Journal of Probability and Statistical Science
24(2), 1-15Aug. 2026

Evolution and Research Trends in Truncated Distribution Studies: A Bibliometric and Meta-Analytical Review

Manju Jose
Department of Statistics
Alphonsa College, India

Lishamol Tomy
Department of Statistics
Deva Matha College, India

Christophe Chesneau
Department of Mathematics
University of Caen, France

Lynn Rose Sojan
Department of Statistics
Alphonsa College, India

ABSTRACT

In empirical studies, data are often truncated because of institutional limits, measurement problems, or sampling methods, which means observations are limited to a certain range. If truncation isn't considered, parameter estimates can be skewed, and statistical conclusions can be wrong. Because of this, truncated probability distributions are needed to accurately model real-world data. This paper gives a bibliometric review of studies on truncated distributions to show the field's history, structure, and how its topics have changed. Data from Scopus between 2000 and 2025 were gathered and examined using the Bibliometrix package in R. Publication trends, key authors and sources, cooperation, and new subjects were assessed using descriptive stats and science-mapping methods like co-authorship, co-citation, keyword co-occurrence, topic mapping, and historical analysis. The results show consistent growth in scientific output, high citation rates for key theoretical work, and more interdisciplinary use in fields like economics, medical statistics, survival analysis, reliability engineering, and finance. In particular, they emphasize a research area that is both well-established and still changing, with solid theoretical bases, more practical uses, and more global teamwork. This work gives a structured look at research on truncated distributions and provides helpful information for people who want to find key studies, main subjects, and future research directions in the study of truncated data.

Keywords: Truncated Distribution, Statistical Modeling, Maximum Likelihood Estimation, Bias Correction, Probability Theory

1. Introduction

Probability distributions are a basic part of statistics and are used a lot to show the uncertainty and variation we see in data from the real world. Common probability distributions, like the normal, exponential, Poisson and gamma distributions, are usually defined for all possible values and assume we can see any outcome. But, in a lot of real-world research, we only see data within a certain range because of rules, limits on how we measure things or restrictions in experiments. When data outside a specific range are left out, they are called truncated data (Nadarajah, S. (2009)).

Truncation changes the basic structure of a distribution by changing its probability density function and important statistical measures like the average and variance. If we don't consider truncation, the parameter estimates we get using normal statistical ways might be wrong, leading to wrong conclusions (Pender, J. (2015)). This is especially important in fields like economics, where data on income, pay, and spending are limited (Maddala, G. S. (1983)). It matters in medical statistics and survival analysis too, where studies might have specific requirements or time limits (Gul, A., et.al. (2021)). Because of this, special truncated

- Received May 4, 2026, in final form August 2026.
- Christophe Chesneau (corresponding author) is affiliated with Department of Mathematics, LMNO, University of Caen, Caen, France
  Email: christophe.chesneau@gmail.com

distribution models and ways to estimate have been created to deal with limited data. Over time, studying truncated distributions has moved from mostly theoretical work to more practical uses (Sun, J. (1995). Better computing methods and statistical programs have also made it easier to use truncated models in different fields (Amemiya, T. (1984)). Along with these method improvements, a lot more scientific papers are being released, so we need good ways to look at research trends, important work, and how people are working together in the field (Nadarajah, S. (2008). Bibliometric analysis gives us a way to study the structure and growth of scientific knowledge by looking at publication and citation data (Donthu N., et.al. (2021). This approach helps researchers and practitioners better understand how research on truncated distributions has changed and where it might be headed.

This study combines theoretical discussion with bibliometric analysis to give a full understanding of truncated distribution research. It looks at the main ideas behind truncation, studies how the literature has grown, and spots new topics and uses. This mix helps us better understand the maturity and future path of research on truncated probability distributions. Through this analysis, researchers and practitioners gain valuable insights into the evolution and potential of truncated distributions in various fields.

2.Methodology

This investigation uses both theoretical examination and bibliometric methods to study what has been researched about truncated probability distributions. Data from scientific papers were taken from the Scopus database, covering years 2000–2025, by searching for keywords related to truncated distributions. The collected data were refined and studied using the Bibliometrix tool in R, which helps in doing performance studies and mapping science (Aria & Cuccurullo, 2017). Basic details such as yearly scientific creation, source influence and how citations are structured were worked out to see the release trends and important inputs.

Based on networks, studies like co-authorship, keyword co-occurrence and co-citation networks were used to explore how ideas and people working together are structured in this field. Thematic mapping and factorial study were used to find main study topics and how they changed over time (Abdian S., et.al. (2023).). As well, a theoretical look at truncated distributions was done to give context to the bibliometric results and show key ways things evolved and where they were applied. This combined way helps to systematically understand both the basic ideas and how study goes in truncated distribution studies.

Probability distributions are basic to statistics and are widely used to simulate uncertainty and change in real data. Standard probability distributions like normal, exponential, Poisson and gamma are usually set over their full theoretical range. They suppose that all results can be seen. But, in many real-world studies, data are seen only in a limited range because of rules, measurement limits, study design or financial and social limits. When data outside a given range are fully left out from the sample, the data are known as truncated data (Johnson et al., 1994).

Truncation greatly changes the probabilistic structure of a distribution by changing its probability density function and key statistical features such as the mean and variance. If truncation is not considered, finding parameter estimates using standard statistical ways can be off and not consistent, which can cause wrong concluding and policy issues (Lee, 1983). This issue is very important in economics, where data about income, pay and spending are often truncated, as well as in medical statistics and survival study, where data may be limited by who can join or how long the study lasts (Loaiciga, H. A., et.al. (1992)). Because of this, special truncated distribution models and ways to estimate have been made to properly account for limited data ranges.

Over time, study on truncated distributions has grown from mainly theoretical studies to a wider range of real-world uses. Better computer methods and statistical programs have also made it easier to use truncated models in different fields. Along with these changes in how things are done, the fast increase in scientific releases has made it needed to have organized ways to measure study trends, key inputs and patterns of working together inside the information. Bibliometric study gives a way to measure things to study how scientific information is structured and changes by studying release and citation data.

By mixing theoretical talk with bibliometric study, this work aims to give a full view of truncated distribution study. It points out the basic ideas of truncation, looks at the increase and intellectual structure of the information and finds new topics and where they are used. This combined way helps to better measure how study on truncated probability distributions is growing and where it may go.

3. Bibliometric Analysis

This study used bibliometric methods to investigate the features of published research on truncated distributions, focusing on publication trends, citation patterns and collaborative networks. This approach gives a detailed picture of the intellectual structure of the field by looking at simple statistics and the relationships among different works. The goal was to pinpoint important researchers, key publications, leading journals and how research topics have changed over time.

The research splits into two main areas: descriptive bibliometric analysis and network analysis. The descriptive part looks at how much different authors, journals, institutions and countries have published, how often their work is cited and how productive they are. The network analysis side studies who are working with whom and how different research topics relate to each other within the field.

