

Economics Research Output in BRICS Countries: A Scientometric Dimension

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Abstract - This article examines the research output of economics published by BRICS countries during 1991-2016. Data collected from the Web of Science database. Growth rate (CAGR), Collaboration index, Transformative Activity index (TAI), Co-authorship index and Relative Citation Impact (RCI) indicators have been adopted to analyze the quantity and impact of economic research. We found that all five BRICS countries contributed approximately 10 percentile of the world's economics research. The highest contribution was made by China with a total of 4424 articles which is 40.59 percent. Russia has the maximum growth rate of 27.99. Overall collaboration rate of economics publications of BRICS countries is moderate.

Keywords: Economics, Research Output, BRICS Countries, Scientometric Dimension

I. INTRODUCTION

BRICS is an international association of five emerging countries. They are the major emerging economies in the world. Among the emerging countries - Brazil, Russia, India, China and South Africa are in this group. BRIC association formed since at the end of the 2000s and since 2009 their leaders meet regularly in formal summits, held in one of the countries. In 2010, South Africa joined the Association. According to IMF (2013) and Christian Science Monitor (2011) "the five BRICS countries represent about 41% of the world population; As of 2018, these five nations have a combined nominal GDP of US\$18.6 trillion, about 23.2% of the gross world product, combined GDP (PPP) of around US\$40.55 trillion (32% of World's GDP PPP) and an estimated US\$4.46 trillion in combined foreign reserves" (Wikipedia, accessed Dec 2018). In recent years, much attention has been paid on the study and highlights the potentials of the BRICS countries. Among these studies, there are ample of scientometric studies on growth of publication activity (Kumar and Asheulova, 2011), (Savanur and Bakanatti, 2018) (Shashnov and Kotsemir, 2018) thematic structure of publications (Yang *et al.*, 2012), citation and visibility (Yi *et al.*, 2013), scientific collaboration (Bouabid, Paul-Hus and Lariviere, 2016) were conducted on the BRICS countries and in comparison with economically developed nations and associations like G7. In these studies, much importance was given for science, technology, medicine subjects. In the present study, an attempt has been made to analyze the research output of economics subject of BRICS countries published during 1991-2016.

II. REVIEW OF LITERATURE

Kumar and Asheulova (2011). This article presented a comparative analysis of the growth of publication share of BRIC countries with that of US in terms of world output on the emerging areas of science. The data extracted from the Scopus database during 1980-2009. The analysis showed that "... publication output is skewed towards China after 1994, while Russia's progression seems relatively slow... It is significant to mention that China produced ~ 13 percent papers of the total world publications, second to the United States, which has ~ 24 percent share of the global publication share. China was followed by India (2.8%), Russia (1.6%) and Brazil (2.0%) and the total BRIC publication share was nearly 19 percent of the global publication in 2009" (p.231).

Chitra, Jeyshankar, and Abu (2014). In this paper, the authors analysed the research output of lung cancer published by G7 (US, UK, France, Germany, Italy, Canada and Japan) and BRIC countries. The data extracted from the Scopus database for the period of ten years (2003-2012). The scientometric indicators like Comparative the Growth Rate (CAGR), Collaboration Coefficient (CC) and Transformative Activity Index (TAI), Absolute Citation Impact (ACI), Relative Citation Impact (RCI), and Co-authorship index have been adopted to compare the quality and impact of the lung cancer research. The results showed that "Among the G7 countries, US topped with 27375 (44.58%) papers, followed by Japan with 10666 (17.37%). Among the BRIC countries, China topped with 9759 (78.82%) papers, followed by India with 1519 (12.27%) papers. China had the highest growth rate of 26.16 followed by India (23.20), Brazil (11.11) and finally Russia (4.93). When the G7 countries were compared with the BRIC countries highest collaboration (CC) rate of 0.80 followed by China (0.79) and Italy (0.78)...the publication activity has increased considerably for the BRIC countries such as China, India and Brazil. For US, UK, France and Canada, RCI is more than 1, indicating higher citation impact than the world rate. Italy, Germany and Russia with RCI = 0.96 to 0.99 have almost equal to world citation rate. Brazil, India, China and Japan have RCI value less than 1 indicates that the research efforts are higher than visibility and impact" (p.75-80).

