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## Research on Psychology in India and South Africa a Comparative Scientometric Study

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# Research on Psychology in India and South Africa a Comparative Scientometric Study

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## Abstract

*Psychology is one of the field in which constant research is going on, the main objective of this paper is to compare the quality of research output of the two countries like India and South Africa in the field of psychology. The study is conducted by taking citations from WOS database. In this paper the analysis of 14,30,700 global research publications out of which, India contributed 12,543 (0.88%), 96,871 citations with 107 h-index and South Africa 9,938 (0.69%) papers, 1,21,385 citations with 126 h-index received is considered. Study during the years from 2001 to 2020 has been compared in the form of publication growth, RGR & DT, Document type, Language wise, Quadrennial Publications and Transformative Activity Index to check the quality of the research on India and South Africa countries. India 12,543 papers published with 96,871 citations received and compared with India, South Africa has less paper published 9,938 but with highest citations of 1,21,385.*

## Keywords

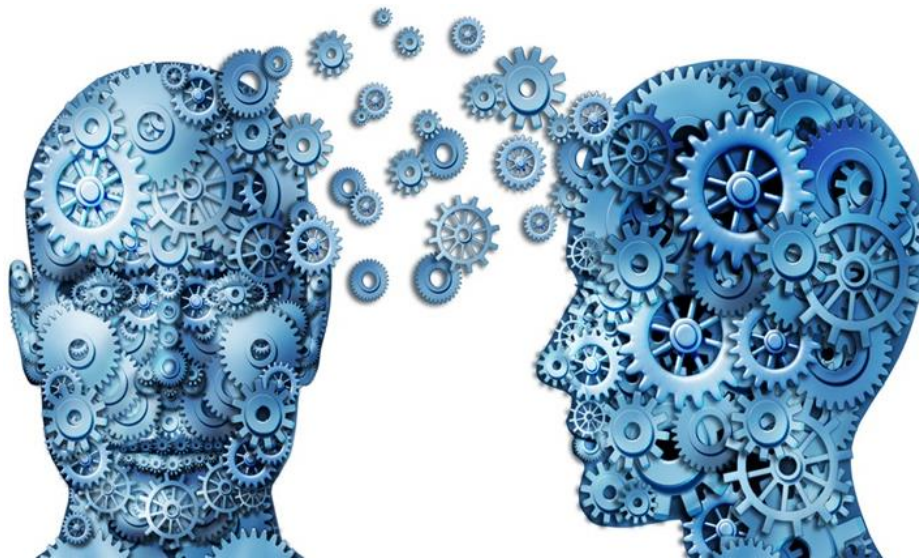
Psychology, Annual growth, RGR, Relative Growth Rate (RGR), Doubling Time (DT), Document, Language, Quadrennial, Transformative Activity Index (TAI) Scientometric, Web of Science, (WoS), India, South Africa, World.

## Introduction:

What is psychology? According to the American Psychological Association, psychology is the empirical study of the mind and actions. Human growth, sports, fitness, clinical, social behavior, and cognitive processes are only a few of the many subfields of psychology that can be studied. According to (Gordon, 1995). His perspective was known as functionalism since the goal of psychology was to research the role of actions in the world. The emphasis of functionalism was on how mental behaviors aided an organism's integration into its

surroundings. The second, more subtle sense of functionalism is that functionalists were more interested in the functioning of the entire mind rather than the particular parts of the mind, which were the subject of structuralism. According to Freud, “the unconscious mind could be accessed through dream analysis, by examinations of the first words that came to people’s minds, and through seemingly innocent slips of the tongue. The psychoanalytic theory focuses on the role of a person’s unconscious, as well as early childhood experiences, and this particular perspective dominated clinical psychology for several decades”. (Thorne & Henley, 2005) showing figure-1.

Figure-1: History of Modern Psychology



Source: <https://study.com/academy/course/psychology-101.html>

Scientometrics is the study of the quantitative characteristics and features of science and scientific analysis. The focus is on studies that use statistical mathematical methods to examine the creation and process of science. Measuring and interpreting scientific literature is the focus of this field of research. Bibliometrics has a sub-field called Scientometrics. The assessment of the influence of research papers and academic journals, as well as the interpretation of scientific citations and the application of such measurements in policy and management contexts, are all major research topics.

