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An Analytical Study of Managing Institutional Repositories by University Libraries in Assam

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Abstract: Institutional Repositories is Considered as an important jewel of a university library. Consequent upon the advancement of Information and communication technology, the libraries across the globe have emerged with the innovative ideas to meet the information needs of the patrons of which Institutional Repository is one of such invention. Institutional Repository facilitates scholarly communication where the research output can be shared and communicate to the mass audience of scholaristic society. The present study tends to study about the management and maintenance of Institutional Repositories of some selected universities libraries of Assam. The study is confined to university libraries namely Assam Agricultural University, Assam Kaziranga University, Tezpur University and Gauhati University of Assam. The data were collected by designing a well-structured questionnaire with relevant questions related to the topic of study. The study primarily focus on knowing the present scenario of Institutional Repositories in libraries of universities ,the policies and procedures employed while implementing Institutional Repositories ,the imitative taken by university libraries in creating awareness about Institutional Repository and to know various professional training given to the staff by library with regard to Institutional Repositories. The authors have elaborately analyze the findings with regard to improvement and advancement of Institutional Repositories in its future to come.

Keywords: Institutional Repositories, Scholarly Communication, Management, DSpace, GSDL and Academic Community.

1.   Introduction

India is well known for its advancement in the field of education since the time immemorial. The Indian history depicts the legacy of ancient civilization such as Indus Valley civilization wherein lot of advancement in field of scientific culture was noticed. In the contemporary world, India has possessed many reputed educational institution which were known for its legacy in teaching and research in globalize atmosphere. The institution outsources lot of valuable finding to the academic and scientific community for its advancement in their respective field. The prodigy of outsourcing of scientific research, applications development as well as business- intelligence is closely associated with the development of the nation. The success and achievement receive by the Indian educational institution set as a promising area for Research and Development which attracts lots of sponsorship from abroad for the collaboration. Some of the institution in Indian Scenario has potentially opened their research finding to the world scenario for further development in their respective discipline. An institutional repository has begun to serve as a platform for sharing knowledge which can be regarded as an extension of Digital Library. In general meaning, Institutional Repositories can be define as a warehouse, a museum, or achieve or a library that store for use and safeguarding in-house records or information falls under the definition of Institutional Repository. In the recent decades, Institutional Repository can be defined in more specific term as preservation and storage of digital information or knowledge assets of an organization.

In the academic setup, Institutional Repository can be described as a set of services offered by the institution library to its membership about the scholarly publication generated by research scholars, faculty, Research associates and others for building a knowledge hub. As the resources are generated digitally and electronically, it has made easy to build or compile the collection of any specific discipline or branches. The university library may build the collection on the basis of self-generated knowledge or it may find its collaboration with the other institution for the channel of publication. In other words, Institutional Repositories is an information management system which performs the function of preserving, capturing and getting access to the intellectual results of the academic members of the institution.

The Institutional Repositories is believed to be the jewel of the university library. In most of the case, it is observed that the faculty, research scholar, students and others are unaware of the term Institutional Repository which may occur due to various reasons like lack of awareness, lack of training and many others. To understand its underlying importance and significance of IR (Institutional Repository) in academic community, the topic *"An Analytical Study of Managing Institutional Repositories by University Libraries of Assam"* has taken into consideration.

2. Institutional Repository

The concept of Institutional Repositories has emerged with the philosophy of sharing the information at easy access, free and avoids duplication. The beginning of 1980s has given birth to free movement such as open access movement, open learning and open-source movement. Institutional repositories is believe to the most remarkable creative invention by library and knowledge centre wherein the academic and research output are displayed. In short, institutional repositories can be elaborately explain as the concept of disseminating, managing and capturing all the electronically produced assets by an institution such as research findings, scholarly work, administrative reports and many others to the audience who have keen interest in academic activity.

The concept of institutional repositories as per Wikipedia can be described as "a repository is a central place where data is stored and mind. A repository can be a where multiple databases or files are located for distribution over a network or a repository can be a location that is directly accessible to the user without having to travel across a network" (wikipedia).

An institutional repository can be defined as set of web-based database where the collection of scholarly materials is present. In other words it can also be explain as the set of services which are offered by university or institute to its academic community for the enhancement of academic teaching, learning and research. One of the basic objectives of institutional repositories is to disseminate and management of digital contents created by the university or research institute so that proper circulation of knowledge and information is maintained. An efficient institutional repository mainly requires some collaborative efforts among policy makers, record manager, administrator, data analytics and many more.

3. Institutional Repository Software

Some of the most commonly and widely used institutional repositories software includes EPrints, CDSware, FEDORA, Dspace etc. these software are either under GNU public license or the

BSD license and it can be downloaded from their own respective sites. Some of IR softwares are discussed below:

a) **Greenstone Digital Library Software**: It is a product with the effort of university of Waikato under the New Zealand digital library project. The main aim of this research project was to explore the underlying technology for digital library creation and disseminate the software publicly so that they can develop their own collections. The main developer of this software was RogerMcNab and Stefan Boddie. The features of greenstone digital library software are:
   - This software can create large documents of digital collections; and
   - It also has graphical greenstone librarians interface.

b) **GNU E-Print Archiving software (Version 2.2.1):** This software was developed by university of Southampton, U.K. as a part of digital library project. It can be downloaded easily at free of cost under the term of GNU general public license and can be function in Linux operating system. This software facilitates creation of own archived of the digital prints. The features of this software are:
   - It is a web and command-line application based on LAMP architecture; and
   - It runs under operating system such as Linux, Solaris and Mac OS X.

c) **Dspace:** This software allows the capturing facilities of items in any format such as text, video, data and audio. It develops the indexes so that the users can retrieve the items. The digital content of thee work can be preserve over the long time. It provides better visibility and accessibility to the patrons. Some of the salient features of Dspace are:
   - It provides the platform for developing, testing and calibrating electronic control units; and
   - It is widely used in medical engineering industries, aerospace as well as in industrial automation.

