THE ESTABLISHMENT OF INSTITUTIONAL REPOSITORY : A BRIEF COMPARATIVE STUDY BETWEEN THE NATIONAL UNIVERSITY OF MALAYSIA AND THE UNIVERSITY OF LIVERPOOL

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ABSTRACT
The implementation of an institutional repository (IR) has never been an easy task since there are challenges that need to be addressed in the pre-implementation process. There are various factors that can interfere with the smooth development of the IR. Awareness, budgeting, technology and human factors such as staffing and depositor's behaviour all become part of the challenges. Even with thorough planning, there is no guarantee that the IR will work smoothly as there are various post-implementation issues awaiting. As a result, institutions must provide solution plans to encounter all these challenges. This article is a result of a brief comparative study on the challenges and issues experienced by the National University of Malaysia (UKM) and the University of Liverpool in the establishment of IR. The discussions are centered on issues such as depositor's behavior, management, access and sustainability.

Keywords: Universiti Kebangsaan Malaysia Institutional Repository; e-ReP; University of Liverpool.

INTRODUCTION

Archives, libraries and museums are manifestations of cultural institutions. Dempsey (2000) upholds these collections as ''memory institutions'' due to its nature of storing the memory of communities, institutions and individuals, scientific and cultural heritage. According to Rothery and Bell (2006, p.123), institutional repositories or IRs have become one of the major instrument in research intensive institutions. They added that universities and research institutions all over the world are working on research and development of digital resources and learning materials in the form of e-repositories.

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From a Malaysian's perspective, Zuraidah (2010, p.110) noted that all institutions are looking for new and creative way to stay competent in the fast changing information and technology (ICT) industry. She added that "with ICT, information that was traditionally kept in paper format can be digitised and stored in the system and made publicly available. The idea of providing and presenting information via electronic means and formats truly fascinates managers of information agencies worldwide. Presently, cultural institutions are actively connecting their collections to these emerging knowledge networks. They are creating innovative network services based on digital surrogates of their current collections in a rich, interactive digital environment".

IRs' main goals are to be a reliable platform for collecting, preserving and disseminating in digital form, academic and intellectual works. The four main objectives for having an IR in the university environment are:
1. to establish global access to university publications,
2. to create a "One-Stop Centre" for information on academic publications, and
3. to preserve the academic heritage through digital content.

THE IMPLEMENTATION
The idea for the IR implementation at the National University of Malaysia (UKM) came about in 2006 whilst preparing the research reports for the Research University Audit. A special committee was formed and given the responsibility of preparing the reports. The Library was included in the committee and was given the task of preparing the report on academic publications. Whilst doing this, the Library struggled to complete the task due to multiple challenges. In the worst case scenario, the Library itself did not hold complete collection of their academicians' publications. At that period in time, information on academic publications was scattered in various resources. The the Library had to hold numerous meetings with various parties just to find out about the information they possess.

While preparing the report on academic publications, the committee suggested that it was the right time for the university to have a "one-stop" centre for all information on academic publications. Again, a special committee on IR was formed with the PPA as the secretariat. The core member of the committee is the Centre for Information Technology, Centre for Research and Instrumentation Development (CRIM) and the Library, and representatives from faculties joined the meeting on a temporary basis. As expected, there were clashes of opinions among the committee members. For instance the academicians wanted a system that is similar to well-established e-journal database. At the same time, copyright and other principles of information management become the main concern for

the librarians. Meanwhile, the IT personnel were in two minds whether to hire private system specialists or to opt for in-house development.

The University of Liverpool (UoL) experienced a similar situation when they began their IR project. The establishment committee obtained full backing which includes funding from the University Research Committee and the Information Services Committee. The University has set the objectives for the establishment as follows:

1. Build an IR which would provide increased access and visibility to the research outputs of UoLworldwide.
2. Provide a means of showcasing the research outputs of UoL in order to enhance its prestige and increase the citation rate of UoL staff.
3. Provide a one-stop shop for all to access the research output of UoL.

According to Jackman (2007, p.36), although the project has won the confidence from a select group of senior academics, the majority still need to be made aware of the benefits of an IR. Within the early establishment period, UoL successfully maintained a series of dialogues in order to develop a system that will serve the needs of the academics.

