.

Introduction

Open access has grown rapidly over the past few years. As at 30 June 2014, the total number of articles in the Directory of Open Access Journals (DOAJ) exceeded 1.6 million, PubMed Central had over 3 million articles, and the Electronic Library had a total of over 45,000 free journals. The growth has been in many counts – number of articles, number of journals, number of repositories, and number of countries represented (Morrison, 2014). Today open access has become an important part of the publishing scene.

Open access has been defined as the

> *free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited* (Budapest Open Access Initiative, 2002).

It combines the traditional need for scholars to disseminate their works with the new technologies that enable making these works freely available for public good.

Open access provides the ability to locate and use (within limits) scholarly research materials, such as journal articles, book chapters, dissertations and theses, and monographs. One of the outcomes of the open access movement has been the development of institutional repositories. Institutional repositories are online archives for collecting, organizing and making available electronic versions of scholarly materials (Harnad, 2005). Many universities and research institutions are building up their institutional repositories with scholarly materials.

Open access repositories have also grown greatly over the past few years, with some regions of the world growing faster than others (Pinfield *et al.*, 2014). Many of the lists which record the open access repositories – such as the Directory of Open Access Repositories (DOAR), Registry of Open Access Repositories (ROAR), Confederation of Open Access Repositories (COAR) – all show growth over the years.

The open access movement and institutional repositories have also grown rapidly in the Asia-Oceania region. The economies of many Asia-Oceania countries are strong, which leads to growth in research and its outputs. Even among the developing and less affluent countries, there is greater emphasis on research and publishing. According to National Science Foundation *Science and Engineering Indicators 2014 Digest*, the number of articles published by researchers in Asian countries increased from 89,000 in 1997 to 212,000 in 2011 (quoted from Marwaha, 2014). While the Asia-Oceania region contributed approximately 17% of the open access repositories in DOAR in 2009 (Wani, Gul & Rah, 2009), the percentage is increasing. Similarly, while the repositories may not have been very visible in the past (Abrizah, Noorhidawati & Kiran, 2010), that too is changing.

With the aim of examining the recent developments of open access institutional repositories in the Asia-Oceania region, the authors of this paper, all members of the IFLA Standing Committee on Asia and Oceania, present an overview of open access development in their respective countries and an analysis of the open access developments at their respective universities.

Open Access and Scholarship in Australia, Hong Kong and Malaysia

Australia: An Overview
Background
In Australia, the Federal Government has played a major role in supporting the establishment of institutional repositories in academic institutions. More than 10 years ago, the Government began the first of a series of initiatives, which provided funding to establish open access institutional repositories.

During this same period, the Australian Government introduced the Research Quality Framework (RQF), an exercise to measure the quality and impact of Australian research. Funding was provided by the Government to enable universities to implement the RQF through a number of initiatives from 2005-2010. This included funding "to assist institutions to establish and maintain digital repositories", and to "allow institutions to place their research outputs, including journal articles and less traditional outputs …in an accessible digital store…" (DIISRTE, 2010). A change in Government at the end of 2007 saw the RQF evolve into the ERA (Excellence for Research in Australia) exercise, a method of assessing quality and impact using metrics and expert review (Carr, 2008), but this did not affect the funding previously committed to universities. There was no better way than these initiatives to demonstrate the Australian Government's "commitment to making publicly funded research more readily available" (DIISRTE, 2010).

Australian university repositories
A study carried out in 2003 by the Council of Australian University Librarians (CAUL) revealed that just six Australian universities had developed e-print repositories with a further 10 institutions planning to do so. By 2008, this figure jumped to 37, or 95% of academic institutions that had, or would have established, a repository by the end of 2009, as revealed by a survey carried out by Kennan and Kingsley (2009).

Libraries and librarians run the majority of Australian repositories, so it follows that CAUL plays a major role in their development. From 2009 to 2010, CAUL established programs for universities which played a key role in the extending development of open scholarship and open access institutional repositories in Australia. CAUL continues to provide support as part of its regular activities (CAUL, 2013).

At about the same time, the Australian Open Access Support Group (AOASG) was created with a view to providing advice and support for open access to the wider community. AOASG develops resources, maintains a blog and has an active discussion list (AOASG, 2013) and is proving to be a valuable resource for academic institutions.

Mandates and policies
By the end of 2013, 75% of Australian universities had either introduced an open access mandate, or had a statement supporting open access (AOASG, 2013).

