Original Research

Web-based Prosodic Perspectives of Open Access Library and Information Science (LIS) Repositories in South Asia and East Asia

Aditi Roy
Research Scholar, Department of Library & Information Science, University of North Bengal Raja Rammohunpur West Bengal, India.
Corresponding Author: rs_aditi@nbu.ac.in
ORCID iD: https://orcid.org/0000-0002-3749-7837

Saptarshi Ghosh
Professor, Department of Library & Information Science, University of North Bengal, Raja Rammohunpur, West Bengal, India.
sghosh@nbu.ac.in
ORCID iD: https://orcid.org/-0000-0001-9567-5868

Abstract

The primary objective of this study is to assess the quality and performance of South and East Asian Open Access Library and Information Science Repositories. The study is segmented into four parts; the first is devoted to quality assessment, and the second is the repositories' performance using the web analysis tool Nibbler and Alexa. In the third segment, the Revised Web Impact Factors (RWIF) were calculated, and the final part represents the Ranking of the repositories in terms of visibility, transparency, and excellence. The results indicate that the Chinese Institutional Repository of the Chinese Academy of Geographic Sciences and Natural Resources Research, CAS, and the Peking University Institutional Repository ranked the first and the second, respectively, with Japanese repositories ranking the last. "Taiwan's Chaoyang University of Technology Institutional Repository" has the most comprehensive collection of resources with varying levels of availability of resources in terms of quality assurance indicators. The authors of this paper are in the dire belief that this study may aid administrators in determining the repositories' strengths and weaknesses to enhance their quality and performance.

Introduction

In today's scholarly discourse, terms like "open knowledge," "open innovation," "open science," and others are used to describe the concept of "openness." However, when addressing any of these open ideas, "Open Access" appears to be the most significant because it gives consumers/users access to information. Moreover, open access helps disseminate information free of cost, which boosts the usage of scholarly published literature. The initiatives taken on Open Access in Budapest in 2002 gave a rapid growth in popularity and importance to Open Access Movements (Sengupta, 2012). The Budapest Open Access Initiative (2002) defines Open Access as 'free availability on the public internet, permitting any users to read, download, copy, distribute and/or print, with the possibility to search or link to the full texts of these

articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself" (http://www.soros.org/openaccess).

An open access repository is a collection of full-text materials that may be accessed freely and instantaneously via online databases. Research institutions manage institutional repositories to store their individual contributors' work (Pinfield, 2005). Open Access Repositories procure and preserve online resources for users free of charge to satisfy their needs (Maharana & Chakrabarti, 2019). Libraries and staff have exciting challenges owing to open access. Librarians in institutions with open access policy or where academics have shown an interest in depositing items in institutional repositories might take advantage of the chance to promote the repository and act as open access liaisons. The creation of open-access institutional repositories boosts intellectual communication tremendously. During this time, open access repositories had much success. The cost of serials is linked to the origin of open access repositories. Now, one indicator of a repository's excellent quality is whether it can aid in disseminating knowledge (Cullen & Chawner, 2011).

The Directory of Open Access Repositories is a comprehensive collection of open access repositories worldwide. OpenDOAR is the quality-assured, global Directory of Open Access Repositories, "We host repositories that make academic outputs and resources available to the public for free. Each repository entry in OpenDOAR has been carefully checked and processed by a member of our editorial team, allowing us to provide the community with a reliable service," according to its About page (OpenDOAR, 2022). On the one hand, institutional repositories and the creation of digital libraries are vital to the open access movement's success (Bailey, 2006). On the other hand, open access publishing adds to the complexity and diversity of digital library development. Subject repositories and institutional repositories are two types of open access repositories.

In this context, this study focuses on the webometric analysis of South and East Asian open access repositories, specifically in the Library and Information Science (LIS) discipline.

Digital repositories, irrespective of their tiers, store, preserve and disseminate information to all. However, there remains a blurred zone between the library and information science community and the contents of the open access repositories on cognitive levels. Are open access repositories related to the library and information science domain? Are there materials on library and information science? What is the role of an information professional in the creation, evaluation, and extension of open access repositories? These queries lead the authors to address the issues regarding open access repositories through a comprehensive analytical discourse.

Objectives

The objectives of the study pivot around specific perspectives that were a). To examine and compare open access LIS repositories relative to the content b). Finding out the preferred software for these repositories. c). identify search mechanisms in those repositories d). analyze and compare content aggregation policies in the Library and Information Science discipline e). Classify the repositories according to their qualities and their performance score obtained by the web analytics tool f). Measure performance parameters of these open-access LIS Repositories in South and East Asia. The performance of an indexing system is of paramount importance for its sustenance. Hence, the focus of the study was to identify the performance of the open access repositories and their internal structure of data storage.

Lastly, this study evaluated the repositories' performance by addressing their quality, primarily using Atenas and Havemann's (2013) quality assurance indicators and additional parameters provided by experts in this field. The parameters considered for the research are, a) Types of resources stored in a repository (Hylén, 2006; Pegler, 2012; Atenas & Havemann, 2013); and b). A mechanism for collecting and storing user feedback for administrative purposes (Downes, 2007; Richter & Ehlers, 2010; Clements & Pawlowski, 2012, Atenas & Havemann, 2013). c). author assignment to each record in the repository (Petrides, Nguyen, Jimes & Karaglani,, 2008; Browne, Holding, Howell & Rodway-Dyer, 2010; Kanwar et al., 2011, Atenas & Havemann, 2013). d). Multilinguality in those repositories (Richter & McPherson, 2012; Pawlowski & Hoel, 2012; OECD, 2007, Atenas & Havemann, 2013). e). The repository's copyright for its contents. f). The users' right to full-text availability (Wiley, 2007; Tuomi, 2006, Atenas and Havemann, 2013). g). search mechanisms for improving the precision ratio. h). The repositories' compatibility with Web 2.0 tools (Shueb & Sofi, 2014) and i). Email Alert service that allows users to receive pertinent information via email.

Finally, this study measured the webometric ranking of repositories regarding their visibility, transparency, and excellence on the web, using the Revised Web Impact Factor (RWIF) and the Ranking Web of World Repository prescriptions.

Literature Review

An analysis of 80 open educational repositories was carried out to evaluate the quality in terms of repository design, sharing, reuse of resources, collaboration among academic communities, and how much the repositories enable to promote openness. The repositories have "adopted the view of furthering the aims of OER Movement as stated in the 2012 Paris Declaration". The developers of the repositories have focused on the resources for development and sustainability (Atenas & Havemann, 2013). Another study on the growth and development of institutional repositories in the discipline of Library and Information Science in Asia with the primary objective to find out the geographical contributions of open access LIS repositories as well as to identify the core content types and language diversity, which is also the sublime of our study (Sengupta,2012). The performance of Sodhganga, a national repository of India, was measured using Web Analyzer Test Score (WATS) obtained from Nibbler, a free web analyzer website, and the overall score found was 6.4 (Chakravarty, 2019). Open access institutional repositories in the Asia continent were examined using OpenDOAR (Directory of Open Access Repositories) and the Ranking of Web World Repositories (RWWR), which found that the operation and maintenance of those repositories lacked in comparison to repositories of the USA and the UK.