INTRODUCTION OF eREP

The committee then decided that UKM need to develop a new system for IR with all the functionality needed by the university, a multi-tasking system that has a role as "one-stop centre" for all information on academic publications by UKM academicians. The library and PPA was given the responsibility to design the system specification before handed it to The Centre for Information Technology for the technical development. The Centre for Information Technology took approximately three months to come up with a prototype and series of meetings was held for system improvement before it ready for the pilot phase.

In September 2007, the system was named e-Penerbitan and went its pilot phase until December 2007. During the pilot phase, the academician was given an option whether to register their publication under SMK (UKM Staff Information System) or they can venture into new experience by registering their publication in e-Penerbitan. The library was given the mandate to become the administrator for the system, while The Centre for Information Technology will continuously work on the technical aspects. In 2009, e-Penerbitan being renamed and officially known as eRep.

In contrast, UoL started their 'Research Archive' pilot project with small scale audiences. They pre-identified 9 academic departments with difference academic

disciplines, and those faculties adopted to represent all faculties in the pilot project to learn and study the issue and challenges. The pilot faculties can freely decided on their content submission, this submission later being retain as content contribution practice after the pilot project ends. In 2008, eRep was given the mandatory mandate by the university, and it becomes compulsory for every academic staff to deposit their academic works into the system. In garnering the support from academics, library staff approached them via effective advocacy strategy.

TECHNOLOGICAL ASPECTS

Nowadays most of the IRs was developed using Open Sources software such as Eprints, DSpace, and Digital Commons (Chapman, Reynolds and Reeves, 2009, p.311). Majority of Open Source software has the capability to support various formats of information, such as audio, image and video, and commonly text documents. The University of Liverpool decided to "follow the crowd" by opted for open source initiatives software. UoL has chosen Eprint as the software for their "Research Archives". In contrast, Open Source software was rarely in discussion at the time the eRep pre-establishment process, furthermore, UKM never had any experience in developing information management system based on Open Source software. Based on eRep multi-tasking functionality, it is easier to start from scratch and the Centre for Information Technology confidently suggested that they are capable of developing a well established system.

eRep was developed using the programming software ColdFusion MX7, and its database management was supported by Informix and MySQL, the software enable the database to manage its saving and uploading process. The Center for Information Technology has decided that the suitable server for eRep is Dell PowerEdge 2850 which operated by Intel Xeon 2.8GHz as its Central Processing Unit (CPU). The server supplies 2GB memory and has the capacity of 68.24 GB on its Hard Disc. The server for storage and database also using the server from the same series, however its Central Processing Unit (CPU) is on 2X Intel Xeon 38.GHZ with 4GB memory and bigger Hard Disc capacity at 270GB. The system took almost six months to be fully operated and undergo its pilot phase, however the ongoing upgrading process is still continuing as it need to suit its community needs and to ensure its sustainability.

THE ROLE OF LIBRARIANS

As the key player in the establishment committee and the administrator for eRep, UKM library played major roles to ensure that eRep can be accepted by the academic section in the university. The library has put a lot of effort in organizing numbers of programmes distinctively to ensure that eRep is a successful project. The 'Road Show' on eRep was launched in parallel with the UKM library outreach programme. As a result, series of trainings, workshops,

meetings, talks and advocacy on eRep was successfully conducted and in addition, the library was in demand for advance advocacy and training sessions for the faculties.

The UoL's librarians also maintained the similar roles in the implementation of the university's IR. Looking back at the establishment history, the 'Research Archive' was initiated by the library, and the University Librarian, Phil Sykes has been successful in clarifying the benefits of an institutional repository to university management, and as a result, they agreed to funding the establishment (Jackman, 2007,p.35). The university also agreed on the appointment of a librarian dedicated to the administration of the IR, known as Research Archives.

ADAPTATION AT THE FACULTY LEVEL
In its early introduction, the task to inculcate the awareness and encourage faculties to use the repository was very challenging. The introduction of "IT based" system did not fall easily with some quarter of the "veteran" academicians, basically due to their time constrain between teaching commitment and ample time to learn a completely new repository, and as beginners, things are always too complicated. The promotion and advocacy campaign was an ongoing process before and after eRep went its pilot phase, as it is important to inculcate the awareness and encourage the faculties to use the repository. According to Jackman (2007,p.36), advocacy campaign is adopted by many universities as effective method to raise the awareness of the IR and to ally fears on depositing in an IR. As for UoL, in their early stage of implementation, the library had to go through a series of advocacy sessions in order to convinced the academics that the IR will offers tangible benefits to them. The UoL are wisely enough to assign a senior academician to act as the "Ambassador" and plays a major role in gaining the support among the peers.

