Institutional Repositories in BRICS Countries: A Study

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ABSTRACT

An institutional repository includes digital assets generated by academics, such as administrative documents, course notes, learning objects, or conference proceedings. It will provide a window that gives open access to improve the sponsoring institution's visibility and status. This paper discusses the growth and development of Institutional Repositories available in BRICS Countries. The relevant data was collected from the directory of OpenDOAR. Based on the data in OpenDOAR, 242 repositories are represented from BRICS countries. Among the 242, 84 (34.71%) repositories are from Brazil, 39 (16.12%) from China, 68 (28.10%) repositories from India, 22 (9.109%) repositories from Russia, and 29(11.98%) repositories from South Africa. Brazil has the largest number of records (11, 17,688) among BRICS Countries repositories.

1. Introduction

Presently the institutional repository plays a vital role in the development of higher education systems at the university level. An institutional repository includes the digitized materials by academic, administrative course and learning materials and publications output. The authors of the learning output by the various authors deposit their publications in their institutional repositories. The main objective of the repositories is to create global visibility for the institutional research output to provide scholarly research of all the digitized documents like theses. Other literatures and unpublished documents are preserved in the repositories to make these unique resources observable to the user community. The five laws of Library Science constituted by Dr.S.R.Ranganthan have enforced the right information at the right time for the right users by creating a place for documents irrespective of the users.

2. Institutional Repositories

The institutional repositories include all digitized materials like electronic theses and dissertations, journals articles, monographs, and other learning objects. It is an online archive for the intellectual

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output of a particular institution for collecting, preserving, and disseminating to the research community. It can be viewed as a set of services that institutions offer to members of the academic community to maintain and provide the digitized materials. It provides open access to the institution's research output and may be varied from one another. The set of technical standards ensures that it exposes the metadata of all items in their contents to the open access in the same basic way. It is the harvesting of metadata through the open archives for the intellectual research output.

The contents are indexed for the search purposes using many search engines like Google and Google Scholar to create open access databases at the global level. The open access nature will definitely increase the scholarly literature for self-archiving.

3. BRICS Countries

BRICS is an association of five major countries which consists of Brazil, Russia, India, China, and South Africa. This association was earlier called "BRIC" before the inclusion of South Africa. This federation was started for newly industrialised countries, but they are distinguished by their large, fast-growing economies and significant influence on regional and global affairs. Actually this term, "BRICS", was coined by economist Jim O'Neill. The foreign ministers of the initial four BRIC states (Brazil, Russia, India, and China) met in New York City in September 2006, beginning a series of high-level meetings.

The BRICS Forum, an independent international organisation encouraging commercial, political, and cultural cooperation between the BRICS nations, was formed in 2011. The Governor of the Russian Central Bank, Elvira Nabiullina, claimed that the "BRICS partners are working towards the establishment of a system of multilateral exchanges that will allow to transfer resources to one or another country, if needed" in an article which concluded that "If the current trend continues, soon the dollar will be uncontrolled by most of the significant global economies, and it will be kicked out of worldwide trade finance."

4. Review of Literature

Crow (2002) identified an institutional repository with four major qualities: institutionally defined, scholarly, cumulative and perpetual, and open and interoperable. Khan and Kumar Das (2008) stated that "A digital repository is one where digital content, assets, are stored and can be searched and retrieved for later use." According to Yeates (2003), "An institutional repository is the collective intellectual output of an institution recorded in a form that can be preserved and exploited."

According to Lynch (2003), a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution.

Dhanavandan and Tamizhchelvan (2014a) studied the recent trends and growth of institutional repositories (IR) in south Asian countries. An institutional repository is an online locus for collecting, preserving, and disseminating - in digital form - the intellectual output of an institution, particularly a research institution. South Asian countries like India, Pakistan, Nepal, Bangladesh, and Sri Lanka have institutional repositories in their respective libraries, but Bhutan and Maldives do not. Among the five countries, India has 62 (82.67%), Bangladesh 7 (9.33%), Pakistan 3 (4.00%), Sri Lanka 2 (2.67%) and Nepal 1 (1.33%) respectively.