3.1 Descriptive Bibliometric Analysis

Descriptive bibliometric analysis was carried out to provide an overall overview of research activity in the area of truncated distributions. The analysis examined key indicators such as annual scientific production, publication growth trends, document types, productive authors, leading journals, and citation impact. These measures help in understanding the evolution of the field, identifying influential contributions and assessing how research output and visibility have changed over time.

3.1.1 Overview of the Data

Table 1 summarizes the bibliometric data used in this study. It indicates the time frame of the publications, capturing how research on truncated distributions has changed. It gives the total number of documents and sources, showing the variety of journals and proceedings in the field. The table also indicates authorship data, like the number of authors, which illustrates the level of teamwork. These indicators show the size and scope of the dataset and give context for understanding the bibliometric analyses. By summarizing the data's key traits, Table 1 offers a clear base for studying publication trends, citation patterns and links within the literature on truncated probability distributions.

Table 1: Overview of the Data

Main Information about Data	**Results**
Timespan	2000:2025
Sources (Journals, Books, etc)	794
Documents	1499
Annual Growth Rate %	10.45
Document Average Age	9.3
Average citations per doc	19.55
References	12129
Keywords Plus (ID)	8635
Author's Keywords (DE)	4902
Authors	3539
Authors of single-authored docs	172
Single-authored docs	206
Co-Authors per Doc	3.06
International co-authorships %	28.09
Article	1499

3.1.2 Annual Scientific Production

Figure 1 displays the change in the number of studies about truncated distributions each year. At first, there were not many papers. The research then was mainly about the theory and basic ways of doing things. These initial papers set the stage for later work.

As time passed, the number of publications slowly went up. This rise matches an increased interest in problems with missing data and the wider of use statistical methods in different areas. Lately, the number of scientific papers published each year has increased a lot. This suggests that academics are still interested in this topic. Truncated distribution models are now being used more often in fields like economics, medical statistics, and reliability studies. Overall, Figure 1 makes it obvious that research on truncated distributions has grown steadily. It has become an important and well-developed area of study.

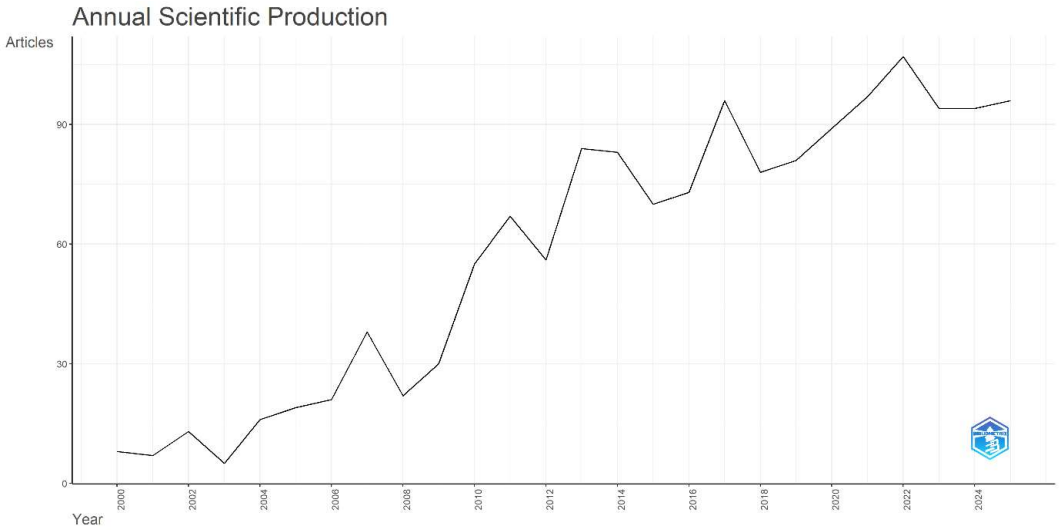


Figure 1: Annual Scientific Production

3.1.3 Average Citations Per Year

Figure 2 displays that the average number of citations per year shows how truncated distributions research's scholarly influence changes as time passes. The average citation rate is kind of high in the beginning because a few important books created standards for the subject and are still cited today. Because these publications have been cited for a longer period of time, their average citation numbers are high.

In later years, the average citations per year change moderately, as shown in Figure 2. The growth in publication output and the addition of more recent studies, which have had less time to get citations, are consistent with this trend. Despite this variation, the overall citation pattern indicates that there is a sustained scholarly interest in and continued relevance of truncated distribution research. The field's continued growth and intellectual vibrancy are confirmed by the presence of both highly cited foundational studies and new applied contributions.

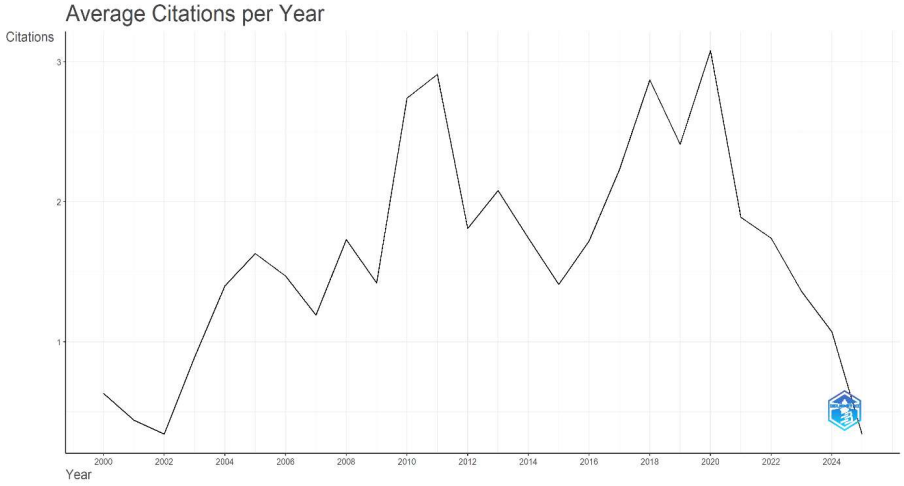


Figure 2: Average Citations Per Year

3.1.4 Life Cycle of Publications

Figure 3 and 4 show how research on truncated distributions has changed over time. Figure 3 indicates the early years, where not many papers were published. This time was mainly spent exploring ideas and creating basic methods. A small number of influential papers helped to form the main concepts of how to analyse truncated distributions.

Figure 4 shows the later stages, with a clear growth in the number of studies published. That rise happened as people noticed how often truncated data appeared and as truncated models were implemented in applied fields. More recently, the number of publications seems to have levelled off, suggesting that the field has matured. At this point, research topics are well-defined, and work continues at a steady pace instead of growing quickly. Taken together, Figures 3 and 4 give a full view of how research on truncated distributions started, grew and settled into a consistent pattern.

