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# Status of Institutional Repository in Indian Institute of Technology: A Case Study

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## Status and Structure of Institutional Repository: A Case Study of Institutions of National Importance of India.

### Literature Review

In a research work, the literature review is one of the most important tasks. It is an important aspect of research. With the help of a literature review, we can know the earlier effort and work done on the related area or subject. Literature review gives us a general idea and better prospective to understand the research topic.

This review of literature will provide a clear sight to understand the origin and the consequential development in the field of Institutional Repository. Although there is not very much written about institutional repository in India. It was hardly two decade the term defined properly. Within the limitation of time and limited resources the researcher has made attempt to justify the work.

Crow was first to define IR as Institutional repositories--digital collections capturing and preserving the intellectual output of a single or multi-university community--provide a compelling response to two strategic issues facing academic institutions” (crow.2002). He further explain the role of library professionals in making different polices for managing the content and choosing the metadata schema and deciding authors limitations, copyright agreements, and guidelines for documents submission and initiate workshops and training programs to make them educate to use of software and marketing the term of institutional repository.

Crow also define three essential characteristics of Institutional Repository “institutionally define, scholarly content, cumulative and perpetual, and interoperability and open access.

And at the same time in India (2002) Indian Institute of Science, Banglore established First Institutional repository, named ePrint@IISc. They used eprint software to create their Institutional repository. IISc. (Indian Institute of Science) provide the access of IR is to everyone but the submission is restricted only to the members of the institutions.

Lynch, 2003 explain the development of IR emerged as new and convenient step for every institutes & university to store preserve and use the scholarly output.

Since 2002, people started recognizing IR as an area of study and they started writing about it. This was the time when big universities of the U.S., like MIT and University of California, launched their IR systems (Kennan and Wilson, 2006).

Several studies have already been conducted in the area of Institutional Repository. Many papers, articles, survey reports highlight the development of Institutional Repository in several developed and developing countries. Hayes, defines a digital repository as a repository that stores all the digital content for easy retrieval and reuse. He further added that it is very common to use an Institutional repository for research purpose. [H. Hayes, 2005].

R. Yeates 2003, explain an Institutional Repository is a collaborative effort of institutes to archive and exploit their scholarly output.

Asian countries started to work on Institutional Repositories around 2 decades before but the situation of a few Asian countries is quite satisfactory. Some of the authors started to write about the growth & development of Institutional repositories in different countries of Asia.

Several other authors highlighted the repository development of few Asian countries like China (Fang & Zhu, 2006). The other researcher (Mukarami & Adachi, 2006) described the repository movement in Japan whereas another expert (Matsuura, 2008) concluded that Japan has been placed as the fourth biggest contributor in the world as per the total number of institutional repositories (OpenDOAR, 2012). Another study (Lee, 2008) showed the growth and development of institutional repository systems in Japan and Korean university.

Sheau-Hwang Chang, (2003), is one of the earliest useful studied about IR. He considered IR as a new way of handling scholarly works created in digital forms by patrons of university and colleges. In this paper, he talked about XML based metadata infrastructure, the role of the library, open archive management information system & Open access.

Lynne Horwood et. al (2004), studied about open archive initiative and protocols for metadata harvesting. He discussed several things regarding Librarians role in the building and maintenance of IR. He states that “Librarians are increasingly working with academic colleagues to provide online content for research, learning, and teaching. Providing an access to digital content is an essential prerequisite for institutions establishing and offering flexible online learning delivery”. He had

discussed the cost, recommendations, peer review, mediation, promotion, advocacy & metadata etc. In a traditional library management system the library professionals has certain way to acquire, store and disseminate the information. But in recent trend the professionals have to change the way the manage the information. Earlier the needs to manage only the documented information but now they will have to manage the electronic forms of information too. The role of library is now expanding day by day. Earlier they are only responsible to collect the information but now they are participating in information creation too.

Libraries are getting fund to digitize the documentary information in electronic forms so that it can be widely accessible. Providing access to digital content is an essential prerequisite for institutions establishing and offering flexible online learning delivery.

In a case study by Graham, Skaggs, and Stevens (2005) discussed that a big library is not required to use web based technology and digital information and to develop an institutional repository. Medium and small size libraries, if they have well equipped then they can use web based technology and create their repository.