Dhanavandan and Tamizhchelvan (2014b) analysed global repositories for library and information science. Data has been analysed by types of repositories, collection sizes, material types, content, languages, and software. Among 120 repositories, the United States has 17 (14.17%) repositories for LIS, followed by the United Kingdom (12, 10.00%), and Germany (9, 7.50%). India is in the fifth position with 5 (4.17%) repositories on Library and Information Science.

Singh (2014) studied the role of Brazil, Russia, India, China, and South Africa (BRICS) in the open access movement with respect to DOAJ and OpenDOAR. He analysed the contribution of BRICS to DOAJ and OpenDOAR by country, year, language, and subject. Brazil and India are the leading nations in BRICS in the open access movement in DOAJ. Similarly, these two countries are ahead of the rest with respect to the contribution of open access repositories to OpenDOAR.

5. Need for Study

The growth and development of institutional repositories in BRICS countries has been examined and assessment of these repositories must be discussed. There is a need to discuss institutional repositories in BRICS countries.

6. Objectives

The following objectives are framed for this study

1) To find out the strength of records available in IRs in BRICS Countries
2) To identify the various software used in IRs
3) To classify the strength of records available IRs in BRICS Countries
4) To identify the languages used in IRs
5) To find out the status of record updates in IRs by BRICS Countries

7. Methodology

This study discusses the growth and development of the institutional repositories available in BRICS Countries. For this, the required data has been collected from the open access directory

from http://www.opendoar.org/ on 1st December, 2014. It was analysed by using SPSS package.

8. Scope and Limitations of Study

The present study is only limited to open access institutional repositories which are registered in the OpenDOAR. It is only considered in BRICS Countries (Brazil, Russia, India, China, and South Africa).

9. Analysis and Interpretation

The main aim of the study is to discuss the growth and development of the institutional repositories from BRICS Countries which are registered in the DOAR. The appropriate sources are collected from the DOAR directory. The strength of the institutional repositories from BRICS Countries and the available number of records are presented in the Table 1.

Table 1. Distribution of Institutional Repositories available in BRICS Countries

Country	Brazil	China	India	Russia	South Africa	Total
No. of IRs	84	39	68	22	29	242
Percentage	34.71	16.12	28.1	9.09	11.98	100
No. of Records	11,017,688	7,012,190	4,052,644	84,657	84,657	25,066,549

Table 1 shows the location of the institutional repositories and their number of records available in BRICS countries. Two hundred and forty-two (242) repositories are available in BRICS countries in the Open DOAR. Among the 242, 84 (34.71%) repositories are from Brazil, 39 (16.12%) from China, 68 (28.10%) repositories from India, 22 (9.109%) repositories from Russia, and 29 (11.98%) repositories from South Africa. There are, in total, 25,66,549 records from 242 repositories in BRICS countries, in which 11,17,688 records are from Brazil, 7,12,190 records from China, 4,52,644 records from India, 84,657 records from Russia, and 84,657 records from South Africa.

Table 2. Software Distribution of Institutional Repositories in BRICS Countries

Sl. No.	Software	Brazil	China	India	Russia	South Africa	Total
1	Not Specified	7(2.87)	0	1(0.41)	2(0.83)	1(0.41)	11(4.54)
2	Architexturez	0	0	1(0.41)	0	0	1(0.41)
3	CALIBRE	0	0	1(0.41)	0	0	1(0.41)
4	ContentPro	0	0	0	0	2(0.83)	2(0.83)
5	Corisco	1(0.41)	0	0	0	0	1(0.41)
6	DigiTool	0	0	0	0	1(0.41)	1(0.41)

