

Impact of Indian Journal of Veterinary Anatomy through Google Scholar

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ABSTRACT

A Scientometric research of the Indian Journal of Veterinary Anatomy (IJVA) was undertaken between 1990 and 2023 utilizing the Publish or Perish (PoP) software platform. The data for 34 years collected for the study. The influence of Indian Journal of Veterinary Anatomy (IJVA) on contemporary academic research was assessed by extracting unprocessed data from Google Scholar and employing 12 h-Index metrics to analyse it. The study analyzed 658 scientific articles to investigate Zipf's Law in relation to annual contributions, authorship patterns and author productivity trends. The study period also involved an examination of IJVA's relative growth rate and doubling time. Based on our data, the year 2018 had the highest number of publications, with 62 articles, accounting for 9.42% of the total publications. The examined impact rankings of IJVA are presented as an average. The current study utilised data from many sources, including indexes (h and g), h-index, g-index, papers, citations, years, citations per year, citations per paper, citations per author and papers per author.

Key words: Indian Journal Veterinary Anatomy, Scientometric study, Zipf's Law, Relative growth rate, Doubling time, Journal impact study

INTRODUCTION

The authors examined the impact summaries of the Indian Journal of Veterinary Anatomy (IJVA). A total of 658 articles were retrieved through the use of Google Scholar. Citations quantify the frequency with which an article is referenced in another publication. The publication years of the journals span a period of 34 years, from 1990 to 2023. Citation count refers to the frequency with which an article is referenced within a specific year. The cited paper is calculated by multiplying the total number of citations by the paper count, which is 1.41.

The term "Cites Author" refers to the average number of citations received by an author, which are 310.58. Authors paper computes the quantity per paper as 3.3. In the present study, as defined by Hirsch, (2005) author-level h-Index was determined to be 12. The g-Index, as defined by Egghe, (2006), indicates that an author's top 10 articles have received a minimum of 100 citations, with an average of 14 citations specifically in the current study. The hc-index in this study is 6. The modern h-index, as proposed by Batista et al., (2006), reduces the importance of older citations. The hi-index of this study, which is 3.69, is calculated by dividing the

conventional h-index by the average number of authors, resulting in a reduction in co-authorship. The individual h-index also incorporates the norm index. Norm standardises the citations of each work by dividing the number of sources by the number of authors. The concept of norm takes into consideration the influence of co-authorship, whereas the h index quantifies the impact of individual authors. The source cited is Jin, (2007). The overall citation count (90.8) of AWCR is determined by the age weighted citation rate.

OBJECTIVES

1. To analyze the impact of publications from the Indian Journal of Veterinary Anatomy, citation metrics used for evaluation.
2. To examine the annual dissemination of an author's publications, identify articles published in a single year by a solitary author, a specific group of authors or a combination of both.
3. To determine the applicability of Zipf's Law to an author's research production in the Indian Journal of Veterinary Anatomy.
4. To ascertain the Relative Growth Rate and the median duration for article views to double within a specified timeframe.

MATERIALS AND METHODS

The analysis relies on papers from the Indian

1. Asstt. Prof., Library Sci., 2. Former Dean Faculty & Retd. Sr. Prof., 3. Prof & Head & Chief Editor, IJVA, Vety. Anatomy, CVSc, Mathura, U.P.; 4 Prof. & Secretary, IAVA, Vety. Anatomy, LUVAS, Hisar

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Table 1: Impact of Indian Journal of Veterinary Anatomy

Query	Indian Journal of Veterinary Anatomy
Source	Google Scholar
Papers	658
Citations	929
Years	34
Cites per Year	27.32
Cites Paper	1.41
Cites Author	310.58
Papers Author	242.95
Authors Paper	3.3
h index	12
g index	14
hc index	6
hI index	3.69
hI norm	5
AWCR	90.8
AW index	9.53
AWCRpA	30.89
e index	6.56
hm_index	7.82

Association of Veterinary Anatomists 2024) that were published between 1990 and 2023 and are archived on the Publish or Perish platform (Harzing, A.W., 2007). The PoP, developed by (Bott & Stinson, 2019), is a Microsoft Windows utility that enables the retrieval and examination of academic citations from various platforms such as OSX (Apple, Inc, 2024, Linux, 2024) when used in conjunction with a compatible emulator. The main sources for metric analysis are obtained from Google Scholar (2024). The majority of the 658 publications examined consisted of research papers, brief communications, reviews and case studies. The obtained information was collated, processed, analysed and visually depicted using tables and graphs for further examination and discussion. Table 1 displays a range of metrics for the Indian Journal of Veterinary Anatomy, including the number of published papers, received citations, number of authors and other relevant statistics.