4.   Review of Literature

A review is believed to be the survey of primary literature to cover specific period of study on a particular topic or area. Its gives and cites a brief review of related literature. In order to accomplish the subject of study, the literature considered for study is such as *Crow (2002)* in his article elaborated the technical, administrative, internal and external issues of Institutional Repository. It may be considered as a valuable guide to understand ore issues of building an IR right from copyright issues to policy issues; *Johnson (2002)* in his article highlights the benefits for authors delivered by Institutional Repositories. According to him IRs can serve the function of print journals more widely by providing a platform to publish scholarly contents worldwide openly; *Kamali (2003)* in his article discusses about the concept of Institutional Repository, its relevance, merits, software requirements and the current trends in India with special reference to the initiatives at Burdwan University; *Bjork (2004)* in his article focused on the obstacles of Open Access in academic environment. The paper also highlights the types of barriers considering the legal framework, IT infrastructure, etc. along with an overview on the main Open Access channel; *Ganguly (2004)* in their article highlight the issues surrounding the archiving of digital information, how it form a cause for concern for many and what can be done to alleviate this problem. The emphasis is on the technologies that are currently in place to combat this issues and what is being done to redress it in more effective; *Grieveld (2006)* in his article takes marketing approaches toward Institutional Repositories. According to him, Institutional

Repository Managers should think in term of marketing perspective of IR (Institutional Repository) and the benefit of having an IR need to be populated in order to attract the scholarly market; *Pickton and Barwick (2006)* has outline some of the guidelines for librarians in setting up a repository where he recommended 15 steps to be undertaken while implementing an IR; *Sinha and Bhattacharjee (2006)* highlights the basic concept of Institutional Repositories, its genesis, its worldwide developments and information infrastructure required for creating Institutional Repositories in Assam University, Assam; *Kuri and Singh (2020)* in their study discuss about the Indian Institutional Repositories which were found in DOAR on all Subjects in different countries of the world. The study analysis presented is based on the some selective Criteria like language and policy used, content included, size of the items, software used and many other likewise. The authors by analyzing try to identify and visualize India contribution in Directory of Open Access Institutional Repository (DOAR) to the world; *Dhanavandan (2020)* in their paper highlights repositories of those countries that are registered in open DOAR. It further studies about open access repositories which are segments as content and languages, country wise, types, software. The gathers its relevant data from DOAR and a sum of 5268 was found. Among all the repositories United States of America holds the first position and followed by Japan; and *Kalbande (2019)* in their study presents the Indian Scenario in building the phase of Indian open Access Repositories in the world platform. The authors has identified and analyzed 84 institutional Repositories in India which are based on the segmentation such as type of IR, position holds by Institutional Repositories, language and barriers, total collection in repositories and many others.

5. Scope and Limitation of the study

This study is mainly focused on management of Indian Institutional Repositories with special emphasis to Assam in term of Geographical Coverage. To analysis the best practice of Institutional repositories in Assam, four universities were chosen for the purpose of study. They comprises of Assam Agricultural University, Assam Kaziranga University, Gauhati University and Tezpur University. The time period taken for the purpose of the study to identify Institutional Repositories in Assam was started from February, 2021. The study mainly covers the Institutional Repositories of academic institution specially Central Library of Universities. The commercial IRs is not incorporated in Study.

6. The Study Objectives

The objective of the study is to understand the existing scenario of Institutional Repository in Indian Universities with special emphasis to universities of Assam. The following objectives are summarized such as:

1. To know the present scenario of Institutional Repositories in libraries of universities in Assam;
2. To study the policies and procedures employed while implementing Institutional Repositories in selected university libraries in Assam;
3. To study the imitative taken by surveyed university libraries in creating awareness about Institutional Repository; and
4. To analyze about the various professional training given to the staff by library with regard to Institutional Repositories.

5. Methodology

The author has designed a structured Questionnaire for the Librarian or Librarian I/C of Central Libraries of Assam Agricultural University, Gauhati University, Tezpur University and Assam Kaziranga University to find out the management of Institutional Repositories in their respective universities. The Observation Method was employed to make a survey of on-site real situation of Central Libraries of selected universities. The interview was also conducted to assess the real situation prevalent in these libraries. The collected data were tabulated in MS Excel and these data were interpreted and analysis in the form of tables diagrams and graphs with the help of application software MS-Excel.

6. Results and Discussion

As the objective of the study is to analyze and interpreted the management of Indian Institutional Repositories in selected universities of Assam, the data were collected manually by visiting the respective institution personally. The collected data of the surveyed University Libraries are represented with charts and graphs with the following sub heading:

Note: A.A.U: Assam Agricultural University, K.K.H Library: Krishna Kanta Handique Library, G.U.: Gauhati University, T.U.: Tezpur University and K.U. : Kaziranga University.

6.1 General Information of the surveyed University Libraries

Table6.1.1 Information about the surveyed Universities

Sl. No	Name of the University	Name of the Library	Year of Estb.
1.	Assam Agricultural University	Rev. B M Pugh Library	1969
2.	Gauhati University	K.K.H Library	1948
3.	Assam Kaziranga University	Kaziranga University Central Library	2012
4.	Tezpur University	Central Library	1994

With the emergence of Research and Developmental Activities, the higher academic institutions are producing a good amount of scholarly information. To record and preserve that valuable information, the institutions are developing Institutional Repository so that the users can access any piece of required information. From the Table 6.1.1 it is clear that Gauhati University is the oldest university and Kaziranga University is the new among others surveyed universities. Here Tezpur University is the central University, while Assam Agricultural University and Gauhati University are two state universities. Assam Kaziranga University is a private university.

Table 6.1.2 Information about Library Staff

Sl. No	Name of University	Professional	Semi-Professional	Non-professional	Total
1.	Rev. B M Pugh Library, A.A.U	5	8	10	23
2.	K.K.H Library, G.U	8	4	15	27
3.	Kaziranga University Central Library	2	3	5	10
4.	Central Library T.U	6	2	7	15

From the above Table 6.1.2 it is seen that K.K.H. Library has the highest number of Staff in the library and Kaziranga University Central Library has the lowest number of Staff. While the Rev. B M Pugh Library occupies second place which is followed by Central Library, Tezpur University. Both Rev. B M Pugh Library, A.A.U and K.K.H Library, G.U have same number of professional staff. While Central Library, T.U. have highest number of professional staff. K.K.H. library have the highest number of semi-professional staff among the surveyed University libraries. Rev. B M Pugh Library, A.A.U and Central Library T.U have no semi-professional staff.