Australia's two major funding bodies have also introduced mandates in the last two years. In July 2012, the National Health and Medical Research Council (NHMRC) became the first funding body to introduce an open access policy (NHMRC, 2012). This was followed on by the Australian Research Council's Policy in January 2013 (ARC, 2013).

The Australian Government has clearly made a significant contribution to the development of open access institutional repositories. In addition, organisations such as ALIA (the Australian Library and Information Association), CAUL, and AOASG and are all supporting open access initiatives in a number of different ways (ALIA, 2014; AOASG, 2013; CAUL, 2013). As of 2014, one hundred per cent of all Australian universities have established an institutional repository, and are committed to open access. Both major Australian funding bodies have mandated open access for any research that they fund. So while the infrastructure is in place, policies written, and the repositories are being filled up with content, there is still much work remaining to be done within institutions, and with researchers themselves, in order to ensure full compliance. This is being undertaken with a mixture of promotional activities, training and consultation, led primarily by library staff working within their own institutions. A good example (see below) of this is Charles Darwin University.

Hong Kong: An Overview
Background
There are eight universities funded by the University Grants Committee (UGC) of the Hong Kong SAR Government, the research funding body for tertiary education in Hong Kong.

Open access (OA) in Hong Kong started with the first institutional repository (IR) in 2003. By 2007, IR or digital initiatives have taken shape at the eight universities (Chan, 2007). At the same time, UGC set up a knowledge transfer working group, and in 2009, it charged and funded all of its eight tertiary education institutions to begin programmes for knowledge transfer (KT). The UGC has committed to provide an annual special allocation for KT to UGC-funded institutions for the 2009-12 and 2012-15 trienniums to enable them to build up their capacity and broaden their endeavour in KT. The new directive and fund resources stimulated the development of many new initiatives, including IR and other OA projects.

Hong Kong Institutional Repositories
Each UGC-funded university library has developed its own IR or digital archive to collect, show case, preserve and disseminate the research output of each institution. The eight IRs and digital archives are harvested and can be cross searched at Hong Kong Institutional Repositories (HKIR). Compared with the IR content (84,865 items) in 2007 (Chan, 2007), the collection size has grown by 300% by the end of May 2014 (338,930 items). Journal article, conference paper and these are the major content.

Mandates and policies
The UGC has made clear its standpoint on OA (RGC, 2014), which states that a Principal Investigator (PI) should assess data archive potential and opportunities for data sharing; and the PI should check whether the publisher already allows full open access to the publisher's version, or the author's depositing a copy of the in the institutional repository for open access.

The Hong Kong Polytechnic University (PolyU) established its OA mandate in 2010. At HKU, the University Libraries has adopted a mandatory OA policy for its staff. MPhil & PhD students are also required to deposit theses in the IR for open access.

Malaysia: An Overview
As at the end of 2013, Malaysia had 20 public universities, 7 foreign university branch campuses, 37 private universities, 20 private university-colleges, and 414 private colleges

(Ministry of Education, 2013). Many of these are involved in research and development (R&D) activities.

Among the these universities, there is an awareness to make valued research outputs openly available to enhance their visibility and provide access to the global academic community. Abrizah (2009) reported that 55.7% of researchers she surveyed had deposited articles into OA repositories. The open access movement in Malaysia had a direct impact on the development of the institutional repository services and in collaboration between scholars. As at the end of June 2014, there were 21 Malaysian IRs listed in Open DOAR, all of which were functional.

However, challenges remain. A recent study by Singeh, Abrizah and Noor Harun (2013) inidcated that while most of the academics endorse the principle of open access and are willing to contribute content to an institutional repository if an opportunity arises or if mandated by their funding institutions. However, they had no or little knowledge of or experience with institutional repositories and were unfamiliar with self-archiving opportunities. Those who agreed to self-archiving see it as being beneficial in the author's life as it enhances visibility and recognition of the author's work, but the main problem encountered is the fact that researchers feel it was time consuming. The major barrier to self-archiving is fear of plagiarism.

Methodology
This study was carried out using interviews. A series of interview questions were devised and collated by the authors to use at the three institutions. The target group was Library staff working with the repository and open access collections at each University. The semi-structured interviews were carried out by the authors through face-to-face and email communication, and in one case supplemented by text messages during May-June 2014.