Many reasons are responsible for the development of research in Scientometric and they are discussed here. The major focus of the study is to apply the Scientometric analysis with a view of analyzing the performance of research output on Annual growth of publications

Research, Relative Growth Rate and Doubling Time, Document type, Language wise, Quadrennial Publications, Transformative Activity Index on Psychology in India and South Africa.

### **Review of Literature:**

The following is a study of the literature:

(Ahila, 2011) This paper examines the success of research production in the field of pharmacology. During the period 1999-2010, a total of 22,065 research articles published in Web of Science were analyzed to determine the output of scientists from around the world in terms of development (12 years).

(Rajendran, Manickaraj, & Elango, 2013) The SCOPUS database was used to look at the research success in wireless communication contributed by Indian scientists from 2001 to 2012. The study used Scientometrics tools including Relative Growth Rate and Doubling Time, Degree of Collaboration, and Co-Authorship Index. They discovered the top ten journals that Indian scientists and highly active Indian institutions favour.

(Neelamma & Anandhalli, 2016) Botany Literature study production success has been observed. For the period 2005-2014, a citation study of all journal articles published in the Botany literature that were covered in Web of Science (online edition database). There were 12051 references cited in 1183 papers published in 572 journals. The study delves into bibliometric components such as citation distribution by document form, citation distribution by language, and citation publication by country. The report also identifies the journals with the highest productivity in the field of Botany Literature. The study of the data reveals that out of 12051 citations, Research papers account for 61.96 percent of all citations, making them the most common source of knowledge among Botany researchers.

(Elango, Rajendran, & Manickraj, 2013) Using SCOPUS, researchers looked at the output of tribology research in BRIC (Brazil, Russia, India, and China) countries over a five-year period from 2006 to 2010. The BRIC countries tribology research performance was examined in terms of document form, authorship, and publication pattern. Development rate, partnership coefficient, co-authorship index, and transformative activity index are among the statistical and Scientometric instruments used.

### **Objectives of the study:**

This study compares the growth of psychology literature from countries of India and South Africa and provides a quantitative evaluation of the state of the science by examining the following characteristics of research outputs.

1. Annual growth of publications in India, South Africa and World
2. Relative Growth Rate and Doubling Time
3. Document type wise Contribution
4. Language wise distribution
5. Quadrennial Publications
6. Transformative Activity Index

### **Methodology and Source of Data:**

This study is based on the publication output as indexed by Web of Science (*WoS*) database for the period from 2001 to 2020. The study uses 20 years publications data on India and South Africa Countries, it used citations data for measuring quality and visibility of these countries research output. These 20 years citations window has been used for computing the quality of the research. With a total of globally 14,30,700 papers, Indian 12,543 (0.88%) with 96,871 citations and South Africa 9,938 (0.69%) papers with 1,21,385 citations records were downloaded and analyzed by using the “*MS Excel*” and “*Histcite*” software application as per the objectives of the study.

## **RESULTS AND DISCUSSION**

### **Annual Growth of Publications in India, South Africa and World:**

The growth and development of India, South Africa and global wise field of Psychology published period of twenty years from 2001 to 2020, the global wise total 14,30,700 papers published on field Psychology, Indian country papers published 12,543 (0.88%), 96,871 citations received with 107 h-index, ACPP 7.72% and South Africa 9,938 (0.69%) papers published with 1,21,385 citations and 126 h-index, ACPP 12.21% received is given in table-1 and figure-2.