Although the study also found that, only some countries in Asia, like Japan, Korea, India, Taiwan, Indonesia, China, Turkey, and Malaysia, had more possibilities for global open-access research than other new and developing countries (Cho, 2019). The Ranking Web of World Repositories (RWWR) considers specific indicators obtained from web search engines following a model like an impact factor considering the number of web pages and external inlinks. 50% weightage is given on activity parameters that are- size (number of pages-20%), PDF files (15%), and items in Google Scholar Database (15%), while the other 50% is on visibility (external inlinks) (Aguillo, Ortega, Fernández & Utrilla, 2010). Open Educational Resources Repositories, which support collaborative teaching and learning, thus need an excellent and sustainable quality to provide better services to the users. The use of good quality

standards such as ISO 9000, use of standardized metadata, review policies, multilingualism, user evaluation tools, etc., can be considered as LOR (Learning Object Repositories) Quality Assurance Framework (LORQAF) for LOR developers (Clements, Pawlowski, & Manouselis, 2015). The Institutional Repositories in the South Asian region with the majority from India, Sri Lanka, and Bangladesh, although the development is lagging compared with the developed countries in the world. The characteristics of those repositories were studied in terms of content types; software used language priority, usage statistics, content management policies, web 2.0 tools, and others. The result found the highest number of operational IRs from India, and most IRs were aggregating "Journal Articles" and using DSpace software (Gul, Bashir & Ganaie, 2019). A webometric study of the websites of social science research institutions in India, with a prime focus on the Indian Council of Social Science Research (ICSSR), sponsored institutes using various Search Engine Optimisation (SEO) tools and websites to calculate the Web Impact Factor (WIF) of those repositories as well as ranking them accordingly (Pal, Kar & Sardar, 2020). The metadata quality representing the datasets in a repository plays an essential role in the long-term sustainability of research data repositories and data reuse. A study on the Dryad repository to identify the metadata quality issues shows that significant problems lie in DC Creator, DC Date, and DC Type of metadata elements and misuse of data. For DC Creator, the problem can be solved by using a unique ID that would hold the creator's full name (Such as ORCID IDs), DC Date should follow the same pattern, i.e., DD-MM-YYYY, and for the DC Type metadata element -the use of the pre-defined list of values for authors to select from (Rousidis, Garoufallou, Balatsoukas & Sicilia, 2014). The webometric study of Open Access Digital Repositories of Agricultural Science in the Continents of Oceania was discussed on several link structures, internet access, and link count. This study analyzed the web impact factors and raking using the WISER index, which is now updated, and we have adopted a new methodology for ranking the repositories in our study (Ghosh & Roy, 2021). Malaysia's Public University Institutional Repositories were studied using a backlink crawler and web search engine, revealing that research repositories dominate the web visibility, whereas non-research repositories were at the bottom of the rankings (Ismail et al., 2021).

Materials and Methods

First, we compiled a list of repositories from OpenDOAR, and following the directory's content policy, the repositories are institutional, departmental, or multi-institution subject-based repositories that accept all types of items (https://v2.sherpa.ac.uk/opendoar/policytool/). Next, we measured the performance of the repositories using two web analyzer tools, Nibbler and Alexa.

The focus of the study was to analyze the quality and performance of the Open Access Repositories in the discipline of Library and Information Science (LIS) in South Asia and East Asia.

The scope of this research work is enunciated as the following.

• Collection of the list of open access LIS repositories of South and East Asia from both OpenDOAR and OpenROAR; however, in this study, we confined ourselves to the repositories registered in the OpenDOAR only.

• Out of the total of 19 open access LIS repositories registered under OpenDOAR, we discarded four repositories; (a) Indian Institute of Petroleum Institutional Repository, India- This institute's institutional repository page is not accessible, but the only homepage is

accessible, (b) Dspace@sdmced, India- Shri Dharmasthala Manjuatheshwara College of Engineering and Technology online catalog of the library and e-resources is accessible only via the campus network, (c) Library and Information Science Institutional Repository, China- the website URL (http://csh.fjnu.edu.cn/dspace/) and (d) One World South Asia Open Archive Initiative (http://open.ekduniya.net/) given in OpenDOAR is found to be wrong and cannot be accessed.

- We could not get the total record count of the Chinese Institutional Repository of the Institute of Geographic Sciences and Natural Resources Research, CAS, so we could not evaluate this repository in terms of quality assurance indicators.

- For some unknown reason, Nibbler (https://nibbler.silktide.com/) was unable to anal analyze the Website of Chaoyang University of Technology Institutional Repository, Taiwan (http://ir.lib.cyut.edu.tw:8080/) but Alexa (https://www.alexa.com/) helped us to interpret it.

This webometric study comprised several steps a) collection of data, b) analysis of data and c) interpretation of the data. The steps are as follows

Step 1: Survey OpenDOAR (Directory of Open Access Repositories) and OpenROAR (Registry of Open Access Repositories) to collect the list of Institutional Repositories of Library and Information Science in the South and East Asia Region. Whereas 19 repositories were registered under OpenDOAR, OpenROAR reported only 13.

Step 2: Web survey and data aggregation from the Open Access LIS Repositories in quality assurance indicators.

Step 3: Application of web analyzer tool to measure the performance of the repositories. Many 'website analyzers' are available, but we used NIBBLER *(https://nibbler.silktide.com/)* to collect data.

Step 4: Using Google as the search engine for collecting the total number of web pages using the google keyword string; *site:url.* Using the most used and recommended SEO tool, 'Majestic' (https://majestic.com/), to collect the external backlinks, complete outlines, and total inbound links (accessed on 24/06/2021 and 25/06/2021).

Step 5: Calculation of Revised Web Impact Factor for each of these repositories using the following formula (Maqbool, 2019),

RWIF= B/A

Where, B= in links (external backlinks) to the website

A= number of web pages published on the website indexed by the search engine.

Step 6: Use the 'Publish or Perish software program to retrieve data sources from Google Scholar to obtain the raw citations for analyzing the customized RWWR (Ranking Web of World Repositories) ranking.

Step 7: Construction of a customized RWWR (Ranking Web of World Repositories) indicator to assign a rank to the repositories, following the specifications given by Cybermetrics Lab (*https://www.webometrics.info/en/Methodology*).

In the customized specification, we changed the Excellence (Scholar Factor). Table 1 shows the excellence parameter in the methodology provided by webometrics.info emphasised "Number of papers amongst the top 10% most cited in each of all 27 disciplines of the full database. Data for the five years: 2015-2019". Our study is restricted to Library & Information Science Domain only, and thus the recommendation of 27 disciplines seemed superfluous for our research. We calculated the numbers of papers by the repository with individual citation

count for each paper through Publish or Perish (POP). We ranked the documents by the number of citations received for all documents and counted 10% of the top-cited articles for the Excellence criterion.

Table 1
Customized Indicators for RWWR Analysis

Indicators	Meaning	Methodology	Source	Weight
Visibility	Web Contents Impact	Number of External Networks linking to the institution's webpages	Majestic	50%
Transparency (Openness)	Top cited researchers	Number of citations from top 210 authors (excl. top 20 outliers)	Google Scholar Profiles	10%
Excellence (Scholar)	Top cited papers	10% of Top cited articles in the entire database	Google Scholar	40%

Step 8: The ranking list of RWWR (https://repositories.webometrics.info/) was also collected to determine the global rank of the repositories, and Alexa (https://www.alexa.com/), was used to find the global popularity rank of the repositories.

These data were collected in spreadsheets, compiled, and then analyzed to satisfy the research objectives.

Results

Figure 1 represents South and East Asia, there are 14 countries, but only five have open access to LIS repositories registered in OpenDOAR, with India having the most. While OpenDOAR and OpenROAR produce similar results in terms of countries, the results in repository count are different, with India having the highest count (7).
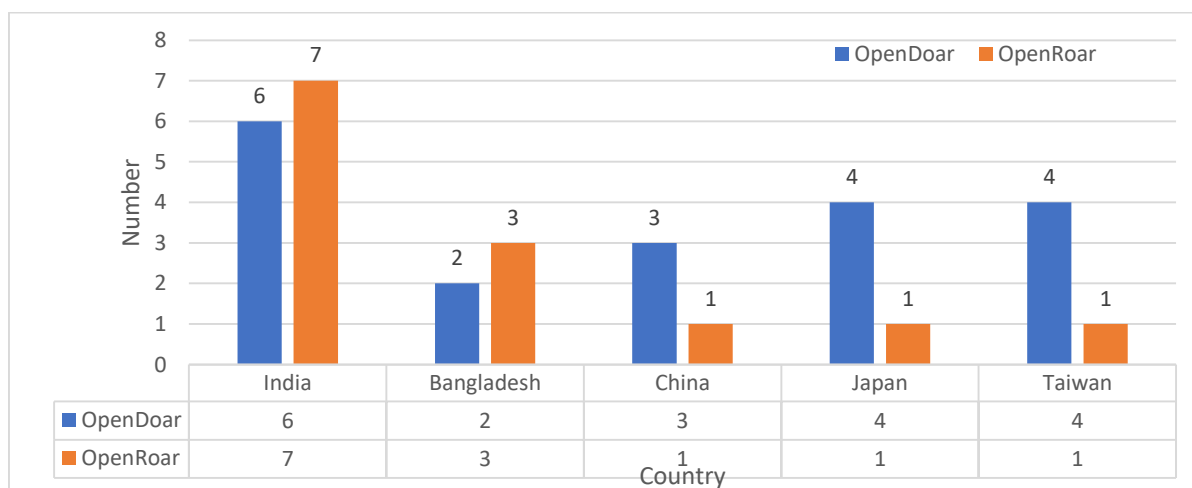

	India	Bangladesh	China	Japan	Taiwan
OpenDoar	6	2	3	4	4
OpenRoar	7	3	1	1	1

Figure 1: Count of Open Access LIS repositories in OpenDOAR and OpenROAR

We noticed that the data collected from OpenDOAR and OpenROAR are entirely dissimilar, and there is no typical match as provided in Table 2. For example, OpenDOAR appears to be more effective at providing a current snapshot of open access repositories, whereas ROAR offers a complete picture of their historical numbers. Additionally, the ROAR

website is a little buggy, with several features not functioning correctly, which does not appear to be an issue with OpenDOAR (Bakersc, 19/08/2016).

