

Research Trends in Political Science Literature: A Study of Scientometric Analysis

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ABSTRACT

This article analysed the various bibliometric components of the articles published in the political science Journal from 2005-2014. The study identifies research trend, characteristics growth and collaboration pattern of political science literature. The analysis of data reveals that the average growth rate increases at the rate of 1.043. Further, moderate degree of collaboration (0.495) is observed and average number of author per paper found to be 1.621. The relative growth rate of an articles increases gradually and correspondingly the values of Doubling time of the articles $Dt(P)$ decreases. The maximum number of articles has been contributed by University (42.40%), the single author papers are more popular among south Asian journal of socio-political studies. The highest number of publications was published in the year 2009 (11.63%). Tamilnadu is the highest contributed state in the field of political science literature. Finally author verified observed data set through Kolmogorov smirnov test.

Keywords: Bibliometrics, Socio-Political Study, Authorship Pattern, Degree of Collaboration, Collaborative Research, Lotka's Law, KS Test.

INTRODUCTION

Bibliometrics is an important field of information science as it represents a unique set of techniques and tools for the monitoring and analysis of information resources and for the management of knowledge in social and organizational contexts.

The Present study is a bibliometric analysis of South Asian Journal of Socio-Political Studies (<http://www.sajospsindia.com>) over the period of 2005-2014. An attempt has been made in this study to find out the various characteristics of Socio-Political literature such as average growth rate of literature, relative growth rate and contribution of different types of institutions, authorship pattern and country wise distribution of publications.

ABOUT THE JOURNAL

South Asian Journal of Socio-Political Studies (SAJOSPS) is a peer-reviewed international

journal devoted to the study of Social Sciences and Management. It also aims to promote scholarship that perceives multidimensional problems of the society and mankind in totality and to present them with sagacity, truth and vision.

The Journal contains articles/scholarly features covering a wide spectrum and encompassing a broad canvas of socio-political-technological-managerial and hospitality issues. It will lend a new perspective and dimension, which will help to illumine hitherto unexplored areas of the subjects and make it a profound study. Moreover, it will provide a forum for the interdisciplinary study of contemporary issues which will help to encourage a closer interaction between the various branches of knowledge. It will also articulate rigorous scientific discussion on the diverse concerns of research in the above mentioned areas. Given the rapidly changing socio, political, economic, technological, and

managerial and tourism climate of South Asia, the major aim of the Journal is to enhance the understanding of South Asia among the countries of the region and beyond. It will also serve as a forum to share fresh thinking and to debate matters of national and regional concern to the South Asian countries from their perspective. The journal has no particularistic affiliation or orientation and is meant exclusively to serve entire mankind with special reference to the issues of South Asia.

REVIEW OF RELATED LITERATURE

Of late a lot of research papers are being published at national and international level on scientometrics. It is observed from LISA, LISTA, Goole and Emerald that the paper like, Mahapatra (1985) assessed the Relative Growth Rates (RGR) is a measure to study the increase in number of articles/pages per unit of articles/pages per unit of time. In the study of Sen and Gan (1990) the conceptual framework to study the individual scientists or group of individuals in the pivotal position of investigation by using the models, devices or tools of Scientometrics and bibliometrics approach, and coined the new term "Bibliometrics." Nattar (2009) conducted scientometric analysis of 829 articles published in Indian Journal of Physics during 2004-2008. Results indicated that the highest numbers of papers have been written by co-authors. The contributions in this journal from India were slightly more than those from the other countries. According to Gavisiddappa Anadahalli (2014) attempt has been made to test the validity of Lotka's law in the domain of library and information science (LIS) published in the LISTA database considers only the Authors of the Articles that appear in 2008 to 2012 as the base for the study which included 1012 articles contributed by 2022 authors. Lotkas law is one of the most basic laws of bibliometric and it deals with frequency of publication by authors in any given field. Further he has used three method namely Sen's Method Pao's Method and Maximum Likelihood Method are used and tested and finally verified through Kolmogorov smirnov test. Finally it can be concluded that Lotka's law by and large holds good for the authorship pattern in the field of library and information science. Maria Isabel Martín Sobrino, Ana Isabel Pestana Caldes and António Pulgarín Guerrero(2008).Examine an application of