6.2 Library Collection of Selected University Libraries

The collections of University Libraries reflect the courses offered and research initiated by the university. The collection of the University library plays an important role in the academic and intellectual development of the students and faculty of the university. The collection of the library should be building and developed on the basis of objective, size, nature and educational philosophy of the institution. Generally the collection includes text-books, reference books, newspaper, periodicals and some non-book materials also. Here the collections of the surveyed University libraries are shown in the table below:

Table 6.2.1 Information about Library Collection (Printed Materials)

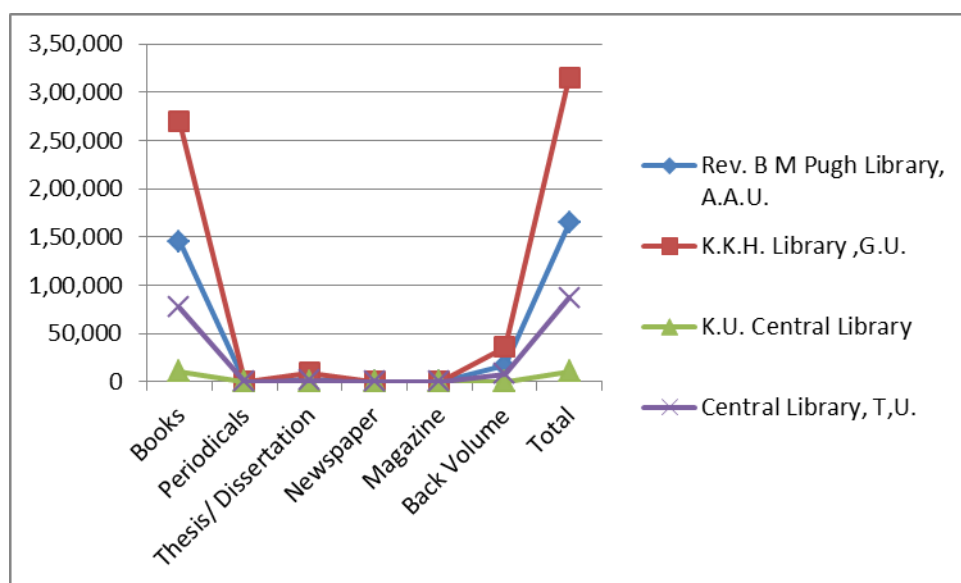| S.N	Name of Library	Books	Periodicals	Thesis/ Dissertation	Newspaper	Magazine	Back Volume	Total
1.	Rev. B M Pugh Library, A.A.U.	1,45,550	50	2,725	13	6	16,711	1,65,005
2.	K.K.H. Library ,G.U.	2,69,369	330	9305	16	16	36,000	3,15,036
3.	K.U. Central Library	10,516	21	271	11	14	82	10,918
4.	Central Library, T,U.	77,286	177	1,511	6	4	7,848	86,832

Figure 1: Library Collection (Printed Materials)

From the Table 6.2.1 a clear sketch can be drawn about the surveyed universities libraries. The collected data states that K.K.H. Library has the highest collection of printed materials and K.U. Central Library has the least collection of printed materials among the surveyed Universities. Rev. B M Pugh Library holds the second highest collection of print materials. K.K.H. Library holds the highest collection in term of books, periodicals, thesis/ dissertation, newspaper, magazine, back volumes. K.U. Central Library should take some necessary measures to increase its collection in printed materials.

Along with the print materials, library also possesses non-print materials. Non-printed materials can have a number of advantages. The first advantage is probably the trees saved by using an electronic format rather than publishing via ink on paper. As the number of non-print formats proliferates, institutions such as libraries must continue to evolve, adjusting the mix of print and non-print materials and fulfill the changing needs of their patron. The table 4.4.1 shows the Library collection of non-print materials.

Table 6.2.2 Information about Library collections (Non-Print Materials)

Sl. No	Name of the Library	CD/DVD	E-journal	E-book	E-databases	Micro-film	Total
1.	Rev. B M Pugh Library, A.A.U.	160	-	1814	-	-	1974
2.	K.K.H. Library,G.U.	-	1,69,000	15,000	31,35,000	-	33,19,000
3.	K.U. Central Library	573	24,130	-	3	-	24706
4.	Central Library, T,U.	2,396	10,618	5,00	46	-	13,560

From the above table 6.2.2 it is seen that K.K.H. Library has the highest collection of non- print materials and Rev. B M Pugh Library has the least collection of non-print materials. Central Library, T.U. has highest number of CD/DVD. Most of the library does not hold the collection of E-journal, E-book and CD/DVD. All the surveyed University libraries do not hold the collection of micro-films. K.U. Central Library has second highest collection of non-print materials.

6.3 Number of Users in the selected University Libraries

One of the basic objectives of University Library is to meet the requirement of the library users. Library is meaningless without user. The development and success of any university library is totally depends on the users. A library gets its justification when the users are satisfied with its services. The library user may comprise of teachers, students, research scholars, staff and others. The following table gives detail of the average number of daily uses visiting the library.

Table 6.3.1 Total number of Library Users (Per-day)

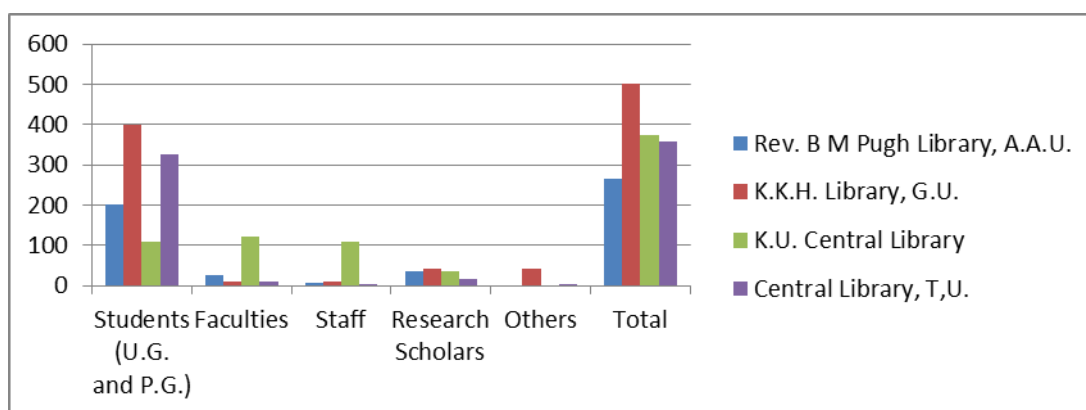| S.N	Name of the Library	Students (U.G. and P.G.)	Faculties	Staff	Research Scholars	Others	Total
1.	Rev. B M Pugh Library, A.A.U.	200	25	5	35	-	265
2.	K.K.H. Library, G.U.	400	10	10	40	40	500
3.	K.U. Central Library	110	120	109	35	-	374
4.	Central Library, T,U.	326	09	03	17	2	357