DUPLICATION AND TIME CONSUMING
The issue of time consuming in depositing works in IR also becomes one of the concerns in UKM. Besides Research Archive, authors were already submitting their works into other databases, so they believe that depositing the same works in eRep is the matter of duplication of effort and time consuming. As the system also required all the full-text or publication proof to be uploaded as Pdf (Portable Document Format) format, the academician and their supporting staff need to be trained on how to convert their files into Pdf. However the Centre of Information Technology provided the converter software which can be downloaded from the system. The user friendly software is called doPDF. Similarly, UoL also had to dealt with the same issue regarding the reluctance of prospect depositor due to duplication and time consuming. In practice, UoL academics already bounded to a university regulation to update the information on their academic contributions into another system at university level.

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SELF-ARCHIVING

As described by Chan, Kwok and Yip (2005) it was never an easy task to drive the universities through self-archiving. UKM was having the same experience as the system did not come easy with the academician, in the early stage, most of them shown some reluctance and the library faced various challenges in handling with it. As the system requires all depositors to upload the full-text, there are issues on unavailability of scanner machine and conversion software for digital born publication. The Library had to joint force with UKM Centre for Information Technology to solve the problems, while The Library focuses on gaining the confident and promotes the system to the academicians and facilitates the faculties' members on registration process, UKM Centre for Information Technology put their effort in providing sufficient technical equipments for every faculties. While experiencing the same situation, UoL approached self-archiving leniently, as the mandate for depositor was on voluntarily basis, the librarians were the one who deposited the works on behalf of their academic colleague.

CONTENT

Many academic institutes around the world shared the view on the importance of academic heritage digitization for future research and effectively managing it (Hayes, 2005). Academic content is the base of an IR, most repositories set their content selection as published materials or post-print such as journal articles, seminar papers, books, chapters in books or proceedings. However, some still consider their grey literature or pre-print such as manuscripts, working papers, thesis, dissertation or technical reports should be part of the IRs content.

Jackman (2007,p.36) said that some IR administrator agreed that the repository should accept every type of academic works that the academician wanted to submit, while others emphasized there should be limitations. However on any situations, with or without content limitations, the faculties as the content contributor must be aware of it, as according to Kim (2006), the amount of content contribution is the measure of IR usability and it will indicate whether the IR is a success or not.

The content in eRep is limited under 15 categories which include pre-print and post-print materials, and base on system-generated data. Until 1st July 2011,the overall numbers of academic works that has been deposited into eRep were 23954. The publications were dated from 1991 until 2011. The content in eRep are based on item type as below;
1. Books
2. Chapter in Books
3. Monographs

4. Journal Articles
5. Proceedings
6. Technical reports
7. Seminar Papers
8. Book Review
9. Translated Articles
10. Occasional Publications
11. Popular writings
12. Translated Books
13. Teaching Package
14. Films / Videos/ Slides/ Multimedia
15. Others

Although the numbers were encouraging, it took lots of effort from the library and the university to encourage the contribution from the academic staff. The same issue also appears in several studies related to the response by academic staff, notably Bjork (2005), Chan (2004), Foster & Gibbons (2005) and Pelizarri (2005).

University of Liverpool (UoL)'s Research Archives has divided the publications categories into two groups, Research Outputs and E-Theses. In UoL view, flexibility is important for the IR to serve the multi-disciplines academic department. The approach also based on the believe that flexibility will encourage a close relationship with the faculties as it is important for sustainability of content contribution in the long term. As on 1st July 2011, UoL's Research Archives contains 699 publications, which encompass various publications as below;

1. Article
2. Book Section
3. Monograph
4. Conference or Workshop item
5. Book
6. Thesis
7. Patent
8. Review
9. Software
10. Map
11. Report
12. Discussion
13. Pre-Submitted Thesis
14. Other