Lotka Law at whole of authors with publication in the field of "Information Science", between 1996 and 2007. The application executed applied the methodology of Lee Pao (1985). It was selected every authors who appears in authors, doesn't make any cut in the distribution and the estimate of critical values was calculated using the proposal formula by Nicholls (1989). The results shows the one pending equal a '2,75', the obtained is lower in the work of Voos (1974), as in the Sen, B. K.; Taib, C. A. and Hassan, M. F(1996), in this comparison percentage of authors, executors of one work only, it is equal to 79% and a excellent adjust of the Lotka Law, to be applied at the Kolmogorov- Smirnov. Kanungo,T. (1995) conducted a study on citing patterns of Indian political scientists in Indian Journal of political science for the period 1990-93. 3509 citations were cited for 119 articles. The analysis revealed that 88.37% authors were Indian; only 111.63% belong to Foreign Countries. There were 89.08% single authors and 10.92% had two or more authors. The score of self- citation constituted to 1.82% and author self-citation, 24.03%. Periodicals as source of Information were 18.97%. Out of which 41.86 were Indian and 58.14% were Foreign. Neelamma and Anandhalli (2016) have highlighted the authorship pattern and research collaboration in the area of Biology based on 1183 scholarly communication appeared in the Botany during 2005-2014. Study illustrates various significant aspects like types and trends of authorship, author productivity, degree of collaboration, collaborative index, Growth rate of the articles, Relative growth rate and Doubling time, geographical wise distribution. Multiple author papers are more popular among Botany literature. USA is the highest Contributor Country in the field of Botany literature, finally verified through Kolmogorov Simonov test. Finally it can be concluded that Botany literature does not follow the Lotka's law of author productivity and found that there is a negative Co-relation in botany literature. Neelamma and Anandhalli (2015).The study explores and analyses the various bibliometric components of the research articles published on-line version of Web of Science in the field of Crystallography during 1999-2013. The various bibliometric components of the 122112 research records published in the study period were studied. The study reveals the various aspects of crystallography literature. such as year wise distribution, relative growth rate, doubling time

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of the literature, geographical wise, organization wise, Language wise, form wise, most prolific authors and funding agency etc. The highest number of articles was published in the year of 2011, while lowest numbers of research articles were reported in the year 1999. Further, the relative growth rate is gradually increases and on the other hand doubling time decreases. Most of the research publications are published in English language and most of the publications published in the form of research articles, China is the highest contributor to the field of Crystallography.

OBJECTIVES OF THE STUDY

The major objectives of the study are to find out the following:

1. The No. of papers published and average growth rate of literature in the journal over the study period of ten years (2005-2014).
2. Authorship pattern and degree of Collaboration of research in the field of South Asian Journal of Socio-Political Studies.
3. To study the Relative Growth Rate (RGR) of Publications;
4. To find out the Doubling Time (Dt) for the articles to become double of the existing amount;
5. Distribution of contribution among different institutions wise.
6. To study the global wise distribution of research articles.
7. To determine whether the n value confirms to Lotka's Law through K-S Test.

METHODOLOGY

Data for the present study is downloaded using principal keywords related to Political Science literature from online open source journal "South Asian Journal of Socio-Political Studies"

(2005-2014). SAJOSPS is online journal which is published half-yearly, to meet the objectives of the present study, necessary data was downloaded. Later the downloaded data is analysed according to Year wise, Average growth rate, Authorship pattern, Collaborative research, Relative growth rate and Doubling time, Institution wise distribution, State wise distribution of the articles. Finally given data set was organized, tabulated and analysed with the help of in Ms-Excel and SPSS. The data is presented in the form of tables and graphs for the purpose of interpretation and discussion.

ANALYSIS AND INTERPRETATION OF THE RESULTS

Table1. Year wise distribution and Average Growth rate of Articles

SI NO	Year	No of Articles	%age	Cumulative	cum%	Growth Rate
1	2005	56	10.507	56	1.824	
2	2006	57	10.694	113	3.681	0.982
3	2007	58	10.882	171	5.570	0.983
4	2008	53	9.944	224	7.296	1.094
5	2009	63	11.632	287	9.349	0.841
6	2010	56	10.507	343	11.173	1.125
7	2011	57	10.694	400	13.029	0.982
8	2012	50	9.381	450	14.658	1.140
9	2013	43	8.068	493	16.059	1.163
10	2014	40	7.505	533	17.362	1.075
	Total	533	99.812	3070	100	1.043

Table-1 shows the growth of research publications published in on-line Journal during the study period of 2005-2014. Altogether 533 publications were published. The highest number of articles, 63 (11.63%) were published in the year 2009, while lowest numbers of research articles, 40 (7.505%) were published in the year 1999. The second highest numbers of articles were published in the year 2007 (58-10.882%). Further it is found that the average rate of increase in the number of publications per year is 1.043%.