Elango, Rajendran and Manickraj (2013). In this paper authors attempted to analyze the Tribology research output among the BRIC countries published during 2006-2010, Scopus database was consulted for the extraction of data for the study. The results of this study showed that “Among the BRIC countries, China topped with 3536 (80.27%) papers, followed by India 537 (12.19%), Russia 202 (4.59%) and finally Brazil 130 (2.95%). Russia recorded the higher growth rate of 63.81%... Brazil and China have been recorded higher collaboration rate of 0.689 followed by India with 0.616 and Russia with 0.591... A higher increase of TAI was observed for Russia with 43 and decrease for Brazil with 34... Out of total papers, 2276 papers received 11303 citations during 2005 – 2012 (up to 15.04.2012) with an average rate of citation as ~ 5” (p.4-6).

Balasubramani, Siriwardena and Abu (2015). In this paper, the authors attempted to analyze the publications published by BRIC countries supported by funding agencies, data for the study captured from the Web of Science database. The findings of the study revealed that “China had published the maximum number funding supported SCI papers, contributing to 652,709 records. In the top three funding agencies, CNPQ contributes the maximum number of publications in Brazil, RFBR in Russia, CSIR in India. In the extent of International collaboration, Brazil, India and China had a maximum number of collaborations with the USA. Russia has the maximum number of collaborations with Germany. The majority of research papers came from areas Chemistry, Physics in Brazil, India and China.” (p.260).

The paper by Biradar & Tadasad (2015), analyzed the pattern of authorship and collaboration by considering various indicators such as Collaborative index, Degree of collaboration, Collaboration co-efficient in Economics subject. The data for the study collected from Social Science Citation Index, WoS during 2000-2014. It was found that the majority of papers are single-authored (41.67%), the authors claim that there was a gradual shift from solo research to the collaboration research. The collaborative index varies from 1.8 in 2003 with the highest in 2014 of 2.29. There was an increase in collaboration coefficient from 0.31 to 0.14 from the year 2000-2014. The highest degree of collaboration (0.58) was during 2000-2014.

III. OBJECTIVES OF THE STUDY

1. To analyze the growth of publication share in BRICS countries in economics subject during 1991-2016;
2. To analyze the collaboration pattern and activity profile of economics research output; and
3. To analyze the citation profile and Relative Citation Index of economics research output.

IV. METHODOLOGY

The present study focused on economics research output published by BRICS countries during 1991-2016. The data

for this study collected from the Web of Knowledge portal, a comprehensive citation indexing database containing databases on sciences, social sciences and arts and humanities. The query was designed by referring to the various topics in the subject and the country. The bibliographic fields like author, source title, year, citations, type of documents, etc. were exported to and analyzed using MS Excel software. Further, the datasets were analyzed using the scientometric indicators like Compound Annual Growth Rate, collaboration index, co-authorship index, transformative activity index, relative citation impact to draw the conclusions.

V. ANALYSIS AND DISCUSSION

The research output and growth rate of the BRICS countries in economics subject from 1991-2016 is shown in Table I.

All the five BRICS countries produced roughly 10924 publications in economics subject field during 1991-2016, accounting for approximately 10 percent of world's papers published in journals indexed by the Web of Science database. The highest contribution was made by China with a total of 4424 articles which is 40.59 percent. China is experiencing faster growth of publications not only among BRICS country but in the world of science and technology. Kumar & Asheulova (2011) argued that "China has a sharp rise that dwarfs other BRIC nations and may catch up with the United States in the near future... China produced ~ 13 percent papers of the total world publications in all fields of science, second to the United States, which has ~ 24 percent share of the global publication share" (p.231). A great deal of (70%) articles of China was published between 2011-2016. Followed by Brazil with 1987 (18.2%) articles. India had published 1924 (17.6%) articles. There was a steady growth of Indian publications during the period of study. Russia has the lowest number with 1162 articles making 10.64 percent of the total. It's interesting to note that 65 percent of the total publications were published in 2015 and 2016. The year of maximum output for India, Brazil, Russia, China and South Africa is 2015 and 2016.