Figure 1: Library users per day in different university libraries

The Table 6.3.1 / Figure 1 display the total number of library user (per-day) of four different Universities. The library user covers the categories such as students (U.G. and P.G.), faculties, staff, research scholars and others. The others cover the category like children, office staff etc. From the above table it is seen that K.K.H. Library has the highest number of library user which is followed by K.U. Central Library and Central Library, T.U. Rev. B M Pugh Library has the lowest number of library user (per-day). K.U. Central Library has the highest number of library user in term of faculties and staff. Rev. B M Pugh Library, A.A.U. and Central Library, T,U. have same number of research scholars using the library per-day. Only K.K.H. Library and Central Library, T.U. has other category of library user per-day.

6.4 Nature of Access of Surveyed University Libraries

The nature of access signifies two things i.e. open and close access. The library should practice open access system which helps the users in finding the required documents quickly and thereby save the time of the user. Some of the libraries are still following close access system. The nature of access of surveyed University libraries are shown in the table.

Table 6.4.1: Nature of Access of Surveyed University libraries

Sl. No	Name of the Library	Open Access	Close Access
1.	Rev. B M Pugh Library, A.A.U.	✔	✕
2.	K.K.H. Library, G.U.	✔	✕
3.	K.U. Central Library	✔	✕
4.	Central Library, T,U.	✔	✕

From the Table 6.4.1 it is seen that the entire surveyed University library follows open access system. The libraries provide open access facilities to their users because open access facilities them to get their required documents. Close access system is removed from the library as such system is not helpful or beneficial to the students, faculties and other category of staff.

6.5 Implementation of Institutional Repository

Institutional Repository is digital in nature. It is centralized collection of intellectual output of any organization. Institutional repository not only store intellectual output of an organization but also stores administrative documents and teaching materials coming out of the normal academic life may be a part of IR. IR may be single organization based or multiple organization based.IR open its door to members (Full access) or All (to a certain extent or full access) depending upon repository policy. Understanding the importance of IR in universities by the LIS professionals, they have tried to implement IR in their respective university. Some of the universities libraries have already implement IR while the others are in the developing stage. The following table shows the implementation of Institutional Repository in some selected University libraries of Assam.

Table 6.5: Implementation of Institutional Repository

Sl. No	Name of the Library	Year of implementation IR	Name of IR Software
1.	Rev. B M Pugh Library, A.A.U.	-	-
2.	K.K.H. Library, G.U.	2014	Dspace
3.	K.U. Central Library	-	Dspace (on pipeline)
4.	Central Library, T,U.	2013	Dspace

The Table 6.5 gives the general eye view about the implementation of Institutional Repository in some selected universities libraries of Assam. Central Library, T.U. and K.K.H. Library G.U had started implementing Institutional Repository in the year 2013 and 2014 respectively. The IR in K.U. Central Library is in the developing stage. While Rev. B M Pugh Library is yet develop to IR in their library. Central Library, T.U. and K.K.H. Library are using Dspace as the Institutional Repository software. K.U. Central Library is using Dspace as Institutional Repository software for creating IR in its Library.

6.6 Materials selected for Institutional Repository

Institutional Repository can be any collection of digital material hosted, owned or controlled and disseminate by any institution irrespective of purpose of origin. Institutional Repository can assume many forms and serve a variety of purposes as per the functions and objectives of parent institution. A digital archive of the intellectual product by the faculty, research staff and students/ research scholar of an institution and it should be accessible to end user without boundaries (with in and out of the

institution). Here the various contents of an Institutional Repository in the surveyed universities are shown in the table.

Table 6.6 Materials selected for Institutional Repository

Sl. No	Name of the Library	Materials					
		Articles	Books	Thesis/ Dissertation	Primary Data	Course materials	Others
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-	-	-
2.	K.K.H. Library, G.U.	-	-	✔	-	-	-
3.	K.U. Central Library	-	-	-	-	-	-
4.	Central Library, T,U.	✔	-	✔	-	-	✔

From above table 6.6 it is clear that all the surveyed University Library do not use Institutional Repository. K.K.H. Library and Central Library T.U. are only two universities libraries where Institutional Repository is used for archiving various materials. Both the universities select Thesis and Dissertation for their Institutional Repository, while the central library of T.U. selected other materials such as annual reports, Bez boruah special collection etc. for archiving in IR. The two university libraries i.e. Rev. B M Pugh Library, A.A.U. and K.U. Central Library are yet to develop their Institutional Repository.

6.7 Disciplinary Covered in the IR

University offers wide variety of courses in various disciplines. With the development of ICT, the modern libraries are using the latest technologies to meet the requirement of 21st century library users. IR is one of such invention. IR in a University may cover different subject's areas. The various disciplinary covered in IR among the surveyed Universities Libraries of Assam are shown in the table 6.7.

Table 6.7 Disciplinary covered in the IR of the survey University

S.N	Library	Disciplinary					
		Humanities and social Science	Life Sciences	Pure Sciences	Engineering	Applied Sciences	Others
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-	-	-
2.	K.K.H. Library, G.U.	✔	✔	✔	✔	✔	✔
3.	K.U. Central Library	-	-	-	-	-	-

| 4. | Central Library, T,U. | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |

From the Table 6.7 it is clear that only two universities are using the IR for archiving and dissemination of scholarly information. K.K.H. Library, G.U. and Central Library, T.U. are only two university libraries where the use of IR is there. Both the libraries cover the disciplinary such as humanities and social science, pure sciences, engineering, applied sciences and others branches of study. So far Rev. B M Pugh Library has not developed their repository and K.U. Central Library is in the developing stage.