Table-1: Growth of Publications in India, South Africa and World

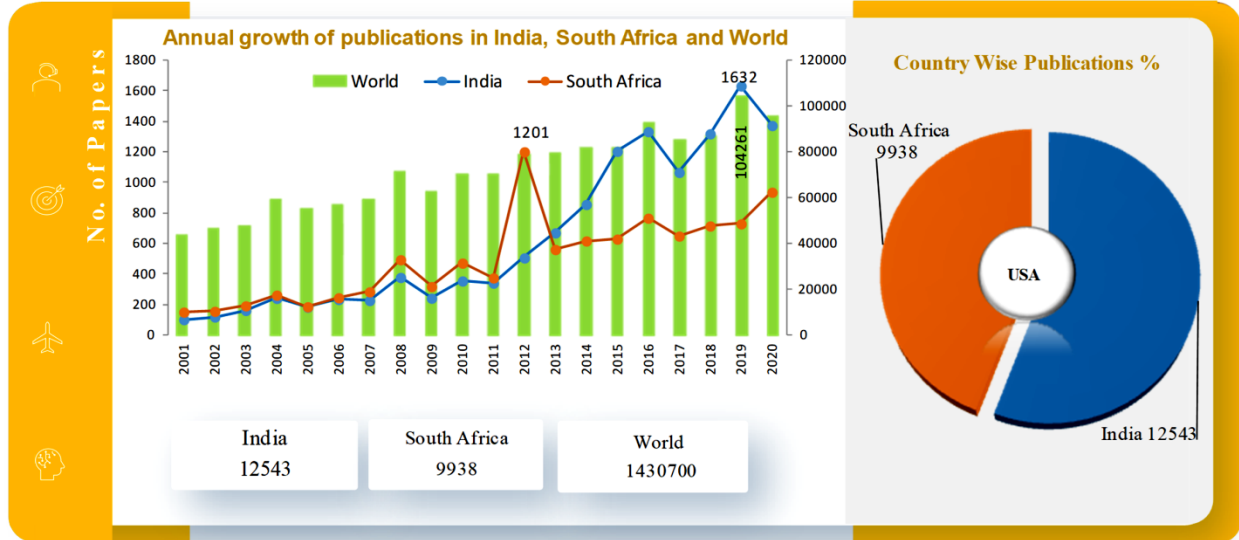
Year	India	H-Index	South Africa	H-Index	World
2001	102	27	151	33	43938
2002	119	32	156	35	46915
2003	162	32	192	33	48214
2004	241	32	262	44	59573
2005	183	39	186	42	55257
2006	234	37	245	43	56989
2007	227	35	284	41	59326
2008	378	37	494	46	71334
2009	242	37	318	41	62644
2010	355	47	472	49	70126
2011	341	41	375	40	70369
2012	506	36	1201	40	79122
2013	670	38	561	46	79486
2014	856	37	617	44	81622
2015	1204	30	629	37	81664
2016	1333	32	766	36	92487
2017	1066	27	649	31	85290
2018	1319	24	715	28	86691
2019	1632	15	729	17	104261
2020	1373	19	936	11	95392
<b>Total</b>	<b>12543</b>	<b>107</b>	<b>9938</b>	<b>126</b>	<b>1430700</b>

The highest papers published from India 12,543 with 107 h-index, during the period published within the years from 2010 to 2019 and 1,632 papers were published which is the highest in year of 2019 again with slight decreased in 2020 publishing 1,373 papers and highest h-index received 47 in the year 2010.

South Africa with total paper publications of 9,938 with 126 h-index contributed during the years from 2010 to 2020 but except for the year 2012, south Africa had highest papers published with 1,201 publications which is thrice more than every year receiving highest h-index of 49 in the year 2010. It is noticed that India has a total 12,543 papers published with

96,871 citations and comparatively , South Africa has less paper published of 9,938 but with maximum of 1,21,385 citations received.

Figure-2: Growth of Publications in India, South Africa and World



**Relative Growth Rate and Doubling Time:**

The relative growth (RGR) rate and doubling time (DT) were applied in relation to the number of publications during the span of time to understand the trend analysis of the research productivity of Psychology in India, South Africa, and globally. There is a connection between growth rate and time to double. It is to determine the time span over which the number of publications doubled, which can be measured using natural logarithms.

The mean relative growth rate R (1-2) over a specified period of the interval can be calculated from the following equation suggested by (Mahapatra, 1985).

$$R(1 - 2) = \frac{W_2 - W_1}{T_2 - T_1}$$

The Explanation Formula.....!

R = Mean relative growth rate over the specific period of the interval;

W1 = log w1 (Natural log of initial number of publications/pages);

W2 = log w2 (Natural log of initial number of publications/pages);

T2-T1 = Unit difference between the initial time and final time. Therefore,

R (a) = Relative growth rate per unit of publications per unit of time (year)

R (p) = Relative growth rate per unit of pages per unit of time (year).