The growth rate is measured using the formula of CAGR or Compound Annual growth rate¹. It gives the average rate of increase per year. The value is appropriate for comparing the growth rates between different countries.

$$CAGR = \left(\frac{\text{Ending Value}}{\text{Beginning Value}} \right)^{\frac{1}{n-1}} - 1$$

Where n is the number of years. In our case $n=26$. Russia has the maximum growth rate of 27.99, though Russia had the lowest number of articles as compared to other BRICS countries, the publications shot up in the years 2015 and 2016 with the phenomenal growth of 37% of the total articles. Brazil with 26.69 and China with 24.04 percentile. China could have been the highest growth rate but in this study, it has no publications during 1991 and 1992. India has the lowest growth rate at 12.86. The table below shows the total output of BRICS countries as a single unit in comparison with the world output.

TABLE I YEAR-WISE GROWTH OF ECONOMICS PUBLICATIONS OF BRICS COUNTRIES

Year	Country					BRICS Output	World output
	Brazil	China	India	Russia	South Africa		
1991	1	-	14	-	11	26	1024
1992	10	-	21	1	2	34	1477
1993	7	4	27	9	11	58	1625
1994	7	7	17	5	8	44	1704
1995	11	11	31	10	14	77	1939
1996	11	9	34	7	7	68	1964
1997	13	11	22	10	13	69	2029
1998	17	17	27	10	11	82	2241
1999	20	23	27	13	9	92	2363
2000	23	39	44	9	24	139	2656
2001	23	50	45	14	16	148	2613
2002	23	65	43	13	19	163	2801
2003	28	58	37	10	24	157	2894
2004	22	79	39	22	27	189	2928
2005	30	73	43	13	43	202	3262
2006	50	94	47	12	36	239	3671
2007	64	112	79	15	45	315	4312
2008	104	145	78	19	62	408	4931
2009	117	208	97	15	75	512	5802
2010	112	247	68	26	81	534	6039
2011	136	302	99	24	111	672	6251
2012	154	346	127	27	108	762	6770
2013	144	413	147	26	114	844	7308
2014	132	520	154	44	132	982	7625
2015	358	720	268	330	187	1863	11057
2016	370	874	289	478	234	2245	11938
Total Publications	1987	4427	1924	1162	1424	10924	109224
% of publications	18.19	40.53	17.61	10.64	13.04		
CAGR	26.69	24.04	12.87	27.99	13.01		
CAGR: Compound Annual Growth Rate							

The total BRICS share has been consecutively increasing in the total output as the numbers indicate in the above table. The increment has occurred from 2.54 percentile in 1991 to 18.81 percentile in the year 2016. Therefore BRICS as a developing economy even shares a considerable amount of research output being 10 percentile in the Economics field.

Shashnov and Kotsemir (2018) in their study on research landscape of BRICS countries found that "In 2010, the total number of publications of BRICS countries exceeded the number of publications in the United States, and in 2014, BRICS countries almost closed the gap with EU-28

countries. In total, in 2015, the BRICS countries accounted for almost 29% of the global volume of publications. Largely this was achieved through the exceptionally high rate of growth of publication activity in China" (p.1126).

Even the Citation ratio has increased from 0.42 percentile in 1991 to 35.85 percentile in 2016 and a slight decrease to 4.02 percentile and 4.8 percentile in the year 2002 and 2003 respectively. Citations received to the BRICS publications contributed to 8 percentile of the total citations of the world publications.