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In term of submitted digital format, at the moment eRep solely accepting digital content is PdF format. However, recently the administrators agree to revise the procedure and considering accepting variety of digital formats. Uol however already set up their IR to receive more digital formats, at the moment Research Archives can accept digital formats as below;
HTML
1. PDF
2. Postscript
3. Plain Text
4. Rich Text (RTF)
5. Microsoft PowerPoint
6. Microsoft Excel
7. Microsoft Word
8. Image (JPEG)
9. Image (PNG)
10. Image (GIF)
11. Image (BMP)
12. Image (TIFF)
13. Video (MPEG)
14. Video (QuickTime)
15. Video (AVI)
16. Video (WMV)
17. Video (MP4)
18. Video (MP4)
19. Video (Flash)
20. Video (AVCHD)
21. XML
22. N3
23. RDF/XML
24. Archive (BZ2)
25. Archive (TGZ)
26. Archive (ZIP)
27. Audio (WAV)
28. Audio (MP3)
29. Audio (OGG)
30. Audio (FLAC)
31. Audio (WMA)
32. Other

PUBLIC ACCESS
Global access to academic heritage might contribute towards the improvement of a university prestige among its peers (Kiran, & Chia, 2009). Realizing the need for global access, UKM decided to open its IR for wider access, however, with
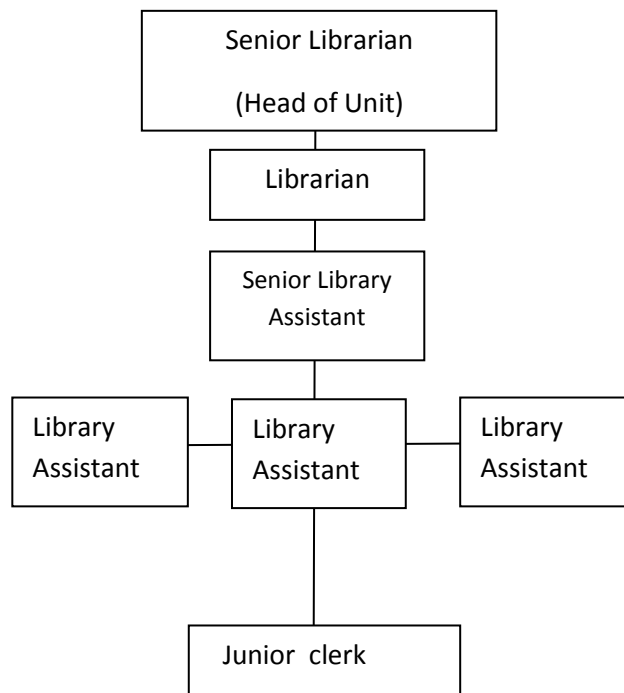
limited bibliographical information, full text can only be access by UKM staff with valid username and password. Another low key in eRep access capability is its content is not indexed by Google or GoogleScholar. The University of Liverpool in other hand is available for worldwide access with some boundaries due to their copyright policies. In contrast, University of Liverpool's Research Archives are working open access initiative platform, it enjoys freedom of access as its content are searchable and accessible globally.

IR MANAGEMENT

1. Human Resources/Staffing

Human resource management is something to look about; there are significant needs for additional post in the administrator team, which encompass the librarian and library assistant. Currently the system is managed under Archives, Gallery and Special Collection (AGSC) Unit, which is led by a Senior Librarian, which recently taking the portfolio and did not involved in the establishment team and it took her lots of effort and time on studying the technical aspect of the system, fortunately, she is assisted by a librarian who has brief experience from the middle of the establishment project and involved in the educator team. There are one senior library assistant, three library assistants and a junior general clerk supporting the service, however they all having a rough days in managing working task between supporting the eRep administration and other library routine works such as acquisition, indexing, cataloguing and others. In other words the staff was forced to be multi-tasking. Currently the organizational chart for the unit is as below;