Table 2
Repository list from OpenDOAR and OpenROAR

Sl. No.	Country	Open Access LIS repositories listed in OpenDOAR	Date (Last Modified)	Open Access LIS repositories listed in OpenROAR	Date
1	India	Inflibnet IR	18/02/2021	Institutional Repository of Intellectual contributions of DTU	8/11/10
2	India	IR@NPL	4/12/2019	ePrints@Bangalore University	28/12/16
3	India	Indian Institute of Petroleum Institutional Repository	18/02/2021	Digital Repository of NIT Goa	17/11/16
4	India	Librarians' Digital Library	4/12/2019	IR@NEERI	26/06/15
5	India	OneWorld South Asia Open Archive Initiative	21/05/2021	OpenDOAR-Home Page	23/06/13
6	India	dspace @ sdmcet	17/10/2019	KNooR (Knowledge Repository Open Network)	25/08/11
7	India			National Science Digital Library at NISCAIR	23/02/10
8	Bangladesh	Daffodil International University Institutional Digital Repository	17/10/2019	EWU Digital Library	23/05/13
9	Bangladesh	Knowledge Repository	18/02/2021	EWU Digital Library	21/10/14
10	Bangladesh			IUT Digital Library	12/08/13
11	China	Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS	17/10/2019	Fujian University Institutional Repository	20/04/10
12	China	Institutional Repository of Peking University	17/10/2019		
13	China	Library and Information Science Institutional Repository (图书馆学系机构库)(LISIR)	17/10/2019		
14	Japan	IPU REPOSITORY	18/02/2021	Osaka Museum of Natural History Research Repository	31/03/17
15	Japan	Surugadai University	18/02/2021		

Sl. No.	Country	Open Access LIS repositories listed in OpenDOAR	Date (Last Modified)	Open Access LIS repositories listed in OpenROAR	Date
		Repository for Academic Resources			
16	Japan	TUIS Academic Repository	09/09/2020		
17	Japan	Tama University Institutional Repository	09/09/2021		
18	Taiwan	Chaoyang University of Technology Institutional Repository	17/10/2019	The Academia Sinica Institutional Repository	23/01/15
19	Taiwan	Hsiuping Institute of Technology Institutional Repository	18/02/2021		
20	Taiwan	National Taipei University of Nursing and Health Sciences Repository	17/10/2019		
21	Taiwan	National Pingtung Institute of Commerce Institutional Repository	17/10/2019		

Among these repositories, the earliest was created in OpenDOAR on December 22, 2005, by DRTC, Bangalore (India), and the latest on July 6, 2016, by the National Taipei University of Nursing and Health Sciences Repository (OpenDOAR ID - 3633), Taiwan.

We discovered that the website URLs listed in OpenDOAR are incorrect for the repositories listed below with the correct URLs: 1. One World South Asia Open Archive Initiative India (could not find the original website), 2. dspace@sdmcet, India (https://sdmcet.ac.in/library/), 3. Institutional Repository of the Chinese Academy of Sciences, CAS, China (http://english.igsnrr.cas.cn/), 4. Library and Information Science Repository (we could not trace the original website).

Data Collected from the Repositories

We collected data from the repositories' websites to determine the repository's total collection, as the record count in OpenDOAR and that in the repository were inconsistent. This is portrayed in Table 3. Chaoyang University of Technology Institutional Repository had the most records (22947). We found that repositories in India and Bangladesh used an English-language interface and did not support multilingual search, whereas repositories in Taiwan, Japan, and China used a multilingual interface and did multilingual support search. Except for those in Japan, all repositories had a feedback option on their website. Most of the repositories included both a basic search technique and an advanced search option.

Table 3
Repository Quality Assessment (total record count, Search Mechanism, Multilingual search, and

Feedback)

Repository list	Total record count	Search mechanism	Multilingual Search	Feedback
Inflibnet IR	1857	Boolean Search, Advanced Search, Subject Category Search	No	Yes
IR@NPL	3661	Simple Search, Advanced Search, Boolean Search	No	Yes
Librarians' Digital Library	496	Boolean Search, Advanced Search, Subject Category Search	No	Yes
Daffodil International University Institutional Digital Repository	5505	Simple Search, Boolean Search technique	No	Yes
Knowledge Repository	6122	Simple Search, Boolean Search, Advanced Search	No	Yes
Institutional Repository of Peking University	3504	Simple Search	Yes	Yes
IPU REPOSITORY	508	Keyword search, Full-text search, detailed search	Yes	No
Surugadai University Repository for Academic Resources	2129	Keyword search, Full-text search, detailed search	Yes	No
TUIS Academic Repository	510	Keyword search, Full-text search, detailed search	Yes	No
Tama University Institutional Repository	693	Keyword search, Full-text search, detailed search	Yes	No
Chaoyang University of Technology Institutional Repository	22947	Simple Search, Advanced Search	Yes	Yes
Hsiuping Institute of Technology Institutional Repository	7895	Simple Search, Advanced Search	Yes	Yes
National Taipei University of Nursing and Health Sciences Repository	6683	Simple and Advanced Search	Yes	Yes
National Pingtung University	17291	Simple Search, Advanced Search	Yes	Yes

We compiled data on content types from OpenDOAR represented in Figure 2. Most repositories contain journal articles as their primary resource, followed by theses and dissertations, as most repositories are university institutional repositories. Furthermore, we noticed only two repositories that collect patents: the Hsiuping Institute of Technology Institutional Repository in Taiwan and the One World South Asia Archive Initiative in India. However, the authors

could not access the One World South Asia Archive Initiative's repository website.
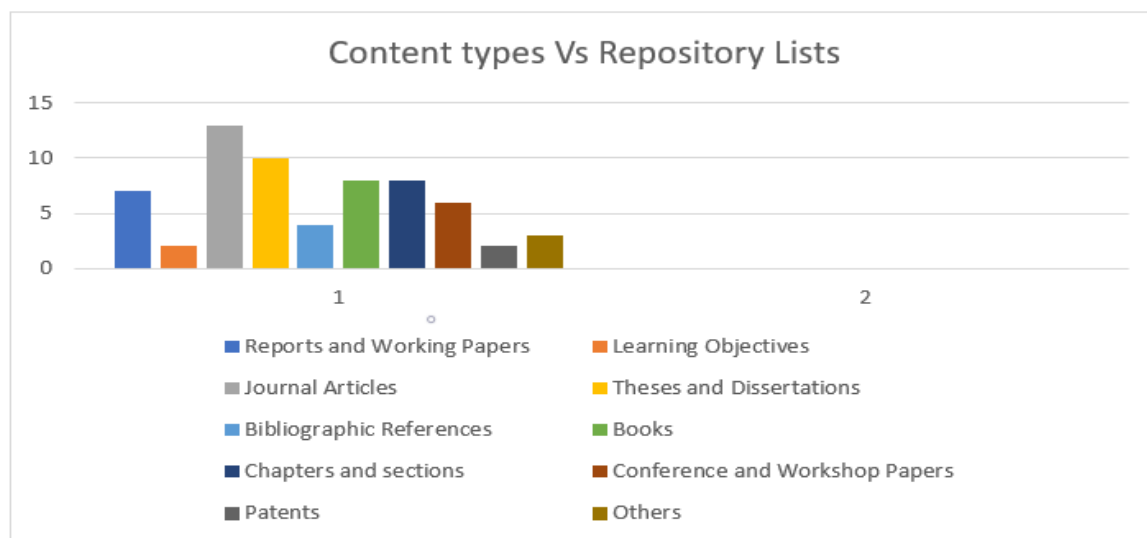

