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Archana Sahu
National Law University Odisha, Cuttack, sahuarch@gmail.com

Puspanjali Jena Prof.
Utkal University, pjutkal87@yahoo.co.in

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Archana Sahu[1] and Puspanjali Jena[2]

[1]Assistant Librarian, National Law University Odisha, Cuttack – 753015, Email: sahuarch@gmail.com

[2]Professor, P.G. Department of Library and Information Science, Utkal University, Bhubaneswar-751004, Email: pjutkal87@yahoo.co.in

ABSTRACT

This study provides a bibliometric analysis of law literature published from 2015-2019. A total of 3001 articles were retrieved from DOAJ database for the study. The law literature has been further divided into two categories, i.e. Public law and Private law. This paper focuses on the journal-wise distribution of publications, subject-wise distribution of publications, annual growth rate as well as compound annual growth rate, relative growth rate (RGR) and doubling time (DT) of open access law literature. Various statistical tests and methods such as Student's t test, Chi-square test and correlation studies have been applied to verify the significance difference between the public law and the private law literature. It is found that the mean RGR for public law and private law are 0.41% and 0.39 % respectively whereas the values of DT for public and private law are 2.03 years and 0.98 year respectively.

Keywords: Annual growth rate; Compound annual growth rate; Relative growth rate; Doubling time; Student's t test; Chi-square test; Correlation study; DOAJ.

1. INTRODUCTION

Law is very much essential for our society to keep it within certain restrictions. It is a system of rules and guidelines which are implemented through social establishments to regulate the behaviour of individuals, of communities and of societies. The law shapes politics, economics, history and society in different ways and serves as a mediator of relations between people. It is

also noteworthy that, each country has its own legal system and it varies from nation to nation. It provides a source of scholarly investigation into legal history, philosophy, economic analysis and sociology. It also raises significant and complex issues concerning equality, fairness, and justice. Law's scope can be classified into two domains. Public law concerns government and society, including constitutional law, administrative law, civil law and criminal law. Private law deals with legal disputes between individuals and/or organisations in areas such as contracts, property, torts/delicts and commercial law etc. Bibliometric analysis is the quantitative analysis of the already published documents by applying certain mathematical and statistical methods. The current study has made an analysis of the growth of the open access law literature available through DOAJ, the Directory of Open Access Journals.

1. LITERATURE REVIEW

Ruiz-Pomeda, Alvarez-Peregrina and Povedano-Monteroc (2020), made bibliometric study of scientific research on optometric visual therapy by applying different bibliometric indicators including doubling time and annual growth rate and found out annual growth rate was 39.62% with a doubling time of 9.93 years. Alvarez-Peregrina, Sanchez-Tena, Martin, Villa-Collar and Povedano-Montero (2020) made a bibliometric study on articles of multifocal contact lenses and found that the number of publications has an exponential growth with a value of $R = 0.53$ and the duplication time was 13.2 years. Sahoo and Pandey (2020), in their bibliometric analysis and visualization of global ocean acidification research made an analysis of the annual growth rate of research in the domain of ocean acidification using various bibliometric methods. Hugar, Bachalapur and Kumara B.M (2020), in their bibliometric study of COVID-19 pandemic disease identified that from 2001 to 2010, the RGR was 1.636 and the DT was 2.36 whereas from 2011 to 2020 the value of RGR and DT were 2.487 and 3.589 respectively. Nishavathi (2020), in the application of growth models to research literature of all India institute of medical sciences and found that the relative growth rate as 1.915 and doubling time as 5.5999. The study also applied t test to prove the significance of faculty strength and

concluded that the faculty strength and the department does not have a remarkable effect on the productivity of AIIMS. Bharati and Singh (2020) in their bibliometric study on global research productivity on coronavirus and found that the value of RGR went on decreasing from 2012 to 2019 whereas the doubling time increased from 2012 to 2019. Vellaichamy & Jeyshankar (2020), in his study bibliometric analysis of contributions to journal of ornithology found that the RGR was in the increasing order in terms of literature productivity and subsequently the doubling time was in decreasing manner. Shilpa and Padmamma (2020), in their scientometrics observations of authorship pattern and collaborative research on leukemia, found that RGR declined from the rate of 0.72 to 0.12 and doubling time for all years increased from 0.96 to 5.62 from 2009 to 2018.

2. OBJECTIVES OF THE STUDY

Basically, the growth of literature publication study is an essential component of the bibliometric analysis. The present study involves three patterns of growth with the following objectives.

- To demonstrate the structural analysis of law literature.
- To assess the year-wise distribution of the growth of publication in law literature.
- To evaluate the relative growth rate as well as doubling time of law literature.

3. HYPOTHESIS OF THE STUDY

- There exists no significant difference in the average publication per issue between the journals of public law and private law.

- The yearly variations of the rate of publications in public law and private law tend to be insignificant.

- The relative growth rates of publications in public law over the years are likely to be similar with that of the private law.

4. SCOPE AND LIMITATION OF THE STUDY

The present study covers the law literature for the period 2015-2019 (5 years). To know the growth of law literature, the study has been divided into 3 basic types of study viz. Annual Growth, Compound Annual Growth and Relative Growth. For the growth study, the total journals of 31 have been covered out of which 24 journals are on public law and the rest 7 journals are on private law.

6. METHODOLOGY

6.1 Search strategy

The data for the study period 2015 to 2019 has been retrieved from the DOAJ database for the law subject. For limiting the search results, other defined search criteria like only Journals, Language- English were used to find out the relevant data. A total of 3001 numbers of articles were retrieved for the period of 2015-2019.