He discussed the benefits of developing IR. There are many benefits of developing a repository projects for academic libraries. With the help of advance technology and machines libraries are now able serve move services to their client.

This case study examines how a shared state-wide repository project impacted one medium-sized academic library and how it helped to open up lines of communications and form a new relationship with a department that, in the past, had little or no contact with the university library.

In the year 2005 Suzie Allard started working on Institutional Repository's literature and identified the role of librarians in developing repositories. In that study reference and user education highlighted as main function of librarians. There is one more similar study by Charles W. in the same year. He explains what are the possible roles of Reference Librarians in Repositories? He also explains the relation between IRs and open access. Open access and Institutional repositories are two different term to identified to different functionality. An institute can develop a repository to provide open access to all to their repository.

This point can lead to some differences of perception between librarians and some open access advocates about IR support requirements and operational costs: open access advocates may focus on technical support costs of IRs, while librarians may also be concerned with additional costs, such as staff and user training and support, IR advocacy and promotion, metadata creation and maintenance (including depositing items for busy faculty), and long-term digital preservation. Role of the reference librarian in IR is further discussed by Holly Phillips Richard Carr Janis Teal, (2005) in taking initiative for developing IR, administration, policy making, education & metadata review, etc. He added some future roles for reference librarian too.

In the view of Lynch, when an institute develop an IR, It showcases all the scholarly output and intellectual life in digital format.

Emily Dill and Kristi L. Palmer (2005), described ideas behind the consideration for implementation of IR like what we should have in our mind when we choose a platform, what skills required for implementing an IR, an idea about hardware, software & installation, how to identify the people and leader. They further explained the test of IR, IR interface, metadata, organizational methods, lead by example, promotion & promotional ideas etc. There is some common and specific motivation behind establishing an IR and the motivation are more or less same for every institution, that is to create, store and spread the scholarly output of the institution.

In the year 2006 Mary Westell had use some inputs indicator to evaluate an IRs. These indicators are basically related to financial model, digitization issues, planning and execution related problems, interoperability etc. This study is important for today also & can be helpful in evaluating IRs of any kind.

In 2007 Ki Tat Lam and his team studied the repository of Hong Kong University of Science & Technology. He explained every stage of IR, from Planning of developing an IR till publicizing that IR to the global level. They also explained minute things related to IR to their article. And in the same year Morag Greig and team, focused their study on charting the growth & development of open access and IR of Scotland. They had a different parameter for that like the software of developing Repository, author, content acquisition, copyright issues, policy decisions: sustainability, support, and purpose, Impact of the university statement, funders open access policies, Usage statistics, Future developments, & Maintaining momentum.

Meanwhile in India there were some of the writers who were interested in writing about IRs and one of them was Ashalatha and team. Who worked on ISRO HQ Institutional Repository. How the idea was develop and execute. He also discussed the traditional library functionality and their limitation. And this study suggested to promote IRs to overcome the space problems and to facilitate better service. One more study by John C. Kelly supported the same. And discussed that with the limited financial and technological resources an IRs can build by the parent organization.

Ghosh 2008 reported that Indian institute of Technology, Mumbai created first electronic thesis and dissertation repository. He examine various ETD repositories and the story of their development to know the possibility of creating one national repository of India. IISC Bangalore was the first institute to develop an IR in India. Das *et al.* (2007) focused their study on policy making, different strategic dimensions, and analyses some of existing repositories of that time like Vidyanidhi (On 25th July 2003, The Department of Library and Information Science, University of Mysore initiated a project to develop an institutional repository called Vidyanidhi.), Shodhganga@ INFLIBNET (It is a repository that facilitate users to deposit their thesis for open access). And he concluded that in India ETD repositories are in developing stage. There should be some policies for developing IRs. One more study by Vijay Kumar agreed on the same point that government policies and lack of awareness about IRs is the main reason behind the slow initiatives of IRs in Indian universities.

Mohmmad Nazim & Maya Devi (2008) discussed open access and institutional repository. He explained that open access is not giving so much burden on your library budget but it will give very high impact of information handling. Somehow it is cost effective too. It can be an alternative to the traditional subscription-based publishing model possible by new digital technologies and networked communications. By open access movement we can have access of scholarly output through the world. It is almost free of cost or there will be some nominal charge for it. Open access facilitate minimal restrictions on users and uses. It can enhance the global visibility of scholarly output of the institutes.