RESULTS AND DISCUSSION

According to Figure 1, the Indian Journal of Veterinary Anatomy had the highest number of publications in 2018, accounting for 9.42% (62) of the top-ranked articles. In 2020, the second rank was achieved by 9.12% (60) while in 2019; the third rank was achieved by 8.66% (57).

The Relative Growth Rate (RGR) is used

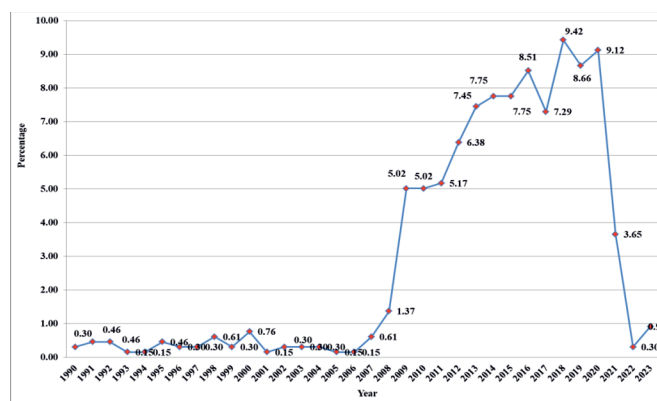


Fig 1. Growth of Year-wise Publications in Indian Journal of Veterinary Anatomy

to measure the rate at which the number of articles/pages increases over a specific period of time. The average Relative Growth Rate for a certain time frame can be determined using the following equation (Hunt and Cornelissen, 1997).

$$\text{Relative Growth Rate (RGR)} = \frac{\log X_e W_2 - \log X_e W_1}{T_2 - T_1}$$

RGR = Mean relative growth rate over the specific period interval.

$\log X_e W_1$ = Log of initial number of articles.

$\log X_e W_2$ = Log of final number of articles for a specific period of interval.

$T_2 - T_1$ = Unit difference between the initial time and the final time.

In this study year is taken as unit of time for calculation of RGR.

Doubling Time (DT)

The parameter Doubling Time (DT) is directly related to RGR and indicates the time required for publications to become double the existing volume. DT is a unit for the exponential growth equation. The DT is computed as follows:

$$DT = \{(t_2 - t_1) \log(2) / (\log c_2 - \log c_1)\}$$

Again, in the per-year growth case, the expression for DT can be $DT = \log(2) / RGR$

The data pertaining to the growth output of the Indian Journal of Veterinary Anatomy is displayed in Table 2. In order to determine the average RGR (Relative Growth Rate) and average DT (Doubling Time), the study period from 1990 to 2023 has been separated into two distinct block periods: 1990-2006 and 2007-2023. The annual production of the Indian Journal of Veterinary Anatomy has increased from the year 2007 onwards. The highest number of research publications was