6.2 Statistical methods used

All the bibliographic data of the retrieved articles were recorded in a MS excel spreadsheet and the analyses of recorded data were done by simple statistical percentage and average. Scientific output has been obtained based on certain statistical methodologies, applied to achieve the objectives.

Annual Growth Rate (AGR) has been calculated by the formula

$$AGR = \frac{End\ value - First\ value}{First\ value} X100$$

Compound Annual Growth Rate has been calculated by the following formula.

$$CAGR = \left(\frac{Ending\ value}{Initial\ value}\right)^{\frac{1}{n}} - 1$$

Where n = number of periods (in years)

The Relative growth rate (RGR) has been calculated by using the following formula (Mahapatra, 1985).

$$RGR = \frac{Log_e W_2 - Log_e W_1}{T_2 - T_1}$$

Where,

RGR = growth rate over the specific period of the interval

$Log_e W_1$ = natural log of the initial number of articles

$Log_e W_2$ = natural log of the final number of articles after a specific period

T_1 = the unit of initial time

T_2 = the unit of final time

Doubling Time (DT) has been calculated by using the formula (Beaie and Acol, 2009)[10]

$$Doubling\ Time\ (DT) = \frac{log_e 2}{RGR}$$

Where,

RGR = Relative Growth Rate over the specific period of the interval

7. DATA ANALYSIS

The data on law literature from the years 2015 to 2019 have been retrieved from DOAJ database

and analysed in the sub-facets as below.

7.1 Journal-wise distribution of publications

The journal wise publications of literature with respect to volumes and issues have been

arranged. The number of publications during the period have been converted to percentages for

more generalisation and their order of rank basing on higher publications to lower have been

assigned in table 1.

Table 1: Journal-wise distribution of publications in Law discipline from 2015 to 2019

Sl. No.	Source journal	Frequency of publications	No. of volumes	No. of issues	No. of contributions	Publications per volume	Publications per issue	% of publications	Rank

#	Journal	Frequency							
1	Acta Universitatis Danubius: Juridica(AUDJ)	Tri-annual	5	10	175	35.00	17.50	5.83	3
2	African Human Rights Law Journal(AHRLJ)	Bi-annual	5	10	110	22.00	11.00	3.67	10
3	Anti-Trafficking Review(ATR)	Bi-annual	5	10	112	22.40	11.20	3.73	9
4	Arctic Review on Law and Politics(ARLP)	Bi-annual	5	10	52	10.40	5.20	1.73	25
5	Baltic Journal of Law & Politics(BJLP)	Bi-annual	5	10	81	16.20	8.10	2.70	16
6	Bond Law Review(BLR)	Bi-annual	5	10	51	10.20	5.10	1.70	26
7	BRICS Law Journal(BLJ)	Quarterly	5	18	59	11.80	3.28	1.97	22
8	Constitutional Review(CR)	Bi-annual	5	10	60	12.00	6.00	2.00	20.5
9	Criminology, Criminal Justice, Law & Society(CCLS)	Tri-annual	5	15	70	14.00	4.67	2.33	19
10	DANUBE: Law, Economics and Social Issues Review (DANUBE)	Quarterly	5	20	60	12.00	3.00	2.00	20.5
11	Hasanuddin Law Review(HLR)	Tri-annual	5	15	161	32.20	10.73	5.36	7
12	Indonesia Law Review(ILR)	Tri-annual	5	15	90	18.00	6.00	3.00	14
13	Journal of Dinamika Hukum(JDH)	Tri-annual	5	15	225	45.00	15.00	7.50	2
14	Journal of Legal Analysis(JLA)	Bi-annual	5	8	38	7.60	4.75	1.27	28
15	Journal of Legal Studies(JLS)	Bi-annual	5	9	78	15.60	8.67	2.60	17
16	Journal of Public Administration, Finance and Law(JPAFL)	Bi-annual	5	12	168	33.60	14.00	5.60	6
17	Journal of Sustainable Development Law and Policy(JSDLP)	Bi-annual	5	9	98	19.60	10.89	3.27	13
18	Law and Method(LM)	Tri-annual	5	14	37	7.40	2.64	1.23	29
19	Law, Democracy & Development(LDD)	Annual	5	5	53	10.60	10.60	1.77	24

20	Laws	Quarterly	5	20	226	45.20	11.30	7.53	1
21	Mizan Law Review(MLR)	Bi-annual	5	11	82	16.40	7.45	2.73	15
22	Rocky Mountain Law Journal(RMLJ)	Annual	5	5	27	5.40	5.40	0.90	31
23	RUDN Journal of Law(RUDNJL)	Quarterly	5	20	174	34.80	8.70	5.80	4
24	SCRIPTed: A Journal of Law, Technology & Society(SCRIPT)	Bi-annual	5	10	32	6.40	3.20	1.07	30
25	Sur: International Journal on Human Rights(Sur)	Bi-annual	5	10	131	26.20	13.10	4.37	8
26	The Chinese Journal of Global Governance(CJGG)	Bi-annual	5	10	40	8.00	4.00	1.33	27
27	The Italian Law Journal(ILJ)	Bi-annual	5	11	109	21.80	9.91	3.63	11
28	Utrecht Journal of International and European Law(UJIEL)	Bi-annual	5	10	55	11.00	5.50	1.83	23
29	Windsor Yearbook of Access to Justice(WYAJ)	Bi-annual	5	8	75	15.00	9.38	2.50	18
30	Wroclaw Review of Law, Administration and Economics(WRLAE)	Bi-annual	5	10	102	20.40	10.20	3.40	12
31	Yearbook of Antitrust and Regulatory Studies(YARS)	Bi-annual	5	10	170	34.00	17.00	5.66	5
	Total		155	360	3001	19.36 (mean)	8.34 (mean)	100	-