Table-2: Relative Growth Rate and Doubling Time

Year	India	RGR	DT	SA	RGR	DT	World	RGR	DT
2001	102	-	2.69	151	-	2.69	43938	-	3.25
2002	119	0.77		156	0.71		46915	0.73	
2003	162	0.55		192	0.49		48214	0.43	
2004	241	0.49		262	0.42		59573	0.36	
2005	183	0.26		186	0.22		55257	0.25	
2006	234	0.25		245	0.23		56989	0.20	
2007	227	0.20		284	0.21		59326	0.17	
2008	378	0.26		494	0.29		71334	0.18	
2009	242	0.14		318	0.15		62644	0.13	
2010	355	0.17		472	0.19		70126	0.13	
2011	341	0.14	4.20	375	0.13	6.20	70369	0.12	7.82
2012	506	0.18		1201	0.32		79122	0.12	
2013	670	0.20		561	0.12		79486	0.10	
2014	856	0.21		617	0.12		81622	0.10	
2015	1204	0.23		629	0.11		81664	0.09	
2016	1333	0.21		766	0.12		92487	0.09	
2017	1066	0.14		649	0.09		85290	0.08	
2018	1319	0.15		715	0.09		86691	0.07	
2019	1632	0.16		729	0.08		104261	0.08	
2020	1373	0.12		936	0.10		95392	0.07	
<b>Mean</b>		<b>0.25</b>	<b>3.49</b>		<b>0.22</b>	<b>4.54</b>		<b>0.18</b>	<b>5.66</b>
<b>Total</b>	<b>12543</b>	<b>4.81</b>		<b>9938</b>	<b>4.19</b>		<b>1430700</b>	<b>3.48</b>	

Doubling Time (DT): Not only is the time to double the number of publications of one subject for a period but then the difference between the number of logarithms by the beginning and end of the period must be the number 2 logarithms has a value of 0.693.

Thus, the corresponding doubling time for publications can be calculated with the following formula:



$$\text{Doubling time (Dt)} = \frac{0.693}{R}$$

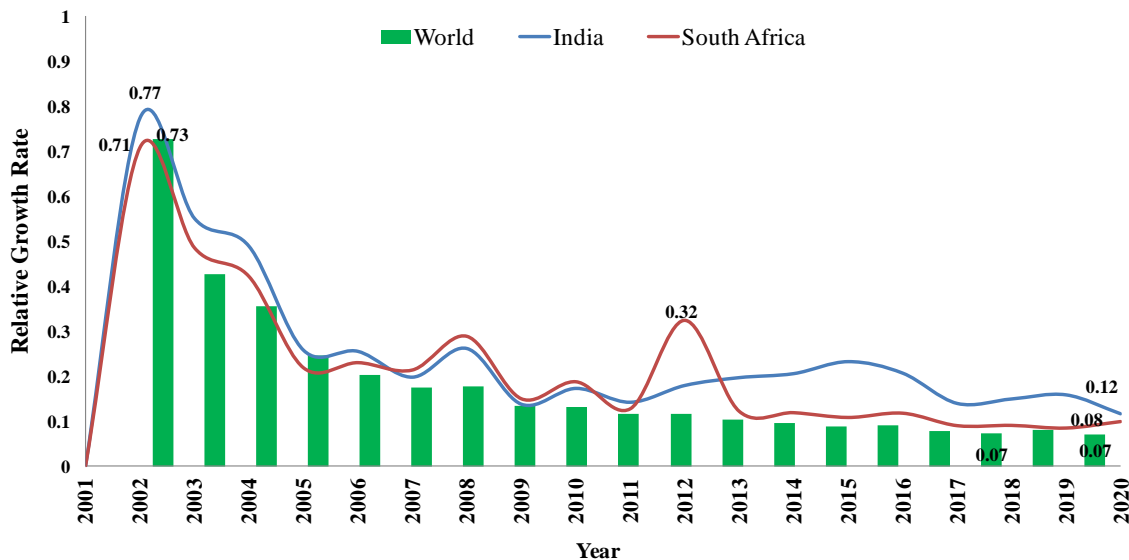
Therefore,

$$\text{Doubling time for publication Dt(a)} = \frac{0.693}{R(a)}$$

The Relative Growth Rate and Doubling Time values shows that the RGR India decreases from 0.77 to 0.12 in the year from 2001 to 2020, doubling time 2.69 in the year 2001 to 2010 and 4.20 in the year from 2011 to 2020, the average of mean relative growth rate 0.25 and the mean doubling time 3.49. South Africa has RGR of 0.71 in the year 2001 and slowly decreased to 0.13 in the year 2011 and again increased to 0.32 in the year 2012 and further decreased to 0.10 in the year up to 2020, doubling time is 2.69 in the year 2001 to 2010 and 6.20 in the year from 2011 to 2020, the average of mean relative growth rate 0.22 and the mean doubling time 4.54.