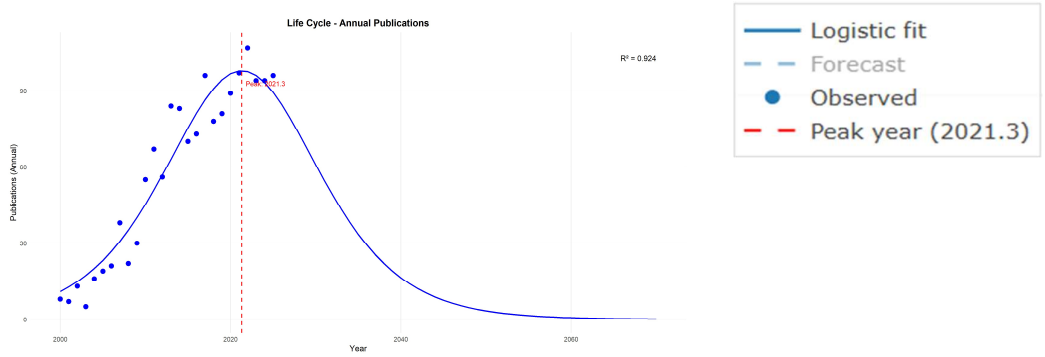


Figure 3: Annual Publications

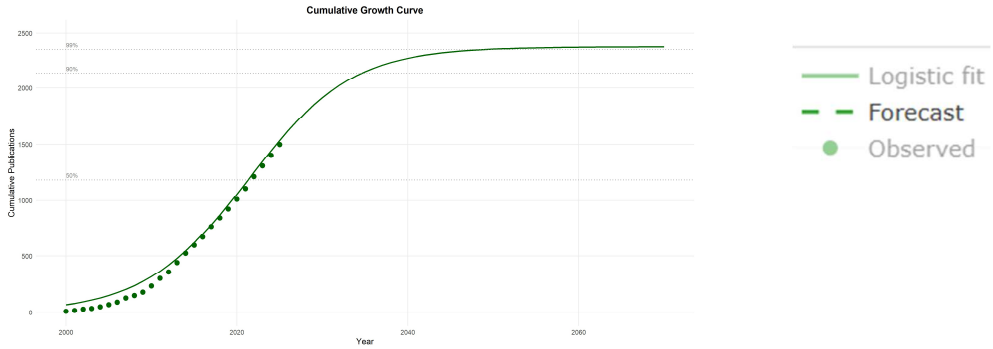


Figure 4: Cumulative Growth Curve

3.1.5 Three Field Plot

Figure 5 is a three-field plot that examines how cited references (CR), authors (AU), and keywords (KW_Merged) relate to each other in the study of truncated distributions. The plot shows the relationships between key publications, authors, and research topics.

The cited references part of the plot indicates that a few important works provide the foundation for future studies. References on truncated normal distributions, acceptance sampling, life testing and estimation methods are commonly cited. This suggests that current studies rely on established statistical theory and quality control methods.

The author field shows that a small group of productive scholars connects basic references with current research topics. These scholars use established works and contribute to different thematic areas, playing a key role in the development of both theory and practice in the study of truncated distributions.

In the keyword field, common terms like probability distribution, probability density function, normal distribution, maximum likelihood estimation, Monte Carlo simulation and Gaussian distribution are strongly related to leading authors and cited references. This indicates that the main issues explored in the literature are distributional properties, estimation and simulation-based inference. Also, keywords related to applied modelling and numerical methods show that truncated distributions are being used more in practical and computational settings.

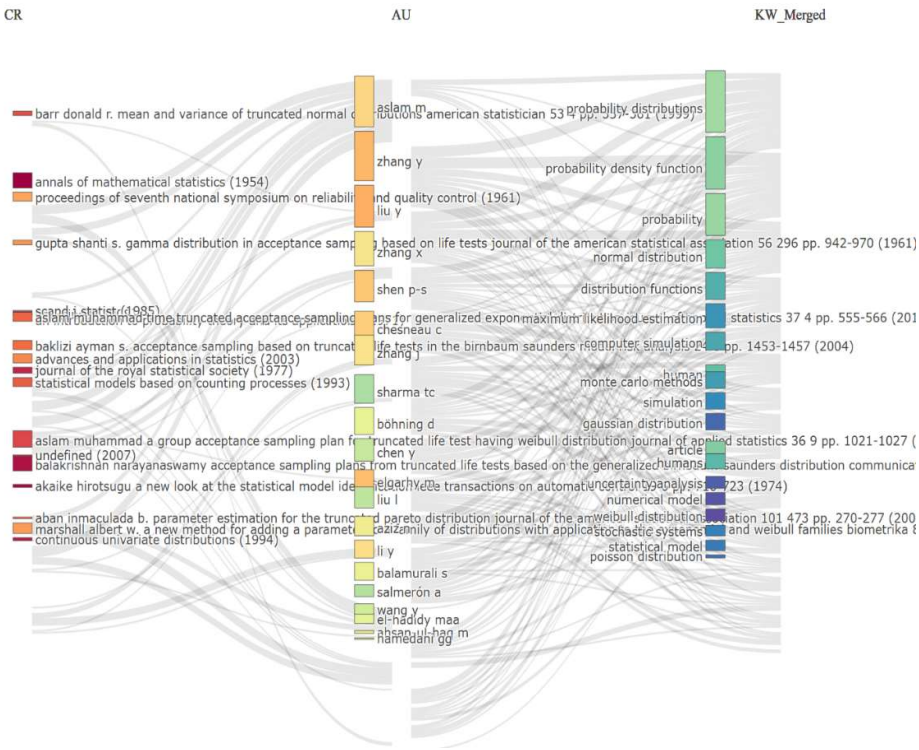


Figure 5: Three Field Plot

3.1.6 Most Relevant Sources

An analysis of Table 2 shows the journals that are important for research on truncated distributions. The data suggest that a few key sources publish the most studies. Communications in Statistics – Theory and Methods are the top source, with 27 papers, which suggests it is very important for new methods and theories. Physica A: Statistical Mechanics and its Applications come next with 17 papers. Communications in Statistics Part B: Simulation and Computation and Statistics in Medicine each have 16 papers, showing use in different fields and a focus on calculations.

Journals like the Journal of Statistical Computation and Simulation and the Pakistan Journal of Statistics and Operation Research (each with 13 papers) show continued interest in practical and simulation-based work. The inclusion of IEEE Access and IEEE Transactions on Vehicular Technology indicates that research on truncated distributions is reaching into engineering and technology. Biometrics and the European Journal of Operational Research point to uses in biology and operations research.

In conclusion, the Table 2 indicates that publications in this area are varied but concentrated, which confirms that truncated distributions have wide use and a solid base in methods.