Figure 2: Repositories according to Content Types

Figure 3 represents the diagrammatic representation of software used by the repositories. While DSpace is the most frequently used software in South and East Asia's Open Access Repositories, all Japan's repositories use WEKO. WEKO is a free and open-source repository management system developed by Japan's National Institute of Informatics (NII). SDMCET library in India uses EasyLib library automation software.
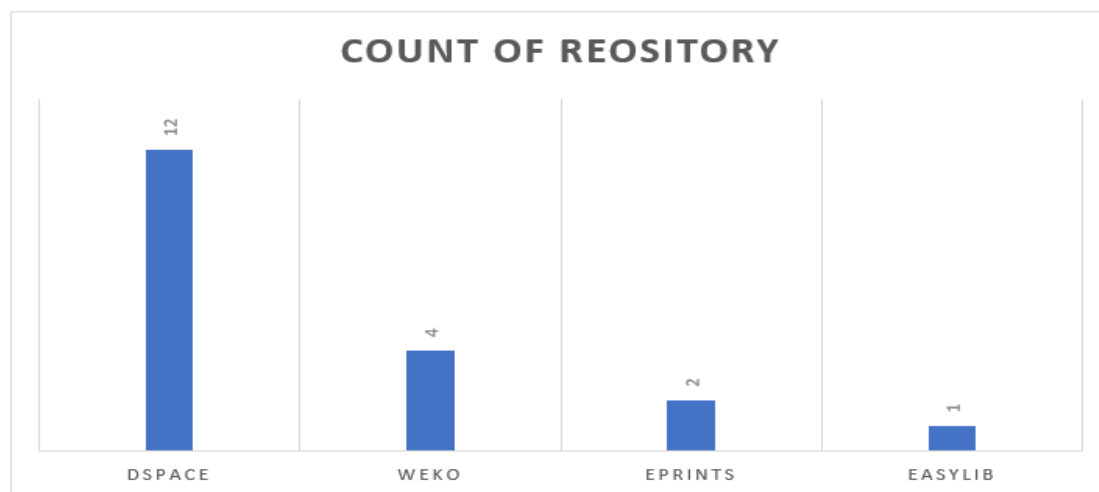

Figure 3: Count of Repositories according to software used

While DSpace is the most frequently used software in South and East Asia's Open Access Repositories, all Japan's repositories use WEKO. WEKO is a free and open-source repository management system developed by Japan's National Institute of Informatics (NII). SDMCET library in India uses EasyLib library automation software.

Many repositories have an English-language interface, while eight support multilingual interfaces as shown in Figure 4. The language-wise division of the repository as per OpenDOAR and as per the original repository description is different. According to

OpenDOAR, the Librarians' Digital Library repository, DRTC, India, is a multilingual repository interface, but when we analyzed it, we found that its interface is in the English language only and does not support multilingual search. The Chinese interface repository Library and Information Science Institutional Repository was not accessible. All the Japanese repositories were multilingual, both in Japanese and English. Hence, the data of OpenDOAR is not all correct in terms of repository interface language.
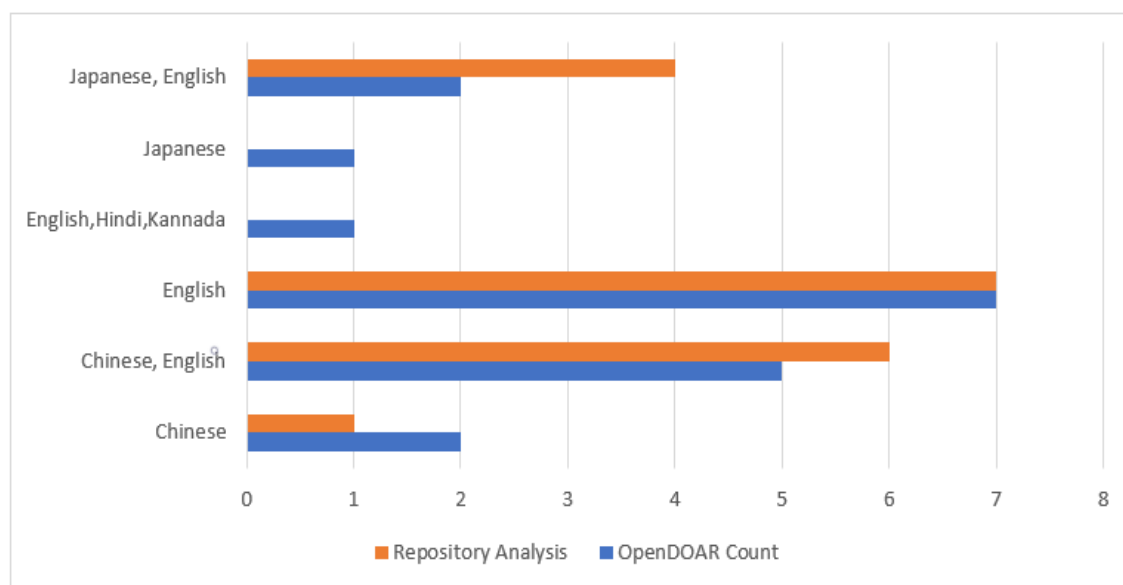

Figure 4: Repository list according to language

Table 4 represents the repository quality assessment. Except for the Institutional Repository of the National Physical Laboratory, India, all the repositories mentioned the resources available. Except for the Institutional Repository of the National Physical Laboratory, India, all the other repositories made the resources available in full text. The email alert service is unavailable in Japan, China, or Taiwan (except for the Hsiuping Institute of Technology Institutional Repository), but repositories in India and Bangladesh do.

Table 4
Repository Quality Assessment (Authorship, web 2.0 tools, copyright, email alerts, and full-text availability)

Repository List	Authorship Mentioned	Web 2.0 tools	Copyright	Email alerts	Full-text availability
Inflibnet IR	Yes	No		Yes	Yes
IR@NPL	Yes	Yes		Yes	No
Librarians' Digital Library	Yes	Yes		Yes	Yes
Daffodil International University Institutional Digital Repository	Yes	Yes		Yes	Yes
Knowledge Repository	Yes	Yes	icddr,b	Yes	Yes
Institutional Repository of Peking University	Yes	No	Ex libris	No	Yes
IPU REPOSITORY	Yes	No		No	Yes

Repository List	Authorship Mentioned	Web 2.0 tools	Copyright	Email alerts	Full-text availability
Surugadai University Repository for Academic Resources	Yes			No	Yes
TUIS Academic Repository	Yes	No		No	Yes
Tamag University Institutional Repository	Yes	No		No	Yes
Chaoyang University of Technology Institutional Repository	Yes	Yes	NTU library IR team	No	Yes-22860 available
Hsiuping Institute of Technology Institutional Repository	Yes	Yes	NTU library IR team	Yes	Yes-4357 available
National Taipei University of Nursing and Health Sciences Repository	Yes	Yes	NTU library IR team	Yes	Yes-6030. Available
National Pingtung University	Yes	Yes	NTU library IR team	No	Yes- 12840 available

Data collected from Nibbler- web-analyzer tool

We experimented with a variety of website analyzers to obtain the desired result for the study. However, we ultimately chose **Nibbler**(*https://nibbler.silktide.com*) for data analysis because it includes additional features such as average word count per page, incoming and internal links, server behavior, and URL formats. Additionally, recommendations are provided to help improve the website.

Overall Score

We calculated the overall score by averaging all of Nibbler's website analysis tests and represented in Figure 5. According to the overall score obtained by the repositories, Librarians' Digital Library, DRTC, India, received the highest score, and the National Pingtung University of Taiwan received the lowest score. Unfortunately, Nibbler was unable to analyze the website of Taiwan's Chaoyang Institute of Technology.