Sl. No.	Software	Brazil	China	India	Russia	South Africa	Total
7	Drupal	2(0.83)	0	0	0	0	2(0.83)
8	DSpace	63(26.03)	39(16.11)	42(17.35)	14(5.78)	19(7.85)	177(73.14)
9	EPrints	0	0	20(8.26)	2(0.83)	2(0.83)	24(9.91)
10	ETD-db	1(0.41)	0	0	0	2(0.83)	3(1.24)
11	Greenstone	0	0	1(0.41)	0	0	1(0.41)
12	HTML	0	0	1(0.41)	0	0	1(0.41)
13	http://ahero.uwc.ac.za /lib/oai/oai2.php	0	0	0	0	1(0.41)	1(0.41)
14	Maxwell	1(0.41)	0	0	0	0	1(0.41)
15	Nitya	0	0	1(0.41)	0	0	1(0.41)
16	Nou-Rau	1(0.41)	0	0	0	0	1(0.41)
17	OAI-CL	0	0	0	1(0.41)	0	1(0.41)
18	SciELO	4(1.65)	0	0	0	1(0.41)	5(2.06)
19	Socionet	0	0	0	3(1.24)	0	3(1.24)
20	TEDE	4(1.65)	0	0	0	0	4(1.65)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 2 indicates software used in institutional repositories available in BRICS countries. Among the 242 repositories, 177 (73.14%) repositories are using DSpace software which includes 63 (26.03%) repositories from Brazil, 39 (16.11%) from China, 42 (17.35%) from India, 14 (5.78%) from Russia, and 19 (7.85%) from South Africa, and it is in the first position among the various software used in the institutional repositories. Eprints is the second position with 24 (9.91%) repositories. Among the 242 repositories, 15 (4.54%) repositories did not mention their specific software in the sources.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	165.122	76	.000
Likelihood Ratio	137.797	76	.000
N of Valid Cases	242		

The Chi-square test is applied for the software used in the institutional repositories in BRICS Countries. The computed Chi-square value is 165.122 and the degrees of freedom value is 76 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in software used is statistically identified as highly significant.

Table 3. Subject Distribution of Institutional Repositories in BRICS Countries

Sl. No.	Subjects	Brazil	China	India	Russia	South Africa	Total
1	Agriculture, Food, and Veterinary	2(0.83)	0	2(0.83)	0	0	4(1.65)
2	Agriculture, Food and Veterinary; Biology and Biochemistry; Ecology and Environment; Computers and IT	1(0.41)	6(2.48)	1(0.41)	1(0.41)	1(0.41)	10(4.13)
3	Architecture	0	0	1(0.41)	0	0	1(0.41)
4	Arts and Humanities General; Fine and Performing Arts	1(0.41)	0	0	0	0	1(0.41)
5	Biology and Biochemistry	0	1(0.41)	2(0.83)	0	0	3(1.24)
6	Biology and Biochemistry; Ecology and Environment; Geography and Regional Studies	1(0.41)	2(0.83)	1(0.41)	1(0.41)	0	5(2.07)
7	Biology and Biochemistry; Health and Medicine	0	0	2(0.83)	0	0	2(0.83)
8	Business and Economics; Education; Management and Planning	1(0.41)	0	0	0	0	1(0.41)
9	Chemistry and Chemical Technology; Physics and Astronomy; Mechanical Engineering and Materials	1(0.41)	4(1.65)	10(4.13)	0	0	15(6.20)
10	Computers and IT	1(0.41)	1(0.41)	0	0	1(0.41)	3(1.24)
11	Earth and Planetary Sciences; Mathematics and Statistics	0	0	0	2(0.83)	0	2(0.83)
12	Ecology and Environment; Geography and Regional Studies	0	4(1.65)	2(0.83)	0	0	6(2.48)
13	Education	1(0.41)	0	0	0	1(0.41)	2(0.83)
14	Education; Law and Politics; Management and Planning	1(0.41)	0	0	0	0	1(0.41)
15	Electrical and Electronic Engineering	0	0	1(0.41)	0	0	1(0.41)
16	Geography and Regional Studies; History and Archaeology	0	0	1(0.41)	1(0.41)	0	2(0.83)
17	Health and Medicine	4(1.65)	0	2(0.83)	0	0	6(2.48)
18	Health and Medicine; Business and Economics; Education	0	0	0	0	1(0.41)	1(0.41)
19	Health and Medicine; Psychology	0	1(0.41)	0	1(0.41)	0	2(0.83)
20	History and Archaeology	0	0	0	1(0.41)	0	1(0.41)
21	History and Archaeology; Language and Literature; Library and Information Science	1(0.41)	0	0	0	0	1(0.41)
22	Law and Politics	5(2.06)	0	0	0	1(0.41)	6(2.48)
23	Library and Information Science	1(0.41)	0	1(0.41)	0	0	2(0.83)
24	Management and Planning	1(0.41)	0	0	1(0.41)	0	2(0.83)
25	Mathematics and Statistics	0	0	2(0.83)	0	0	2(0.83)
26	Mathematics and Statistics; Law and Politics	1(0.41)	0	0	0	0	1(0.41)
27	Mechanical Engineering and Materials	1(0.41)	0	0	0	0	1(0.41)