Table 2: Most Relevant Sources

Sources	Articles
Communications in Statistics - Theory and Methods	27
Physica A: Statistical Mechanics and its Applications	17
Communications In Statistics Part B: Simulation and Computation	16
Statistics in Medicine	16
Journal of Statistical Computation and Simulation	13
Pakistan Journal of Statistics and Operation Research	13
IEEE Access	12
IEEE Transactions on Vehicular Technology	11
Biometrics	10
European Journal of Operational Research	10

3.1.7 Sources' Production over Time

Figure 6 displays how key journals in truncated distribution research have increased their output over time. Communications in Statistics – Theory and Methods have the strongest and most consistent growth, which confirms it is a main place for studies on theory and method. Communications in Statistics Part B: Simulation and Computation and the Journal of Statistical Computation and Simulation also show steady increases, which indicates that research using computation and simulation is important in the field.

Statistics in Medicine has grown notably in recent years, revealing increasing uses in medical and health-related studies, while Physica A makes moderate but sustained contributions between fields. The Pakistan Journal of Statistics and Operation Research have a gradual upward trend, which points at consistent applied research output. In general, the figure shows a steady growth among main journals, which suggests that truncated distribution research is mature and expanding.

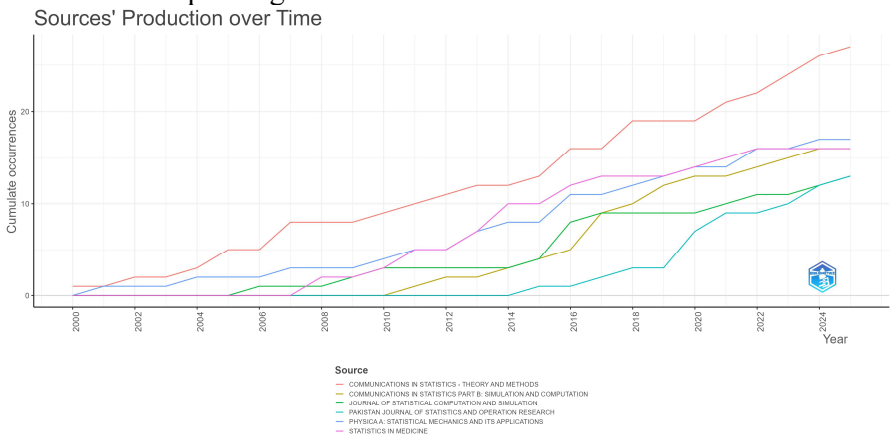


Figure 6: Sources' Production over Time

3.1.8 Core Sources by Bradford's Law

Figure 7 and Table 3 show the main journals in research on limited distributions, based on Bradford's Law of scattering. The figure indicates a quick drop in how often publications appear as journal rank goes up, meaning a few sources contain most of the information.

Table 3 indicates that Communications in Statistics – Theory and Methods is first with 27 papers. Physica A: Statistical Mechanics and Its Applications is next with 17 papers. Communications in Statistics Part B: Simulation and Computation and Statistics in Medicine each have 16 papers. These journals are the main sources and add a lot to the total number of publications.

Past the main sources, publications are spread across more journals, like those for statistics, computing, medicine, and engineering. These make up the other Bradford zones. The

data support that publication structure is both very focused and involves different fields, with a clear group of main journals guiding research on limited distributions

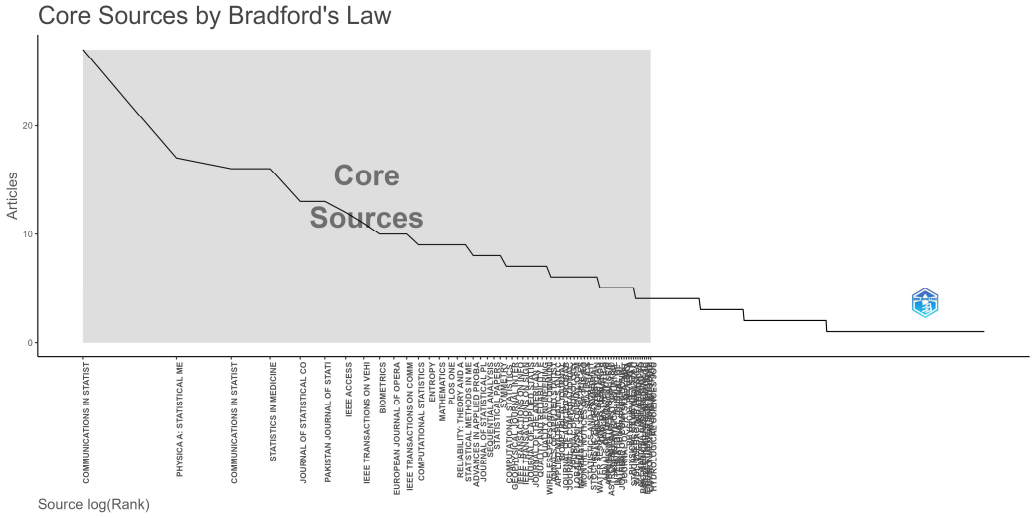


Figure 7: Bradford's Law

Table 3: Core Sources by Bradford's Law

SOURCES	Rank	Freq	Cum Freq
COMMUNICATIONS IN STATISTICS - THEORY AND METHODS	1	27	27
PHYSICA A: STATISTICAL MECHANICS AND ITS APPLICATIONS	2	17	44
COMMUNICATIONS IN STATISTICS PART B: SIMULATION AND COMPUTATION	3	16	60
STATISTICS IN MEDICINE	4	16	76
JOURNAL OF STATISTICAL COMPUTATION AND SIMULATION	5	13	89
PAKISTAN JOURNAL OF STATISTICS AND OPERATION RESEARCH	6	13	102
IEEE ACCESS	7	12	114
IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY	8	11	125
BIOMETRICS	9	10	135
EUROPEAN JOURNAL OF OPERATIONAL RESEARCH	10	10	145
IEEE TRANSACTIONS ON COMMUNICATIONS	11	10	155
COMPUTATIONAL STATISTICS	12	9	164
ENTROPY	13	9	173
MATHEMATICS	14	9	182
PLOS ONE	15	9	191
RELIABILITY: THEORY AND APPLICATIONS	16	9	200
STATISTICAL METHODS IN MEDICAL RESEARCH	17	9	209
ADVANCES IN APPLIED PROBABILITY	18	8	217
JOURNAL OF STATISTICAL PLANNING AND INFERENCE	19	8	225
SEQUENTIAL ANALYSIS	20	8	233
STATISTICAL PAPERS	21	8	241
SYMMETRY	22	8	249
COMPUTATIONAL STATISTICS AND DATA ANALYSIS	23	7	256
GEOPHYSICAL JOURNAL INTERNATIONAL	24	7	263
IEEE TRANSACTIONS ON INFORMATION THEORY	25	7	270

3.1.9 Most Local Cited Authors

Table 4 shows the most cited authors within our truncated distribution research dataset. This approach indicates who is referenced most by their peers in the field and points to leaders and key contributors.