The findings are summarized below.

Open Access and Scholarship at CDU
The University
Charles Darwin University (CDU) is a young regional university based in northern Australia that services more than 23,000 students on and off campus. In 2014, the University featured in the Times Higher Education's (THE) annual listing of the world's top 100 universities under the age of 50, for the third year running. (CDU, 2014).

Its geographical location ensures that CDU has close links with its near neighbours in Asia, and forms the heart of the wider Australasian region with East and South East Asia to its north, and Australia, to its south.

The Repository
At the university, CDU eSpace, its institutional repository, was set up by the Library in 2009, with support from Australian Government funding.

The software used is Fez-Fedora, with Fez being a PHP / MySQL front end to the Fedora repository software. Fez was developed by the University of Queensland Library (UQL) as an

open source web-based digital repository that allows the integration of metadata for all research outputs including theses and images.

The Open Access Collection
The Open Access Collection of research materials at CDU was established much more recently, in 2011, with the groundwork laid prior to that in consultation with the CDU Office of Research and Innovation (ORI).

The promotion of open access scholarship, and its benefits, and the process of making research available open access at CDU, is done in a number of different ways: CDU Library marks Open Access Week in October by organising an annual seminar for the research and academic community; and an OA award is presented at this annual event to the researcher with the most OA publications in the repository in any given year. In addition, Library staff carry out presentations to various research committees and at research school meetings to help spread the word. A new OA subject guide has been developed with links to key resources. Furthermore, a new Institutional Repository policy, with procedures has been formulated, and which will play a big part in helping consolidate the CDU OA collection.

Generally, feedback from academics and researchers to open access at CDU is very positive with the majority supporting the concept; there are comparatively few scholars who appear to be opposed to the concept. What is becoming increasingly apparent though, is that continual and regular promotion to academics and researchers is required to ensure that correct versions of publications are retained in order to be compliant with Government policies.

Recent Developments
At the end of 2013, a Researcher Identifiers Project was set up with a project officer employed by the Library to work with the RSC in rolling out ResearcherIDs and ORCIDs to all researchers at CDU. Within three months, 50 per cent of the community had set up a ResearcherID account, with a lesser number following on with an ORCID account. The plan is to link them to records in the IR. This project has now been taken over by the Research Office.

Challenges
There are two challenges ahead: immediately, the team is working on enabling Google to pick up CDU publications though the web; and more long term, the aim is to change the culture of academics at CDU to encourage greater participation. This will be a gradual process and continual promotion of the benefits will be required.

The implementation of the Institutional Repository demonstrates the commitment of the University to the open access movement; and that it regards this development as a strategic priority in the direction it should take.

Open Access and Scholarship at HKU
The University
Established in 1912, The University of Hong Kong as the oldest and leading University in Hong Kong, and one of Asia's finest attracts the best local students and the distinguished academics from all over the world. It was ranked as 1st in Hong Kong, 3rd in Asia and 43rd in the world according to Times Higher Education World (THE) University Rankings 2013. There were 27,440 students and 7,000 academic and non-academic staff in 2013.

Open Access - Overview
OA is recognized as a part of Knowledge Exchange (KE) which is one of the university's strategic themes. There is a well-defined internal structure to support and enhance KE activities across campus. OA projects are funded by UGC's annual special KE allocations to eight local institutions. The institutional OA policy is in place and the Libraries has its mandatory OA policy for its staff. OA achievements at HKU are evidenced by the growth of its institutional repository and OA publishing. OA has provided an opportunity for the Libraries to reposition itself and plays a greater role in fulfilling the university's strategic goals. The success of IR and OA publishing is a collaborative effort from all stakeholders.

Scholars Hub- Institutional Repository
The Scholars Hub (The Hub), the university IR was launched by the Libraries in 2005 and managed by the Hub team in the Libraries. It is now the university's Knowledge Exchange Hub. It started as a publication repository but has evolved into a Current Research Information System (CRIS), which includes not only publications but also research information and serves as a vehicle to make HKU authors and their research very visible, with the goal of increasing all forms of collaboration. There are about 152,309 items by 2012-2013. Journal article, conference paper and PG thesis constitute 87% of the entire content.