Sl. No.	Subjects	Brazil	China	India	Russia	South Africa	Total
28	Multidisciplinary	48(19.83)	11(4.54)	29(11.98)	14(5.78)	22(9.10)	124(51.24)
29	Multidisciplinary; Education	1(0.41)	0	0	0	0	1(0.41)
30	Physics and Astronomy	1(0.41)	1(0.41)	4(1.65)	0	0	6(2.48)
31	Physics and Astronomy; Computers and IT; Management and Planning	0	2(0.83)	0	0	0	2(0.83)
32	Psychology	1(0.41)	0	0	0	0	1(0.41)
33	Science General	4(1.65)	3(1.24)	5(2.06)	0	0	12(4.96)
34	Social Sciences General	2(0.83)	0	1(0.41)	0	1(0.41)	4(1.65)
35	Social Sciences General; Library and Information Science	1(0.41)	0	0	0	0	1(0.41)
36	Technology General	1(0.41)	3(1.24)	1(0.41)	0	1(0.41)	6(2.48)
37	Technology General; Library and Information Science	1(0.41)	0	0	0	0	1(0.41)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 3 states the subject wise distribution of institutional repositories available in BRICS Countries. Among the 242, 124 (51.24%) repositories are in the Multidisciplinary subject category which ranked top in the subject wise distribution and includes 48 (19.83) repositories from Brazil, 11 (4.54%) repositories from China, 29 (11.98%) repositories from India, 14 (5.78%) repositories from Russia, and 22 (9.10%) repositories from South Africa. This was followed by 15 (6.20%) repositories for Chemistry and Chemical Technology/Physics and Astronomy/Mechanical Engineering and Materials subject which is in the second rank. It is highlighted that 12 (4.96%) repositories are available for the subject of science in general.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	197.134	144	.002
Likelihood Ratio	183.537	144	.014
N of Valid Cases	242		

The Chi-square test is applied for discussion of the subject wise distribution of the institutional repositories in BRICS Countries. The computed Chi-square value is 197.134 and the degrees of freedom value is 144 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in subject wise is statistically identified as significant.

Table 4. Contents Wise Distribution of Institutional Repositories in BRICS Countries