The data show that a few authors get most of the attention. AÑÓN leads with 388 citations, suggesting they have a strong effect on how we think about truncated distributions. ASLAM (139 citations) and CHEN (133 citations) follow, shaping how we estimate, understand distributions, and use models. WANG, ZHANG, LI, and LIU have also helped the field.

People like GUPTA, BALAKRISHNAN, BALAMURALI, and CHENG are also cited a lot, especially for their work on truncated models in areas like reliability and quality control. BÖHNING, CORDEIRO, KIM, CAI, and CHANG's presence indicates different ways to approach the topic, like using likelihood or extending distributions. In short, a core group of scholars strongly shapes truncated distribution research. Even with contributions from many, a few highly cited people guide the ongoing studies.

Table 4: Most Local Citied Authors

Sources	**Articles**	**Sources**	**Articles**
AÑÓN	388	BÖHNING	35
ASLAM	139	CORDEIRO	34
CHEN	133	KIM	33
WANG	90	CAI	32
ZHANG	68	CHANG	31
LI	62	HUANG	31
LIU	58	ZHOU	29
GUPTA	49	CHAO	26
BALAKRISHNAN	48	WU	25
BALAMURALI	36	YANG	25
CHENG	36	AHSAN-UL-HAQ	24

3.1.10 Author's Production Over Time

Figure 8 displays the output of authors over time in the field of truncated distributions. It shows when publications came out and how much of an impact the authors had during the study. Each author's work is indicated on a timeline. The size and colour of the markers show the number of articles published and how often they were cited each year.

The figure shows that a few authors have been doing research for a long time. Authors like LIU Y., ZHANG Y., SHEN P.-S., and ASLAM M. publish regularly, which means they are important to the steady growth of this field. Their work over many years shows they have shaped both the theory and practice of truncated distributions. On the other hand, some authors only publish a lot during certain times. This might be because their work is related to specific methods or applications. Some authors have become more productive recently, which means that new people are joining the field and there is new interest in truncated distribution modelling.

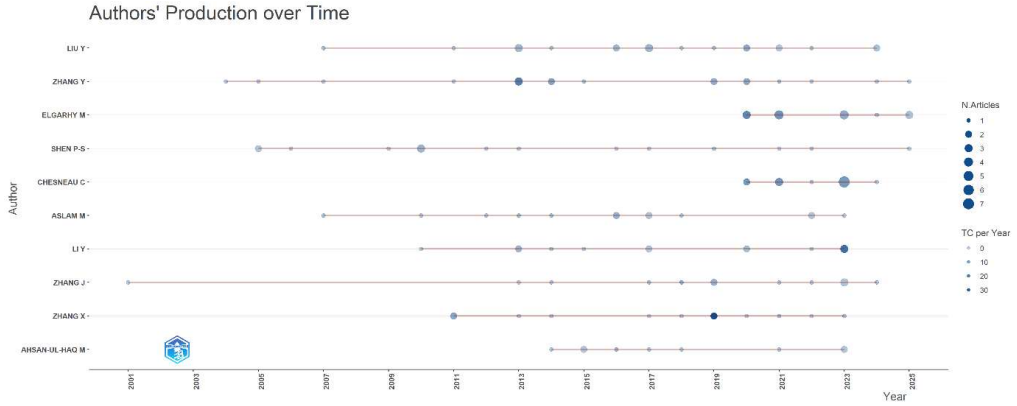


Figure 8: Author's Production Over Time

3.1.11 Sources' Local Impact

Table 5 indicates how sources affect truncated distribution research locally. It uses the h-index, g-index, m-index, total citations (TC), and number of publications (NP) to measure this. These metrics show how productive and influential journals are in the data.

Statistics in Medicine has the biggest local impact, with an h-index of 11 and 488 total citations. This points to its major role in applied and medical research. Physica A and Biometrics also have a lot of citations, showing they are relevant to different fields. Communications in Statistics – Theory and Methods and Communications in Statistics Part B are very productive, confirming they are important sources for methods. Some IEEE journals, like IEEE Access, have high m-index values, which means their citations have grown quickly lately. In general, the table points to a varied and important group of main sources in statistics, medicine, engineering and applied sciences that together shape truncated distributions research.

Table 5: Sources' Local Impact

Source	h_index	g_index	m_index	TC	NP	PY
STATISTICS IN MEDICINE	11	16	0.579	488	16	2008
PHYSICA A: STATISTICAL MECHANICS AND ITS APPLICATIONS	9	17	0.346	344	17	2001
COMMUNICATIONS IN STATISTICS - THEORY AND METHODS	8	12	0.296	175	27	2000
EUROPEAN JOURNAL OF OPERATIONAL RESEARCH	8	10	0.421	188	10	2008
IEEE ACCESS	8	12	0.889	170	12	2018
IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY	8	11	0.364	229	11	2005
ADVANCES IN APPLIED PROBABILITY	7	8	0.304	115	8	2004
GEOPHYSICAL JOURNAL INTERNATIONAL	7	7	0.5	203	7	2013
IEEE TRANSACTIONS ON COMMUNICATIONS	7	10	0.389	333	10	2009
ANNALS OF APPLIED STATISTICS	6	6	0.353	246	6	2010
BIOMETRICS	6	10	0.24	345	10	2002
COMMUNICATIONS IN STATISTICS PART B: SIMULATION AND COMPUTATION	6	10	0.375	109	16	2011
COMPUTATIONAL STATISTICS AND DATA ANALYSIS	6	7	0.375	228	7	2011
ENTROPY	6	9	0.75	173	9	2019
JOURNAL OF STATISTICAL COMPUTATION AND SIMULATION	6	10	0.286	107	13	2006
JOURNAL OF STATISTICAL PLANNING AND INFERENCE	6	8	0.25	83	8	2003
MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY	6	6	0.222	286	6	2000
PLOS ONE	6	9	0.333	166	9	2009
STATISTICAL METHODS IN MEDICAL RESEARCH	6	9	0.4	81	9	2012
WATER RESOURCES RESEARCH	6	6	0.316	256	6	2008

3.1.12 Author's Local Impact

Table 6 presents the local influence of key authors in truncated distribution research. It uses measures like the h-index, g-index, m-index, total citations, and number of publications.

Zhang Y has the most influence, with an h-index of 9 and 626 citations since 2004. Liu Y and Aslam M are also productive and well-cited, showing they have consistently added to the field. In addition, Zhang X's citation record is worth noting. Chesneau C and Elgarhy M, who are newer to the field, have high m-index values. This suggests their work is being cited more and more quickly, even though they haven't been publishing for as long.