Table 2: Relative Growth Rate and Doubling Time of Indian Journal of Veterinary

Year	Quantum of Output	Cumulative total output	LogXeW1	LogXeW2	RGR	Block Period	Double time	Block Period
1990	2	2	0.6931	0.6931	0.0000	2.1414	0.0000	0.368143
1991	3	5	1.0986	1.6094	0.5108		1.3569	
1992	3	8	1.0986	2.0794	0.9808		0.7067	
1993	1	9	0.0000	2.1972	2.1972		0.3155	
1994	1	10	0.0000	2.3026	2.3026		0.3010	
1995	3	13	1.0986	2.5649	1.4663		0.4727	
1996	2	15	0.6931	2.7081	2.0149		0.3440	
1997	2	17	0.6931	2.8332	2.1401		0.3239	
1998	4	21	1.3863	3.0445	1.6582		0.4180	
1999	2	23	0.6931	3.1355	2.4423		0.2838	
2000	5	28	1.6094	3.3322	1.7228		0.4023	
2001	1	29	0.0000	3.3673	3.3673		0.2058	
2002	2	31	0.6931	3.4340	2.7408		0.2529	
2003	2	33	0.6931	3.4965	2.8034		0.2473	
2004	2	35	0.6931	3.5553	2.8622		0.2422	
2005	1	36	0.0000	3.5835	3.5835		0.1934	
2006	1	37	0.0000	3.6109	3.6109		0.1920	
2007	4	41	1.3863	3.7136	2.3273	2.3055	0.2978	0.364231
2008	9	50	2.1972	3.9120	1.7148		0.4042	
2009	33	83	3.4965	4.4188	0.9223		0.7515	
2010	33	116	3.4965	4.7536	1.2571		0.5514	
2011	34	150	3.5264	5.0106	1.4843		0.4670	
2012	42	192	3.7377	5.2575	1.5198		0.4561	
2013	49	241	3.8918	5.4848	1.5930		0.4351	
2014	51	292	3.9318	5.6768	1.7449		0.3972	
2015	51	343	3.9318	5.8377	1.9059		0.3637	
2016	56	399	4.0254	5.9890	1.9636		0.3530	
2017	48	447	3.8712	6.1026	2.2314		0.3106	
2018	62	509	4.1271	6.2324	2.1053		0.3292	
2019	57	566	4.0431	6.3386	2.2955		0.3020	
2020	60	626	4.0943	6.4394	2.3450		0.2956	
2021	24	650	3.1781	6.4770	3.2989		0.2101	
2022	2	652	0.6931	6.4800	5.7869		0.1198	
2023	6	658	1.7918	6.4892	4.6974		0.1476	
Total	658							

recorded in 2018 with a total of 62 publications. The data shows that the average RGR rose from 2.1414 in the initial block period to 0.368143 in the subsequent block period. However, the average Double Time

declined from 2.3055 in the first block period to 0.364231 in the second block period. The RGR has shown an increase from 1.3569 in 1991 to 3.6109 in 2006. Similarly, the DT had a progressive decline

Table 3: Authorship Pattern in Indian Journal of Veterinary Anatomy

S.No	Year	Single (Ns)	Two	Three	Four	Five and above	Total	Percentages
1	1990	0	2	0	0	0	2	0.30
2	1991	0	1	0	0	2	3	0.46
3	1992	0	1	2	0	0	3	0.46
4	1993	0	0	0	1	0	1	0.15
5	1994	0	1	0	0	0	1	0.15
6	1995	0	2	1	0	0	3	0.46
7	1996	0	1	0	1	0	2	0.30
8	1997	0	2	0	0	0	2	0.30
9	1998	0	1	2	1	0	4	0.61
10	1999	0	2	0	0	0	2	0.30
11	2000	0	1	2	2	0	5	0.76
12	2001	0	0	0	0	1	1	0.15
13	2002	0	0	2	0	0	2	0.30
14	2003	0	1	1	0	0	2	0.30
15	2004	0	2	0	0	0	2	0.30
16	2005	0	0	1	0	0	1	0.15
17	2006	0	1	0	0	0	1	0.15
18	2007	0	0	3	1	0	4	0.61
19	2008	0	2	3	3	1	9	1.37
20	2009	1	4	14	13	1	33	5.02
21	2010	0	2	12	17	2	33	5.02
22	2011	0	1	11	15	7	34	5.17
23	2012	1	13	10	16	2	42	6.38
24	2013	2	6	14	17	10	49	7.45
25	2014	3	7	6	32	3	51	7.75
26	2015	0	11	15	17	8	51	7.75
27	2016	1	5	13	30	7	56	8.51
28	2017	1	8	9	26	4	48	7.29
29	2018	2	12	12	29	7	62	9.42
30	2019	9	9	10	17	12	57	8.66
31	2020	12	11	14	19	4	60	9.12
32	2021	19	0	0	4	1	24	3.65
33	2022	1	1	0	0	0	2	0.30
34	2023	0	0	1	3	2	6	0.91
Total		52	110	158	264	74	658	100.00
Percentage		7.90	16.72	24.01	40.12	11.25	100.00	

from 0.7515 in 2009 to 5.7869 in the same time of 2022.

Authorship Pattern in Indian Journal of Veterinary Anatomy

Table 3 presents the authorship pattern in papers published in the Indian Journal of Veterinary Anatomy. There is a grand total of 658 articles, encompassing both single-authored and multi-authored works, authored by a collective of 2172 authors. Among them, 19 (7.9%) were authored by a single individual in the year 2021. There were 110 authors in the year 2012, accounting for 16.72% of the total authors. Out of the total, 13 are double authors. According to the data, a combined total of 158 authors (24.01%) published their work in 2015. Among these, a total of 15 publications had exactly three authors. Four authors accounted for 40.12% of total publications (264) over 34 years, the maximum being 32 in the year 2014. Five authors and above accounted for 11.25% of total publications (74), the maximum being 12 in the year 2019.

