

Content Analysis of “Transactions of The American Mathematical Society

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Abstract- This paper attempts to highlights the quantitative assessment of status of the Journal by way of analyzing the various features of Journal “Transactions of the American Mathematical Society”. During 2019-2021 a total of 1153 Articles were published in the Journal “Transactions of the American Mathematical Society” by researchers in various countries.

Keywords- Authorship collaboration, collaboration pattern, communication channel

- To find out the authorship and collaboration pattern in the publication,
- To find out the extent of international collaboration,
- To find out the most productive authors in the field,
- To find out organization – wise distribution of publication,
- To find out the channels of communications used by the scientists and
- To find out the high frequency keywords appeared in the channels of communication.

I. INTRODUCTION

Content analysis is rapidly becoming less of a tool to be used in the experimental manipulation of the communication process. In these instances of experimental studies, systematic changes in content are made and documented through content analysis, and the audiences are observed for the effects of these changes. The specific role to be played by content analysis in organizing for recall the world’s store of recorded knowledge. Content analysis appears to have two general and major functions. The first is to provide the descriptive abstract of any document at a level and of such a nature as will indicate what information may be found in it. The second is to provide guidelines in transforming document content from one medium to another and in reducing content for ease of bibliographic access. The “Transactions of the American Mathematical Society” is an international, peer-reviewed journal published monthly that aims to its readers with a unique forum for the exchange and sharing of information in social economics.

Objectives

The main objective of the study is to analyze the content of Transactions of the American Mathematical society and make the quantitative assessment of status of the Journal by way of analyzing the following features of Journal

- To find out year-wise growth of publications,
- To find out Geographical distribution of research output,

Hypothesis of the Study

The study consists of following hypothesis:

- Authorship trend is towards multiple authored papers.
- USA is the high productive country.
- Majority of the affiliated Institution are from Canada

Scope & Limitation of the Study

Scope of study is restricted to the Journal “Transactions of the American Mathematical Society” published during 2019-2021. The papers presented in the Journal are analyzed using content analysis technique. The present study is limited to the total numbers of 1153 papers published during 2019 to 2021.

Data Analysis and Interpretation:

In views of the objectives of the present study, analysis of Journal of Transactions of The American Mathematical Society is presented further. The analysis is further divided into following:

Year-Wise Publication Productivity and Collaboration Rate

The word publication means the act of publishing. Productivity refers to measures of output from production processes, per unit of input. Collaboration is a recursive

process where two or more people or organizations work together toward an intersection of common goals

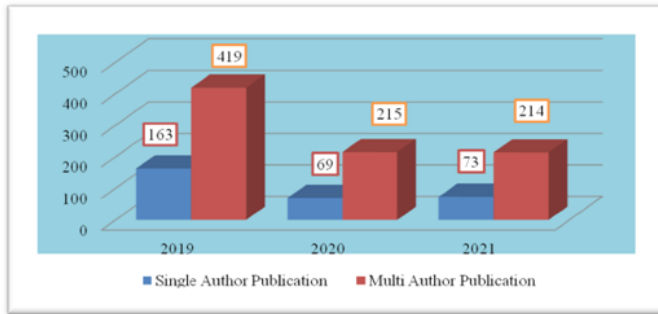


Figure No.01 Year-Wise Publication Productivity and Collaboration Rate

It can be observed from figure No.01 that during the periods 2019-2021 a total of 1153 Articles were published in the Journal of Transactions of The American Mathematical Society by researchers in various countries. Majority of the contributions were contributed in year 2019 with 582 contributions. Minimum contributions were contributed in years 2020 with same contributions 284 contributions.

Geographical Distribution of Research Output

Geographical distribution of research output means the article published from different countries. In Political Geography and International Politics, a country is a political division of a geographical entity. Frequently, but not exclusively, a sovereign territory, the term is most commonly associated with the notions of both state and nation, and also with government.

Table 01: Country-Wise Distribution of Articles

| Sr.No. | Country | No. of Country | Percentage | Rank |
|--------|----------------|----------------|------------|------|
| 1 | United States | 697 | 27.58 | 1 |
| 2 | China | 266 | 10.53 | 2 |
| 3 | Germany | 170 | 6.73 | 3 |
| 4 | France | 166 | 6.57 | 4 |
| 5 | United Kingdom | 149 | 5.90 | 5 |
| 6 | Canada | 114 | 4.51 | 6 |
| 7 | Italy | 101 | 4.00 | 7 |
| 8 | Spain | 92 | 3.64 | 8 |
| 9 | Japan | 85 | 3.36 | 9 |
| 10 | Brazil | 59 | 2.33 | 10 |

Truncated....

It can be observed from Table No.01 that, there were as many as 47 countries carrying out research and produced 1153 articles. Table no.04 provides ranked List of countries contributing to this field, the number of publications of each country and their share in percentages is the top producing country United States with 697 publications (27.58) of the total output. Therefore, the hypothesis, “United States is the high productive country” (Hypotheses No.2) is valid.