Sl. No.	Contents	Brazil	China	India	Russia	South Africa	Total
1	Articles	11(4.54)	2(0.83)	10(4.13)	3(1.24)	1(0.41)	27(11.15)
2	Articles; Books	2(0.83)	0	0	0	0	2(0.83)
3	Articles; Conferences	0	0	3(1.24)	1(0.41)	0	4(1.65)
4	Articles; Conferences; Books	0	0	1(0.41)	0	0	1(0.41)
5	Articles; Conferences; Theses	0	0	0	0	1(0.41)	1(0.41)
6	Articles; Conferences; Theses; Books	1(0.41)	0	0	0	0	1(0.41)
7	Articles; Conferences; Theses; Books; Patents	0	2(0.83)	0	0	0	2(0.83)
8	Articles; Conferences; Theses; Unpublished; Books; Multimedia; Special	0	0	0	0	1(0.41)	1(0.41)
9	Articles; Conferences; Unpublished; Books; Multimedia	2(0.83)	0	0	0	0	2(0.83)
10	Articles; Learning Objects; Multimedia; Special	1(0.41)	0	0	0	0	1(0.41)
11	Articles; Multimedia	1(0.41)	0	0	0	0	1(0.41)
12	Articles; References	0	1(0.41)	1(0.41)	1(0.41)	0	3(1.24)
13	Articles; References; Books; Software	0	0	0	1(0.41)	0	1(0.41)
14	Articles; References; Conferences; Theses; Books	14(5.78)	11(4.54)	11(4.54)	3(1.24)	4(1.65)	43(17.76)
15	Articles; References; Conferences; Theses; Unpublished	0	1(0.41)	0	0	0	1(0.41)
16	Articles; References; Conferences; Theses; Unpublished; Books	0	0	0	1(0.41)	0	1(0.41)
17	Articles; References; Conferences; Theses; Unpublished; Books; Special	0	0	0	0	1(0.41)	1(0.41)
18	Articles; References; Conferences; Theses; Unpublished; Multimedia; Patents	0	14(5.78)	10(4.10)	3(1.24)	2(0.83)	29(11.98)
19	Articles; References; Theses; Unpublished	0	1(0.41)	0	0	0	1(0.41)
20	Articles; References; Theses; Unpublished; Books	1(0.41)	0	0	0	0	1(0.41)
21	Articles; Theses	4(1.65)	0	1(0.41)	0	4(1.65)	9(3.71)
22	Articles; Theses; Books	4(1.65)	3(1.24)	13(5.378)	2(0.83)	0	22(9.10)
23	Articles; Theses; Multimedia	12(4.95)	3(1.24)	3(1.24)	1(0.41)	2(0.83)	21(8.67)
24	Articles; Theses; Patents	0	1(0.41)	0	0	0	1(0.41)
25	Articles; Theses; Unpublished; Books; Datasets	1(0.41)	0	0	0	0	1(0.41)
26	Articles; Theses; Unpublished; Books; Learning Objects	5(2.06)	0	3(1.24)	4(1.65)	2(0.83)	14(5.78)
27	Articles; Unpublished	0	0	1(0.41)	0	0	1(0.41)
28	Books	2(0.83)	0	2(0.83)	0	0	4(1.65)
29	Conferences	1(0.41)	0	0	0	0	1(0.41)

Sl. No.	Contents	Brazil	China	India	Russia	South Africa	Total
30	Conferences; Unpublished; Datasets; Special	2(0.83)	0	3(1.24)	1(0.41)	0	6(2.06)
31	Datasets	1(0.41)	0	0	0	1(0.41)	2(0.83)
32	Multidisciplinary	0	0	0	1(0.41)	0	1(0.41)
33	Multimedia; Special	2(0.83)	0	0	0	0	2(0.83)
34	References; Theses; Multimedia	0	0	1(0.41)	0	1(0.41)	2(0.83)
35	Theses	13(5.37)	0	5(2.06)	0	8(3.30)	26(10.74)
36	Theses; Books	2(0.83)	0	0	0	0	2(0.83)
37	Theses; Multimedia	2(0.83)	0	0	0	1(0.41)	3(1.24)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 4 indicates the content wise distribution of institutional repositories which are available in the BRICS Countries. Among the 242, 43 (17.76%) repositories mentioned their content for Articles/References/Conferences/Theses/Books including 14 (5.78%) repositories from Brazil, 11 (4.54%) repositories are equally from China and India, 3 (1.24%) repositories from Russia, and 4 (1.65%) repositories from South Africa. It is pointed out that 26 (10.74%) repositories are available for Theses purposes.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	227.140	144	.000
Likelihood Ratio	211.813	144	.000
N of Valid Cases	242		

The Chi-square test is applied for further discussion. The computed Chi-square value is 227.140 and the degrees of freedom value is 144 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in BRICS Countries in content wise is statistically identified as highly significant.

Table 5. Languages Wise Distribution of Institutional Repositories in BRICS Countries

Sl. No.	Languages	Brazil	China	India	Russia	South Africa	Total
1	Afrikaans; English; Sesotho	0	0	0	0	1(0.41)	1(0.41)
2	Chinese	0	8(3.31)	0	0	0	8(3.31)
3	Chinese; English	0	29(11.98)	0	0	0	29(11.98)
4	English	0	2(0.83)	53(21.90)	2(0.83)	25(10.33)	82(33.88)
5	English; Afrikaans	0	0	0	0	3(1.24)	3(1.24)
6	English; Arabic	0	0	1(0.41)	0	0	1(0.41)
7	English; Bengali	0	0	1(0.41)	0	0	1(0.41)