ResearcherPages (RPs) includes a range of information on a researcher such as Profile, Publications, Network of collaborations, External relations, Patents, University responsibilities, Grants, Bibliometrics, etc. RPs allow industry, government and academia to find an HKU expert for contract research, consulting, and collaboration. After initial creation by Hub administrators, researchers can further sustain and enhance their own RPs. The RPs once created are being enhanced constantly. Recently, ORCID accounts were created for all HKU Professoriate staff and linked to their RPs.

One big challenge we have encountered is the difficulties in obtaining the IR data from different sources including the individuals, university and external publishers, and the obtained data may be erroneous and inaccurate which need constant verification and corrections.

The Hub team won the HKU Knowledge Exchange Award (Non-Faculty Unit) in 2012 for their outstanding achievement. It was also ranked by Cybermetrics in February 2014, as No. 1 IR in Asia and 57 in the world (Cybermetrics Lab, 2014).

OA publishing
Agreements have been made between HKU and several publishers, which allow HKU authors in some cases to publish in open access journals for free, and in other cases at a discount. The publishers include Springer Open (2010-2012), Sage Open, Public Library of Science (PLoS), BioMed Central (BMC), etc. However, there are still doubts about the quality of OA journals due to the lack of a sophisticated peer-review process and scholarly impact compared with the traditional subscription-based academic journals. It is not uncommon that researchers tend to search and read OA journals but feel reluctant to have their articles published in them.

Success
Recognizing the value of knowledge exchange and OA as one of the KE key indicators have increased the incentive for researchers to deposit more items in IR. The KE fund and new KE

organizations have ensured the sustainability of OA development.

OA helped reposition the Libraries in a role of high strategic importance at the University. While the Libraries plays the leading role, the OA development largely replies on the collective efforts across campus. It is important to involve some high-profile academics and administrators in the OA advocacy. They are the OA activists and can exercise significant influence on their peers.

Future
The Libraries is in the process of getting a Research and Data Archive Librarian to be responsible for the development of the university data archive.

The Research Council of UK (RCUK) revised its Open Access policy in April 2013 that requires researchers "publish any peer-reviewed research papers which acknowledge Research Council funding in journals that are compliant with the RCUK policy on Open Access". It has set an example for Hong Kong UGC to consider adopting an OA mandate for its funded research. If this comes true, it will have a significant impact on the open access culture at the UGC-funded universities.

Open Access and Scholarship at UM
The University
The University of Malaya (UM) is the oldest and leading university in Malaysia. It was established in Kuala Lumpur in 1962, although its roots go back to the establishment of King Edward VII College of Medicine in Singapore in 1905. It is a multidisciplinary research university today with more than 27,000 students (of which about 4,000 are international students) and 1700 academic staff.

The Repository
At UM, the institutional repository came about as one of the new initiatives of the Library influenced by developments in other countries. It started when the UM Library had a workshop on Eprints attended by systems librarians from various local academic libraries, which led to the establishment of the institutional repository in 2007. The repository has developed over the years, and now has approximately 30,000 items. It is placed under the Information Systems Division in the University Library.

Policies and Support
The repository is given support by the university top management, even though it is not listed as a strategic priority. Funds are made available, but they have be budgeted for well in advance and competitively bid for.

Collection
The repository has a number of sub-repositories, with collections (as mid-2014) being approximately as follows:

Table 1
Univeristy of Malaya Institutional Repository Collection

UM Research Repository (for research-based items)	7,097 items
StudentsRepo (repository for students' theses and dissertation)	3,612 items
CommonRepo (repository for law gazette and newspaper clippings related to customs or religion matters)	4,926 items
UM Memory (digital library of photos taken in various events at University Malaya)	4,472 photos
MyManuscript (old manuscripts)	179 manuscripts
UM News (recent newspaper clipping regarding University of Malaya)	9,462 news items

and increasing.

The key section is the UM Research Repository, which has 7097 research-based items. These items include full-text articles, posters and slide presentations. This is growing rapidly in view of UM's emphasis on research and publishing.

The overall collection is also growing, despite there being no specific mandate by the university. This is increase is due to promotion activities by the UM Library, including roadshows, encouragement during information skills sessions, and by researchers doing self-archiving.

Staffing
There are four staff members involved with the institutional repository, but they also have to handle other tasks, e.g. IT acquisitions, and other day-to-day tasks, and serve on various committees. They are responsible for the release of documents into the IR, after they have been deposited by staff or students.

Usage
The users of the institutional repository fall into two categories:
Academic staff and researchers who are keen on self-archiving, especially those who are doing intensive research, and.