Table2. Authorship Patten in Political Science Research

Sl. No	Author ship pattern	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	%
1	Single	28	33	30	34	35	25	21	26	25	30	287	53.85
2	Double	24	17	18	13	21	22	27	18	16	8	184	34.52
3	Three	3	5	5	5	5	4	5	4	1	2	39	7.32
4	Four	1	1	3	0	1	2	4	2	1	0	15	2.81
5	five	0	1	2	1	1	3	0	0	0	0	8	1.50
	Total	56	57	58	53	63	56	57	50	43	40	533	100

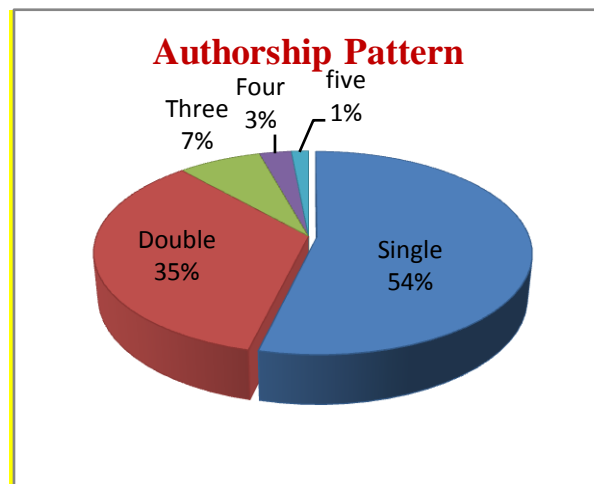


Table- 2 (fig 1) shows the year wise distribution of authorship pattern of SAJOSPS. In 533 papers, 53.85% comprises of single author contributions to SAJOSPS during the study period, followed by double authors with 34.52%, and Three authors with 7.32%.

However, four authors have contributes only 2.81% and Five authors with 1.50% respectively. This analysis of results shows that solo contribution dominate compared to Collaborative research in the field of Political Science Research.

Table3. Collaborative coefficient research in political science

Year	Single author papers	Multiple authored papers	Total paper	TA	DC	CC	MC	CI
2005	28	28	56	117	0.500	0.263	0.268	2.089
2006	33	24	57	124	0.421	0.235	0.239	2.175
2007	30	58	58	133	0.659	0.279	0.284	2.293
2008	34	19	53	114	0.358	0.201	0.204	2.151
2009	35	28	63	136	0.444	0.244	0.248	2.159
2010	25	31	56	129	0.554	0.314	0.319	2.304
2011	21	36	57	127	0.632	0.348	0.354	2.228
2012	26	24	50	108	0.480	0.263	0.269	2.160
2013	25	18	43	89	0.419	0.219	0.224	2.070
2014	30	10	40	82	0.250	0.133	0.137	2.050
Total	287	276	533	1159	0.469	0.248	0.253	2.177

TA = Total authors DC= Degree of Collaboration CC = Collaborative coefficient

CI= Collaborative indexMC= Modified coefficient

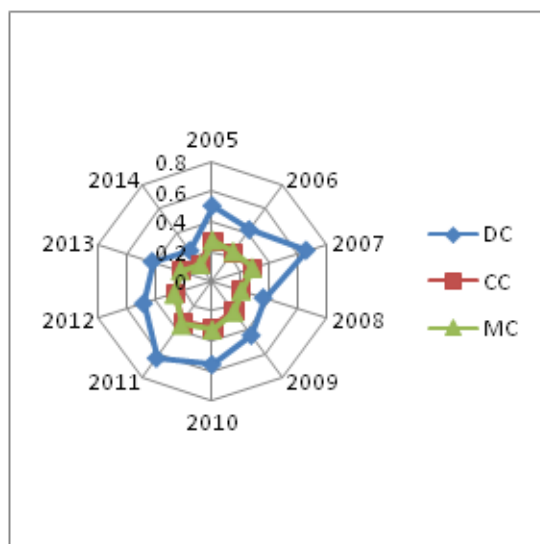


Table-3 (fig-2) shows the Collaborative coefficient research in political science literature for the period of 10 year (2005-2014). The analysis of the table shows that out of 533 articles published, single author share is 287 and multiple paper author shares is 276. This indicates that single paper contribution is more than multiple author papers. Moderate degree of collaboration is observed (0.469), while .248 Collaboration coefficient, 0.253, Modified coefficient and 2.177 Collaborative index is observed in the political science literature. It can be summarized from the above discussion that very low collaborative research activities are observed in political science literature.