Table 6: Author's Local Impact

Author	h_index	g_index	m_index	TC	NP	PY_start
ZHANG Y	9	18	0.391	626	18	2004
ASLAM M	8	13	0.4	237	13	2007
LIU Y	8	17	0.4	312	20	2007
CHESNEAU C	7	14	1	234	14	2020
ELGARHY M	7	15	1	255	15	2020
LI Y	7	13	0.412	235	13	2010
ZHANG X	7	12	0.438	501	12	2011
BARAN S	6	6	0.462	312	6	2014
GUADAGNINI A	6	7	0.316	271	7	2008
LIU L	6	8	0.353	112	8	2010

3.1.13 Most Relevant Affiliations

Table 7 shows the main affiliations involved in research on truncated distributions, with most publications coming from a few places. King Abdulaziz University tops the list with 23 papers, followed by the Faculty of Science (19) and Tunghai University (16), which suggests these institutions are very involved in this area.

The Faculty of Graduate Studies for Statistical Research and Southeast University (both with 15 papers) are also major players. Thammasat University, Université de Caen Normandie, and the University of California show wider international involvement. Other institutions contribute regularly, which points to the interdisciplinary and global aspect of this research.

Table 7: Most Relevant Affiliations

Affiliation	Articles
King Abdulaziz University	23
Faculty of Science	19
Tunghai University	16
Faculty of Graduate Studies for Statistical Research	15
Southeast University	15
Thammasat University	14
Université De Caen Normandie	14
University of California	13
Imam Mohammad Ibn Saud Islamic University	12
Northwestern Polytechnical University	12
Politecnico Di Milano	12
Zhejiang University	11
Faculty of Commerce	10
Kalasalingam Academy of Research and Education	10
Universidad De Almería	10

3.1.14 Affiliation's Production Over Time

Figure 9 shows how much different institutions have published on truncated distributions over time. It gives us an idea of how these institutions got involved in this research, showing which ones have consistently contributed, grown or recently expanded their work in this area.

At the start, only a few institutions put out research. Tonghai University was one of the early players, steadily increasing its publications. This demonstrates their early dedication to the theory and methods around truncated distributions, which helped build the field's base. Around the mid-2010s, many institutions started publishing more. King Abdulaziz University and Southeast University, in particular, grew a lot in recent years. This increase lines up with truncated distribution models becoming more common in applied research. The Faculty of Graduate Studies for Statistical Research and the Faculty of Science had a steadier, but slow, increase. Their ongoing contributions point to continuous academic work in the field instead of quick bursts of publications.

The rise in varied publications recently points to the field's growing global interest, suggesting more teamwork between institutions. This indicates truncated distribution studies are becoming more established and part of a wider variety of research.

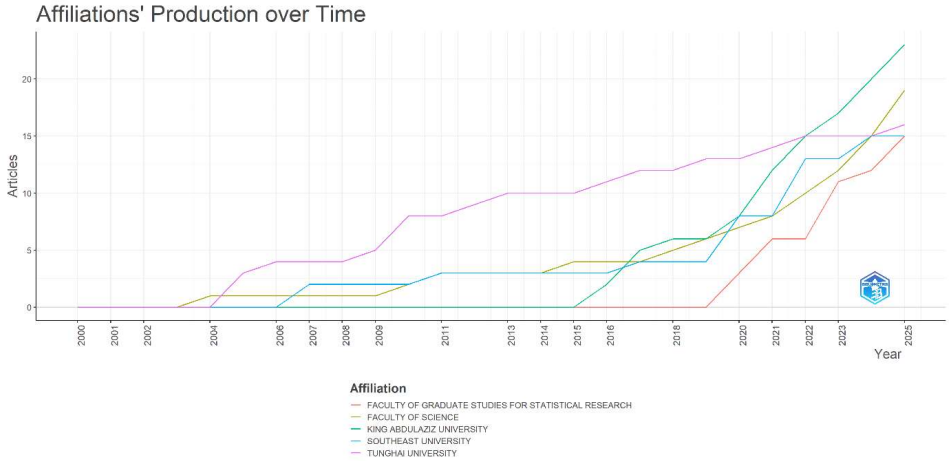


Figure 9: Affiliation's Production Over Time

3.1.15 Corresponding Authors' Countries

Figure 10 presents the countries of origin of corresponding authors, separating single-country publications (SCP) from multiple-country publications (MCP) in truncated distribution research. China and the United States are the top producers, with most papers done within the country, but with some international teamwork. India is next, mostly with single-country papers, showing its rising skill. France, the United Kingdom, Italy and Germany have moderate contributions and a mix of SCP and MCP, pointing to more cross-national work. Canada, Spain, Korea, Saudi Arabia and Japan also contribute, often collaboratively.

The Figure 10 shows that research is cantered in certain countries while still spread across the globe, with leading countries producing the most papers and growing international teamwork supporting the growth of truncated distribution research.

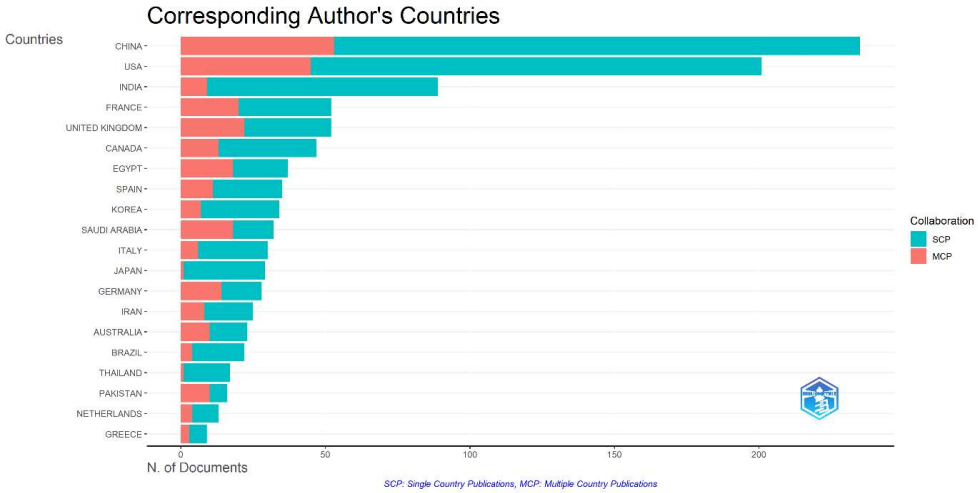


Figure 10: Corresponding Author's Countries

3.1.16 Countries' Scientific Production

Figure 11 illustrates the global distribution of scientific papers on truncated distributions. Shading indicates the volume of publications. China and the United States lead in output, suggesting strong research capabilities and interest in the subject. The United Kingdom, France, Germany and Italy in Europe also show considerable activity, with continuous work in methods and applications.

India, Canada, Spain, Australia and parts of East and Southeast Asia have moderate production, showing expanding of truncated distribution models. South America, Africa and the Middle East have lower output but indicate rising participation and interest. In general, research is concentrated in a few leading countries, though growing contributions from other countries show the internationalization of truncated distribution research.