In the year 2008, 37 IR registered on OpenDOAR & ROAR. And one of the study by Khan B. examine the status of IR. He have collected data from the Depository of Open Access Repository (OpenDOAR) and Registry of open access repository (ROAR). There are some limitations of data collection. Only humanities

and social Sc. Repositories have been taken for study. He further explains the functioning of IR System. He believes that it is very important to know system functioning for better understanding of the system.

Gordon Dunsire, (2008) focuses their study on interoperability of institutional repository. He wrote about OAIPMH (Open archive initiative for metadata harvesting), which is allow barrier mechanism for repository interoperability. He finds from his research is “the efficiency and effectiveness of any information retrieval service requires coherency and consistency in its metadata. Aggregator services potentially face two distinct but related categories of variation in harvested metadata: structure and content”.

Francis Jayakanth (2008) wrote about first profession software to create Institutional Repository (Eprint). It is used for making repository worldwide. That time there were very fewer numbers of software. And there was no ideal software for the institutional repository. In that limited no. of software, Eprint was one of the best software to create and maintain the repository. Manual is very easy so a layman can also installed the software. And if you feel like stuck in anytime while installing the software, there is a technical support team to help you round the clock. IISc Bangalore , used Eprint to create India’s first interoperable open access repository.

There was a time when IRs getting popularity and some more writers attracted towards this topic and they started thinking about uses statistics and how to evaluate the uses of IRs. Hee Kim & Yog Ho Kim in the year 2008, have done usability study. They studied the Korean digital repository. That study was based on literature review. First they decided some categories to make an evaluation framework to calculate the usability of an IRs. His evaluation framework was made of four categories 1) satisfaction of the users, 2). supportiveness of the members of the IRs, 3). uses of the IRs, 4). effectiveness of IRs on users. As a part of the study. He had done it in two phase. First phase he created a group and decided some criteria to make an evaluation framework to calculate the collection and their uses. In second phase he made a team and done a focused interview. Usability is a multidimensional construct that can be examined from various perspectives (Jeng, 2006). Previously Booth suggested that usability has four aspects: usefulness effectiveness learnability and attitude.

Institutional Repository and Open access both terms frequently used together. Elisavet Chantavaridou in the year 2009 studied the influence of open access on Institutional repository and vice versa. Earlier library professionals were only focusing on digitizing gray literature so that it can be accessible online. They cannot make a bold move to published recent articles & peer reviewed literature etc. Because they did not know whether authors will allow their work for open access? Slowly but Institutional repositories are developing and maintaining world-wide . And this was the time when some authors were putting effort to make comparison in IRs systems of the different countries. Chen and Hsiang (2009) studied different IRs of UK, USA, European countries and Asian countries. And in compare to above continent Asia have less numbers of IRs because Asian countries are relatively late in implementing IRs. More specific when we see Repositories of Asian countries, maximum repositories are not facilitate open access. If we see research data, it reveals that the statics are very poor for Asian country's IRs. If we exclude China (It has centralized IRs for 300 universities) then the total no. of Asian country's repositories shares only 4 – 10% of the total world Repositories.

A. Abrizah and team have done detailed study of open access repositories of Asian Universities. This study gives a brief report on the OARs of Asian Universities. It contains every characteristic like, what type of repository, what content they have, subject of the repository, Language of the documents, technical, operational and policy related issues. According to this research data total no. of Repository in Asian country is 191 and Japan has maximum no. of repositories followed by India and Taiwan. But again when we compare Asian country's IRs to the other IRs of world, we found that out of 191 Asian IRs only 48 are listed in the top 400 RWWR. It means only 12 % of the total Asian IRs are visible world-wide. Out of these 48 institutions, 29 are among the Asian Top 200 universities. However, only 14 of these 29 universities were ranked top 100 in the RWWR. This study is also proving that Asian Universities are not actively participating in open access movement. The study suggest that it need to reconsider on the policies so that it web performance will increase and the quality of the IRs will improve. This study is very useful in showcasing the current trends of Asian Universities.

OpenDOAR report 2010, advocated to executing the IRs because it has potential to improve knowledge sharing and scholarly communication. Developed countries are adopting more in compare to developing countries.