Nibbler ran a single test to determine the repositories' freshness regarding how frequently they are updated and maintained. Only three repositories received a score of ten out of ten; these are Institutional Repository of the Institute of Geographic Sciences and Natural Resources Research, CAS, China- Last updated on 01/06/2021 (test performed on 8/06/2021) National Pingtung University, Taiwan- Last updated on 08/06/2021 (test performed on 08/06/2021) Bangladesh Knowledge Repository- Last updated on 25/05/2021 (test performed on 26/05/2021).
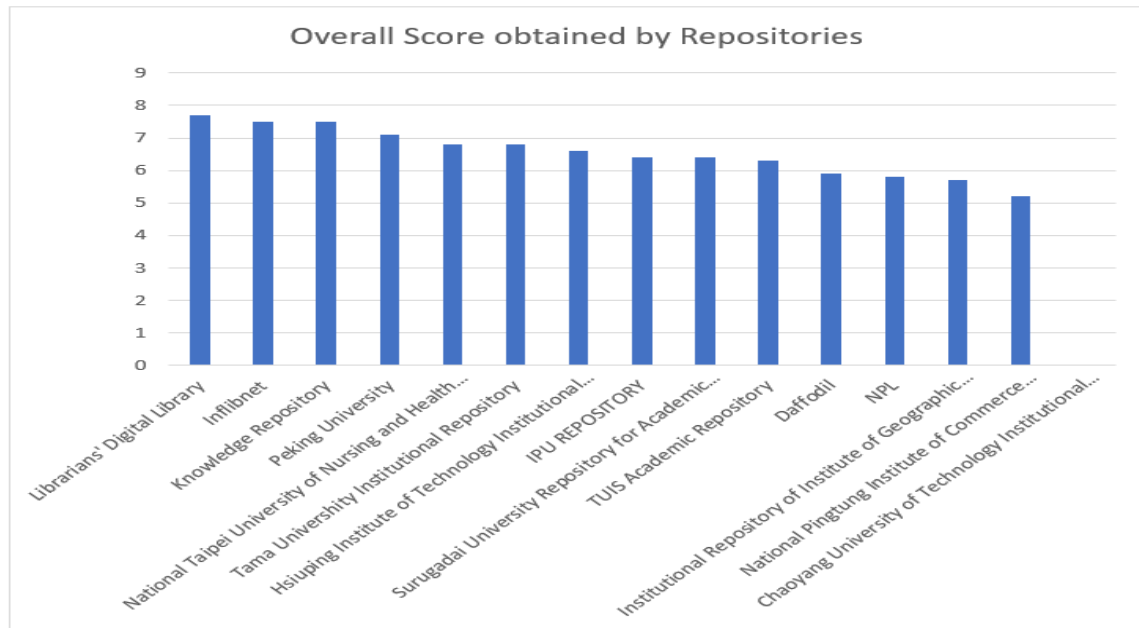
Figure 5: Overall Score obtained by Repositories (Nibbler)

We calculated the overall score by averaging all of Nibbler's website analysis tests. According

Performance

The performance of the repositories is thus calculated using the results of tests conducted to determine their accessibility, experience, marketing, and technology and visualized in Figure 6. Apart from marketing, the top three repositories were India's two, Librarians' Digital Library and Inflibnet, and Peking University in China. Japan's TUIS Academic Repository and Bangladesh's Knowledge Repository placed first and second in the marketing test.

The least scoring repositories were-

Accessibility - National Pingtung University of Taiwan

Experience - Hsiuping Institute of Technology Repository of Taiwan

Marketing – 1. National Physical Laboratory, India

      2. Daffodil International University, Bangladesh

      3. Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS, China

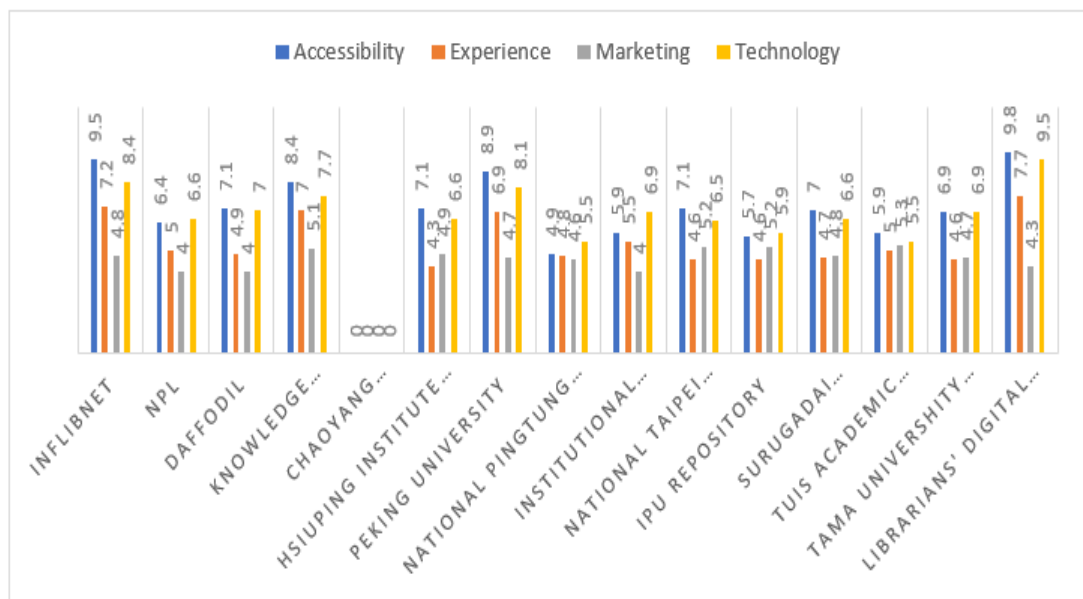Technology- TUIS Academic Repository, Japan

Figure 6: Score obtained on the performance of the repositories (Nibbler)

Amount of Content

Figure 7 represents the content amount analysis determined by the number of words on each page. A repository is of high quality if it contains an adequate amount of relevant content. Both the highest and lowest scoring repositories were in Japan; the former is the TUIS Academic Repository, which includes 2309 words per page, and the latter is the Tama University Institutional Repository, which contains 88 vocabularies per page.
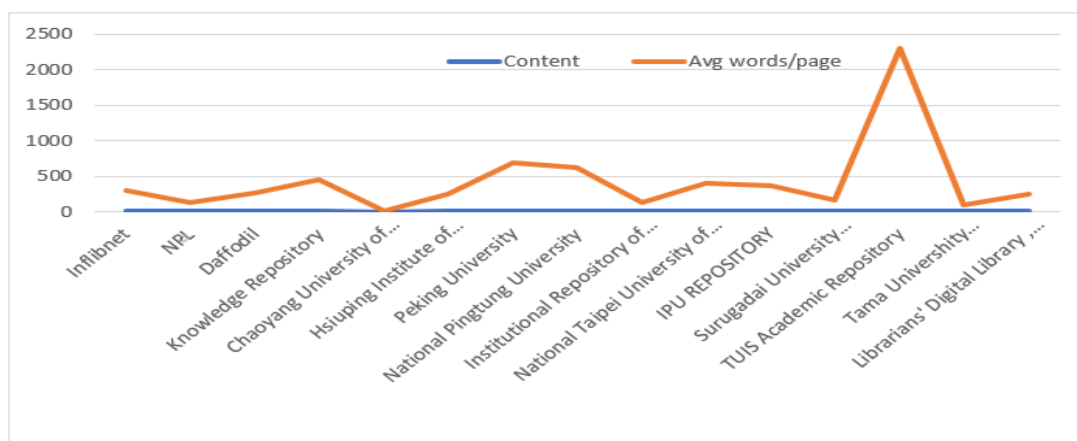

Figure 7: Content of the repositories (Nibbler)

Web calculations

Table 5 displays the rank of repositories as determined by Revised Web Impact Factor calculations. For example, Tama University Institutional Repository in Japan has the highest web impact factor, followed by the Institutional Repository of the Chinese Academy of Sciences' Institute of Geographic Sciences and Natural Resources Research.