LOTKA’S LAW

Lotka’s Law is one of the most basic Law of Bibliometrics, which deals with the frequency of publication by authors in any given field. The generalized form of Lotka’s law can be expressed as

$$X^n Y = C$$

Where y is the number of authors with x articles, the exponent n and constant C are parameters to be estimated from a given set of author productivity data.

Lotka’s law describes the frequency of publication by authors in a given field. It states that “the number of authors making n contribution is about 1/n² on those making one and the proportion of all contributions that make a single contributions, is about 60 percent (Lotka 1926, cited in potter1988). This means that out of all the authors in a given field, 60 percent will have just one publication and 15 percent will have two publications. 7 percent of authors will have three publications and so on. According to Lotka’s law of scientific productivity only a six percent the authors in a field will produce more than 10 articles.

Table4. KS Test of Observed and Expected distribution of authors

# of pub x	# of Authors y _x	% of Authors f _o (y _x)=y _x /Σy _x	Cumulative % of Authors Σf _o (y _x)	Expected % of Authors f _e (y _x)=C/(1/x ⁿ)	Cumulative expected % of Authors Σf _e (y _x)	D=Σf _o (y _x)-Σf _e (y _x)
1	561	0.841079	0.8410795	0.8326	0.8326	0.008479
2	74	0.110945	0.952024	0.111545	0.9441448	0.007879
3	17	0.025487	0.9775112	0.034418	0.9785628	-0.00105
4	7	0.010495	0.988006	0.014944	0.9935066	-0.0055
5	2	0.002999	0.9910045	0.007824	1.0013305	-0.01033
6	1	0.001499	0.9925037	0.004611	1.0059415	-0.01344
7	2	0.002999	0.9955022	0.002949	1.0088904	-0.01339
8	1	0.001499	0.9970015	0.002002	1.0108924	-0.01389
9	1	0.001499	0.9985007	0.001423	1.0123152	-0.01381
10	1	0.001499	1	0.001048	1.0133634	-0.01336
	667					

$$D_{max} \text{ Critical Value} = 1.63 / \sqrt{(667 + 1)} = .06307$$

To test the goodness of fit, weather the observed author productivity distribution is not significantly different from a theoretical distribution. K-S test was applied. According to this test, the maximum deviation is observed and estimated values ‘D’ is calculated as follows.

$$D_{max} = F(x) - En(x)$$

The K-S critical value at 5% level of significance is calculated as 1.63/√n. When √n is the total number of authors under study. If the