TABLE II COMPARISON BETWEEN BRICS OUTPUT TO THAT OF THE WORLD

Year	BRICS output	World output	Percentage share of BRICS	Year	Citation received by BRICS	Citations of the world	Percentage share of BRICS
1991	26	1024	2.54	1991	70	16533	0.42
1992	34	1477	2.30	1992	182	30524	0.60
1993	58	1625	3.57	1993	448	38603	1.16
1994	44	1704	2.58	1994	463	33832	1.37
1995	77	1939	3.97	1995	768	51471	1.49
1996	68	1964	3.46	1996	1044	46363	2.25
1997	69	2029	3.40	1997	1634	58733	2.78
1998	82	2241	3.66	1998	1297	65304	1.99
1999	92	2363	3.89	1999	2349	69075	3.40
2000	139	2656	5.23	2000	4717	90485	5.21
2001	148	2613	5.66	2001	3492	69959	4.99
2002	163	2801	5.82	2002	3397	84477	4.02
2003	157	2894	5.43	2003	4086	85079	4.80
2004	189	2928	6.45	2004	10133	90123	11.24
2005	202	3262	6.19	2005	5202	90428	5.75
2006	239	3671	6.51	2006	7737	98076	7.89
2007	315	4312	7.31	2007	6524	97628	6.68
2008	408	4931	8.27	2008	11652	100610	11.58
2009	512	5802	8.82	2009	10026	106070	9.45
2010	534	6039	8.84	2010	9816	93223	10.53
2011	672	6251	10.75	2011	13614	85089	16.00
2012	762	6770	11.26	2012	9356	74003	12.64
2013	844	7308	11.55	2013	8833	64007	13.80
2014	982	7625	12.88	2014	8075	51470	15.69
2015	1863	11057	16.85	2015	11198	35966	31.13
2016	2245	11938	18.81	2016	6466	18034	35.85
Total	10924	109224	10.00	Total	139567	1745165	8.00

A. Measure of Collaboration

The collaboration between authors and that too between different countries brings in more consolidated and stronger results because such results suit different scenarios and conditions as tested and evaluated by the respective scientists of the different countries. In this section, an attempt has been made to study the authorship pattern by counting single and multi-authored papers. This study helps to find out collaboration patterns and related Scientometric indicators.

Scientometric indicators strive to measure the factors and coefficients which govern and quantify the collaborations between the authors. But not all indicators provide an insight into the collaborative patterns. Hence a few selected Scientometric indicators are used in this study, as discussed in (Savanur&Srikanth. 2010).

Collaborative Coefficient (CC): Proposed by Ajiferuke *et al.*, (1988). It gives a proper number which expresses the level of collaboration. The shortcomings of Collaborative Index (CI) and Degree of Collaboration (DC) are solved by CC. The Collaborative coefficient lies between 0 and 1. The result yields 0 for only single-authored papers and a digit nearer to 1 for all maximal multi-authored papers.

$$\text{Collaborative Coefficient} = 1 - \frac{\sum_{j=1}^A \frac{f_j}{j}}{N}$$

Where f_j is the number of papers having j authors in collection K ;

N is the total number of papers in K .

A is the total number of authors in collection K .

Modified Collaborative Coefficient (MCC): Proposed by Savanur & Srikanth (2010). It is a modified version of Collaborative coefficient (MCC). The benefit of MCC is that its value tends to one as the number of the sum of

collaborative authors goes on increasing unlike that of Collaborative coefficient which remains less than one.

$$\text{Modified Collaborative Coefficient} = \frac{A}{A-1} \left\{ 1 - \frac{\sum_{j=1}^A \frac{f_j}{j}}{N} \right\}$$

Table III provides the authorship and collaboration pattern of BRICS countries and the year-wise collaboration rate is depicted in figure 1. It can be observed that Brazil and

China have maximum collaboration rate of 0.56, followed by India (0.52), South Africa (0.43) and Russia has the lowest collaboration rate i.e. 0.29, the great deal of (54%) Russian economics papers are single-authored. Overall collaboration rate of economics publications of BRICS countries is moderate. A similar result of the collaborative rate of 0.38 was observed (Biradar & Tadasad, 2015) for the world economics literature published during 2000-2014.