Sl. No.	Languages	Brazil	China	India	Russia	South Africa	Total
8	English; Gujarati	0	0	1(0.41)	0	0	1(0.41)
9	English; Hindi	0	0	2(0.83)	0	0	2(0.83)
10	English; Hindi; Arabic; Persian	0	0	1(0.41)	0	0	1(0.41)
11	English; Hindi; Gujarati	0	0	2(0.83)	0	0	2(0.83)
12	English; Hindi; Kannada	0	0	2(0.83)	0	0	2(0.83)
13	English; Malayalam	0	0	1(0.41)	0	0	1(0.41)
14	English; Russian	0	0	0	4(1.65)	0	4(1.65)
15	English; Tamil	0	0	1(0.41)	0	0	1(0.41)
16	Hindi; English	0	0	1(0.41)	0	0	1(0.41)
17	Marathi	0	0	1(0.41)	0	0	1(0.41)
18	Portuguese	61(25.21)	0	0	0	0	61(25.21)
19	Portuguese; English	13(5.37)	0	0	0	0	13(5.37)
20	Portuguese; Spanish; English	9(3.72)	0	0	0	0	9(3.72)
21	Russian	0	0	0	16(6.61)	0	16(6.61)
22	Sanskrit; Malayalam; Hindi; English	0	0	1(0.41)	0	0	1(0.41)
23	Spanish	1(0.41)	0	0	0	0	1(0.41)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 5 stated the distribution languages used in the institutional repositories available in BRICS Countries. Among the 242, 82 (33.88%) repositories are available only in English language which includes 2 (0.83%) repositories each from China and Russia, 53 (21.90%) repositories from India, and 25 (10.33%) repositories from South Africa. There is no repository from Brazil in English language alone. But, among the 84 repositories in Brazil, 61 (25.21%) repositories are in only Portuguese, 13 (5.37%) are using Portuguese/English, and 9 (3.72%) are using English/Spanish/Portuguese languages. Only one is available for Marathi (India) and Spanish (Brazil).

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	722.706	88	.000
Likelihood Ratio	585.987	88	.000
N of Valid Cases	242		

The Chi-square test is applied for further discussion of the languages is used in the Institutional Repositories in BRICS Countries. The computed Chi-square value is 722.706 and the degrees of freedom value is 88 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in with respect of languages used is statistically identified as highly significant.

Table 6. Combination of Languages Used in Institutional Repositories in BRICS Countries

Sl. No.	Combination of Languages	Brazil	China	India	Russia	South Africa	Total
1	Monolingual	62(25.62)	10(4.13)	54(22.31)	18(7.43)	25(10.33)	169(69.83)
2	Bilingual	13(5.37)	29(11.98)	8(3.30)	4(1.65)	3(1.24)	57(23.55)
3	Trilingual	9(3.72)	0	4(1.65)	0	1(0.41)	14(5.78)
4	Tetralingual	0	0	2(0.83)	0	0	2(0.83)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 6 indicates type of languages which was categorized as monolingual, bilingual, trilingual, and tetra lingual. Among the 242 repositories, 169 (69.83%) repositories are monolingual, which consists of 62 (25.62%) from Brazil, 10 (4.13%) from China, 54 (22.31%) from India, 18 (7.43%) from Russia, and 25 (10.33%) from South Africa. The 169 repositories available in monolingual type use Spanish, Russian, Portuguese, Marathi, English, and Chinese. Out of 242 repositories, 57 (69.83%) repositories are bilingual, which consists of 13 (5.37%) repositories from Brazil, 29 (11.98%) repositories from China, 8 (3.30%) repositories from India, 4 (1.65%) repositories from Russia, and 3 (1.24%) repositories from South Africa. The bilingual type repositories used Chinese, Portuguese, Afrikaans, Arabic, Bengali, Gujarati, Malayalam, Russian, Tamil, and Hindi along with the English language. The 14 (5.78%) repositories available in the trilingual type consist of 9 (3.72%) repositories from Brazil, 4 (1.65%) repositories from India, and 1 (0.41%) repositories from South Africa, and they used Afrikaans, Sesotho, Hindi; Gujarati, Kannada, Portuguese, and Spanish along with English. Only 2 (0.83%) repositories are available in the tetralingual type, from India only by using Hindi, Arabic, Persian, Sanskrit, and Malayalam along with English.