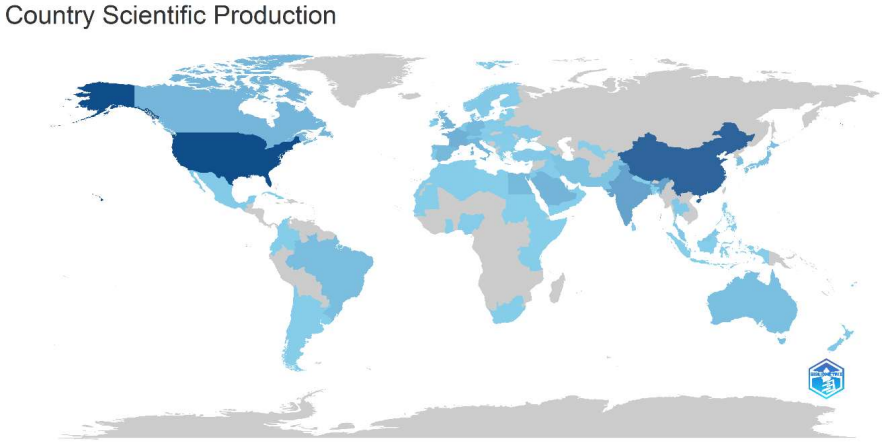


Figure 11: Countries' Scientific Production

3.1.17 Most Cited Countries

Table 8 presents the most cited countries in truncated distribution research, based on total citations and average citations per paper. The United States has the most citations (6567), showing its strong research production and impact, followed by China (3888 citations). The United Kingdom, Japan, and Germany also have a sizable impact, with Japan and Germany having high average citation rates. Some countries, such as Austria, Georgia, Hungary, Denmark and Singapore, have high average citations per paper despite having fewer total citations. This suggests some individual studies are very important. On the other hand,

countries like India, Pakistan, and Egypt have lower average citation values, which suggests their research activity is still growing. In short, the citation data show a globally varied pattern, in which both high-output countries and smaller countries with high-impact publications contribute to truncated distribution research.

Table 8: Most Cited Countries

Country	**TC**	**Average Article Citations**	**Country**	**TC**	**Average Article Citations**
USA	6567	32.70	EGYPT	379	10.20
CHINA	3888	16.50	KOREA	369	10.90
UNITED KINGDOM	1430	27.50	HUNGARY	329	41.10
JAPAN	1173	40.40	AUSTRALIA	323	14.00
GERMANY	1135	40.50	BRAZIL	305	13.90
CANADA	967	20.60	SAUDI ARABIA	282	8.80
FRANCE	885	17.00	SINGAPORE	237	39.50
SPAIN	824	23.50	JORDAN	236	26.20
ITALY	676	22.50	DENMARK	225	37.50
INDIA	599	6.70	AUSTRIA	217	43.40
IRAN	516	20.60	GEORGIA	211	52.80
NETHERLANDS	406	31.20	PAKISTAN	189	11.80

3.1.18 Most Globally Cited Documents

Table 9 shows the most cited papers on truncated distribution research. It uses total citations, citations per year, and normalized citations to measure each paper. Linton et al. (2020) is at the top, with the most citations and citations per year, suggesting it has been quickly accepted. Older papers, like Rhee (2011) and Zhang H.P. (2010), have had a lasting over time. Newer studies (like Chen, 2018; Zhang X., 2019) have high citations per year, which means they are relevant right now. In short, the Table 9 makes it clear that papers become by being either foundational or recent and by coming from different subjects. This proves that research on truncated distribution methods has had a wide and lasting.

Table 9: Most Global Cited Documents

Paper	DOI	Total Citations	TC per Year	Normalized TC
LINTON NM, 2020, J CLIN MED	10.3390/jcm9020538	890	127.14	41.23
RHEE I, 2011, IEEE ACM TRANS NETWORKING	10.1109/TNET.2011.2120618	808	50.50	17.36
ZHANG HP, 2010, PROC NATL ACAD SCI U S A	10.1073/pnas.1001651107	641	37.71	13.77
CHEN W, 2018, BMC MED RES METHODOL	10.1186/s12874-018-0519-5	419	46.56	16.22
CHANG TP, 2011, APPL ENERGY	10.1016/j.apenergy.2010.11.010	312	19.50	6.70
RÖDDER D, 2011, GLOBAL ECOL BIOGEOGR	10.1111/j.1466-8238.2011. 00659.x	273	17.06	5.86
ZHANG X, 2019, RELIAB ENG SYST SAF	10.1016/j.ress.2019.01.014	272	34.00	14.12
SOCQUET-JUGLARD H, 2005, J FLUID MECH	10.1017/S0022112005006312	264	12.00	7.35
SLOUGHTER JM, 2010, J AM STAT ASSOC	10.1198/Jasa. 2009.ap08615	226	13.29	4.86
CLARKSON KL, 2017, J ACM	10.1145/3019134	222	22.20	9.96
ABAN IB, 2006, J AM STAT ASSOC	10.1198/016214505000000411	220	10.48	7.11
BUBECK S, 2013, IEEE TRANS INF THEORY	10.1109/TIT.2013.2277869	215	15.36	7.38
WU J, 2013, INT J NUMER METHODS ENG	10.1002/nme.4525	211	15.07	7.25
SOLTANI MD, 2019, IEEE TRANS COMMUN	10.1109/TCOMM.2018.2882213	201	25.13	10.44
GESKUS RB, 2011, BIOMETRICS	10.1111/j.1541-0420.2010. 01420.x	195	12.19	4.19
LOW BK, 2007, INT J ROCK MECH MIN SCI	10.1016/j.ijrmms.2007.02.008	190	9.50	8.00
ZOLINA O, 2013, J CLIM	10.1175/JCLI-D-11-00498.1	187	13.36	6.42
FRÜHWIRTH-SCHNATTER S, 2010, BIOSTATISTICS	10.1093/biostatistics/kxp062	182	10.71	3.91
GERDS TA, 2013, STAT MED	10.1002/sim.5681	179	12.79	6.15
WOLBERS M, 2014, BIOSTATISTICS	10.1093/biostatistics/kxt059	172	13.23	7.62
CARTA JA, 2008, ENERGY CONVERS MANAGE	10.1016/j.enconman.2008.01.010	172	9.05	5.24
BOTEV ZI, 2017, J R STAT SOC SER B STAT METHODOL	10.1111/rssb.12162	170	17.00	7.63
BURNS M, 2008, EUR FOOD RES TECHNOL	10.1007/s00217-007-0683-z	165	8.68	5.03
SCANZIANI A, 2017, J COLLOID INTERFACE SCI	10.1016/j.jcis.2017.02.005	159	15.90	7.13
SIMON D, 2010, INT J SYST SCI	10.1080/00207720903042970	157	9.24	3.37

3.1.19 Most Local Cited Documents

Table 10 presents the most cited documents in truncated distribution research. It shows their influence in the core literature through local citations (LC), as well as global citations (GC) and the LC/GC ratio. Baklizi (2004) has the most local citations, which suggests a key foundational role in the area. Studies by Aban (2006), Aslam, and Ahsan-ul-Haq also show considerable local influence, reflecting their contribution to the development of methods. Documents with higher LC/GC ratios have a stronger impact within the truncated distribution community, even with moderate global citations. In short, the table identifies a set of key works that support truncated distribution research, integrating strong internal influence with different levels of wider scholarly recognition.