Authorship and Collaboration Trend:

Gupta, D.K. Authorship is an observable phenomenon reflecting the contemporary scholarly practices clearly showing the communication, productivity and collaborative patterns and influences among researchers even though their quantities and qualities are not well understood. Collaboration in research is said to have taken place when 2 or more persons work together on a scientific problem of project and effort, both physical and intellectual.

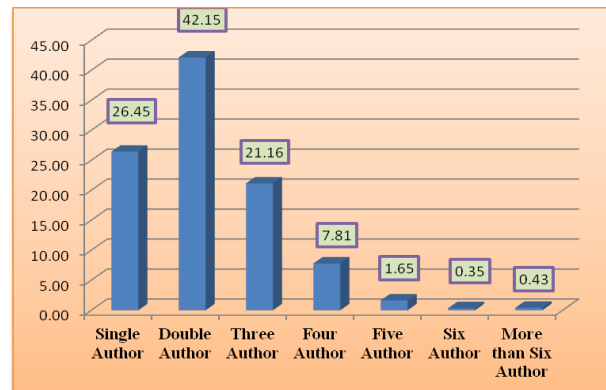


Figure No.02: Authorship and Collaboration Trend

It can be observed from Figure No.02 that, year-wise authorship and collaboration trend is given in table 05. Authorship trend is towards multiple-authored papers. Single authored papers accounted for 305 (26.45%). Therefore, the hypothesis, “Authorship trend is towards multiple authored papers. (Hypothesis No.1) is valid.

International Collaboration Pattern of Articles

The International collaborative production of articles is the simultaneous action of many people who try to combine their ideas to make a new one. In fact “collaborative” is the process where two or more people work together toward a common goal and they don’t required leadership.

Table 02: International Collaboration Pattern of Articles

| Year | No. of Countries | | Total no. of Publication |
|--------------|------------------|---------------|--------------------------|
| | Single | Collaboration | |
| 2019 | 321 | 261 | 582 |
| 2020 | 156 | 128 | 284 |
| 2021 | 157 | 130 | 287 |
| Total | 634 | 519 | 1153 |

The distribution of the collaboration of the various countries and their institutions respectively are given in the further table.

Most Productive Author

An author is defined both as "the person who originates or gives existence to anything" and as "one who sets forth written statements" in the Oxford English Dictionary.

Table No .03: Most Productive Author

| Sr.no. | Author name | No.of Publication | Percentage | Rank |
|--------------|---------------------|-------------------|------------|------|
| 1 | Pham Huu Tiep | 5 | 0.2 | 1 |
| 2 | Dragos Ghioca | 3 | 0.12 | 2 |
| 3 | Feng Dai | 3 | 0.12 | 2 |
| 4 | Filippo Callegaro | 3 | 0.12 | 2 |
| 5 | Gabriel Navarro | 3 | 0.12 | 2 |
| 6 | Hao Chen | 3 | 0.12 | 2 |
| 7 | Igor E. Shparlinski | 3 | 0.12 | 2 |
| 8 | José María Martell | 3 | 0.12 | 2 |
| 9 | JungHwan Park | 3 | 0.12 | 2 |
| 10 | Kathrin Bringmann | 3 | 0.12 | 2 |
| Truncated... | | | | |

It can be observed from Table No.03 that, the most productive authors is Pham Huu Tiep who had the highest number of the publication (5). Followed by Dragos Ghioca, Hao Chen, Igor E. Shparlinski, José María Martell, JungHwan Park, Kathrin Bringmann, Tong Liu, Zakhar Kabluchko, Zhi-Qiang Wang, Feng Dai is on second rank with 3 publications, then Filippo Callegaro , Gabriel Navarro is on second rank with 3 publications. Double author publication is on third rank with 290 publication, Single author publication is on fourth

rank with 2196 publication,Table gives a list of Authors appeared in the articles.

Institutes Wise Distribution Of Articles Published.

Institution is a society or organization for the promotion of science, education etc. An institute is a permanent organizational body created for a certain purpose. Often it is a research organization (research institution) created to do research on specific topics. An institute can also be a professional body. In some countries institutes can be part of a university or other institution of higher education, either as a group of departments or an autonomous educational institution without a classic full university status such as a University Institute.