From table 1, it is found that the total 31 journals considered for study consisted of 155 volumes and 360 issues and a total of 3001 number of publications. Out of the total source journals, 2 journals got published annually, 19 journals bi-annually, 6 journals tri-annually and 4 journals published quarterly. The average number of publications per volume is found as 19.36 whereas publications per issue is 8.34. From the study, it is also revealed that sometimes some law journals have either special issues apart from their regular issues and also two or more issues are merged into one issue instead of multiple issues. The quarterly journal Laws has been

ranked as 1 with maximum (11.30%) number of publications followed by JDH with 7.50% of publications and RMLJ is the last (31st) ranked journal with only 0.90% of the total publications. The journal -wise publication of the law literature during the period of study, i.e. 2015-2019 is being represented pictorially as follows.
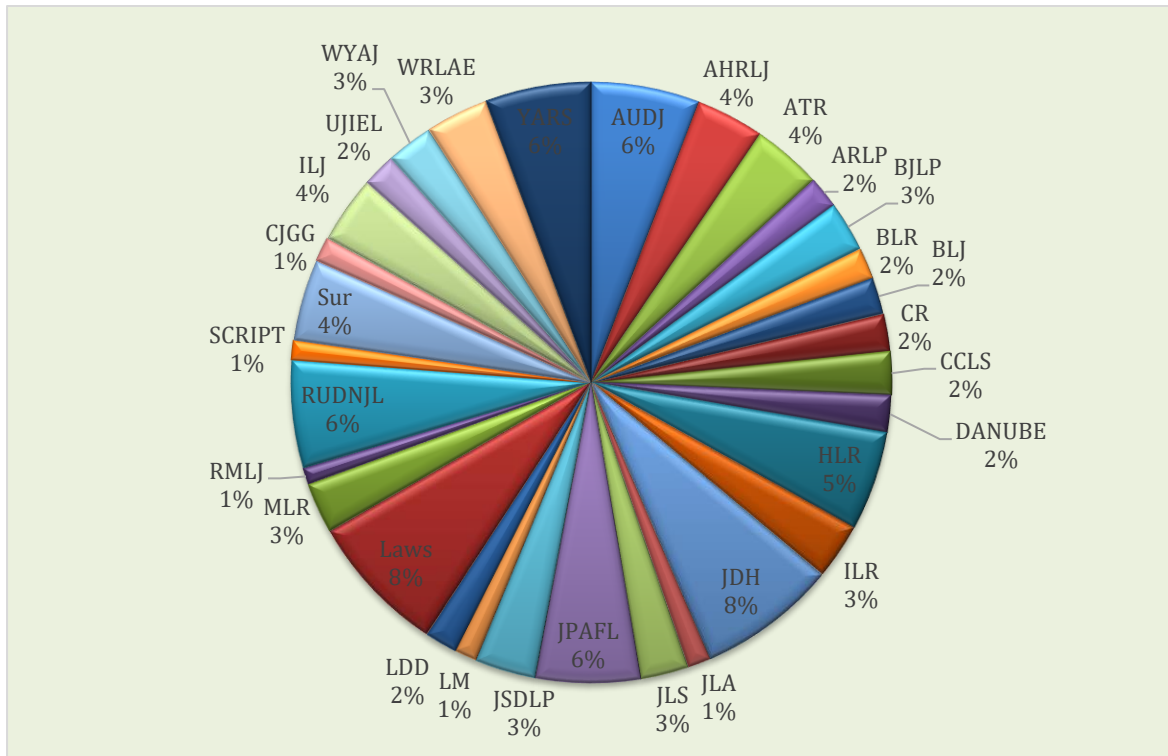

Figure 1: Journal-wise distribution of publications in law discipline from 2015-2019

7.2 Subject-wise distribution of law literature

The journals have been divided into two main categories of law, i.e. Public law and Private law. The public law consists of constitutional law, administrative law, criminal law and procedural law whereas the private law consists of contract, tort, property, trusts, family, business and social law. So, the 31 journals under the study have been segregated under the above two categories with their features for comparative study as well as to study the respective growth of literature during the period of study. The table 2 contains the features and analysis of journal wise publications on public law while the table 3 contains that of the private law.