Rowena Cullen and Brenda Chawner (2010) have studied IRs of New Zealand. This study explains what are the factors which is effecting the implementation? And according to the Library managers who established the IRs, and the members of the community what is most important thing for success of IRs. The study raise some basic questions including why the institutes of New Zealand establishing IRs? What will libraries do for popularize IRs? What will be the researcher's attitudes towards IRs? How libraries will motivate people to submit their work in IRs.

Linde et al. (2011) analyzed the accessibility of refereed conference articles on the web and found out, that IRs are a very important source for their visibility. In all, 17 percent of the studied conference papers were uploaded into IRs, next 13 percent were archived on the authors' websites or web sites of their institutions. The authors highlighted the role of IRs built on higher education institutions.

**Rashmi Rekha Gohain (2011)** has worked on Institutional repository of universities and research institution of India. Her Research was based on primary and secondary both kind of data. She had taken data from Institutional websites, ROAR and OpenDOAR. After checking all the links of repositories she found that 79 IRs of different university and institution are actively working and they facilitate open access. Her research reveals that DSpace and EPrints are dominating to be the leading software for repository development in India. She suggested that in the developing countries like India, where infrastructures are not so good and having financial problems most go for open access software because open access software are almost free of cost and have low maintenance cost. They should establish IRs for better visibility of scholarly output of the institution.

Roy and his team had done an analytical study of IRs in India. Institutional digital repositories are widespread in universities and academic institutions. Most of the libraries in India facing common problems of low budget, continuously increasing the cost of information handling, adaptation of advanced technology, never ending patrons expectations etc. in this scenario it is very difficult to overcome the problems and fulfill the users demand. IRs can be solution to many of the above mention problems. But establishing an IRs is not sufficient but we have to be prepare for all the consequences, like we need manpower to establish and maintaining IRs, technical expertise, metadata standards, copyright issues etc.

But still IRs is not very popular area of study in India. Now the authors are evaluating every aspect of Institutional repositories. Manjunatha K & Thandavamoorthy in the year 2011, have done a user study to know the attitude of users towards a new mode of scholarly publishing that is IR. This study categories user of IR in three parts: faculty, Research Scholar and PG students. For the study they have taken institutions of Science & technology, medicine, arts, humanities and social science. The data shows the in compare to humanities and social sciences students' medicine and S&T students are more aware and have interest in contributing to IRs. However the humanities and S. Sc. Students are less aware but interested in open access repository movement.

In the year 2011 Shu Liu Yongli Zhou, studied technical issues relating to implementing and using DigiTool, proprietary software by Ex Libris, to develop an institutional repository (IR). DigiTool is a complex digital asset management system, which allows institutions to create, manage, and preserve online-accessible digital collections. DigiTool's system architecture includes back-end databases, web services/components, and a client-server module that works on the Windows system. Institutional repositories (IR) have recently become a fast-growing area of academic institutions' information landscape. IR provides open access to valuable research and historical materials worldwide and is a useful promotional tool for universities. And The DigiTool, a powerful, complex, and relatively mature out-of-box IR platform that fulfills one's needs to establish and maintain an IR are considered.

Sarika Sawant is one of the most renowned author who worked on different prospective of IRs like women studies on IRs, open access & IRs, IR system and features, effect of IRs on scholarly communication etc. She defined IR as an archive which store Intellectual output in digital format created by members of the institutes for giving free and wide accessibility to users. In her research she shows that Science & Technology Institutes are more adoptive in compare to arts and humanities Institutes. In maximum libraries IRs developed by Library Science Professionals. And she suggested to the library community to take forward step to learn more technology And should have a positive attitude towards new changes.

M. Krishnamurthy & T.D. Kemparaju, (2011) studied 20 of the institutional repositories (IRs) in use in Indian universities and research institutes. An IR is a natural extension of an academic institution's role as a generator of primary research. IRs are a practical, cost-effective, and strategic means for universities to

build partnerships with their faculty to advance scholarly communication. IRs are built on growing faculty practices of posting research output online, often on personal websites, but also on institutional websites or in disciplinary repositories, suggesting an increasing desire for expanded exposure of, and access to, their work. Furthermore, IRs allow universities to offer secure digital hosting and archiving services combined with more effective web dissemination, while the universities can benefit from the enhanced visibility of their research outputs and the prestige that this confers. The emerging economies among the developing countries are not far behind in building up the necessary information structure, essential for sustainable economic development. These emerging countries, however, have limitations in terms of bridging the digital divide within their societies, due to the co-existence of marginalized and privileged communities. IRs expand access to research, facilitate control over the research output of universities and institutions of national importance, and provide a sustainable management system for digital content.