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                    ┌──────────────────────┐
                    │   Senior Librarian    │
                    │                       │
                    │   (Head of Unit)      │
                    └──────────┬───────────┘
                        ┌──────┴───────┐
                        │  Librarian    │
                        └──────┬───────┘
                    ┌──────────┴───────────┐
                    │  Senior Library       │
                    │  Assistant            │
                    └──────────┬───────────┘
     ┌─────────────┐  ┌────────┴────────┐  ┌─────────────┐
     │  Library     │──│   Library        │──│  Library     │
     │  Assistant   │  │   Assistant      │  │  Assistant   │
     └─────────────┘  └────────┬────────┘  └─────────────┘
                        ┌───────┴────────┐
                        │  Junior  clerk  │
                        └────────────────┘
```
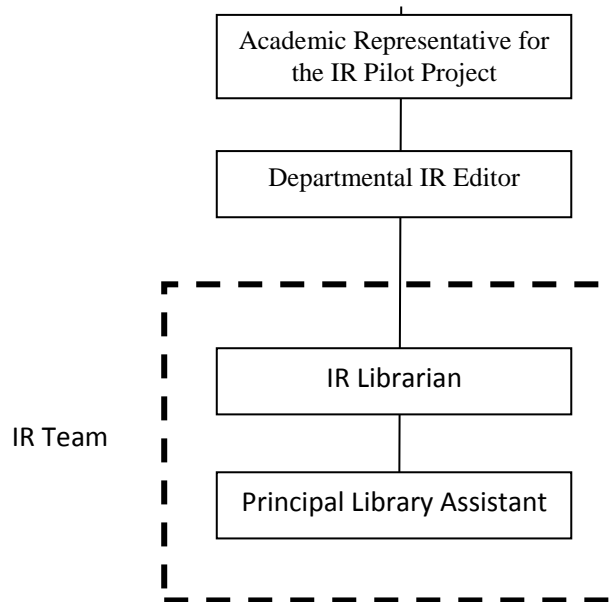
Current Agsc Organization Chart

Under the Malaysian Standards, MS ISO 9001:2000, each library staff must attend at least two training programme conducted by the university or the library, which means they had to leave the office, normally each member of staff attends four training programme, either selected by the library management or with their own request. As the library is in short number of staff, this somehow affected the services, especially in delivering immediate action on enquiries from the eRep users.

The organizational chart for UoL went for simplicity which is parallel to its nature of work; however, they really optimize the human power that available. There are four tiers of administration structure for IR management as below;

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          ┌─────────────────────────────┐
          │  Academic Representative for │
          │      the IR Pilot Project    │
          └─────────────────────────────┘
                         │
          ┌─────────────────────────────┐
          │     Departmental IR Editor   │
          └─────────────────────────────┘
                         │
   ┏━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━┓
   ┃      ┌─────────────────────────────┐ ┃
   ┃      │        IR Librarian          │ ┃
IR Team   └─────────────────────────────┘ ┃
   ┃                   │                   ┃
   ┃      ┌─────────────────────────────┐ ┃
   ┃      │  Principal Library Assistant │ ┃
   ┃      └─────────────────────────────┘ ┃
   ┗━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━ ━┛
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Current Research Archive Organization Chart.

2. Publicity and Advocacy

The library might believe that they already done all necessary method in promoting the eRep within the campus. The methods include road-shows, web-based announcement and demonstration session in faculty meetings. However, as the system is in ongoing upgrading process, the information that they delivered in the past road-show need to be updated. Unfortunately it never be done and the library tried to counter it by deliver the latest information via library and UKM webpage. According to Papin-Ramcharan and Dawe (2006), the poor response on self-archives by the academician might be as a result of low system understanding and awareness due to ineffective publicity and advocacy strategy. Uol has "planted" a representative among the academician to play a promotion and advocacy role, this particular role effectively run by Professor Ann Jacoby. From the library part, The IR Librarian, Shirley Yearwood-Jackman consistently published publications on IR that available online and with her IR team member, they conducted mobile talks for each divisions in UoL.

WHAT CAN WE LEARN FROM THE UNIVERSITY OF LIVERPOOL ? SUSTAINABILITY

The crucial part after the establishment is sustainability. There are numbers of recommendations approaches for the library in order to maintain the usability of the IR. Content curation must become an ongoing process to guarantee the usability value of the current content in the future. As there are possibilities for

the institution to refocus or increase their IR functionality, the various experiment is in need and perhaps willingness to learn from both success and failure will contribute to the successful sustainability.

The engagement of all parties related to IR is very important, every major players in the earlier establishment team must ensure their continuity in contributing relevant input especially within their expertise, for instance the library will continue the research on IR usability, user behaviour or digital preservation needs. From the technical aspect, the Centre of Information Technology can play their roles in technological watch; they must be prepared for alternative solution in case of Technology obsolescence. UoL adopted partnership approach, in which academics take part –ownership of making decision about on how the IR will function in their academic unit. In the process, representatives from the academics cluster will work closely with the Uol IR team for approximately 6 month. During that period, the representatives will receive advocacy and give their contribution in developing the partnership policy between the IR administrative and their faculty.