Table 5

Ranking of the repositories on Revised Web Impact Factor calculations

Repository name	Web Pages (A)	External Backlink (B)	Supplemental Link	Total Inbound link	Total outlinks	RWIF (B/A)
Tama University Institutional Repository	1390	8164	8168	16332	21	5.873381
Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS	1360	5576	2268	7844	43	4.1
NPL	4160	8577	13	8590	25	2.061779
Inflibnet	13100	5099	270	5369	32	0.389237
National Pingtung University	84	24	4	28	1	0.285714
IPU REPOSITORY	638	59	9	68	73	0.092476
Peking University	6500	327	8	335	1	0.050308
Surugadai University Repository for Academic Resources	3270	163	11	174	94	0.049847
TUIS Academic Repository	984	44	5	49	36	0.044715
Hsiuping Institute of Technology Institutional Repository	9420	14	12	26		0.001486
National Taipei University of Nursing and Health Sciences Repository	12300	13	11	24		0.001057
Knowledge Repository	6960	5	0	5	1	0.000718
LDL	3420	2	0	2	52	0.000585
Daffodil	11300	1	0	1	3	0.000088
Chaoyang University of Technology Institutional Repository	40500	2	0	2		0.000049

RWWR list of repositories

The Ranking Web of Repositories (https://repositories.webometrics.info/) demonstrates a Transparent ranking (https://repositories.webometrics.info/en/transparent, accessed on May 26, 2021) of all repositories by Google Scholar (May 2021) 11th edition funded by the CSIC Intramural 201710E077, and includes nine open access LIS repositories from our study. Table 6 presents the ranks assigned to those repositories and the number of items included in the list is listed below.

Table 6

Ranking of the repositories from the RWWR list

SL.NO.	Repositories	Rank	Number of items
1	Daffodil International University Repository	924	3990
2	Chaoyang University of Technology Institutional Repository	1371	
3	National Taipei University of Nursing and Health Sciences Institutional Repository	1464	1460
4	Surugadai University of Academic Institutional Repository	1781	821
5	Tama University Institutional Repository	1983	544
6	Hsiuping University of Science and Technology Institutional Repository	2455	161
7	National Physical Laboratory Institutional Repository	2558	100
8	Indian Institute of Petroleum IIP Institutional Repository	2871	0
9	Institutional Repository Institute of Geographic Sciences and Natural Resources Research, CAS	2871	0

Alexa Search and Retrieved Data

Furthermore, we used Alexa (http://alexa.com, accessed on June 17, 2021) to generate a website analysis report that included the global popularity rank, the percentage of search traffic, and the bounce rate.

Table 7

Global Popularity Rank, Search Traffic Percentage, and Bounce Rate of the repositories (Alexa):

Repositories	Global Popularity Rank	Search Traffic Percentage (%)	Bounce Rate (%)
Inflibnet IR	19757	59.4%	38.2%
IR@NPL	4095351	No data	No data
Librarians' Digital Library	450101	No data	75%
OneWorld South Asia Open Archive Initiative			
Daffodil International University Institutional Digital Repository	56751	38.1%	17.6%
Knowledge Repository	400423	87.7%	43.4%
Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS	14919	65%	50.4%
Institutional Repository of Peking University	1744	17.8%	24.2%
IPU REPOSITORY	15061	58.1%	55.6%
Surugadai University Repository for Academic Resources	15061	58.1%	55.6%
TUIS Academic Repository	15061	58.1%	55.6%

Repositories	Global Popularity Rank	Search Traffic Percentage (%)	Bounce Rate (%)
Tama University Institutional Repository	15061	58.1%	55.6%
Chaoyang University of Technology Institutional Repository	132463	92.2%	68.1%
Hsiuping Institute of Technology Institutional Repository	578291	5.6%	51.4%
National Taipei University of Nursing and Health Sciences Repository	121239	26.4%	33.7%
National Pingtung University	212771	86%	65.5%

Table 7 depicts the bounce rate as the percentage of website visits solely to a single pageview (Maqbool, 2019). Librarians' Digital Library, DRTC, India, receives the most visits (75%), followed by Chaoyang University of Technology Institutional Repository, Taiwan (68.1 %). Additionally, the Chaoyang University of Technology Repository in Taiwan received the highest percentage of search traffic (92.2%). The search traffic percentage refers to the volume of traffic generated by various sources of visitors via a particular medium (https://en.ryte.com/wiki/Search Traffic, accessed on 27/06/2021).

Figure 8 demonstrates the global popularity rank of the repositories of the samples of our study. According to Alexa's Global Popularity Rank, the most popular repository is China's Peking University Repository, which is ranked 1744, and the least popular repository is India's National Physical Laboratory, which is ranked 4095351. According to Alexa's Global Popularity Rank, the most popular repository is China's Peking University Repository, which is ranked 1744, and the least popular repository is India's National Physical Laboratory, which is ranked 4095351.
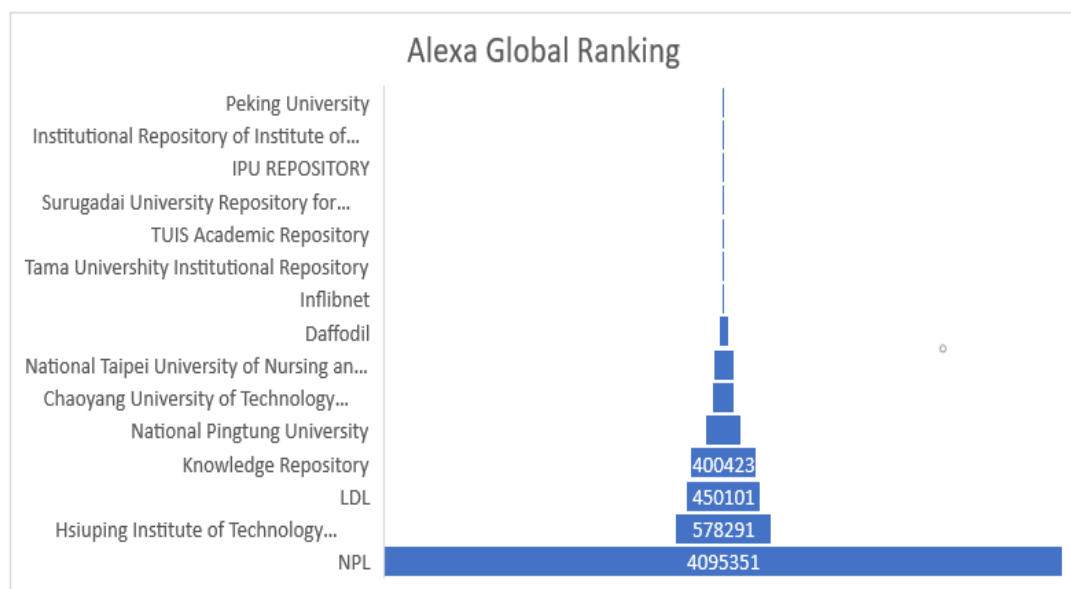

Figure 8: Alexa Global Popularity Rank of the Repositories

Webometric Ranking of the repositories

Table 8 ranks the repositories, with the first being the Institutional Repository of the Chinese Academy of Sciences' Institute of Geographic Sciences and Natural Resources

Research and the fifteenth being the TUIS Academic Repository of Japan. Again, Chinese repositories and Bangladesh's repositories were ranked higher than other countries.

Table 8
Webometric Ranking of the repositories (Visibility, Transparency, and excellence)

Rank	Repository Name	Visibility (External Links 50%)	Transparency (Top cited researcher 10%)	Excellence (Top cited papers 40%)	Weight
1	Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS	5576	145656	60	17377.6
2	Daffodil	1	91561	882	9509.4
3	NPL	8577	38600	5	8150.5
4	Peking University	327	64592	256	6725.1
5	Tama University Institutional Repository	8164	323	31	4126.7
6	Knowledge Repository	5	24360	4028	4049.7
7	Inflibnet	5099	567	1654	3267.8
8	National Taipei University of Nursing and Health Sciences Repository	13	8388	95	883.3
9	Chaoyang University of Technology Institutional Repository	2	1022	983	496.4
10	National Pingtung University	24	564	225	158.4
11	LDL	2	757	71	105.1
12	Surugadai University Repository for Academic Resources	163	57	14	92.8
13	Hsiuping Institute of Technology Institutional Repository	14	283	0	35.3
14	IPU REPOSITORY	59	0	10	33.5
15	TUIS Academic Repository	44	32	6	27.6

Discussion

OpenDOAR has always been the prime tertiary source of open access repositories barring its shortcomings. Data from OpenDOAR reflects the collection pattern of the open access repositories. The article authored by Pinfield, et al. (2014), the OARs enlisted in OpenDOAR "contain a wide number of content types, most of which are various forms of research outputs, and most commonly include English-language material". Similarly, the varieties of information resources found in this study are Journal Articles, theses and dissertations, reports, and working papers. In addition, there are deposits of books, chapters, sections, bibliographical references, and conference papers in these collections. As identified in the study by Nayek and Parhi(2021),

the categorization of open access repositories encompasses aggregating, disciplinary, governmental, and institutional, which seems to be a grey zone. An aggregating or governmental repository might also be an institutional repository. Featured resources in any repository help get more viewers and develop interest among the users for its contents.