Table 4: Institutes wise distribution of articles

| Sr.no | Affiliation | No.of Publication | Percentage | Rank |
|-------|---------------------------------------------------------------------------------------------------------|-------------------|------------|------|
| 1 | Department of Mathematics, University of British Columbia, Vancouver, British Columbia, V6T 1Z2, Canada | 17 | 0.67 | 1 |
| 2 | Department of Mathematics, University Connecticut, Storrs, Connecticut | 14 | 0.55 | 2 |
| 3 | Department of Mathematics, University Michigan, Ann Arbor, Michigan | 13 | 0.51 | 3 |
| 4 | Department of Mathematics, University Washington, Seattle, Washington | 11 | 0.44 | 4 |
| 5 | Department of Mathematics, University of Illinois at Urbana-Champaign, Urbana, Illinois | 10 | 0.4 | 5 |
| 6 | Department of Mathematics, University Missouri, Columbia, Missouri | 10 | 0.4 | 5 |

| | | | | |
|---------------------|--------------------------------------------------------------------------------------------|---|------|---|
| 7 | Department of Mathematics, Massachusetts Institute of Technology, Cambridge, Massachusetts | 9 | 0.36 | 6 |
| 8 | Department of Mathematics, Oklahoma State University, Oklahoma | 9 | 0.36 | 6 |
| 9 | Department of Mathematics, Rutgers University, Piscataway, New Jersey | 9 | 0.36 | 6 |
| 10 | Department of Mathematics, University of Chicago, Chicago, Illinois | 9 | 0.36 | 6 |
| Truncated... | | | | |

It can be observed from Table No. 10 that, there were 2527 organizations involved in research activity. The organizations that have contributed in the publication during 2019- 2021. Department of Mathematics, University of British Columbia, Vancouver, British Columbia, V6T 1Z2, Canada is on rank first with 17 publication it is most productive institution, followed by Department of Mathematics, University of Connecticut, Storrs, Connecticut united States is on second rank with 14 publication. followed by Department of Mathematics, University of Michigan, Ann Arbor, Michigan United States is on third rank with 13 publications, followed by Department of Mathematics, University of Washington, Seattle, Washington united states with fourth rank 11 publications. Like that many affiliations were contributed in the study table shows the list of affiliations with their product. single publications institutions with 1269 Single publication. Therefore the hypothesis **“Majority of the affiliated institution are from Canada (Hypothesis No.3) is valid”**.

Distribution Of Keywords

“A word occurring natural language text of documents or its surrogate that is considered significant for indexing and information retrieval”. Keywords are the words that are used to reveal the internal structure of an author’s reasoning. Keywords are one of the best scientometric indicators to understand the grasp instantaneously the thought content of the articles and to find out the growth of the subject field. By analyzing the keywords appeared either on the title or article will help in knowing in which direction the

knowledge grows. “Keyword is a word that succinctly and accurately describes the subject discussed in a document”.

Table No.12: Distribution of Keywords

| Sr.no. | Keywords | No.Of Publication | Percentag | Rank e |
|---------------------|----------------------|-------------------|-----------|--------|
| 1 | automorphism group | 12 | 0.25 | 1 |
| 2 | Hausdorff dimensions | 8 | 0.17 | 2 |
| 3 | Lyapunov exponent | 8 | 0.17 | 2 |
| 4 | cohomology | 7 | 0.14 | 3 |
| 5 | Polynomials | 7 | 0.14 | 3 |
| 6 | abelian variety | 6 | 0.12 | 4 |
| 7 | elliptic curve | 6 | 0.12 | 4 |
| 8 | equidistribution | 6 | 0.12 | 4 |
| 9 | heat kernel | 6 | 0.12 | 4 |
| 10 | homogeneous space | 6 | 0.12 | 4 |
| Truncated... | | | | |

It can be observed from Table No. 12 that, the high frequency keywords were automorphism group(12), Hausdorff dimensions (8), Lyapunov exponent (8), cohomology (7), Polynomials (7), abelian variety (6) are same keywords like that table gives a list of keywords appeared in the articles.

II. CONCLUSIONS

During 2019-2021 a total of 1153 Articles were published in the Content Analysis of Transactions of The American Mathematical Society by researchers in various countries. The average numbers of articles published per year were 384. The highest numbers of Articles (582) were produced in 2019.

There were as many as 47 countries carrying out research and produced 1153 articles. Table no.04 provides ranked List of countries contributing to this field, the number of publications of each country and their share in percentages, United States is the top producing country with 697 publications (27.58%) of the total output. Therefore, the hypothesis, It can be stated that China being the publishing country the output is more than other country.

Authorship trend is towards multiple-authored papers. Single authored papers accounted for 305 (26.45%).

Out of 1153 articles, 519 articles (45.01%) are written in collaboration with International Institutions. The collaboration is observed with two countries and three countries. The country which has maximum collaboration is United States (315) and then followed by Germany (125) is on second position, followed by China (118) is on third position.

The most productive author is Pham Huu Tiep who had the highest number (5) of the publication. Followed by Dragos Ghioca and Feng Dai is on second rank with 3 publications, then Filippo Callegaro, Gabriel Navarro, Hao Chen, Igor E. Shparlinski and José María Martell is on second rank with 3 publications, Table gives a list of Authors appeared in the articles. 290 Authors with 2 publications, 2196 Author with single publication.

Researchers communicated their publication through variety of communication channels Journal is 1153(100%) of the total article. all analysis and total content of Journal analyzed.

The high frequency keywords were automorphism group, Hausdorff dimensions and Lyapunov exponent, abelian variety are same keywords like that table gives a list of keywords appeared in the articles.

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