PUBLICITY AND ADVOCACY STRATEGY
Advocacy considered as one of major tools to deliver the value of the IR to the potential depositors. The University of Liverpool set the executives management and head of departments as target market that need to be reach. They believe that garnering the support of those influential personnel is important for close partnership that will contribute towards the development of services that based on needs of research community.

The Library can effectively deliver the value of IR in many ways, for example using their internal communication through meetings, bulletins, newspaper or circulars. The wider communication such as through university gazette, official website, bulletins or campaign will contribute more. In that sense, perhaps UKM can utilize all channels which may include going on-air and disseminate the information through out the whole campus via Radio Midas, UKM's own radio station.

In order to gain the confidents and delivering the information effectively, the library should carefully document the information by outlining the benefit of the IR to the university, perhaps by emphasizing more on the academic development and preservation. The follow up approach should be the promotion strategy through workshops, trainings or any other "hands-on" programme.

MANAGING COPYRIGHT
Library must ensure that all the IR users are acknowledged and be knowledgeable about the university's intellectual property policies and ethics

policies. The legal precaution must be taken starting from the beginning of the implementation; university policy on copyright should be in place. If necessary, depositors and user should be able to access the policy online, for example University of Liverpool provided their legal services including copyright, the information available at http://www.liv.ac.uk/legal/copyright/index.htm. In practice, as according to its policy, All depositors will be required to agree to a click through licence, or sign a written licence in order to give permission for their work to be held in the repository; to provide for the distribution of their work, and to allow ongoing preservation of both their work and the related metadata. Upon receiving any complaint or detecting any case of potentially breach of copyright, the IR team will immediately remove the item from the public access pending further investigation.

UKM should implement the same approach by making their legal services accessible, especially regarding copyright. For eRep, the copyright requirement should also made available, this is what University of Liverpool's Research Archive trying to do, although that particular page is still under construction as found on 8th September 2010.

Library as the IR manager can create online copyright form for authors to deposit content in the repository. In order to create a proper copyright form, the library can seek advice from the university's lawyer or legal advisor to draft, review and work together to craft suitable terms for the copyright form. As many authors believe that their works should well protect under copyright act, the Library of the university must initiate sufficient measures that can serve the needs. Based on Central Michigan University experience, they provide a copyright agreement from the author as the copyright holders on approval on handing the publications by the repository (Helwig, 2009).

However, not every original author is the copyright holder, some may turned over the copyright to the publisher, and appropriate approach must be taken to handle this kind of situation. Repository must well identified this case and restricted access to the publication may be needed, at least until the permission from the right copyright holder be granted.

CONTENT SUBMISSION
The most effective method to counter the poor content submission from the faculties is by establishing mandatory policy as institutional mandate. Based on Suber (2006) findings, institutions with mandatory policy have high volumes of content in their IR which also largely self-archived; in contrast, the institution with voluntary policy appears to have low level of content contribution.

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The situation in UKM and University of Liverpool can be taken as direct examples, with mandatory mandate, within approximately 3 years after its establishment, eRep (UKM) contains 16,059 records, while voluntary basis Research Archives (UoL) only manages to accumulate 623 publications data after its establishment in 2008, there should be written policy based on university mandate.