Table 2: Distribution of publications in Public law discipline from 2015 to 2019

Sl. No.	Source journal	Frequency of publications	No. of volumes	No. of issues	No. of contributions	Publications per volume	Publications per issue	% of publications	Rank
1	AUDJ	Tri-annual	5	10	175	35.00	17.50	7.50	3
2	AHRLJ	Bi-annual	5	10	110	22.00	11.00	4.71	7
3	ARLP	Bi-annual	5	10	52	10.40	5.20	2.23	20
4	BJLP	Bi-annual	5	10	81	16.20	8.10	3.47	12
5	BLR	Bi-annual	5	10	51	10.20	5.10	2.19	21
6	BLJ	Quarterly	5	18	59	11.80	3.28	2.53	17
7	CR	Bi-annual	5	10	60	12.00	6.00	2.57	16
8	CCLS	Tri-annual	5	15	70	14.00	4.67	3.00	15
9	HLR	Tri-annual	5	15	161	32.20	10.73	6.90	5
10	ILR	Tri-annual	5	15	90	18.00	6.00	3.86	10
11	JDH	Tri-annual	5	15	225	45.00	15.00	9.64	2
12	JLA	Bi-annual	5	8	38	7.60	4.75	1.63	23
13	JLS	Bi-annual	5	9	78	15.60	8.67	3.34	13
14	LM	Tri-annual	5	14	37	7.40	2.64	1.59	24
15	LDD	Annual	5	5	53	10.60	10.60	2.27	19
16	Laws	Quarterly	5	20	226	45.20	11.30	9.68	1
17	MLR	Bi-annual	5	11	82	16.40	7.45	3.51	11
18	RUDNJL	Quarterly	5	20	174	34.80	8.70	7.46	4
19	Sur	Bi-annual	5	10	131	26.20	13.10	5.61	6
20	CJGG	Bi-annual	5	10	40	8.00	4.00	1.71	22
21	ILJ	Bi-annual	5	11	109	21.80	9.91	4.67	8
22	UJIEL	Bi-annual	5	10	55	11.00	5.50	2.36	18
23	WYAJ	Bi-annual	5	8	75	15.00	9.38	3.21	14
24	WRLAE	Bi-annual	5	10	102	20.40	10.20	4.37	9
Total			120	284	2334	19.45	8.22	100	-
Average			-	-	-	-	8.28±3.71	-	-

From table 2, it is observed that the source journal Laws has the highest value of publications per volume (45.20) and percentage of publications (9.69%) whereas Acta Universitatis Danubius: Juridica (AUDJ) has the highest publications per issue (17.50) and the journal Law and Method (LM) has the lowest values of publications per volume (7.40), publications per

issue (2.64) and percentage of publications (1.59%). The value of publications per volume and publications per issue of other journals varies between 7.40 and 45.20 with a mean of 19.45 and 2.64 to 17.50 respectively with a mean of 8.22 respectively while the value of the percentage of publications of other journals varies between 1.59% and 9.69%. It is found that all the journals covered same number of volumes with a total number of volumes being 120. The journals Laws; RUDN Journal of Law (RUDNJL) have the maximum number of issues (20) each while the journal Law, Democracy & Development (LDD) has the minimum number of issues (5) with the total number of issues being 284. The journal Laws has the greatest number of contributions indexed in DOAJ (226) while the journal Law and Method (LM) has the least number of contributions indexed in DOAJ (37) with the total number of contributions indexed in DOAJ being 2334. The average value of the publications per issue of the 24 journals came out as 8.28±3.71 as against the mean value of 8.22 which is well comparable. The publications in percentage have been presented as pie-diagram as in figure 2.
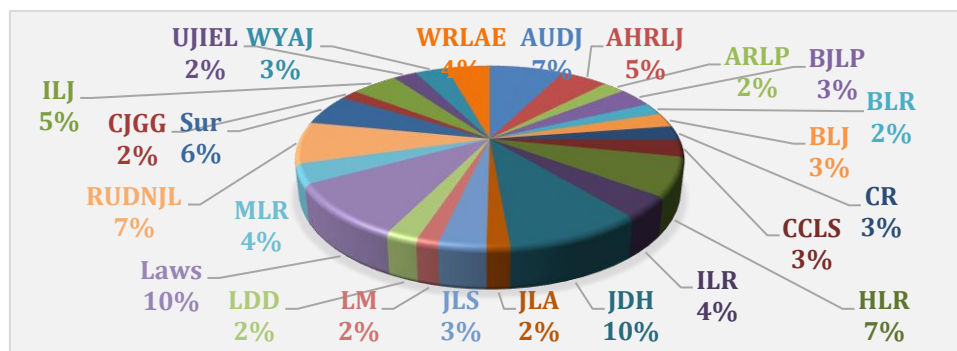

Figure 2: Distribution of publications in Public law discipline from 2015 to 2019

Table 3: Distribution of publications in Private law discipline from 2015 to 2019

Sl. No.	Source journal	Frequency of publications	No. of volumes	No. of issues	No. of contributions	Publications per volume	Publications per issue	% of publications	Rank
1	DANUBE	Quarterly	5	20	60	12.00	3.00	9.00	5
2	RMLJ	Annual	5	5	27	5.40	5.40	4.05	7
3	JSDLP	Bi-annual	5	9	98	19.60	10.89	14.69	4
4	SCRIPT	Bi-annual	5	10	32	6.40	3.20	4.80	6

No	Journal	Frequency	Volumes	Issues	Publications	Pub/volume	Pub/issue	Percentage	Rank
5	JPAFL	Bi-annual	5	12	168	33.60	14.00	25.19	2
6	ATR	Bi-annual	5	10	112	22.40	11.20	16.79	3
7	YARS	Bi-annual	5	10	170	34.00	17.00	25.49	1
Total			**35**	**76**	**667**	**19.06**	**8.78**	**100**	**-**
Average			**-**	**-**	**-**	**-**	**9.24±5.07**	**-**	**-**