6.8 Role of Librarian in IR of surveyed University Libraries

The SHERPA document essentially identifies two roles in repository management: The Repository Manager: Who manages the repository policies, the advocacy and communication programmes, the internal and external liaisons and the Repository Administrator: Who manages the technical implementation, customization of the repository software and develops value-added technical services for users. Institutional Repository is the recent responsibility of the libraries to act as a beginner of an open platform to the scholarly world. Here the table 6.8 displays the role of the librarian in the surveyed University libraries.

Table 6.8 Role of Librarian in IR of Surveyed University

Sl. No	Name of the Library	Role of the librarian			
		System Manager	**Manager**	**Reviewer**	**Customizer**
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	-	-	-	✔
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	✔	-

From the table 6.8 it is seen that the role of the librarian in IR of the surveyed universities libraries is minimum. The role of librarian in K.K.H. Library and Central Library, T.U. is customizer and reviewer respectively, while the other two libraries are yet to develop their IR in their respective institution. Rev. B M Pugh Library, A.A.U. should take some remedial steps for the development of Institutional Repository.

6.9 Motivation for establishing Institutional Repository

Motivation is an essential element for the success of any institution. There are certain factors which motivate any institution for establishment of Institutional Repository. The table 4.12 shows some of the motivational factors which has helps the universities libraries in the establishment of IR in the surveyed universities.

Table 6.9 Motivation for establishing IR

S.N.	Name of the Library	Motivation for establishing IR			
		To enhance the visibility of research output	**Provide free access**	**Preserve research output**	**Evaluate researcher and department**
1.	Rev. B M Pugh	-	-	-	-

	Library, A.A.U.				
2.	K.K.H. Library, G.U.	✔	-	-	-
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	✔	✔	✔	✔

The table 6.9 clearly displays the motivational factor of the surveyed university for establishment of Institutional Repository. K.K.H. Library and Central Library, T.U. are only two universities for establishing IR in their respective libraries. The motivation for establishing IR in K.K.H. Library is to enhance the visibility of research output in the university. On the other hand Central Library, T.U. derives motivation for providing free access to research output, to preserve research output and to help evaluate researcher and department besides enhancing the visibility of research output. The other two university libraries Rev. B M Pugh Library and K.U. Central Library are still on its way to find their motivational factors. The analysis shows the number of motivational factors of Central Library. T.U. is higher in comparison with K.K.H. Library, G.U.

6.10 Challenges faced in implementing IR

There are several basic challenges/ issues related with the implementation of Institutional Repository. Some issues specific to national archives and some general issues relevant to libraries and archives. Some well-known challenges such as difficulties in generating content, lack of incentives, right management issues, lack of awareness etc. The table 6.10 shows the various challenges faced in implementing IR in the surveyed universities.

Table 6.10 Challenges in implementing IR

Sl. No	Name of the Library	Challenges in implementing IR			
		Difficulties in generating content	Lack of incentives	Right management issues	Lack of awareness
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	✔
2.	K.K.H. Library, G.U.	-	-	-	-
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	-	✔

From the above table 6.10 it is clearly display that only two universities libraries namely K.K.H. Library and Central Library, T.U. has maintain their repository. Both the universities has faced the same challenges of lack of awareness among the user community of the university. While the other two universities libraries i.e. Rev. B M Pugh Library and K.U. Central Library are yet to face those challenges in the coming days.

6.11 Training and awareness among the library users

Training improves employee performance in an organization. The employee who receives the necessary training is more able to perform in their job smoothly. A training program allows in strengthening those skills that each employee needs to improve in the libraries. A development program brings all employees to a higher level so they all have similar skills and knowledge. Similarly trained manpower can generate awareness among the user community about the use of Institutional Repository. The table 6.11.1 shows the training provided to staff and students to use IR in the surveyed libraries.

Table 6.11.1 Training provided to staff and students by surveyed universities library

Sl. No	Name of the Library	Training provided to staff and students by library	
		Yes	No
1.	Rev. B M Pugh Library, A.A.U.	-	-
2.	K.K.H. Library, G.U.	✔	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	-

From the above table 6.11.1 it is seen that K.K.H. Library, G.U. and central Library, T.U. provide the training to staff and students with regards to how to use the IR in their respective Institution. Training is being provided by the library so that the users are aware and can use the IR whenever necessary. While Rev. B M Pugh Library and K.U. Central Library are lacking far behind in the use of IR in their libraries.

6.11.2 Periodic training to staff employed in IR

The table 6.11.2 shows the Periodic training to staff employed in IR of the surveyed university libraries.

Table 6.11.2: Periodic training to staff employed in IR

Sl. No	Name of the Library	Periodic training to staff employed in IR	
		Yes	No
1.	Rev. B M Pugh Library, A.A.U.	-	-
2.	K.K.H. Library, G.U.	✔	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	-

From the table 6.11.2 it is seen that K.K.H. Library, G.U. and central Library, T.U. provide periodic training to persons employed in IR of their respective libraries. This training helps them to keep up to date with the latest development in the field of Library and Information Science, while Rev. B. M. Pugh Library and K.U. Central Library are yet to develop their IR.

6.11.3 Awareness generation programmes by the surveyed university library

The table 6.11.3 displays the Awareness generation programmes undertaken by the surveyed university library.

Table 6.11.3: Awareness generation programmes by the surveyed university library

Sl. No	Name of the Library	Awareness generation programmes

		Seminar	Workshop	Lectures	Training
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	-	✔	-	✔
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	-	✔

The table 6.11.3 clearly shows that K.K.H. Library, G.U. and Central Library, T,U. are only two surveyed University Libraries where user generation programmes are being organize. K.K.H. Library, G.U. organizes user generation programmes like workshops and training programmes. On the other hand Central Library, T,U. only organize training programme for the awareness about the use and implementation of IR in their respective libraries. Both Rev. B M Pugh Library, A.A.U. and K.U. Central Library are far away for developing their IR in their respective libraries.

6.12 Access to Institutional Repository

Institutional repositories provide access to research to users outside the institutional community are one of the recommended ways to achieve the open access vision described in the Budapest Open Access Initiative definition of open access. This is sometimes referred to as the self-archiving or "green" route to open access.

6.12.1: Categories of users having accessibility to IR of the surveyed University Libraries

There are different categories of library user in the university. The user may comprise of students, research scholars, faculties, staff and other categories of people. The table 6.12.1 shows the different categories of users who can access the IR in the surveyed universities libraries.