Global wise Relative Growth Rate decreases over a period of twenty years (RGR) from 0.73 to 0.07 from 2001 to 2020, doubling time 3.25 in the year 2001 to 2010 and 7.82 in the from 2011 to 2020, and the average of mean relative growth rate 0.18 and the mean doubling time 5.66 shows the total production of India, South Africa and the world second period like 2011 to 2020 highly Doubling Time comparative previews period showing table-2 and figure-3.

Figure-3: Relative Growth Rate and Doubling Time



### Document Type wise Contribution:

The performance of the Psychology field research publications is been done through careful analysis of the (fourteen) type of publications (*Article, Meeting Abstract, Editorial Material, Review, Proceedings, Book Review, Letter, Correction, News item and Book Chapter*) during the period of the 2001 to 2020 in India, South Africa and other countries globally.

Table-3: Document Type wise Contribution India, South Africa and World

Document Type	India				South Africa				World	
	TP	%	TC	%	TP	%	TC	%	TP	%
Article	4834	39	79840	82	6417	65	101361	84	848876	59
Meeting Abstract	4916	39	249	0	2050	21	381	0	317443	22
Editorial Material	748	6	3684	4	755	8	2823	2	69170	5
Review	501	4	9452	10	405	4	13233	11	58268	4
Proceedings	73	1	62	0	76	1	3007	2	47342	3
Book Review	79	1	16	0	117	1	22	0	44409	3
Letter	1340	11	3311	3	76	1	439	0	31467	2
Correction	30	0	6	0	33	0	36	0	9653	1
News item	2	0	57	0	1	0	56	0	2533	0
Book Chapter	9	0	193	0	3	0	24	0	946	0
Reprint	0	0	0	0	4	0	3	0	321	0
Retraction	0	0	0	0	1	0	0	0	126	0
Bibliography	11	0	1	0	0	0	0	0	79	0
Software Review	0	0	0	0	0	0	0	0	67	0
<b>Total</b>	<b>12543</b>		<b>96871</b>		<b>9938</b>		<b>121385</b>		<b>1430700</b>	

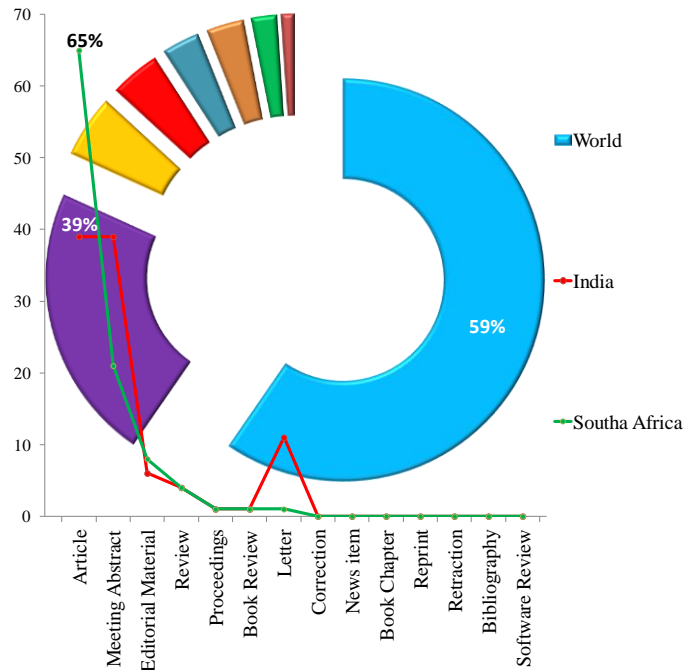
TP: Total Papers, TC: Total Citations

India the maximum collection has published in form of *Meeting Abstract* contribution 4,916 with 39% and total citations 249 with 0%, *Article* Papers were 4,834 with 39% and high citations 79,840 with 82% contributions, *Letter* 1340 with 11% and citations 3,311 with 3% contributions, *Editorial Material* 748 with 6% and citations 3684 with 4% contributions followed by the other bibliographic forms India the remaining types of documents recorded lowest output numbers below 5% of output.

South Africa has higher paper publications published from *Article* 6,417 with 65% and total citations 1,01,361 with 84%, *Meeting Abstract* contribution 2,050 with 21% and total citations 381 with 0%, *Editorial Material* 755 with 8% and total citations 2,823 with 2% followed by the other bibliographic forms recorded lowest output numbers below 5% of output.