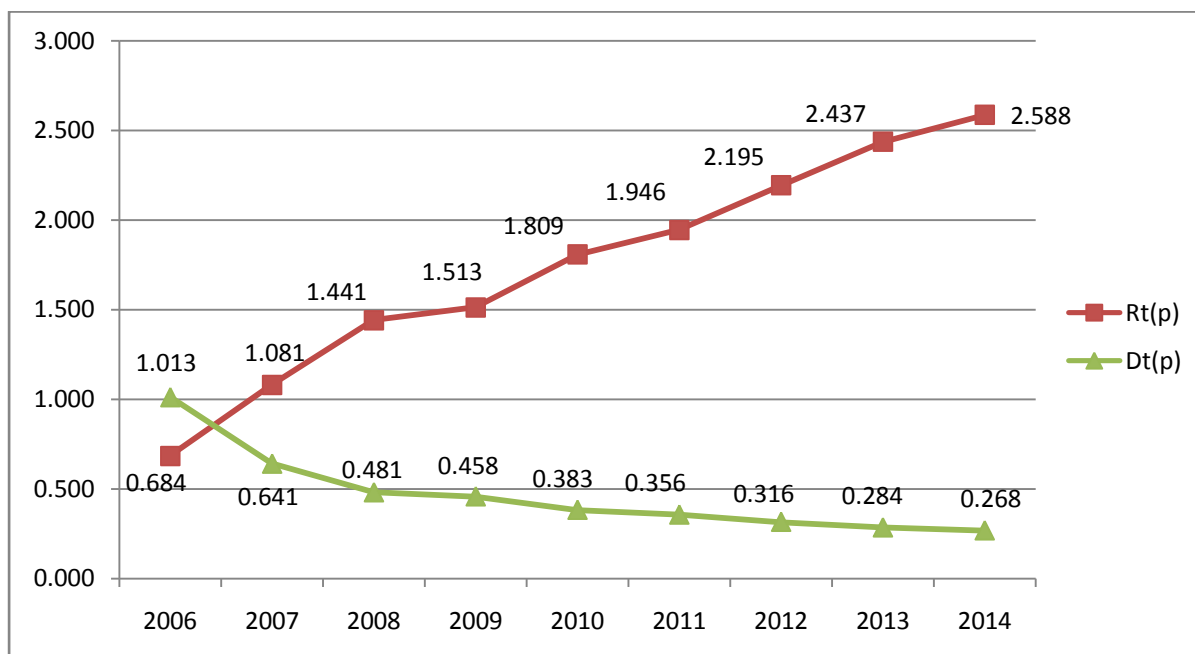
observed maximum difference “D_{max}” is less than K-S critical value. Then, the null hypothesis is accepted.

In the present study, K-S critical value determined at the 5% level of significance is 0.0631. Which is greater than the D_{max} value (0.008479) and hence, support for the consideration of null hypothesis i.e. the observed authorship productivity of distribution is same as the theoretical distribution. Hence, it can be concluded that observed Authorship data distribution holds good for the Lotka’s law in the field of Political Science.

Table5. Relative growth rate and doubling time of political science literature

Year	Quantum of output	Cumulative output	W1	W2	Rt(p)	Mean RP(p)	Dt(p)	Mean Dt(p)
2005	56	56	4.025	4.025		1.180		0.648
2006	57	113	4.043	4.727	0.684		1.013	
2007	58	171	4.060	5.142	1.081		0.641	
2008	53	224	3.970	5.412	1.441		0.481	
2009	63	286	4.143	5.656	1.513		0.458	
2010	56	342	4.025	5.835	1.809	2.195	0.383	0.321
2011	57	399	4.043	5.989	1.946		0.356	
2012	50	449	3.912	6.107	2.195		0.316	
2013	43	492	3.761	6.198	2.437		0.284	
2014	40	532	3.689	6.277	2.588		0.268	
Total	533							

Relative Growth and Doubling time of Articles in SAJOSPS



RELATIVE GROWTH RATE (RGR)

Relative Growth Rate (RGR) means the increase in the number of articles per unit of time. The mean RGR of articles over the specific period of interval is mathematically given by

$$Rt(P) = [\log P(t) - \log P(0)]$$

R_t = Relative growth rate of articles over the specific period of time.

$\log P(0)$ = Logarithm of initial number of articles

$\log P(t)$ = Logarithm of final number of articles.

Doubling Time

Doubling time is defined as the time required for the articles to become double of the existing amount. It has been calculated using following formula.

$$Dt \text{ is given by } D(t) = \frac{0.693}{\bar{R}}$$

Where \bar{R} is relative growth rate of articles.

Dt = It is directly related to RGR

Table-5 (fig-3) Clearly indicates the average Relative Growth Rate ($Rt(P)$) and Doubling time of articles in Political Science literature during the study period. It is observed that the value of relative Growth rate of an article has gradually increases from 2006 (0.684) to 2014 (2.588) correspondingly the value of Doubling time of the articles $Dt(P)$ gradually Decreased from 1.013 years (2006) to 0.268 years (2014). The mean relative growth $Rt(P)$ of articles for the first five years (from 2005 to 2009) was 1.180. It was increased to 2.195 for the next five years (from 2010 to 2014), whereas for the Doubling time of the articles $Dt(P)$ for the first five years (from 2005 to 2009) indicates 0.648 has gradually decreased for the next seven years (from 2010 to 2014) to 0.321. It can be concluded from the above analysis that relative Growth rate of articles has been gradually increases on the other hand doubling time of the articles has been gradually decreases.