Table 6.12.1: Categories of users having accessibility to IR of the surveyed University Libraries

Sl. No	Name of the Library	Categories of users having accessibility to IR			
		Students	Research Scholars	Faculty	Others
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	
2.	K.K.H. Library, G.U.	✔	✔	✔	✔
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	✔	✔	✔	✔

From the table 6.12.1 it is seen that the K.K.H. Library, G.U. and Central Library, T.U. can access those IR in the libraries. In both the universities libraries all category of users can access the IR. All categories of library users comprise of students, research scholars, faculties, and other like office staff, children etc. While Rev. B M Pugh Library and K.U. Central Library are lacking far behind in the use of Institutional Repository.

6.12.2 Log-in ID for accessing of repositories

For accessing the IR in their respective institution, a log-in ID is necessary. The table 6.12.2 shows that whether log-in ID are provided by the library for accessing of repositories.

Table 6.12.2: Log-in ID for accessing of repositories

Sl. No	Name of the Library	Log-in ID for accessing of repositories	
		Yes	No

1.	Rev. B M Pugh Library, A.A.U.	-	-
2.	K.K.H. Library, G.U.	✔	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	-

The table 6.12.2 shows that only two university libraries K.K.H. Library and Central Library, T.U. are able to give log-in ID for accessing of repositories by the library users. While the other two universities libraries are still phase behind in use Institutional Repositories in their respective institutional library.

6.12.3 Type of accessibility

The table 6.12.3 shows the type of accessibility provided by the surveyed university Library.

Table 6.12.3: Type of accessibility provided by the surveyed university Library

Sl. No	Name of the Library	Type of accessibility	
		Remote Accessible	**Local host/ within campus**
1.	Rev. B M Pugh Library, A.A.U.	✔	-
2.	K.K.H. Library, G.U.	-	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	✔

From the above table 6.12.3, it is seen that K.K.H. Library and Central Library, T.U. are providing different type of accessibility to the users. K.K.H. Library provide only remote accessible and on the other hand Central Library, T.U. provide both accessibility i.e. remote accessible and local host/ within campus. This facility helps the user is accessing of information by sitting in any corner of the world, while, the other two University libraries are yet to develop their IR.

6.13: Devices, content management software and analytics used in IR

Capturing and storing of data are essential functions in Institutional Repository. Institutional Repository uses several devices for capturing the data which has been selected for digitizing. The capture devices are in the form of scanner, camera and others. It also uses several storage device for storing the capture images.

To manage the content in Institutional Repository, there is an application of content management software. Drupal and Joomla are the example of content management software. It also uses several analytics for analyzing that content in the Institutional Repository.

6.13.1: Types of capture devices

The Table 6.13.1 shows the various capture device used by the surveyed university libraries.

Table 6.13.1: Types of capture devices

Sl. No	Name of the Library	Types of capture devices		
		Scanner	**Camera**	**Others**
1.	Rev. B M Pugh Library, A.A.U.	-	-	-
2.	K.K.H. Library, G.U.	✔	-	-
3.	K.U. Central Library	-	-	-

| 4. | Central Library, T,U. | ✔ | - | - |

The table 6.13.1 clearly shows that both K.K.H. Library, G.U. and Central Library, T.U. uses scanner for capturing the materials selected for digitation, while the other two university libraries are yet to develop their IR.

6.13.2 Types of storage devices

After capturing the data, data are needed to be stored. The table 6.13.2 shows the various storage device used by the surveyed universities libraries.

Table 6.13.2: Types of storage devices

Sl. No	Name of the Library	Types of storage devices			
		CD-ROM Disk	Cloud storage	External Hard Disk	Others
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	-	✔	-	-
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	✔	-	✔	-

From the above table 6.13.2 it is clearly seen that K.K.H. Library, G.U. and Central Library, T.U. uses several storage device for storing. K.K.H. Library use cloud storage while Central Library T.U. uses both CD-ROM Disk and External Hard Disk for storing data. The other two university libraries are still in the developing stage.

6.13.3 Content management software

The table 6.13.3 shows the various Content management software by the surveyed university libraries.

Table 6.13.3: Content management software used by the surveyed universities libraries

Sl. No	Name of the Library	Content Management Software		
		Drupal	Joomla	Others
1.	Rev. B M Pugh Library, A.A.U.	-	-	-
2.	K.K.H. Library, G.U.	-	-	-
3.	K.U. Central Library	-	-	-
4.	Central Library, T,U.	-	✔	-

From the above table 6.13.3 it is seen that only the central library of T.U. uses Joomla as the content management software, while the K.K.H. Library does not use nay content management software. The other two university libraries do not have IR of its own.

6.13.4 Types of analytics used in IR

The Table 6.13.4 shows different types of analytics used in IR by the surveyed university libraries.

Table 6.13.4: Types of analytics used in IR by the surveyed university libraries

Sl. No	Name of the Library	Types of analytics used in IR		
		Google analytics	PIWIK	Any Other
1.	Rev. B M Pugh Library, A.A.U.	-	-	-
2.	K.K.H. Library, G.U.	-	-	-
3.	K.U. Central Library	-	-	-
4.	Central Library, T,U.	✔	-	-

The table 6.13.4 shows that only the Central Library, T.U. uses Google analytics in analysis of content of IR in the library. K.K.H. Library does not use any analytics. The other two are lacking far behind in the regard of implementation of IR.

6.14 Manpower employed in the IR

Manpower Planning which is also called as Human Resource Planning consists of putting right number of people, right kind of people at the right place, right time, doing the right things for which they are suited for the achievement of goals of the organization. Manpower planning is also essential in Library for performing various functions.

6.14.1 Professional staff engaged in content management activity

The table 6.14.1 shows the Professional staff which are engaged in content management activity among the surveyed university libraries.

Table 6.14.1 Professional engaged in content management activity

Sl. No	Name of the Library	Professional engaged in content management activity	
		Yes	No
1.	Rev. B M Pugh Library, A.A.U.	-	-
2.	K.K.H. Library, G.U.	✔	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	-

From the above table 6.14.1 clearly shows that both K.K.H. Library and Central Library, T.U. has train manpower engaged in the content management activity, whereas, the other two libraries namely Rev. B M Pugh Library, A.A.U. and K.U. Central Library, do not have trained manpower in their respective libraries to handle such activity.