Table 7. Classification of Records Available in IRs in BRICS Countries

Sl.	Size	Brazil	China	India	Russia	South Africa	Total
1	Not Specified	8(3.31)	2(0.83)	2(0.83)	2(0.83)	1(0.41)	15(6.20)
2	1-50000	44(18.18)	14(5.79)	46(19.01)	14(5.79)	18(7.44)	136(56.20)
3	5001-10000	11(4.55)	9(3.72)	9(3.72)	3(1.24)	2(0.83)	34(14.05)
4	10001-20000	9(3.72)	7(2.89)	3(1.24)	3(1.24)	6(2.48)	28(11.57)
5	20001-30000	2(0.83)	2(0.83)	5(2.07)	0	0	9(3.72)
6	30001-40000	0	0	1(0.41)	0	1(0.41)	2(0.83)
7	40001-50000	4(1.65)	0	1(0.41)	0	0	5(2.07)
8	50001-60000	2(0.83)	0	0	0	1(0.41)	3(1.24)
9	60001-70000	0	2(0.83)	0	0	0	2(0.83)
10	70001-80000	1(0.41)	1(0.41)	0	0	0	2(0.83)
11	80001-90000	1(0.41)	0	0	0	0	1(0.41)
12	90001-100000	0	0	1(0.41)	0	0	1(0.41)
13	Above 100001	2(0.83)	2(0.83)	0	0	0	4(1.65)
	Total	84(34.71)	39(16.12)	68(28.10)	22(9.09)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 7 indicates the institutional repositories in BRICS Countries were classified based on the number of records available in the repositories. The number of records are classified under the following ranges: up to 5000, 5001-10000, 10001-20000, 20001-30000, 30001-40000, 40001-50000, 50001-60000, 60001-70000, 70001-80000, 80001-90000, 90001-100000, and above 100000 records. Among the 242 repositories, 136 (56.20%) repositories have below 5000 records, which includes 44 (18.18%) repositories from Brazil, 14 (5.79%) repositories from China, 46 (19.01%) repositories from India, 14 (5.79%) repositories from Russia, and 18 (7.44%) repositories from South Africa. Thirty-four (14.05%) repositories have more than 5000 but below 10000 records, and 28 (11.57%) repositories have more than 10000 but below 20000 records. It was found that 4 (1.65%) repositories have more than 100000 records in their collections which include 2 (0.83%) repositories each from Brazil and China. Among the 242, 15 (6.20%) repositories did not specify the strength of the collection of the institute.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.188	44	.140
Likelihood Ratio	57.298	44	.086
N of Valid Cases	227		

The Chi-square test is applied for discussion of the number of records and their strength is available in the institutional repositories in BRICS Countries. The computed Chi-square value is 54.188 and the degrees of freedom value is 44 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in classification of records is statistically identified as significant.

Table 8. Status of Record Updates in IRs in BRICS Countries

Sl. No.	Latest Update	Brazil	China	India	Russia	South Africa	Total
1	2014-November	63(26.03)	17(7.02)	45(18.60)	20(8.26)	23(9.50)	168(69.42)
2	2014-October	1(0.41)	3(1.24)	2(0.83)	0	1(0.41)	7(2.89)
3	2014-September	0	1(0.41)	2(0.83)	0	0	3(1.24)
4	2014-August	2(0.83)	2(0.83)	2(0.83)	0	1(0.41)	7(2.89)
5	2014-July	1(0.41)	6	0	0	1(0.41)	8(3.30)
6	2014-June	0	1(0.41)	0	0	0	1(0.41)
7	2014-May	0	1(0.41)	1(0.41)	0	0	2(0.83)
8	2014-March	0	1(0.41)	6	0	0	7(2.89)
9	2014-January	1(0.41)	0	1(0.41)	0	0	2(0.83)
10	2013-December	1(0.41)	0	0	0	0	1(0.41)
11	2013-November	1(0.41)	2(0.83)	0	0	0	3(1.24)
12	2013-October	1(0.41)	1(0.41)	2(0.83)	0	1(0.41)	5(2.06)