Students who are doing research (especially postgraduates) and are keen on self-archiving, although many do not have the products of research to deposit as yet.

Unfortunately, there are some who are reluctant to use the facility as they are taking a wait-and-see attitude.

Challenges
In the development of the IR, there have of course been many chllanges. The main hurdle has been academicians who feel that depositing their work in IR increases their workload, as they already have to submit to another university database, the UM Expert, which basically lists the expertise and publoicatins of the staff for outisders to view. Efforts are being made to link the two databases, but intellectual property rights remain to be overcome.

Future Plans
Future plans call for increasing the visibility of our repositories and improve the repository ranking among public universities in the country as well as internationally. Among the challnges are the technical aspects and increasing the copyright clearance of some items.

Critical success factors
In reflecting upon the development of the IR, one factor that can enhance the growth of the IR is the need for a top-down approach, where a specific mandate should be made to ensure all academic staff to lecturers contribute to IR.

Summary
OA at the three institutions
The above survey findings reveal that OA has been established and developed at the three institutions with remarkable progress.

The institutional repository is the focus and represents the major achievement of OA development at each institution. Each IR is at its own developmental stage and differs in content, size, software and approach. While they share a basic purpose to collect, showcase the institutional research output and make it more visible to the general public, HKU's Hub has gradually evolved into a Current Research Information System, including ResearcherPages (RPs) and links to staff's ORCID accounts and serving as a vehicle to increase various research collaboration. CDU's eSpace is taking a similar course by rolling out Research IDs and ORCIDs to its researchers. While one IR archives all publications at HKU and CDU, UM has three IRs, each with a distinct collection. IR is encouraged at three institutions with different degrees of policy, funding, staffing and organizational support. OA at CDU is blessed with the ARC & NHMRC mandates, while at HKU, the knowledge exchange, the IPR policy and the well-defined OA organization have provided a solid foundation for its OA growth.

Unanimously, the Library at the three institutions initiated the IR and is responsible for its development, management, promotion and coordination. An IR team (HKU) or library staff (CDU and UM) are dedicated to IR projects with additional support from relevant library staff. Although the Library plays a leading role, the success of IR relies largely on the collaborations among all stakeholders such as the internal and external data sources, administrators, individual researchers and software partners.

In addition to IR, HKU staff are also encouraged and subsidized to publish their articles in OA journals from several publishers.

The common challenges facing OA development also apply to the three institutions. There is usually a process of change of perceptions about OA from disapproval, suspicion to acceptance and appreciation. Library's proactive promotion has contributed greatly to this shift. But still, there are barriers that impedes OA progress. Typically, they include researchers' concerns about the extra workload resulting from depositing their publications in IR (UM) and the quality of OA journals (HKU), and lack of OA mandates from research funders or institutions, etc. While IR is supported by various data sources (HKU, CDU), the accuracy and consistency of the data received need to be constantly verified and corrected (HKU).

While the future of IR at the three institutions has slightly different focuses in line with their own state of development and targets, they all aim to encourage greater participation, foster an open access culture and eventually increase the institutional visibility.

Guidelines
Drawn from the success and failure in OA development at the three institutions, the following guidelines may be of value to institutions in the region at various levels of development:

1. Position your library at the frontline responsible for the OA development, administration, coordination and publicity.
2. Set a detailed rules and policies before setting up your IR.
3. Make your IR easy for academics to deposit publications and flexible for them to edit information and choose what to show or hide.
4. Talk to your institutional administrators about the need, value and benefits of OA to get their support.
5. Find a strategic position for OA at your institution which may help justify its funding, staffing and organizational support.
6. Reach out to the academics via different communication channels such as seminars, emails, roadshows, and phones to cultivate a broad understanding of OA.
7. Develop a circle of OA advocates including administrators, librarians, academics to exercise the positive influence on their peers.
8. Develop a good team consisting of dedicated administrators (librarians who are responsible of promotion, editing and provisions of metadata), technical team and depositors.
9. The technical team should have a good command of Unix/Linux operating system. At least two or three staff should be from an IT background.
10. Recognize and award outstanding OA achievements and their contributors.
11. Develop an institutional OA policy or mandate to encourage and enforce OA compliance.
12. Join other regional, national or international institutions, libraries, research funders, publishers to develop OA collaborations, policies and practice guidelines.

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