From table 3, it is found that the source journal Yearbook of Antitrust and Regulatory Studies (YARS) has the highest publications per volume (34), the highest number publications per issue (17) and the highest percentage of publications (25.49%) while the journal Rocky Mountain Law Journal (RMLJ) Journal has the lowest publications per volume (5.40) and the lowest percentage of publications (4.05%) whereas the journal DANUBE: Law, Economics and Social Issues Review (DANUBE) has the lowest number of publications per issue (3). The value of publications per volume of other journals is observed to be between 5.40 and 34 with a mean of 19.06. The value of publications per issue for all the journals varies between 3 and 17 with a mean of 8.78. It is found that all the journals have 5 number of volumes each. The total number of volumes is found to be 35. The highest number of issues is found to be present in the journal DANUBE: Law, Economics and Social Issues Review (DANUBE) (20) while the lowest number of issues (5) is found to be present in the journal Rocky Mountain Law Journal (RMLJ). The number of issues of all other journals which were studied, is found to be between 3 and 17 with a total of 76 issues. The average value of publications per issue came out as 9.24±5.07 as against the mean value of 8.78 which is higher and the higher standard deviation reveals the wider difference between the journals on their publications per issue. The figure 3 represents the percentages of publications in private law from 2015 to 2019 for ease of comparative study.
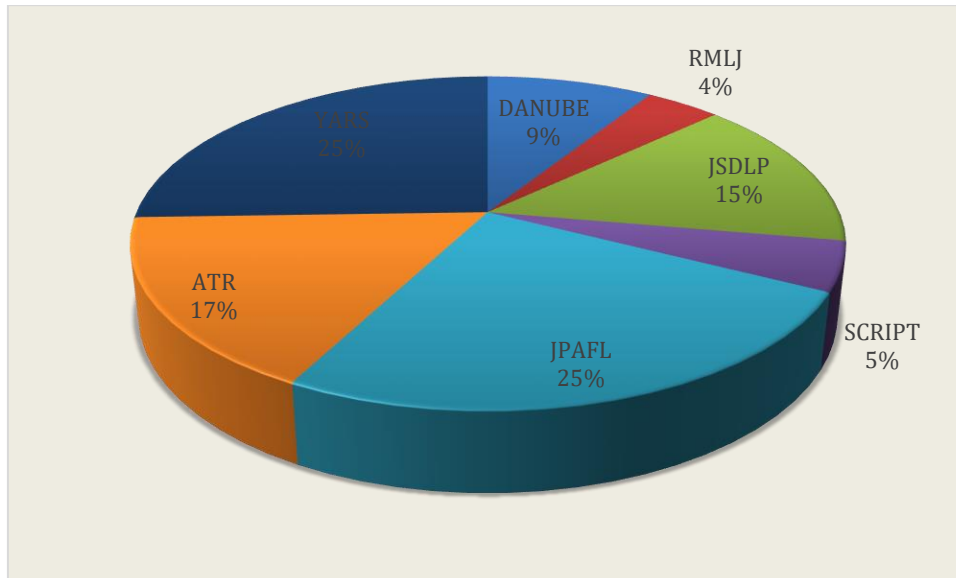
Figure 3: Distribution of publications in Private law discipline from 2015 to 2019

From the tables 2 and 3, it is found that the average publications per issue in public law and private law are 8.28±3.71 and 9.24±5.07 respectively. To know whether the difference in two values are due to chance or having any statistical significance Student's t test has been conducted as shown in table 4.

Table 4: Student's t test on average values of publications per issue

Categories compared	Difference in average	Combined standard deviation (σ)	Standard error of difference (SE_d)	Computed 't'	Degree of freedom (df)	Table value of 't' at 0.05 level	> or <	s/ns
Public law vs Private law	0.96	4.03	1.71	0.56	24+7-2=29	1.699	<	ns

s/ns = significant/non-significant

The computed 't' value came out as 0.56 which is smaller than the table value of 1.699 at 0.05 level with df 29. So the difference between the two average values has got no statistical significance. It is inferred that there is no significant difference between the Public law and Private law publications on their publications per issue.

7.3 Yearly distribution and growth of literatures in law

The annual growth rate of literatures (AGR) in successive year is the proportion of net growth with respect to the preceding year. So, it is independent of commutative growth literature after a particular period. In the contrary, the compound annual growth rate (CAGR) of literature is

a function of successive cumulative growth with respect to the initial literature and is an average growth rate over the time (years) which is being compounded after each year. Both are expressed either as unit rate or as percentage. The table 5 and 6 contains the completed values of AGR and CAGR for the literature in public law and private law respectively.

Table 5: Yearly distribution and growth of publications in Public law

Sl. No.	Year	No. of publications	% of publications	Cumulative publications	% of cumulative publications	AGR (%)	CAGR
1	2015	451	19.32	451	19.32	0	0
2	2016	456	19.54	907	38.86	1.11	1.01
3	2017	484	20.74	1391	59.60	6.14	0.76
4	2018	492	21.08	1883	80.68	1.65	0.61
5	2019	451	19.32	2334	100.00	-8.33	0.51
Total		2334	20±0.76 (Mean)			0.11 (Mean)	

AGR = Annual Growth Rate, CAGR = Compound Annual Growth Rate

From table 5, it is found that the total publications of 2334 in public law from 2015 to 2019 have been distributed over the 5 years of study as 19.32%, 19.54%, 20.74%, 21.08% and 19.32% respectively. The AGR in successive years from 2016 are 1.11%, 6.14%, 1.65% which showed a negative value of 8.33% in the end year (2019). The CAGR at the end of 2019 with respect to 2015 is 0.51, i.e. 51%, which implies that at an average rate of 51% compounded after each successive year. The total literature of 451 have grown to 2334 in the end year (2019).