However, the decision to establish mandatory policy or voluntary should be taken according to the needs and capability of the institutions as the IR will serve their needs. According to Genoni (2004, p.302) "These repositories are, after all, designed to serve the needs and interests of the institutions that support them, and their content should be developed with local requirements foremost. Just as academic libraries would not look to international standards to determine the content of print collections, nor should they look to such standards to dictate the content of an institution-based repository. It may be that some form of acknowledged "best practice" will emerge with regard to content selection, but each institution or library must be responsible for selecting material that suits its own needs.".

UoL practices content submission as below;

1. **Self-Archive Deposit**
   Depositors complete the submission procedure and upload the full-text document into the repository themselves without any assistant from the library.

2. **Assisted Self-Archive Deposit**
   The assisted self-archive deposit process allows depositors with limited time to complete a reduced number of fields in order to submit their work to the repository. Faculty's supporting staff or library staff will complete the submission process on behalf of the original author.

3. **Mediated Deposit**
   The mediated deposit service must be negotiated with the Institutional Repository Librarian. The Library or any third party will be responsible for completing the entire submission form. This service is aimed at helping depositors who have extremely limited time to deposit their research output in to the repository. Depositors opting to take advantage of this service will be required to sign a standard deposit agreement in order to give permission for IR staff or their agents or an authorised individual in the depositors department, Faculty, division or some other related unit to complete the deposit process on their behalf.

4. **Bulk Deposit**
   The Bulk deposit service provides for the submission of large amounts of usually retrospective content. The Library IR team or any authorized

third party will be complete the submission procedure on behalf of the original author.

USER SUPPORT

Information regarding policies, procedures or any related information regarding IR must be available for reference. It is advisable to provide all information online, and it would be the best to make it available not just on the IR website, but also on each university's WebPages, for examples The Library, Faculties, Centres of Excellent, Academic society, institution official website (university website) or Research Departments. While policies and procedures must be presented in original format, any other related information can be presented in a form of *Frequently Asked Questions (FAQ)* document and *Best Practice Guide*. Any effort by the IR system to assist its user to use the system may increase its usability and effectiveness. UoL Research Archive for instance equipped its IR with email alert, Users may set up email alerts or RSS feeds to be alerted to new content.

CONCLUSION

The implementation of IR never been an easy task, there are challenges that need to be address in pre-implementation process. There are various factors that can disrupted the smooth development of the IR, awareness, budgeting, technology and human factor such as staffing and depositor behaviour are the potential challenges. However, even with thorough planning, there is no guarantee that the IR will smoothly work as there are various post-implementation issues waiting. As a result from diversity of working culture, collections and background, Institutions must be prepared to encounter unique challenges that never been experienced by other institutions. Both UKM and UoL has similar and unique challenges in IR establishment.

REFERENCES

_____. (2009). Institutional repositories in Malaysia : the copyright issues. *International Journal of Law and Information Technology,* 17(3), 268-281.

Abrizah, A. (2009). Faculty's awareness, self-archiving experience and contribution to university's Institutional repository. *Malaysian Journal of Library and Information Science,*14(2),

Abrizah, A. (2010). Piloting an institutional repository at a research-Intensive university: strategies for content recruitment and the role of the library. *International Conference on Digital Libraries ICDL 2010,* New Delhi, India, 23-26.

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Allard, S., Mack, T.R., & Feltner-Reichert, M. (2005). The librarians' roles in institutional repositories: a content analysis of the literature. *Reference Services Review*, 33(3),325-336.

ARL Digital Repository Issues Task Force. (2009). *The research library's role in digital repository services: final report of the ARL digital repository issues task force*. Washington, DC: Association of Research Libraries.

Association of Research Libraries.(2009). *The research library's role in digital repository services* : final report of the ARL digital repository issues task force. Retrieved from http://www.arl.org/bm~doc/repository-services-report.pdf

Bauer, C. (2005). Institutional repositories. In N. Courtney (Ed.), *Technology for the rest of us*. Westport: Libraries Unlimited.

Bell, S., Nancy, F. F., & Susan, G. (2005). Reference librarians and the success of institutional repositories. *Reference Services Review,* 33, 283-290. Retrieved from https://urresearch.rochester.edu/handle/1802/1965