Table6. Institution wise Distribution of Research Articles

SI NO	Year	University	College	Government Institution	Research Institution	Total
1	2005	18	19	10	9	56
2	2006	29	11	8	9	57
3	2007	26	13	9	10	58
4	2008	25	19	7	2	53
5	2009	26	23	4	10	63
6	2010	18	23	5	10	56
7	2011	27	17	8	5	57
8	2012	23	6	11	10	50
9	2013	14	13	10	6	43
10	2014	20	9	6	5	40
	Total	226	153	78	76	533
	%age	42.40150094	28.7054409	14.634146	14.25891182	100

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By the examination of table-4, it is found that majority of the research articles (N=226, 42.401%) have been contributed by Universities to the South Asian Journal of Socio Political Studies followed by Colleges (N=153,

28.705%), Government Institution (N=78, 14.634%) and Research Institutions (N=76, 14.258%), respectively. By this analysis it can be concluded that the Universities are the major contributors to the Political science field.

Table7. Year vs. State wise Distribution of SAJOSPS

Sl. No	YEAR	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	%age
1	Tamil Nadu	13	12	8	18	24	22	26	15	13	7	158	29.42
2	New Delhi	9	8	7	6	4	4	5	8	6	3	60	11.17
3	Kerala	7	8	8	2	7	2	3	6	4	7	54	10.06
4	Punjab	3	4	7	1	2	6	1	2	1	0	27	5.03
5	Karnataka	7	1	2	2	3	1	4	0	2	1	23	4.28
6	Rajasthan	3	1	4	4	2	2	2	1	2	2	23	4.28
7	Gujarat	2	4	3	1	1	4	1	1	3	2	22	4.10
8	Andhra Pradesh	2	3	3	2	0	1	0	3	3	2	19	3.54
9	West Bengal	0	0	2	4	4	2	3	1	1	2	19	3.56
10	Odissa	1	7	3	1	1	0	1	2	0	2	18	3.35
11	Uttar Pradesh	1	2	3	3	0	2	2	0	2	3	18	3.38
12	Madya Pradesh	0	2	2	5	6	0	1	1	0	0	17	3.17
13	Maharashtra.	1	0	1	0	1	2	0	2	1	1	9	1.68
14	Assam	0	0	0	0	3	2	0	2	0	2	9	1.69
16	Uttarakhand	1	0	0	1	3	1	0	0	1	1	8	1.50
17	Kolkatta	2	1	1	0	0	0	0	1	1	0	6	1.12
18	Chattisgarh	0	0	0	0	0	1	2	1	1	0	5	0.93
20	Nagaland	0	0	0	0	0	0	1	0	0	2	3	0.56
21	Himachal Pradesh	0	0	0	0	0	0	2	1	0	0	3	0.56
22	Other Foreign Countries	4	4	4	3	2	4	3	3	3	6	36	6.70
23	Total	56	57	58	53	63	56	57	50	44	43	537	100.08

Table-7 gives the year and state Studies. Out of 533 Contributions, the highest number of research publications have been contributed by Tamil Nadu (N=158, 29.643%), the next highest number of articles are contributed by New Delhi (N=60, 11.257%), followed by Malaysia (N=54, 10.13%) and other foreign countries have contributed (N=36, 6.70%). However, lowest number of publications were contributed by Himachal Pradesh and Nagaland (N=3, 0.56285%). It can be summarised by the above analysis that Tamil Nadu is the major contributor to the South Asian Journal of Socio-Political Studies.

CONCLUSION

The Study quantitatively identifies the research productivity in the area of Political science Literature over the study period of ten years (2005-2014). The study identifies the trends and characteristics of growth and collaboration pattern of South Asian Journal of Socio Political studies. Average growth rate of increases of C is 1.043, a high degree (0.495) of collaboration is observed and average number of authors per paper is (1.621). Relative Growth Rate (Rt(P)) of an article gradually increases(1.180-

2.195), correspondingly the values of Doubling time of the articles Dt(P) decreases(0.648-0.321). Universities are the major contributors to SAJOSPS. Single author papers are more popular among South Asian Journal of Socio Political studies. Tamil Nadu is the highest Contributor State in the field of South Asian Journal of Socio Political studies. Lotka's Law authorship productivity holds good in the field of Political Science Literature. Finally study shows that the South Asian Journal of Socio Political studies is one the emerging journal in the field of political science domain.

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