6.14.2 Number of trained manpower employed in IR of surveyed university libraries

The Table 6.14.2 shows the number of trained manpower employed in IR of surveyed university libraries.

Table 6.14.2: Number of Trained manpower employed in IR of surveyed university libraries

Sl. No	Name of the Library	Trained Manpower Employed in IR			
		One	Two	Three	More than three
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-

2.	K.K.H. Library, G.U.	-	-	✔	-
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	-	✔

From the table 6.14.2 it is seen that the Central Library, T.U has highest number of trained manpower employed in IR. While K.K.H. Library has only three man powers employed in IR. Both the other two universities libraries are still to develop their IR.

6.15 Access to Institutional Repository by different category of users

Table 6.15.1: Categories of users to access IR

S.No.	Name of the Library	Category of Users			
		Students	**Research Scholars**	**Faculty**	**Others**
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	✔	✔	✔	✔
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	✔	✔	✔	✔

In table 6.15.1, it is seen that the K.K.H. Library, G.U. and Central Library, T.U. can access those IR in the libraries. In both the universities libraries all category of users can access the IR. All categories of library users comprise of students, Resaerch Scholars, faculties and others, while Rev. B M Pugh Library and K.U. Library are lacking far behind in the use of Institutional Repository.

6.15.2 Types of Accessibility

Table 6.15.2: Types of Accessibility provided by the surveyed University libraries

Sl. No.	Name of the Library	Types of Accessibility	
		Remote Accessible	**Local host/ within Campus**
1.	Rev. B M Pugh Library, A.A.U.	✔	-
2.	K.K.H. Library, G.U.	-	-
3.	K.U. Central Library	-	-
4.	Central Library, T,U.	✔	✔

In the above table 6.15.2, it is noticed that K.K.H. Library and Central Library, T.U. are providing different types of accessibility to the users. K.K.H. Library provides only remote Access and on the other hand, the Central Library, T.U. provides both the accessibility.

6.16 Role of librarian in the management of IR

Table 6.16: Role of the Librarian

Sl. No.	Name of the library	Role of the librarian			
		System Manager	**Manager**	**Reviewer**	**Customizer**
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	-	-	-	✔

3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	✔	-

In the above table 6.16, the role of the librarian in Institutional Repositories in the surveyed university where its plays a minimum role in the management of IR. The role of librarian in K.K.H. Library and Central Library, T.U. is customizer and reviewer respectively, while the other two libraries are far away from developing their IR in their respective institution.

6.17: Training and awareness among the library users

<div align="center">Table 6.17: Training and Awareness Generation Programmes</div>

S. No	Name of the library	Awareness Generation Programmes			
		Seminar	Workshop	Lectures	Training
1.	Rev. B M Pugh Library, A.A.U.	-	-	-	-
2.	K.K.H. Library, G.U.	-	✔	-	✔
3.	K.U. Central Library	-	-	-	-
4.	Central Library, T,U.	-	-	-	✔

In the above table 6.17, it is seen that K.K.H. Library and Central Library, T.U. are two university libraries where user generation programmes are being organize. K.K.H. Library organizes user awareness generation programmes like workshops and training programmes. On the other side, Central Library, T.U. only organize training programme for the awareness about the use and implementation of IR in their respective libraries.

7. Major Findings

The major findings from the study are as follows:

- The types of document in Institutional repositories vary significantly and it comprise of documents like preprints, unpublished as well as peer reviewed articles, thesis and Dissertations, teaching and learning objects, conference proceedings administrative papers, manuscripts faculty, scholarly and university publications.
- Among the surveyed University Libraries, it is found that all of them do not have Institutional Repository.
- K.K.H. Library and Central Library. T.U. are the only two universities libraries where Institutional Repository is used for archiving various materials. Both the universities select Thesis and Dissertation for their Institutional Repository. The number of documents in Central Library of T.U. is higher in comparison to the K.K.H. Library, G.U. The Central Library of T.U. selected other materials such as annual reports, Bez boruah special collection etc. for archiving in IR. The two university libraries i.e. Rev. B M Pugh Library, A.A.U. and K.U. Central Library are yet to develop their Institutional Repository.
- Institutional repositories in universities of Assam are using open source software like Greenstone Digital library software, Dspace and so on. Using Dspace, self-archiving of document is possible after usual peer review process. This saves the time of information professionals for metadata creation.

- It is found from the analysis that Central Library, T.U. and K.K.H. Library are using Dspace as the Institutional Repository software. Whereas K.U. Central Library is using Dspace as Institutional Repository software for creating IR in its Library.
- Institutional repositories may be multidisciplinary or subject-oriented. Subject oriented institutional repositories are few in number, where scholars of a particular subject can contribute their documents. Among the surveyed university libraries, it is seen that K.K.H. Library, G.U. and Central Library, T.U. are only two university libraries where the use of IR is there. Both the libraries cover the disciplinary such as humanities and social science, pure sciences, engineering, applied sciences and others branches of study. Rev. B M Pugh Library is yet to develop their repository and K.U. Central Library is in the developing stage.
- The institutional repositories, if available in Internet, can be accessible throughout the world and if available in intranet, can be accessible only throughout the campus of the university. It is seen from the analysis that K.K.H. Library and Central Library, T.U. are providing different type of accessibility to the users. K.K.H. Library provide only remote accessible and on the other hand Central Library, T.U. provide both accessibility i.e. remote accessible and local host/ within campus. This facility helps the user is accessing of information by sitting in any corner of the world. While other two University libraries are yet to develop their IR.
- Institutional Repository is digital in nature. It is centralized collection of intellectual output of any organization. Understanding the importance of IR in universities by the LIS professionals, they have tried to implement IR in their respective university libraries. It is found from the analysis that Central Library, T.U. and K.K.H. Library G.U had started implementing Institutional Repository in the year 2013 and 2014 respectively. Central Library, T.U. is the first among the surveyed universities to implement Institutional Repository in their library. The IR in K.U. Central Library is in the developing stage. While Rev. B M Pugh Library is yet develop to IR in their library.
- University offers wide variety of courses in various disciplines. IR in a University may cover different subject's areas. It is seen from the analysis that K.K.H. Library, G.U. and Central Library, T.U. are only two university libraries using IR in their libraries. Both the libraries cover the disciplinary such as humanities and social science, pure sciences, engineering, applied sciences and others branches of study. So far Rev. B M Pugh Library has not developed their repository and K.U. Central Library is in the developing stage.
- The roles of the librarian in repository management are the Repository Manager: Who manages the repository policies, the advocacy and communication programmes, the internal and external liaisons and the Repository Administrator: Who manages the technical implementation, customization of the repository software and develops value-added technical services for users. it is seen from the analysis that the role of the librarian in IR of the surveyed universities libraries is minimum. The role of librarian in K.K.H. Library and Central Library, T.U. is customizer and reviewer respectively. While the other two libraries are yet to develop their IR in respective institution. Rev. B M Pugh Library, A.A.U. should take some remedial steps for the development of Institutional Repository.
- There are certain factors which motivate any institution for establishment of Institutional Repository. It is found that K.K.H. Library, G.U. and Central Library, T.U. are only two