Bjork, B. (2004). Open access to scientific publications: An analysis of the barriers to change. *Information Research,* 9(2). Retrieved from http://informationr.net/ir/92/paper170.html

Burk, A., Muhammad Al-Digeil, Dominic, F., & Jennifer, W. (2007). New possibilities for metadata creation in an institutional repository context. *OCLC systems & services: International Digital Library Perspectives* 23(4), 403-410.

Chan, Diana L.H., Kwok, Catherine S.Y., & Yip, Steven .K.F. (2005). Changing roles of reference librarians: the case of the HKUST institutional repository. *Reference Services Review*, 33(3), 268-282.

Chan, L. (2004). Supporting and enhancing scholarship in the digital age: the role of open-access institutional repositories. *Canadian Journal of Communication,* .29, 277-300.

Chang, S.-H. (2003). Institutional Repositories: The library's new role. *OCLC systems & services* 19(3), 77-79.

Chapman, J. W., David R., & Sarah A. S. (2009). Repository Metadata: approaches and challenges. *Cataloging & Classification Quarterly*, 47(3/4), 309-325. Retrieved from http://hdl.handle.net/2142/13968

Dempsey, L. (2000). Scientific, industrial and cultural heritage: a shared approach. *Ariadne*, 22. Retrieved from http://www.ariadne.ac.uk/issue22/dempsey

Dunsire, G. (2008). Collecting metadata from institutional repositories. *OCLC Systems & Services: International Digital Library Perspectives,* 24(1), 51-58.

Eawage, V., & Abbie, S. (2008). Running head: institutional repository : benefits and challenges for libraries. *The Open Movement and Libraries,* LIBR 287-06, 1(1).

Foster, N. F., & Gibbons, S. (2005). Understanding faculty to improve content recruitment for institutional repositories. *D-Lib Magazine,* 11(1). Retrieved from http://www.dlib.org/dlib/january05/foster/01foster.html

Gaffney, M. (2008). Involving the library and campus community in institutional repository projects. *The Serials Librarian,* 55(4), 568-576.

Genoni, P. (2004). Content in institutional repositories: a collection management issue. *Library Management,* 25(6), 300-306.

Harnad, S., Carr, L., Swan, A., Sale, A. & Bosc, H. (2009). Open access repositories —maximizing and measuring research impact through university and research-funder open-access self-archiving mandates. *Wissenschaftsmanagement* 4(4), 36-41.

Jackman, S. Y. (2007). Creating an institutional repository at the University of Liverpool: our approach. *SCONUL Focus* (42), 35-37.

Johnson, R. (2002). Institutional repositories: partnering with faculty to enhance scholarly communication. *D-Lib Magazine*, Vol. 8, No. 11 . Retrieved from http://www.dlib.org/dlib/november02/johnson/11johnson.html

Jones, P., Day, M. & Ball A. (2009). Topic 3: Institutional Repositories should ne built on open source software. *Bulletin of the American Society for Information Science and Technology*, 35(4), 22-26.

Jones, R ., Andrew, T. & MacColl, J. (2006). *The institutional repository*. Oxfords: Chandos Pubs.

Kim J. (2006). Motivating and impeding factors affecting faculty contribution to institutional repositories. In *Proc. Joint Conference on Digital Libraries*. Chapel Hill, NC, USA: ACM Press.

Papin-Ramcharan, J.I. & Dawe, R.A. (2006). Open access publishing : a developing country view. *First Monday,* 11(6). Retrieved from http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1332/12 52

Park, J.R. (2009). Metadata quality in digital repositories: a survey of the current state of the Art. *Cataloging & Classification Quarterly,* 47, 213-228.

Pelizzari, E. (2005). Harvesting for disseminating: open archives and the role of academic libraries. *The Acquisitions Librarian*, 33(34), 35-51.

Rothery, A. & Bell,V. (2006). E-Sharing: developing use of e-repositories and e-libraries for learning and teaching. Is Information Technology Shaping the Future of Higher Education? *Proceedings of the 12th International Conference of European University Information Systems*. University of Tartu, Estonia, Tartu, Estonia, pp. 123-129.

Schraefel, M. C., Smith,D.A. & Carr, L.A. (2006). *mSpace meets EPrints: a case study in creating dynamic digital collections.* Southampton: University of Southampton.

Suber, P. (2006). Ten lessons from the funding agency open access policies. SPARK Open Access newsletter, Issue 10. *The Acquisitions Librarian*, 33(34), 35-51.

The National University of Malaysia, 'Mission'. Retrieved from http://pkukmweb.ukm.my/v3/index.php?option=com_content&view=article &id=90&Itemid=196&lang=en

Van Westrienen, G. and Lynch, C.A. "Academic Institutional Repositories: Deployment Status in 13 Nations as of Mid 2005" *D-Lib Magazine*, Vol. 11. Available at: doi:10.1045/september2005-westrienen. 2005

Watson, S. (2007). Authors' attitudes to, and awareness and use of, a university institutional repository.The journal for the serial community 20(3), 225-230.

Zuraidah Abd. Manaf. (2008). Establishing the national digital cultural heritage repository in Malaysia. *Library Review* , 57(7), 537 – 548.

Zuraidah Abd Manaf & Aliza Ismail. (2010). Malaysian cultural heritage at risk?: a case study of digitisation projects. *Library Review*, 59(2), 107-116.