TABLE III COLLABORATION RATE OF THE BRICS COUNTRIES

Country	Single Aut	2- Aut	3- Aut	>3 Aut	Total	CC	MCC
Brazil	378	469	364	771	1982	0.56	0.56
China	732	1098	1097	1497	4424	0.56	0.56
India	420	480	407	615	1922	0.52	0.52
Russia	632	260	132	140	1164	0.29	0.29
South Africa	483	394	218	311	1406	0.43	0.43

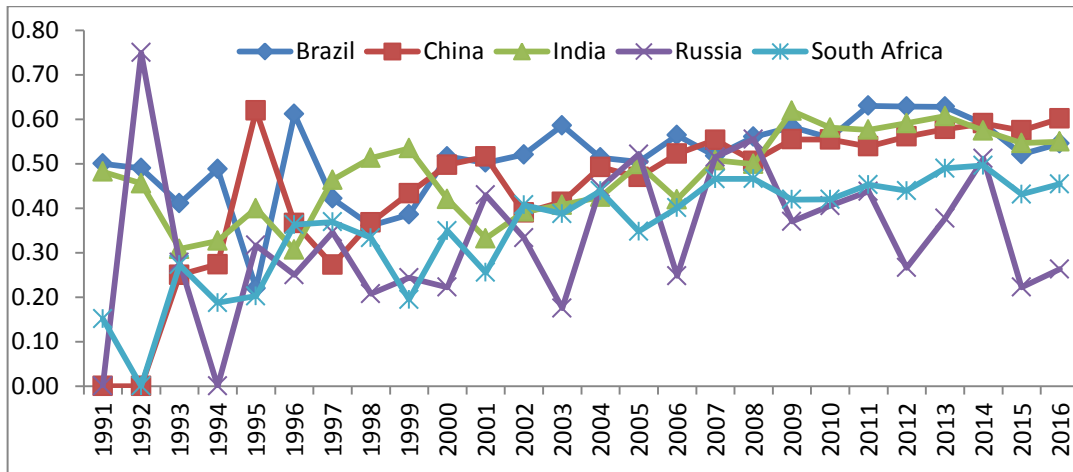


Fig. 1 Collaborative Coefficient (CC) of BRICS Countries

B. Co-Authorship Pattern of the BRICS Countries

Schubert and Braun (1996) "suggested the use of *Co-Authorship Index* for the first time, and is obtained by calculating proportionally the publications by single, two, multi- and mega-authored papers for different nations or for different sub-disciplines.

The Co-authorship Index is calculated as follows:

$$CAI = \frac{N_{ij}/N_{io}}{N_{oj}/N_{oo}} \times 100$$

Where:

- N_{ij} denotes the number of papers co-authored by j authors in the i-th country,
 - N_{io} denotes the total number of papers in the i-th country,
 - N_{oj} denotes the number of papers co-authored by j authors in all countries,
 - N_{oo} denotes the total number of papers in all countries.
- CAI=100 indicates that the number of publications corresponds to the average within a co-authorship pattern.

CAI>100 reflects higher than the average, and CAI<100 indicates lower than the average" (as cited in Guan & Ma, 2007, p.114).

Table IV provides the co-authorship pattern of BRICS countries and these values depicted in the following figure 2. It is clear from the table that, in all the BRICS countries, the CAI value for India and China was more than 100 (average) in all authorship categories which shows that they preferred to work in small and big teams. In single-authored publications, Russia and South Africa, the CAI value stands more than the average value which indicates that these countries preferring to work independently. In two-authored publications of India and China, CAI value is exactly equal to the average CAI value which indicates the number of publications corresponds to the average within a co-authorship pattern, and the CAI value of South Africa is higher than the average, which represents this country prefer to work as a team.

TABLE IV CO-AUTHORSHIP PATTERN OF THE BRICS COUNTRIES

Country	Single Author	CAI	Two Authors	CAI	Three Authors	CAI	>3 Authors	CAI	No. of Records
Brazil	378	79	469	95	364	90	771	127	1982
India	420	90	480	101	407	104	615	105	1922
China	732	68	1098	100	1097	122	1497	111	4424
Russia	632	224	260	90	132	56	140	39	1164
S Africa	483	142	394	113	218	76	311	72	1406
	2645		2701		2218		3334		10898