universities for establishing IR in their respective libraries. The motivation for establishing IR in K.K.H. Library is to enhance the visibility of research output in the university. On the other hand Central Library, T.U. derives motivation for providing free access to research output, to preserve research output and to help evaluate researcher and department besides enhancing the visibility of research output. The other two university libraries Rev. B M Pugh Library and K.U. Central Library are still on its way to find their motivational factors. The analysis shows the number of motivational factors of Central Library. T.U. is higher in comparison with K.K.H. Library, G.U.

- There are several basic challenges/ issues related with the implementation of Institutional Repository. it is from the analyis that only two universities libraries namely K.K.H. Library and Central Library, T.U. has maintain their repository. Both the universities has faced the same challenges of lack of awareness among the user community of the university. While the other two universities libraries i.e. Rev. B M Pugh Library and K.U. Central Library has so far not met those challenges.

- Training improves employee performance in an organization. The employee who receives the necessary training is more able to perform in their job smoothly. It is seen from the analysis that K.K.H. Library, G.U. and central Library, T.U. provide the training to staff and students with regards to how to use the IR in their respective Institution. Training is being provided by the library so that the users are aware and can use the IR whenever necessary. While Rev. B M Pugh Library and K.U. Central Library are lacking far behind in the use of IR in their libraries. It is also seen that K.K.H. Library, G.U. and central Library, T.U. provide periodic training to persons employed in IR of their respective libraries.

- Among the surveyed university libraries, it is found that K.K.H. Library, G.U. and Central Library, T. U. are only two surveyed University Libraries where user generation programmes are being organized. K.K.H. Library, G.U. organizes user generation programmes like workshops and training programmes. On the other hand Central Library, T.U. only organize training programme for the awareness about the use and implementation of IR in their respective libraries. Both Rev. B M Pugh Library, A.A.U. and K.U. Central Library are far away from developing their IR in their respective libraries.

- The libraries of universities use several analytics for analyzing that content in the Institutional Repositories. It is only the Central library; T.U. uses Google analytics in analysis of content of IR in the library.

8. Conclusion

Institutional Repositories is considered as important assets in a University library. From the study conducted to understand the management of Institutional Repositories in selected university libraries of Assam, it is noticed that Tezpur University and Gauhati University are the two institutions where there is proper implementation of Institutional Repositories were found. Initiative of Open Access has been taken up by several universities of India as much of these higher educational institutions are showing interested in publishing their scholarly information in the public domain. When there is implementation of Institutional Repository in the libraries, the role of librarians and LIS professionals should be maximize so that they can play a vital role in its proper development. According to the study, there are various challenges which are associated with the implementation of

Institutional Repository. The in charge should engage the professional staff for the proper handling of the various mechanisms. The study also suggests several strategies for improving growth of repositories of Assam in compatible with the global standard. As all the Indian IDRs are based on open standards and open source software so surely that there is a scope for developing a "Best Practice Guidelines" for designing institute-oriented IDR in institution of Assam. As per the study conducted by Kalbande (2019), the findings reveals that Shodhganga: A reservoir of Indian thesis has the maximum number of collections in Indian Institutional Repositories. A total of 982288 documents were available in the existing 84 Indian Institutional Repositories. Again the study has found that various institutions in India are undertaking initiative for the development of Institutional Repositories. The Shodhganga has the highest number of Electronic Thesis and Dissertations among the other ETD initiative. A sum of 305308 e-theses was available in Indian ETD platforms.

At the end, the analysis of the study gives the insight that there is need to raise awareness and consciousness among the manager of educational institute or university to understand the importance of Institutional repository in their respective institutions. It is also affirm that country like India has a long way to achieve excellence in the proper management of its digital resources and the researcher need to practice the self- achieving practice so that the society is also benefited. The government in this regard need to undertake some legitimate measures so that every educational and research and development institution adopt and implement the policies as per their need and connivance.

References

- Bjork, B.C. (2004). Open Access to Scientific publications-An Analysis of the barriers to change? *Information Research*, 9(2).
- Crow, R. (2002). *SPARC Institutional Repository Checklist & Resource Guide*. Washington, Dc: Scholarly Publishing & Academic Resources Coalition.
- Dhanavandan, S.S. (2020). Open Access Repositories in the world: An Overview. *Library Philosophy and Practice*.3805.
- Greiveld, H. (2006). Considering a Marketing and Communications Approach for an Institutional Repository. *Ariadne*, 49.
- Johnson, R. K. (2002). Institutional Repositories: Partnering with faculty to enhance scholarly communication. *D-Lib Magazine*, 8(11).
- Kalbande, D. T. (2019).Institutional Repository in Open DOAR: Status Quo India. *Library Philosophy and Practice*. 2562.
- Kamila, K. (2009). Institutional Repository Projects in India. International CALIBER,25-27 Februrary, Pondicherry University.
- Kamraninina, K. & Abdullah, A. (2010). Librarians' role as change agents for Institutional Repositories: A case study of Malaysian academic librarians. Malaysian Journal of Library & Information Science, 15(3).
- Kuri. R. & Singh, M. (2020). Indian Institutional Repositories (IRs) reflected in the Directory of Open Access Repository (DOAR): A Case Study. *Library Philosophy and Practice*.4640.

- Pickton, M. & Barwick, J. (2006). A Librarians guide to Institutional Repositories. *eLucidate*, 3 (2), 3-9.
- Wikipedia, retrieved on 20 July, 2021 from En.wikipadia.or/wiki/repository.