From 2010 to 2020, the data in Figure 2 represents co-authorship (Romero-Riaño et al., 2020) using the full counting approach. The maximum number and minimum number of writers considered per document were 25 and 1 respectively. Out of the 599 writers, 32 authors fulfilled the threshold for top cluster, which is cluster-2. The color associated with this cluster is green, and the author is (Farooqui, 2019). There are 27 documents and links available. The total link strength is 21, with a maximum average of 61 in the year 2016. This is followed by cluster-19, which is associated with the emerald color, and the author is Bansal, (2021). The user has provided 28 papers with a total of 20 links and a link strength of 58. The maximum average of publications were in the year

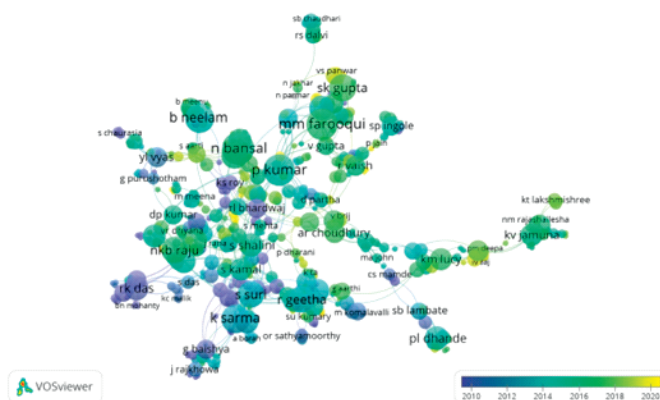


Fig 2. Co-Authorship of Indian Journal of Veterinary Anatomy

2015, and they belong to cluster-15, which is associated with (Sarma et al., (2014)). There are 22 papers and links. The total link strength is 23, with minimum average in the year 2012.

Authors Collaboration in Indian Journal of Veterinary Anatomy

In this study, where Degree of Collaboration

$$C = \frac{Nm}{Nm + Ns}$$

Ns = Total Number of Single Authors

Nm = Total Number of Multiple Authors

C = Degree of Collaboration

$C = 606 / 606 + 52 = 0.92$

Table 4: Degree of Collaboration during the study period in the Indian Journal of Veterinary Anatomy

S.No	Year	Single (Ns)	Multiple Authors (Nm)	Total	Degree of Collaboration
1	1990	0	2	2	1.00
2	1991	0	3	3	1.00
3	1992	0	3	3	0.00
4	1993	0	1	1	1.00
5	1994	0	1	1	1.00
6	1995	0	3	3	0.00
7	1996	0	2	2	1.00
8	1997	0	2	2	1.00
9	1998	0	4	4	0.00
10	1999	0	2	2	1.00
11	2000	0	5	5	1.00
12	2001	0	1	1	1.00
13	2002	0	2	2	1.00
14	2003	0	2	2	1.00
15	2004	0	2	2	1.00
16	2005	0	1	1	1.00
17	2006	0	1	1	1.00
18	2007	0	4	4	1.00
19	2008	0	9	9	0.00
20	2009	1	32	33	0.97
21	2010	0	33	33	1.00
22	2011	0	34	34	1.00
23	2012	1	41	42	0.98
24	2013	2	47	49	0.96
25	2014	3	48	51	0.94
26	2015	0	51	51	1.00
27	2016	1	55	56	0.98
28	2017	1	47	48	0.98
29	2018	2	60	62	0.97
30	2019	9	48	57	0.84
31	2020	12	48	60	0.80
32	2021	19	5	24	0.21
33	2022	1	1	2	0.50
34	2023	0	6	6	1.00
Total		52	606	658	

The outcome reveals that the Degree of Collaboration score is 0.92. Table 4 displays data on the level of collaboration between studies conducted by an individual author and research conducted by numerous authors throughout the specified study period. Out of the 658 research articles, only 52 unique writers were involved, whereas 606 authors had contributions from multiple contributors.