While examining the contents of the LIS, this study reflects the importance of journal articles followed by books and chapters as the critical resources in most of the repositories. This result complements the status quo of a similar study in which journal articles were the most count information source, followed by theses and dissertations (Nayak & Parhi, 2021, p. 9). Every digital repository runs with digital resource management software. Out of the several digital resource management software, Dspace, EPrints, and Fedora Greenstone are very common in usage. WEKO, now version 3, is also used in a few selected open access repositories of Japanese origin. In this study, the second objective was to find the preferred software for these repositories. A previous study in 2012 on global open access repository reported Dspace as the most used software, followed by others for digital assets management (Pinfield et al., 2014, p.22). In the other study on open access repositories globally, DSpace was identified as the most used software, followed by EPrints (Sharmah, 2015). The present study also finds DSpace as the most preferred software used by the repositories, followed by WEKO; WEKO is an invenio-based multi-tenancy repository platform that aims to support 500 Japanese universities, which is apparent in the sample variations of the studies. Surprisingly we found that OpenDOAR mentioned that the SDMCET repository uses DSpace software, the official website shows usage of EasyLib software, and the repository is not providing open access. Therefore, DSpace, backed by Hewlett Packard (HP) and the Massachusetts Institute of Technology (MIT), was the obvious choice because of its robust configuration and customization aspect and the online community support.

Search mechanisms play an essential role in the retrieval of relevant information. The resources available in any Open Access Repository are used for searching within the repository and search engines. In addition, keywords and metadata on each content of the OARs boost search and retrieval (Atenas & Havemann, 2013). This study found that most repositories have both a basic search and advanced search mechanisms for retrieval efficacies.

Unicode-compliant information retrieval and representation system for multilingual search and retrieval facilities and a single search window for metadata harvesting from interoperable OARs were portrayed in a paper published in the *Library Philosophy and Practice* (Roy, Biswas & Mukhopadhyay, 2017). Multilingual search facilitates the visibility and usage of relevant information for its worldwide acceptance. The OARs of Japan, Taiwan, and China integrated multilingual search facilities.

In terms of Quality Assurance Indicators, the *best performing repository with the highest record count, multilingual interface, and search support was Chaoyang University of Technology Institutional Repository*, but it did not have any email alerts service. Out of the three Chinese Repositories, we analyzed two, which were ranked at 1 and 4 using RWWR methodology and 1 and 2 as per Alexa Global Popularity Ranking, and both the repositories have *high RWIF*.

The study of Das and Singh (2017) highlights the status of open access institutional repositories in China and its contribution to a global knowledge base. China is one of the most rapidly developing countries in the world, and from this study, the results revealed that *China is the best-performing country among all studied in terms of the performance of the OARs.* The

Institutional Repository of *Peking University was not accessible*. However, the *full metadata and full-text availability provided on the homepage were considered total content coun*t and other details from the website E-Journals/EBooks Navigation (serialssolutions.com).

Maqbool (2019) evaluated the Revised Web Impact Factor (RWIF) of the selected Knowledge Portals in India and used Alexa Web Ranking to measure each portal's Web Ranking and performance. Our study followed the same methodology to determine the RWIF and global ranking of each OAR. The institutional repository of the *National Physical Laboratory has the most extensive collection of records* than other Indian repositories, has a high RWIF (2.061), and is ranked at 3 (using RWWR methodology). However, it was ranked last in Alexa Global Popularity Rank. The reason might be that the number of visitors to the repository is fewer than in other repositories. *Indian repositories had a decent collection of resources*, but the *global popularity rank of NPL and LDL were inferior, and their RWIF was incredibly low*. However, if we consider all the factors we have analyzed, Inflibnet is the best among all three. While the *Institutional Repository of the Indian Institute of Petroleum was not accessible*, we analyzed the repository's homepage using Nibbler.

We found that *it is the only website among all the institutions of our study with a Twitter account* with 1060 followers and 120 tweets. Social media helps the repositories increase the use of the contents and the visibility of the repository worldwide, as stated by Atenas and Havmann (2013). "Social media tools to enable the users to share the resources within social media platforms".

Dawson and Yang (2016) stated in their study on Institutional Repository, Open Access, and Copyright that "Educating users on copyright is necessary; repositories and archives should help authors understand copyright issues". Our research indicated that many repositories did not explicitly mention copyright information on their home pages; nonetheless, we discovered that the institution held the copyright for the repository in cases where the repository as part of a parent institution.

Conclusion

In this paper, we attempted to present the quality and performance of Open Access Library and Information Science (LIS) repositories in South and East Asia by utilizing Web Analysis software tools Nibbler and Alexa. We also calculated the revised web impact factor and Ranking of the repositories. This study demonstrated the visibility, transparency, and excellence of repositories on the web to ascertain their strengths and weaknesses. The quality assurance indicators assist in evaluating repositories to attract more viewers, which increases the repository's popularity, and marketing or promotion of the repository is critical for this. All the objectives we framed for the study addressed that those were pertinent for practical evaluation of the Open Access repositories. We computed the score of all repositories that came around five out of ten on the Nibbler marketing test. Even the quality indicators reflect the repositories' design, structure, and content, allowing administrators to identify and improve the repositories' weaknesses for increased performance and quality. According to OpenDOAR data, only five countries in East and South Asia have Open Access LIS repositories out of 14. Even the repositories' performances were ineffective or unsatisfactory. Although the repositories were enlisted under the Library and Information Science domain, only a few contained records on the field, giving rise to the OpenDOAR subject policy question.

References

Aguillo, I. F., Ortega, J. L., Fernández, M., & Utrilla, A. M. (2010). Indicators for a webometric ranking of open access repositories. *Scientometrics*, 82(3), 477–486. https://doi.org/10.1007/s11192-010-0183-y

Atenas, J. & Havemann, L. (2013). Quality assurance in the open: An evaluation of OER repositories. *INNOQUAL - International Journal for Innovation and Quality in Learning*, 1(2), 22-34. http://papers.efquel.org/index.php/innoqual/article/view/30

Bailey, C. W. (2006). What Is Open Access? Retrieved from http://digital-scholarship.org/cwb/WhatIsOA.htm

Browne, T., Holding, R., Howell, A., & Rodway-Dyer, S. (2010). The challenges of OER to academic practice. *Journal of Interactive Media in Education*, 2010(1), p.Art. 3. https://doi.org/10.5334/2010-3

Budapest Open Access Initiative (2002).Retrieved from https://www.budapestopenaccessinitiative.org

Chakravarty, R. (2019). National ETD repository evaluation using web analyzer: A webometric analysis of Shodhganga, India. *International Journal of Web-Based Learning and Teaching Technologies*, 14(1), 54–68. https://doi.org/10.4018/IJWLTT.2019010104

Cho, J. (2019). Exploratory analysis of the operation of institutional repositories in Asian countries. *Information Development*, 35(2), 262–271. https://doi.org/10.1177/0266666917742442

Clements, K. I. & Pawlowski, J. M. (2012). User-oriented quality for OER: Understanding teachers' views on reuse, quality, and trust. *Journal of Computer Assisted Learning*, 28(1), 4–14. https://doi.org/10.1111/j.1365-2729.2011.00450.x

Clements, K., Pawlowski, J. & Manouselis, N. (2015). Open educational resources repositories literature review-Towards a comprehensive quality approaches framework. *Computers in Human Behavior*, 51, 1098–1106. https://doi.org/10.1016/j.chb.2015.03.026

Cullen, R. & Chawner, B. (2011). Institutional repositories, open access, and scholarly communication: a study of conflicting paradigms. *The Journal of Academic Librarianship*, 37(6), 460-470. https://doi.org/10.1016/j.acalib.2011.07.002

Das, K. C. & Singh, K. (2017). Current Status of Chinese Open Access Institutional Repositories: A Case Study. *International Research: Journal of Library & Information Science*, 7 (1), 62-70. Retrieved from http://irjlis.com/wp-content/uploads/2017/05/4-IR-371.pdf