The year-wise publications as percentage have been presented in the shape of a graph in order to find out the trend line of growth of publication as in figure 4.
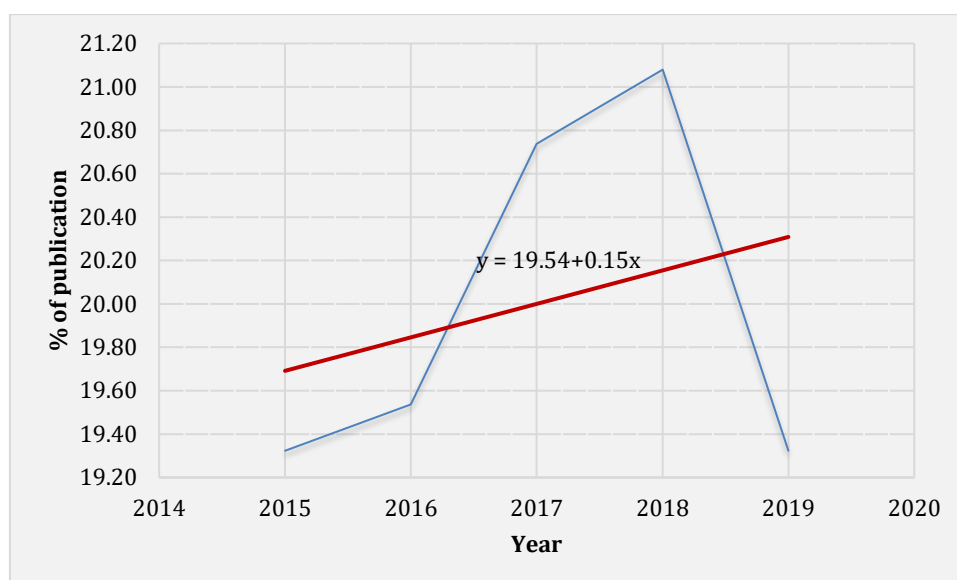
Figure 4: Percentages of publications in Public law

From the figure 4, the trend line equation comes out as y = 19.54+0.15x which implies that the slope of the line is 0.15, clearly indicating the increase over years and the ordinate is -19.54. Here, y is the % of total publications and x is the number of years taking 2015 as the 1st year.

The year-wise publications and their growth of literature in private law over the years have been shown in table 6 along with the analysis.

Table 6: Yearly distribution and growth of publications in Private law

Sl. No.	Year	No. of publications	% of publications	Cumulative publications	% of cumulative publications	AGR (%)	CAGR
1	2015	138	20.69	138	20.69	0	0
2	2016	141	21.14	279	41.83	2.17	1.02
3	2017	155	23.24	434	65.07	9.93	0.77
4	2018	134	20.09	568	85.16	-13.55	0.60
5	2019	99	14.84	667	100.00	-26.12	0.48
Total		667	20±2.79 (Mean)			-5.51 (Mean)	

AGR = Annual Growth Rate, CAGR = Compound Annual Growth Rate

From table 6, it is observed that the distribution of total publications from 2015 to 2019 in terms of percentages in the chronological order are 20.69%, 21.14%, 23.24%, 20.09% and 14.84%, which clearly shows a negative growth rate from 2018. The resultant AGR for 2016 and onwards are 2.17%, 9.93%, (-)13.55% and (-) 26.12%. The CAGR at 2019 is 0.48, i.e.

48% which implies that the literature in private law in 2015, i.e. 138 numbers has grown to the whole 667 in 2019 at the rate of 48% compounded after completion of each year.

The annual publications of literature in private law have been presented in the shape of a graph in figure 5 to find the trend line of publications.
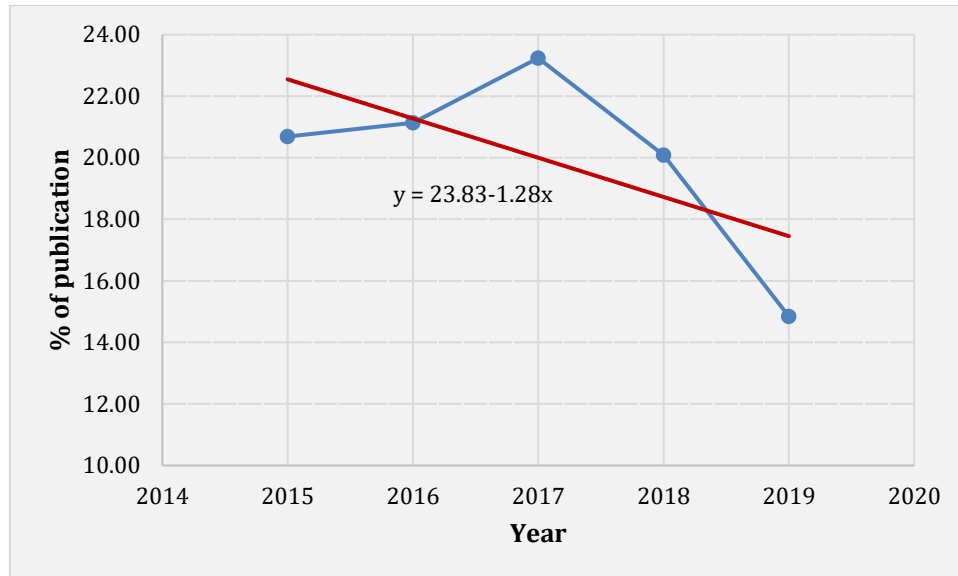

Figure 5: Percentages of publications in Private law

From the figure 5, the trend line equation comes out as y = 23.83-1.28x, which implies that the slope of the line is (-1.28), clearly indicating the reductions over years and the ordinate is 23.83. This is useful for future estimations of the publications. The y is the % of publications at nth year taking 2015 as the 1st year.