Table 5: Number of Documents Vs Number of Citations

Year	Publication	%	Citation	%
1990	2	0.30	7	0.75
1991	3	0.46	9	0.96
1992	3	0.46	6	0.64
1993	1	0.15	10	1.07
1994	1	0.15	3	0.32
1995	3	0.46	3	0.32
1996	2	0.30	5	0.53
1997	2	0.30	2	0.21
1998	4	0.61	3	0.32
1999	2	0.30	11	1.17
2000	5	0.76	12	1.28
2001	1	0.15	3	0.32
2002	2	0.30	7	0.75
2003	2	0.30	15	1.60
2004	2	0.30	5	0.53
2005	1	0.15	13	1.39
2006	1	0.15	2	0.21
2007	4	0.61	14	1.49
2008	9	1.37	10	1.07
2009	33	5.02	47	5.02
2010	33	5.02	40	4.27
2011	34	5.17	21	2.24
2012	42	6.38	137	14.62
2013	49	7.45	150	16.01
2014	51	7.75	151	16.12
2015	51	7.75	75	8.00
2016	56	8.51	72	7.68
2017	48	7.29	12	1.28
2018	62	9.42	29	3.09
2019	57	8.66	41	4.38
2020	60	9.12	18	1.92
2021	24	3.65	4	0.43
2022	2	0.30	0	0.00
2023	6	0.91	0	0.00
Total	658	100	937	100

Table 5 provides data on the citation count per article. In 2014, 51 documents were received which accounted for 7.75% of the total publications and 151 citations accounting for 16.12% of the total

citation. In 2013, there were 150 citations, accounting for 16.01% of the total citations. Among the documents, a total of 49 (7.45%) were referenced. There were 137 citations in 2012, accounting for 14.62% of the total citations. Among the documents, 42 (6.38%) were referenced. However, the act of assessing the impact or "quality" of an article by quantifying how often other authors refer to it in their work, along with considering citation metrics and the overall number of publications in a particular field, has become the widely acknowledged standard for evaluating researchers and the sustainability of a field–(Ahmed et al., 2016; DeGroote, 2022).

Authors Rank in Zipf's Law Derivation

Zipf's Law is a statement that is founded on introspection rather than on concepts. The data studied in Natural and Social science can often be described by a Zipf's law distribution, which is a discrete probability distribution based on Zipf's rule. Zipf's law was established using mathematical statistics by George (1950). According to Zipf's law, when the unique words in a text are arranged in decreasing order of how often they appear, the product of their frequency and rank is approximately the same for all terms in the text. Let's suppose that a word has a specific frequency and that its position in the list of word frequencies is denoted as "r". If Zipf's Law is valid for all words, it may be expressed as $f = a/r^b$, where a and b are constants and b is approximately equal to 1 (Hermetic, 2022). According to Zipf's Law, the frequency of items of rank k, $f(k; s, N)$, in a population of N elements can be predicted as follows:

$$(k, s, N) = 1/ks \sum \left(\frac{1}{ns} \right) Nn = 1$$

N : be the number of elements;

K : be their rank;

S : be the value of the exponent characterizing the distribution

The results of a study published in the Indian Journal of Veterinary Anatomy are depicted in Figure 3. The study attempted to evaluate the precision of Zipf's law, which establishes a distribution of rank frequency in datasets, such as author names. The graph (Figure 3) illustrates the hierarchical distribution of authors' names, determined by the number of articles obtained from a Google scholar search using IJVA. The name "Kumar" is the most frequent among a collection of

1125 terms and 2172 authors, with a total of 57 occurrences (2.76%). The name "Gupta" follows closely with 53 occurrences (2.57%). The term "Singh" is present in the text a total of 51 times, which accounts for 2.47% of the overall occurrences. Although Zipf's law has been applied, certain mistakes have been detected in this analysis. The issues arise due to the widespread usage of the name 'Singh' as a family name in the Indian cultural context. The author's first and middle names are denoted by capitalized initials, such as K. Singh and R.K. Singh. To partially correct this inaccuracy, it is recommended to provide the author's full first and middle names, such as 'Rajeev Kumar Singh'. However, it is conceivable for there to exist two separate authors who happen to have the identical name, specifically 'Rajeev Kumar Singh'. In order to fully eliminate this problem, it is advisable to incorporate the ORCID number of every individual author. The ORCID, (2022), is an alphanumeric identifier known as the Open Researcher and Contributor ID. It serves the purpose of uniquely identifying authors and contributors and is not owned by any specific entity. A notable feature of ORCID is the mandatory inclusion of the author's email ID. An author is prohibited from having numerous email addresses inside the same email service provider. The ORCID registration process restricts the use of only one email ID, which can lead to inaccuracies in author names. The additional results generated by the PoP programme demonstrate a positive link with the corresponding outcomes of Zipf's law.