Dawson, P. H., & Yang, S. Q. (2016). Institutional repositories, open access and copyright: What are the practices and implications? *Science & Technology Libraries*, *35*(4), 279–294. https://doi.org/10.1080/0194262x.2016.1224994

Downes, S. (2007). Models for sustainable open educational resources. *Interdisciplinary Journal of e-Skills and Lifelong Learning*, 3, 029-044. https://doi.org/10.28945/384

Ghosh, S. & Roy, B. K. (2021). Webometric analysis of open access digital repositories of agricultural sciences in continents of Oceania. *Library Philosophy and Practice (e-journal)*, 4963. Retrieved from *https://digitalcommons.unl.edu/libphilprac/4963?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F4963&utm_medium=PDF&utm_campaign=PDFCoverPages*

Gul, S., Bashir, S. & Ganaie, S. A. (2019). Evaluation of institutional repositories of South Asia. *Online Information Review*, 44(1), 192–212. https://doi.org/10.1108/OIR-03-2019-0087

Hylén, J. (2006). Open educational resources: Opportunities and challenges. Retrieve from http://library.oum.edu.my/oumlib/sites/default/files/file_attachments/odl-resources/386010/oeropportunities.pdf. *Proceedings of the Open Education.*

Kanwar, A., Uvalic-Trumbic, S. & Butcher, N. (2011). *A basic guide to open educational resources* (OER). United Nations Educational, Scientific and Cultural Organization. Retrieved from http://unesdoc.unesco.org/images/0021/002158/215804e.pdf

Maharana, B. & Chakrabarti, A. (2019). LIS open access institutional digital repositories in OpenDOAR: An appraisal. *Library Philosophy and Practice (e-journal).* 2757. Retrieved from https://digitalcommons.unl.edu/libphilprac/2757

Maqbool, T. (2019). A webometric analysis of select knowledge portals of national repute in India. *Library Philosophy and Practice (e-journal)*, 2323. Retrieved from https://digitalcommons.unl.edu/libphilprac/2323?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F2323&utm_medium=PDF&utm_campaign=PDFCoverPages

Nayak, S. & Parhi, B. K. (2021). Assessment of open-access institutional repositories of China on Directory of Open Access Repositories (OpenDOAR). *Library Philosophy and Practice (e-journal)*, 5315. Retrieved from https://digitalcommons.unl.edu/libphilprac/5315?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F5315&utm_medium=PDF&utm_campaign=PDFCoverPages

OECD, Organisation for Economic Co-Operation and Development. (2007). Giving knowledge for free: The emergence of Open educational resources. Retrieved from http://www.sourceoecd.org/9789264031746. OECD Publishing

Pal, A., Kar, S. & Sardar, S. (2020). Webometric analysis of ICSSR sponsored research institutions in India. *Library Philosophy and Practice (e-journal)*, 3804. Retrieved from https://digitalcommons.unl.edu/libphilprac/3804?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F3804&utm_medium=PDF&utm_campaign=PDFCoverPages

Pawlowski, J. M. & Hoel, T. (2012). Towards a global policy for open educational resources: The Paris OER Declaration and its Implications. *White Paper*, Version 0.2, Jyväskylä, Finland.

Pegler, C. (2012). Herzberg, hygiene and the motivation to reuse: Towards a three-factor theory to explain motivation to share and use OER. *Journal of Interactive Media in Education*, 2012(1), p. Art. 4. https://doi.org/10.5334/2012-04

Pinfield, S., 2005. A mandate to self archive? The role of open access institutional repositories. Serials, 18 (1), 30–34. http://doi.org/10.1629/1830

Pinfield, S., Salter, J., Bath, P. A., Hubbard, B., Millington, P., Anders, J. H. S. & Hussain, A. (2014). Open-access repositories worldwide, 2005-2012: Past growth, current characteristics, and future possibilities. *Journal of the Association for Information Science and Technology (JASIST)*, 65(12), 2404–2421. https://doi.org/10.1002/asi.23131

Petrides, L., Nguyen, L., Jimes, C. & Karaglani, A. (2008). Open educational resources: Inquiring into author use and reuse. *International Journal of Technology Enhanced Learning*, 1(1/2), 98–117. https://doi.org/10.1504/IJTEL.2008.020233

Richter, T. & Ehlers, U. D. (2010). Barriers and motivators for using open educational resources in schools. In *Open ED 2010 Proceedings. Barcelona: UOC, OU, BYU*.

Retrieved from
http://openaccess.uoc.edu/webapps/o2/bitstream/10609/4868/6/Richter_editat2.pdf

Richter, T. & Mcpherson, M. (2012). Open educational resources: Education for the world? *Distance Education*, 33(2), 201–219. https://doi.org/10.1080/01587919.2012.692068

Rousidis, D., Garoufallou, E., Balatsoukas, P. & Sicilia, M. A. (2014). Metadata for big data: A preliminary investigation of metadata quality issues in research data repositories. *Information Services and Use*, 34(3–4), 279–286. https://doi.org/10.3233/ISU-140746

Roy, B.K; Biswas, S. C. & Mukhopadhyay, P. (2017). BURA: An open access multilingual information retrieval and representation system for Indian higher education and research institutions. *Library Philosophy and Practice (e-journal)*, 1541. Retrieved from http://digitalcommons.unl.edu/libphilprac/1541?utm_source=digitalcommons.unl.edu%2Flibphilprac%2F1541&utm_medium=PDF&utm_campaign=PDFCoverPages

Sengupta, Sh. (2012 December). Open access repositories: The Asian Scenario with Special Reference to Library & Information Science., 2012. In *Redesigning Libraries & Information Centres in Digital Era, Degloor, Dist. Nanded, Maharashtra, 26th-27th* (104–111).

Sharmah, M. (2015 February). Open access repositories in global context. In *Bilingual International Conference on Information Technology: Yesterday, Today, and Tomorrow,* (pp. 85–90). DESIDOC. Retrieved from https://b2n.ir/w76427

Shueb, S. & Sofi, R. A. (2014) [Web]. 2.0 Interactivity in open access (OA) repositories: An analysis. *Journal of Library and Information Sciences*. 2(1) 29-38. Retrieved from http://jlisnet.com/journals/jlis/Vol_2_No_1_March_2014/4.pdf

Tuomi, I. (2006). Open educational resources: What they are and why do they matter Report prepared for the OECD. Retrieved from http://www.meaningprocessing.com/personalPages/tuomi/articles/OpenEducationalResources_OECDreport.pdf

Wiley, D. (2007). On the sustainability of Open educational resource initiatives in higher education. *Paper commissioned by the OECD's Centre for Educational Research and Innovation (CERI). OECD's Centre for Educational Research and Innovation (CERI).* OECD Publishing (p. 1-21). Retrieved from http://www.oecd.org/dataoecd/33/9/38645447.pdf

Appendix
List of the URLs of the repositories analyzed

Sl. No.	Repository Name	URLs
1	Inflibnet IR	http://ir.inflibnet.ac.in/
2	IR@NPL	http://npl.csircentral.net/
3	Librarians' Digital Library	https://drtc.isibang.ac.in/ldl
4	Daffodil International University Institutional Digital Repository	http://dspace.daffodilvarsity.edu.bd:8080/
5	Knowledge Repository	http://dspace.icddrb.org/
6	Institutional Repository of Institute of Geographic Sciences and Natural Resources Research, CAS	http://english.igsnrr.cas.cn/
7	Institutional Repository of Peking University	https://www.lib.pku.edu.cn/
8	IPU REPOSITORY	https://ipu.repo.nii.ac.jp/
9	Surugadai University Repository for Academic Resources	https://surugadai.repo.nii.ac.jp/
10	TUIS Academic Repository	https://tuis.repo.nii.ac.jp/
11	Tamag University Institutional Repository	https://tama.repo.nii.ac.jp/
12	Chaoyang University of Technology Institutional Repository	http://ir.lib.cyut.edu.tw:8080/
13	Hsiuping Institute of Technology Institutional Repository	http://ir.hust.edu.tw/
14	National Taipei University of Nursing and Health Sciences Repository	http://irlib.ntunhs.edu.tw/
15	National Pingtung University	https://eng.nptu.edu.tw/