World first largest contribution in the form of *article* publication 8,48,876 with 59%, *Meeting Abstract* 31,74,43 with 22% and *Editorial Material* 69,170 with 45% contributions, *Review* 58,268 with 4% and followed by the other bibliographic forms the remaining types of documents recorded lowest output numbers below 3% of output the table-3 and figure-4 shows the fourteen document type wise contribution of Psychology research output in India, South Africa and Global from the year 2001 to 2020.

Figure-4: Document Type wise Contribution India, South Africa and World



### Language wise Distribution:

Analyzed a total of eight Language-wise results maximum result got the English language first ranked followed by the Turkish language second position.

India in terms of language publications, *English* has 12,525 articles with 99.86% and 96,835 citations with 99.96% and *English* literature articles tops the list during the study period 2001 to 2020, the *Turkish* language occupied the second position 11 articles with 0.09% and 23 citations with 0.02%. The other languages remain recorded the lowest output numbers below 0.02% of output in India.

Table-4: Language wise India and South Africa

Language	India				South Africa			
	TP	TP%	TC	TC%	TP	TP%	TC	TC%
English	12525	99.86	96835	99.96	9911	99.73	121328	99.95
Turkish	11	0.09	23	0.02	0	0.00	0	0.00
German	3	0.02	9	0.01	9	0.09	16	0.01
French	2	0.02	3	0.00	0	0.00	0	0.00
Spanish	1	0.01	0	0.00	2	0.02	32	0.03
Portuguese	1	0.01	1	0.00	1	0.01	0	0.00
Dutch	0	0.00	0	0.00	14	0.14	9	0.01
Russian	0	0.00	0	0.00	1	0.01	0	0.00
<b>Total</b>	<b>12543</b>		<b>96871</b>		<b>9938</b>		<b>121385</b>	

South Africa regarding the English literature publications, *has* 9,911 articles with 99.73% and 1,21,328 citations with 99.95%, *English* language articles tops the list during the study period 2001 to 2020, the *Dutch* language 14 articles with 0.14% and 9 citations with 0% occupied the second position followed by remaining all language recorded lowest output numbers below 0% of output.

**Quadrennial Publications:**

Quadrennial publication output of India, South Africa and World during the period of the 2001 to 2020, India’s total publication is 12,543 with highest Quadrennial 53.60%, South Africa 9,938 with highest Quadrennial 38.19%, and World 14,30,700 with highest Quadrennial 32.44% showing table-5 and figure-5.

Table-5: Quadrennial Publications India, South Africa and World

Year	India			South Africa			World		
	Records	Q%	GR	Records	Q%	GR	Records	Q%	GR
2001-2005	807	6.43	-	947	9.53	-	253897	17.75	-
2006-2010	1436	11.45	1.78	1813	18.24	<b>1.91</b>	320419	22.40	<b>1.26</b>
2011-2015	3577	28.52	<b>2.49</b>	3383	34.04	1.87	392263	27.42	<b>1.22</b>
2016-2020	6723	53.60	1.88	3795	38.19	1.12	464121	32.44	1.18
<b>Total</b>	<b>12543</b>			<b>9938</b>			<b>1430700</b>		
<i>Q%: Quadrennial%, GR: Growth Rate</i>									

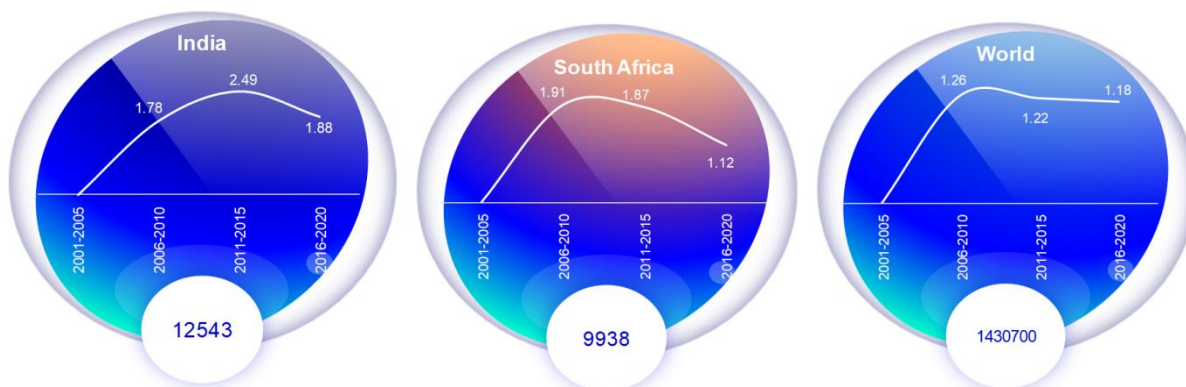
India quadrennial publications output showed that 807 (6.43%) during the period of the 2001 to 2005, 1,436 with (11.454%) papers publications during the since 2006 to 2010, 3,577