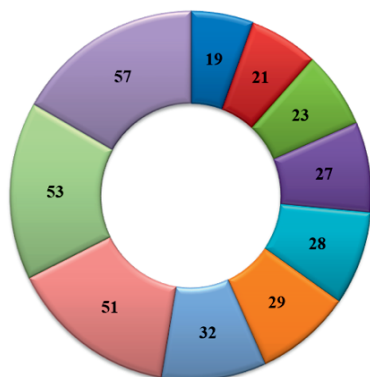


Fig 3. Bar Chart for Ranking of Authors

The binary counting method employed titles and the abstract - (Flis and Van Eck, 2018) cluster figure 4 demonstrates that word 1, out of the total of 2723 terms, meets the threshold with the minimal number of occurrences, which is also 2723. A

relevance score will be calculated for each of the 2723 words. According to this source, the most pertinent phrases will be chosen. The default option is to choose the 60% of terms that are most relevant. The desired number of terms to be selected is 1634. Number one Cluster-6 is associated with the blue colour and the term "Investigation" appears 24 times. It has a relevance score of 0.41 and is linked to 98 times. The total link strength is 115 and the average publication is calculated based on this. In 2014, the term "Cell" appeared 20 times in cluster-25, with a grey hue. It had a relevance score of 0.56 and was linked 48 times. The total strength of the links was 63 in the year 2013 and the average publication was calculated based on this. The term "Chicken" appears 17 times in Cluster-14, which is characterized by a light grey tint. The relevance of this term is 0.61 and it is associated with link 67. The total link strength in the year 2012 in this cluster is 71, with an average publication score of Cell.

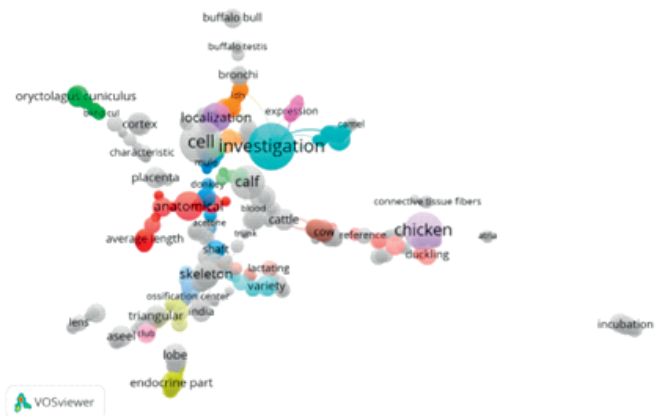


Fig 4. Titles and Abstract of Indian Journal of Veterinary Anatomy

CONCLUSION

This study has the potential to facilitate further investigation into the efficacy of academic research publications and their authors. Further investigation is required to ascertain the extent of the tasks involved, the allocation of authors across different fields of study, and the frequency of collaboration among writers. Conducting a study of this nature would establish the foundation for subsequent inquiries of a similar nature. The research and analytical papers published in the Indian Journal of Veterinary Anatomy between 1990 and 2023 received a citation score of 929 on the NAAS (4.48) scale. In 2018, the Indian Journal of Veterinary Anatomy published 9.42 percent of its whole collection of articles. To calculate the relative growth rate (RGR) and the doubling time (DT), the

study period was divided into two equal parts: 1990-2006 and 2007-2023. The number of research publications reached its highest point in 2006, with a total of 37 articles being published. The average RGR increased from 2.1414 to 2.3055. The mean duration of the double-time interval decreased from 0.368143 to 0.364231. Double Time experienced a decline from 1.3569 in 1991 to 0.7515 in 2009; however, the Relative Growth Rate exhibited an increase. The editor is responsible for performing a solitary impact journal study, the results of which will ascertain the long-term sustainability and trajectory of the journals and its administration. ORCID reduces misidentification. Due to the abundance of researchers sharing identical or highly similar names, it is quite effortless to confuse them. This is particularly true if the researchers have undergone a name modification or have used other spellings or transliterations of their given name. By utilising their own ORCID ID, individuals can ensure that their identity cannot be misrepresented. Therefore, it is imperative to educate authors about the advantages of establishing an ORCID profile. Furthermore, authors who make contributions may be required to furnish their ORCID identifiers.

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