In order to ascertain whether the percentages of publications from 2015 to 2019 in both public as well as private law are having any significant statistical differences, chi-square test has been conducted as in table 7.

Table 7: Chi-square test on the yearly publications in Public as well as Private law

Year of publication	% publication in public law (O)	% publication in private law (E)	$\frac{(O-E)^2}{E}$	Degree of freedom (df)	Table value of χ^2 at 0.05 level	s/ns
2015	19.32	20.69	0.09			
2016	19.54	21.14	0.12	5-1=4	9.49	ns
2017	20.74	23.24	0.27			
2018	21.08	20.09	0.05			

2019	19.32	14.84	1.35		
Total			$\sum 1.88$		

The computed value of chi-square is 1.88 which is less than table value of 9.49 at 0.05 level with df 4. Hence, there is no significance difference between the year-wise publications in public law and private law. Further from tables 5 and 6, the mean % of publications per year in both the cases came out as 20 which reinforced the above observation. The higher value of standard deviation, i.e. 2.79% in the case of private law indicates less consistency in the number (%) of publications over the years.

7.4 Relative Growth Rate (RGR) and Doubling Time (DT) of literature

The relative growth rate is a measure to quantify the increase/decrease in the number of publications of literature with time. The doubling time indicates the time required for publication of literatures to become double of the existing quantity. Thus, there exists an inverse relationship between the relative growth rate of literature and their doubling time. The table 8 contains the relative growth rates and doubling times of literature in public law and table 9 contains the relative growth rate and doubling times of literature in private law.

Table 8: Relative Growth Rate and Doubling Time of literature in Public law

Year	No. of publications	Cumulative total	$Log_e W_1$	$Log_e W_2$	RGR	DT= $log_e 2/$RGR
2015	451	451	-	6.11	-	-
2016	456	907	6.11	6.81	0.70	0.99
2017	484	1391	6.81	7.24	0.43	1.62
2018	492	1883	7.24	7.54	0.30	2.29
2019	451	2334	7.54	7.76	0.21	3.23
Total	2334	-	-	-	0.41 (Mean)	2.03 (Mean)

From the table 8, it is found that the Relative Growth Rate (RGR) is the highest in 2016 (0.70) followed by 2017 (0.43), 2018 (0.30) and 2019 (0.21) which implies a reduction in RGR with time with a mean RGR of 0.41. The corresponding Doubling Time (DT) came out as 0.99 year, 1.62 year, 2.29 year and 3.23 year with an overall DT of 2.03 years. Here the literature of 451 publications in 2015 has grown to 2334, i.e. by 5.18 times (2334/415) over 4 years period. Hence, the mean RGR shall be (ln 5.18)/4 = 0.41, which matches to the mean value of RGR in

the table. The values of RGR and DT against the years have been presented in figure 6 which shall show their inverse relationship, i.e. RGR decreases, the DT increases and vice versa.
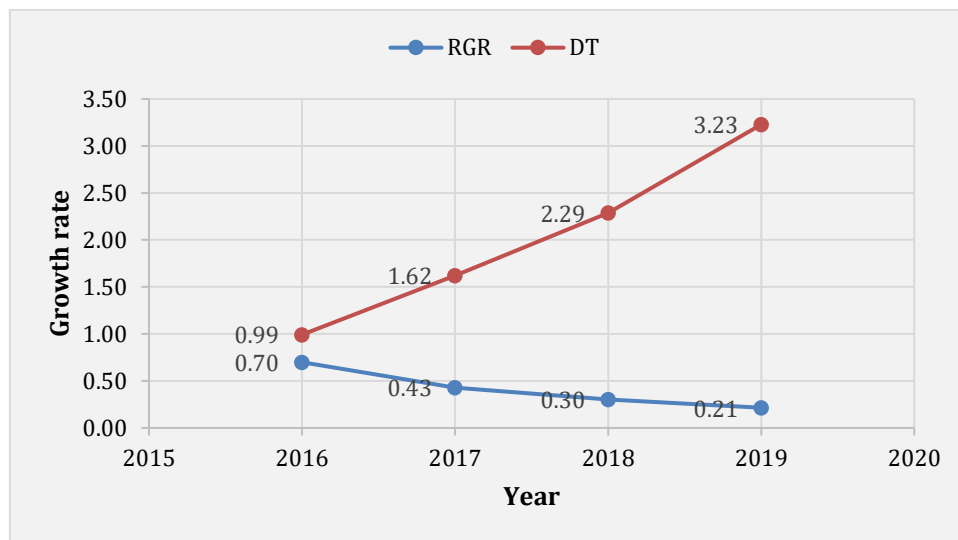

Figure 6: Relative growth rate and doubling time of literature in Public law

From the figure 6, it is found that the relative growth rate of the of literature in public law decreases with time whereas the doubling rate increases beyond 2016.