Nazim and Mukharjee (2011) have done a study of the IRs of Asian countries. This study was a quantitative study. They believe that due to ICT advancement some new options of scholarly publishing has emerged and one of them is open access model. Now the use of ICTs are very common and there are some good open source software available so most of the institution are developing IRs. IRs now become an important new player in the field of academic information management and publishing. The development and growth of IRs arose in response to the major changes in scholarly communication. The new form of scholarship - that is born digital - constitutes an important source for present and future research and teaching. It was the time when universities were cutting library budget and the prices of scholarly journals are increasing day by day. So it was become a necessity to develop a new way to overcome from all these problems. With the invent of www, things are getting changed. www become a very easy and cost effective way to publish and distribute the information in digital form. IRs benefit scholars by providing free access to all scholarly works which are published or likely to be published in near future. It reduces the gap of 'backlog' by bringing timely access and increases visibility through a freely accessible Web.

Sarika Sawant (2012), studied institutional repositories on women's studies in India & Canada. He had taken data from ROAR and found in India out of 22 IR only 3 IR containing documents on women studies and in Canada out of 32 IR 22 IR containing documents on women studies. She further explained that in India some policy should be there for making an IRs. She mentioned that NKC has already recommended to develop some of repositories in which research reports

(funded by Gov.) should be deposited but there is no implementation yet to see. It may be possible due to lack of awareness about IRs and their benefits policymakers are ignoring this. And in her research she found that subject-specific repositories on women's studies are not available in India.

Syed Sajjad Ahmed & Saleh Al-Baridi, (2012) studied the development of IR in the Arabian Gulf Region. The lack of information on OA and IR in the Arabian Gulf Region, plus the current interest of the King Fahd University of Petroleum & Minerals University (KFUPM) stakeholders in establishing an IR led to the development of this study. This study contributed to the already scarce literature in the area of OA and IR fields in the Arabian Gulf Region.

Sarika Sawant (2012) studied various issues regarding management of Institutional repositories developed in India. She has identified 16 functional repositories and some of these are subject specific repository & some are not registered in any directory. The study mainly focused to identify people, the source of fund allocation, policies, activities, issues concerning intellectual property right and contributors of IR.

Kenning Arlitsch Patrick S. O'Brien, (2012) studied why IRs are very less visible in Google scholar? It may be because repositories are mostly use Dublin core for identifying their metadata and the bibliographic fields of Dublin core are insufficient for academic papers. And Google Scholar basically manage the academic papers so it is less indexed in Google scholar. Institutional and disciplinary repositories had taken for the study. Authors have conducted three pilot project and two surveys to prove the above hypothesis and recommended metadata schema for IRs to improve the visibility in Google scholar.

Roy and his team had studied approximately 80 IRs of India. They believe open access movement is growing as a social movement. They have studied about current state of open access IDR in India. They evaluate the repositories by their content, software choices, subject of repositories, statistics of records, language of the information contain, problems in running the repositories and policy making issues etc. this paper also highlights the position of Indian IDR in world ranking. This study suggested some of the strategies to improve the global ranking of IDRs of India.

One of the similar study is done by Md. Anwarul Islam & Rowshon Akter (2013) in Bangladesh. The study is focused on IDRs of Bangladesh and the rise of open access movement in the developing countries. The study highlights the most important problem with the universities of Bangladesh is awareness about information handling like they are stucked between the information storage and dissemination. Dekeyser (2012) Open access is not only giving a platform to read the research output but also facilitating a place to showcase the institutional research output across the globe. In a report of CIA (2012) the most important reason of lower visibility of the research outcome of universities of Bangladesh is limited awareness of scholarly communication among the library professionals. Bangladesh does not stand alone with these problems, although it is one of the least developed and most populous nations in South Asia with a literacy rate of 47.9% .