Sl. No.	Latest Update	Brazil	China	India	Russia	South Africa	Total
13	2013-August	0	1(0.41)	0	0	0	1(0.41)
14	2013-July	1(0.41)	0	1(0.41)	0	0	2(0.83)
15	2013-February	0	0	1(0.41)	0	0	1(0.41)
16	2013-January	0	0	1(0.41)	0	0	1(0.41)
17	2012-October	1(0.41)	0	0	0	1(0.41)	2(0.83)
18	2012-June	0	0	1(0.41)	0	0	1(0.41)
19	2012-February	1(0.41)	0	0	0	0	1(0.41)
20	2012-January	1(0.41)	0	0	0	0	1(0.41)
21	2011-December	0	1(0.41)	0	0	0	1(0.41)
22	2011-April	1(0.41)	0	0	0	0	1(0.41)
23	2011-March	0	0	1(0.41)	0	0	1(0.41)
24	Not Mentioned	8(3.31)	2(0.83)	2(0.83)	2(0.83)	1(0.41)	15(6.19)
	Total	84(34.71)	39(16.11)	68(28.09)	22(9.10)	29(11.98)	242(100)

(Figures in parentheses denote percentage)

Table 8 indicates the status and the latest update of the records and maintenance of the institutional repositories available in the BRICS Countries. Among the 242 repositories, 168 (69.42%) repositories updated their status and records in the end of November 2014, which includes 63 (26.03%) repositories from Brazil, 17 (7.02%) repositories from China, 45 (18.60%) repositories from India, 20 (8.26%) repositories from Russia, and 23 (9.50%) repositories from South Africa. Three repositories were not updated after 2011, and 15 (6.20%) repositories have not specified the details of update.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	102.724	92	.209
Likelihood Ratio	98.705	92	.297
N of Valid Cases	242		

The Chi-square test is applied for status and latest updating of their records in the Institutional repositories in BRICS countries. The computed Chi-square value is 102.724 and the degrees of freedom value is 92 which is higher than its tabulated value at 5 percent level of significance. Hence the difference among the institutional repositories in status of updating the repositories is statistically identified as significant.

10. Findings

➢ Presently 25,066,549 records are available from 242 repositories in BRICS countries. 11,017,688 records from Brazil, 7,012,190 records from China, 4,052,644 records from India, 84,657

records from Russia, and 84,657 records from South Africa are in the repositories.

- ➢ The 177 (73.14%) repositories are using DSpace software including 63 (26.03%) repositories from Brazil, 39 (16.11%) from China, 42 (17.35%) repositories from India, 14 (5.78%) repositories from Russia, and 19 (7.85%) repositories from South Africa, and it is in the first position among the various software.
- ➢ Among the 242, 124 (51.24%) repositories are in the Multidisciplinary subject category which occupies the first rank, followed by 15 (6.20%) repositories for Chemistry and Chemical Technology/Physics and Astronomy/Mechanical Engineering and Materials subject, which occupies the second position in ranking. Twelve (4.96%) repositories are available for the subject of science in general.
- ➢ Twenty-six (10.74%) repositories are available for Theses purposes.
- ➢ The 169 (69.83%) repositories are monolingual, 57 (69.83%) repositories are bilingual, 14 (5.78%) repositories are trilingual, but only 2 (0.83%) repositories are tetralingual, which are from India.

11. Conclusion

Among the 242 repositories in the BRICS Countries, 168 repositories have been updated regularly. The institutional repositories play a vital role among the user communities to create knowledge and awareness of digital information sources. It is agreed that the number of institutions participating are not a real reflection of the repositories from the BRICS countries. The Open Access Movement is a unique and important feature in the current digital era. The authors suggest that it is the right time to have free open access repository system over the internet like Social Networking Sites-Facebook, Twitter, etc. It should be provided to the facility to have repository without having software, hard disk memory and so on. If it is just like other social networking sites, then it will definitely increase the number of open access repositories tremendously.

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