Table 9: Relative Growth Rate and Doubling Time of literature in Private law

Year	No. of publications	Cumulative total	Log_eW_1	Log_eW_2	RGR	DT= log_e2/RGR
2015	138	138	-	4.93	-	-
2016	141	279	4.93	5.63	0.70	0.98
2017	155	434	5.63	6.07	0.44	1.57
2018	134	568	6.07	6.34	0.27	2.58
2019	99	667	6.34	6.50	0.16	4.31
Total	667	-	-	-	0.39 (Mean)	2.36 (Mean)

From table 9, the relative growth rate (RGR) of literatures in private law is 0.70 in 2016 which shows decreasing trend over the years to 0.16 in 2019 with a mean value of 0.39. Thus, the doubling time (DT) which is 0.98 year in 2016 has been increased to 4.31 years in 2019 with a mean value of 2.36 years over the four years' time. Here the literature in private law in 2015 viz. 138 has grown to 667 in 2019, i.e. 4.83 times in 4 years with a RGR of (ln 4.83)/4 = 0.39. This is the mean RGR arrived in the table 9.
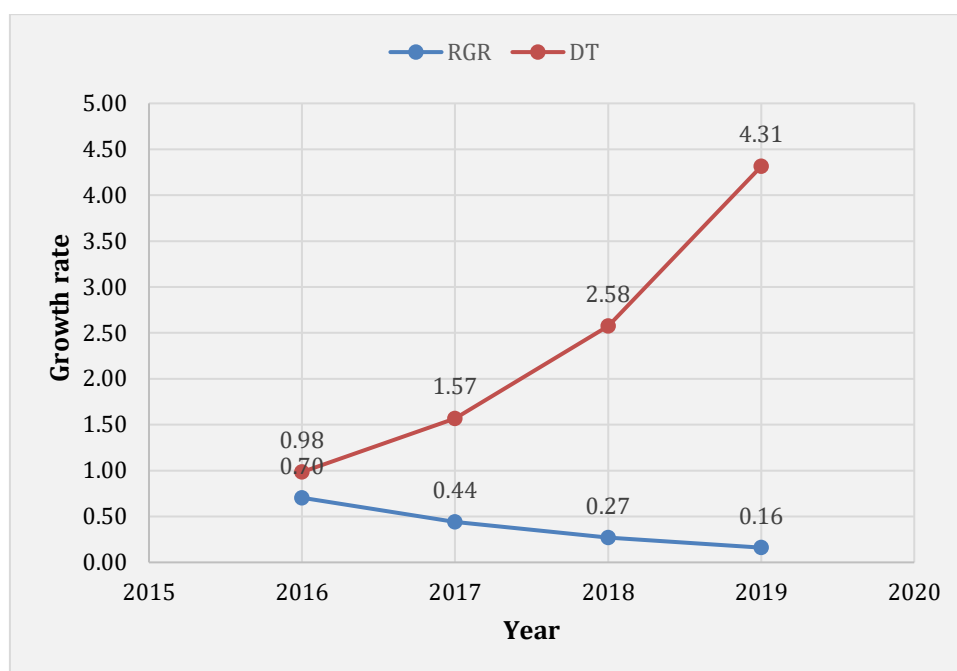
Figure 7: Relative growth rate and doubling time of literature in Private law

From the figure 7, it is found that the DT line has shown almost a constant linear increase with time when the RGR is showing almost a constant linear decrease establishing the inverse relationship between RGR and DT.

In order to find out if there exists any correlation between the relative growth rates of the literature in public and private law, correlation study has been made as shown in table 10.

Table 10: Correlation study of RGR for literature in Public law and Private law

Year	RGR of public law	RGR of private law	Coefficient of correlation (r)	Degree of freedom (df)	Table value of r at 0.05 level	> or <	s/ns
2016	0.70	0.70					
2017	0.43	0.44					
2018	0.30	0.27					
2019	0.21	0.16	1.00	4-2=2	0.95	>	s

From the table 10, the computed value of r is 1.00 which is the highest value at any level. Hence the relative growth rates over the studied period of 2015 to 2019 of literature in both public law and private law are highly and significantly correlated. In other words, there exists no significant difference in the growth pattern of literature between public law and private law.

8. FINDINGS & CONCLUSION

A total 31 (24 are of public law and 7 are from private law) journals indexed in DOAJ were considered for study which consisted 3001 number of publications with different publication frequencies. Among the 31 journals, the quarterly journal Laws has been ranked as 1st with maximum (11.30%) number of publications followed by JDH with 7.50% of publications and RMLJ is the last (31st) ranked journal with only 0.90% of the total publications.

In public law, the journal Laws has the highest value of publications per volume (45.20) and percentage of publications (9.69%) and Acta Universitatis Danubius: Juridica (AUDJ) has the highest publications per issue (17.50) and the journal Law and Method (LM) has the lowest values of publications per volume (7.40), publications per issue (2.64) and percentage of publications (1.59%). In private law, the journal Yearbook of Antitrust and Regulatory Studies (YARS) has the highest publications per volume (34), the highest number publications per issue (17) and the highest percentage of publications (25.49%) while the journal Rocky Mountain Law Journal (RMLJ) Journal has the lowest publications per volume (5.40) and the lowest percentage of publications (4.05%) whereas the journal DANUBE: Law, Economics and Social Issues Review (DANUBE) has the lowest number of publications per issue (3). On doing Student's t test, it is found that there is no significant difference between the public law and private law publications on their publications per issue.

It is found that in public law, the average growth rate is 0.11% and the CAGR at the end of 2019 with respect to 2015 is 0.51, i.e. 51%. And in private law, the average growth rate is (-) 5.51% and the CAGR at 2019 is 0.48, i.e. 48%. The chi-square test showed that there is no significance difference between the year-wise publications in public law and private law.

It is found that in public law, the Relative Growth Rate (RGR) is the highest in 2016 and went on decreasing afterwards. The mean RGR and the DT in public law are found to be

0.41% and 2.03 years respectively. Similarly, in private law the RGR is the highest with a value of 0.70 in 2016 and went on decreasing onwards. The mean value of RGR and the DT as found out for private law are 0.39% and 0.98 year respectively. It is also found out that the correlation between the relative growth rates of the literature in public and private laws are highly significant.

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