(28.52%) articles in 2011 to 2015 and 6,723 with (53.60%) paper published during the period the 2016 to 2020 were published. The India research publications in triennial growth were 1.78% for the triennial period 2001-2005 to 2006-2010, 2.49% period 2006-2010 to 2011-2015 and it is 1.88% during 2011-2015 to 2016-2020. Evidently contribution of publications output at a much higher rate in the first and second period to third and fourth periods.

South Africa quadrennial publications output showed that 947 (9.53%) during the period of the 2001 to 2005, 1,813 with (218.24%) papers publications during the since 2006 to 2010, 3,383 (34.04%) articles in 2011 to 2015 and 3,795 with (38.19%) paper published during the period the 2016 to 2020 were published. The South Africa research publications in triennial growth were 1.91% for the triennial period 2001-2005 to 2006-2010, 1.87% period 2006-2010 to 2011-2015 and it is 1.12% during 2011-2015 to 2016-2020. Evidently contribution of publications output at a much higher rate in the third and fourth period to previous two periods.

World quadrennial publications output 2,53,897 (17.75%) during the period of the 2001 to 2005, 3,20,419 with (22.40%) papers publications during the since 2006 to 2010, 3,92,263 (27.42%) articles in 2011 to 2015 and 4,64,121 with (32.44%) paper published during the period the 2016 to 2020 were published. The World research publications in triennial growth were 1.26% for the triennial period 2001-2005 to 2006-2010, 1.22% period 2006-2010 to 2011-2015 and it is 1.18% during 2011-2015 to 2016-2020. Evidently contribution of publications output at a much higher rate in the third and fourth period to previous two periods.

Figure-5: Quadrennial Publications India, South Africa and World



### Transformative Activity Index:

The Transformative Activity Index (TAI) proposed by (Guan & Ma, 2007) was used to investigate the shift in the performance of Psychology papers between Indian and South African countries.

Mathematically,

$$TAI = \frac{C_i/C_o}{W_i/W_o} \times 100$$

~  $C_i$  = Number of publications for a particular country in a particular year,

~  $C_o$  = Total output for a particular country during the study period;

~  $W_i$  = Number of publications for all the countries in a particular year;

~  $W_o$  = Total output for all the countries during the study period;

Table-6: Transformative Active Index India and South Africa

Country	2001-2010	TAI	2011-2020	TAI	2001-2020	Change in TAI
India	2243	59	10300	117	12543	58
South Africa	2760	92	7178	103	9938	11
Total	5003		17478		22481	

Table-6 reveals about the India and South Africa countries on the *Transformative Active Index* (TAI) during the period from 2001 to 2010 and 2011 to 2020. During 2001 to 2020 the changes were identified among the India and South Africa countries, there is a fluctuation trend while showing steady progress from 2011 to 2020. It is clear from the table-7 that the publication activities in India and South Africa countries shows an increasing trend in their publication activity as shown by the values of TAI.

### Conclusion:

The study examines the growth of publications Indian, South Africa and Global. With overall global paper publications, 14,30,700 papers were published in the field of Psychology. Indian contributes to 12,543 papers published 0.88%, and 96,871 citations received with 107 h-index, ACPP 7.72% and South Africa 9,938 (0.69%) papers published with 1,21,385 citations and 126 h-index, ACPP 12.21% received, India, South Africa and the world second period like 2011 to 2020 shows highly Doubling Time comparative previews period, Documents type Article, Meeting Abstract and Editorial Materials highly published and English language 99%

published in India, South Africa and World. Indian quadrennial publications has higher output rate in the first and second period to third and fourth periods, South Africa has higher rate in the third and fourth period to previous two periods, The Global wise quadrennial publications were higher rate in the third and fourth period to previous two periods and Transformative Activity Index India and South Africa countries show an increasing trend in their publication activity by the values of TAI.

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