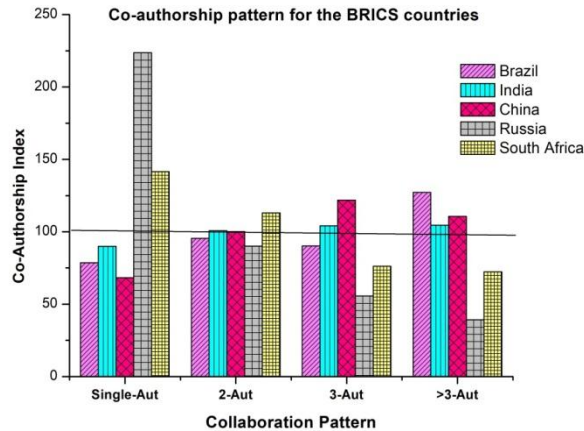


Fig. 2 Collaboration patterns reflected by CAI

C. Transformative Activity Index (TAI)

In order to study the change in the research output of the economics field of the BRICS countries, an index, *Transformative Activity Index* suggest by Guan & Ma (2007) has applied with the following formula.

$$TAI = \frac{Ci/Co}{Wi/Wo} \times 100$$

C_i = Number of publications of the specific country in the i^{th} block;

C_o = Total number of publications of the specific country during the period of study

W_i = Number of publications all the countries in the i^{th} block;

W_o = Total number of publications of all the countries during the period of study

Table V shows the publication output of economics research of the BRICS countries during the two blocks i.e. 1991-2003 and 2004-2016. By using the dataset, TAI for the two blocks has been calculated.

It is clear from the table that, the publication activity in economics research is increased exceptionally in all the BRICS countries. Chaitra, Jeyshankar, & Abu (2014) found similar results in their study on Lung Cancer research in G7 and BRIC countries. China’s publication activity (819) increased tremendously along with other BRICS countries

such as Russia (764), Brazil (760), South Africa (720) and India (562) lag behind in terms of TAI.

TABLE V TAI OF THE BRICS COUNTRIES

Country	1991-2003	TAI	2004-2016	TAI	1991-2016	Change in TAI
Brazil	194	92	1793	852	1987	760
China	294	63	4133	881	4427	819
India	389	191	1535	753	1924	562
Russia	111	90	1051	854	1162	764
South Africa	169	112	1255	832	1424	720
	1157		9767		10924	

Kumar & Asheulova (2011) in their study highlighted that "... BRIC countries are projected to be the fastest growing economies in the world. The BRIC governments have declared education and S&T to be a strategic engine of sustainable economic development. Therefore, BRIC governments are boosting their R&D investments and China, followed by India, has become an important player in research output. China was the third largest R&D-performing country in 2003, behind the United States and Japan and has increased the percentage of its GDP spent on R&D. Among the BRIC countries, the gross domestic expenditure on R&D as a percentage of GDP was highest in China (1.5%), followed by Russian Federation (1.1%), Brazil (1.0%) and India (0.8%) in 2007" (p.228). It can be inferred that, in order to improve the publication activity in India, more funding on the R&D activities in general and in economics field of research, in particular, has to happen. It is also suggested that, most of the publications published in national languages, not digitized publication contents (inaccessible on Google Scholar and other search engines) and publications appeared in journals which are not indexed by well-known databases such as Web of Science, Scopus, etc. are difficult to find or to even to know of their existence, even though these publications represented high-quality research. Policies can be made at the national or institutional level that all the publications published by respective organizations should be made open access so that electronic copies of the papers made available through open access repositories. This effort will enhance the visibility of research publications mentioned above and hence followed by the accessibility and impact.

D. Citation Profile of Economics Research for the BRICS Countries

Citation profile of the BRICS countries is tabulated in the following Table VI. It is clear from the table that, in all the BRICS countries, out of 10929 publications, 2920 (26.7%) publications did not receive any citations; remaining 8009 (73.3%) publications received citations during the period of study from 1991-2016. A maximum of 2542 (23.3%) papers cited from the range of 11-100 citations. An average citation per paper for all BRICS countries is 13.05. Only South Africa and China received citations more than the average

citation rate. The h-index for papers of all BRICS countries is 122.

It is interesting to note that, a considerable number 703 (60.3%) of Russian papers did not receive any citations. On the other hand, an exceptionally high number of Chinese papers 3694 (83.4%) got citations. South Africa papers cite with the highest average citation per paper rate of 16.09 percentile and Russian papers cited at the less average citation rate i.e. 7.4 percentile. Among the BRICS countries, China tops with a highest h-index value of 92, followed by India (64), South Africa (62), Brazil (60) and Russia (30) lagging far behind in the rank.

TABLE VI CITATION PROFILE OF THE BRICS COUNTRIES

Citations Range	Brazil	China	India	Russia	S Africa	Total
0	654	733	504	703	326	2920
1	215	498	264	153	178	1308
2	164	399	169	70	108	910
3	125	310	128	26	82	671
4	94	244	99	37	60	534
5	86	201	75	19	55	436
06-10	241	643	248	67	217	1416
11-100	379	1318	399	80	366	2232
101-1000	29	78	38	6	31	182
>1000	0	3	0	6	1	10
Total	1987	4427	1924	1167	1424	10929
Total Citations	23247	65559	22234	8630	22909	142579
Average Citation	11.70	14.81	11.56	7.40	16.09	13.05
h-index	60	92	64	30	62	122

E. Absolute Citation Impact and Relative Citation Impact (RCI)

$$RCI = \frac{\text{A country's share of total citations}}{\text{A country's share of total publications}}$$

The Absolute Citation Impact (ACI) which is similar to the average citation per paper (CPP) and comparatively better indicator for measuring the performance of the research rather than considering either only total number of publications or the total number of citations. On the other hand, Relative Citation Impact (RCI) indicator was used to analyse the impact of BRICS countries. This indicator was developed by Thomson Reuters to calculate science and engineering indicators. (LalithaKumari, 2009), (Chitra, Jeyshankar, & Abu, 2014).

$RCI = 1$ indicates denotes a country's citation rate equal to world citation rate.

$RCI < 1$ indicates a country's citation rate less than world citation rate and also implies that the research efforts are higher than its impact.

$RCI > 1$ indicates a country's citation rate higher than world citation rate and also imply high impact research in that country.

TABLE VII ACI AND RCI OF BRICS COUNTRIES

Country	Publications	BRICS share (%) publications	Citations	BRICS share (%) Citations	ACI	RCI
Brazil	1987	18.19	23247	16.30	11.70	0.90
China	4427	40.53	65559	45.98	14.81	1.13
India	1924	17.61	22234	15.59	11.56	0.89
Russia	1162	10.64	8630	6.05	7.43	0.57
South Africa	1424	13.04	22909	16.07	16.09	1.23
	10924		142579		13.05	

ACI= Absolute Citation Impact; RCI= Relative Citation Impact

The ACI and RCI values of BRICS countries shown in table VII. South Africa has the maximum ratio of average citation per paper (CPP) 16.09, which signify the quality of research undertaken in the country, followed by China with 14.81 ACI, Brazil with 11.7 and India had somewhat closer citation values with Brazil and hence ACI value 11.56 is also more closer to it. Russia being the lowest ACI value with 7.43. For all the BRICS countries, South Africa and China, the RCI value is more than 1.00, i.e. 1.23 and 1.13 respectively indicating the higher citation impact. Brazil and India have almost equal RCI value 0.9 i.e. close to one indicate countries' citation rate is equal to that of BRICS share. Russia has RCI value less than one i.e. 0.57 indicate citation rate is less than other countries of study. Shashnov and Kotsemir (2018) got the similar results except for Russia in terms of citation metrics, they found that "For all BRICS countries except South Africa, the value of FWCI is below 1.00, i.e. less than the average global level of citation. South Africa, China, and Russia demonstrate quite rapid growth of the FWCI value" (p.1131).

VI. CONCLUSION

Scientometric studies using the various bibliometric and economic indicators and techniques highlights the research contribution, performance and evaluation of various countries, institutions. The empirical data shows that BRICS countries contribution in social science subjects like economics is appreciable. China showed tremendous growth in research publication activities in economics after 2000 and other BRICS countries show steady growth. The collaboration effort in economics subject is comparatively less with science and technology arena. BRICS countries have tremendous potential in R&D in social sciences.

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