Table 10: Most Local Cited Documents

Paper	DOI	Year	Local Citations	Global Citations	LC/GC Ratio (%)	Normalized Local Citations	Normalized Global Citations
BAKLIZI A, 2004, RISK ANAL	10.1111/j.0272-4332.2004.00541.x	2004	13	107	12.15	14.86	3.31
ABAN IB, 2006, J AM STAT ASSOC	10.1198/016214505000000411	2006	11	220	5.00	12.83	7.11
AHSAN-UL-HAQ M, 2016, J MOD APPL STAT METHODS	10.22237/jmasm/1462076160	2016	8	45	17.78	32.44	2.38
ASLAM M, 2007, EUR J SCI RES		2007	8	43	18.60	21.71	1.81
AL-OMARI AI, 2015, ELECTRON J APPL STAT ANAL	10.1285/i20705948v8n1p1	2015	5	51	9.80	19.44	3.01
ASLAM M, 2014, RES J APPL SCI ENG TECHNOL	10.19026/rjaset.7.483	2014	5	29	17.24	20.75	1.28
BARAN S, 2014, COMPUT STAT DATA ANAL	10.1016/j.csda.2014.02.013	2014	5	73	6.85	20.75	3.23
ASLAM M, 2013, INT J ADV MANUF TECHNOL	10.1007/s00170-013-4747-x	2013	5	43	11.63	42.00	1.48
BÖHNING D, 2005, J R STAT SOC SER C APPL STAT	10.1111/j.1467-9876.2005.05324.x	2005	5	55	9.09	6.79	1.53
KHASAWNEH MT, 2005, QUAL ENG-a	10.1081/QEN-200028681	2005	5	19	26.32	6.79	0.53

3.1.20 Word Cloud Analysis

Figure 12 is a word cloud showing the most common words in truncated distribution research. Word size indicates how often a word appears in titles, abstracts and keywords, showing the main topics in the studies. Terms like probability distributions, probability, probability density function and normal distribution are large, meaning these basic probability ideas are key to this research.

Words about methods, like maximum likelihood estimation, statistical model, Monte Carlo simulation and computer simulation, are also common. This shows that estimation and simulations are important for dealing with issues related to truncation. The cloud also includes Poisson distribution, Gaussian distribution and Weibull distribution, which points to continued interest in certain types of distributions and their truncated versions. The word cloud shows research is focused on both basic probability ideas and modern statistical and computing methods. This mix suggests that truncated distribution research has a strong theoretical base and uses many methods, with stress on real-world modelling and conclusions.



Figure 12: Word Cloud Analysis

3.2 Network Approach

The network approach studies the links between parts of the literature—like authors, papers, keywords, and sources—by showing them as connected points. Using Scopus data on truncated distribution research, this method helps expose the structure of knowledge and how it's shared in the field. Network shapes point to a core-periphery setup. A main group of papers and authors has strong links, with lots of citations, shared sources and similar research topics. These main points usually deal with basic theoretical work and common study methods. Around this core are outer points with newer or practical studies, linked to the core but less connected to each other.

Keyword and paper networks also display topic groups in the field. Closely linked keywords relate to distribution theory, estimation ways and likelihood-based modelling. Other groups link these ideas to things like economics, medical statistics and reliability studies. In general, the network approach shows a connected but changing research structure, where known studies lead to newer work and keep truncated distribution research growing.

3.2.1 Clustering by Coupling

Figure 13 presents a bibliographic coupling analysis of truncated distribution studies, grouping documents by shared references to show the field's intellectual structure. Major clusters include theoretical and methodological work that emphasizes distribution properties and model estimation, relying on core statistical texts. There is applied work using truncated distributions in economics, medical statistics, and reliability analysis. Smaller clusters show methodological extensions and simulation studies, which indicate ongoing development. In general, the study area has a structured base with interconnected theoretical and applied themes.

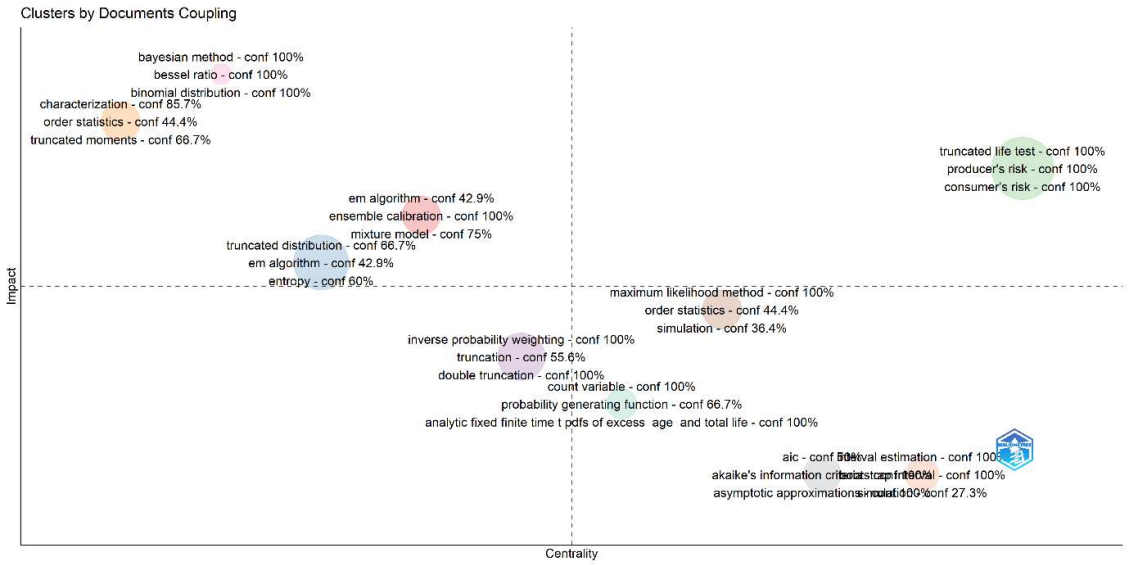


Figure 13: Clusters by Coupling

3.2.2 Co-occurrence Network Analysis

Figure 14 displays a keyword co-occurrence network for research on truncated distributions, showing how often terms appear together and how themes are structured in the literature. Nodes stand for keywords, and links show co-occurrence strength. Bigger nodes mean higher frequency.

The network has two main themes. The first centres on probability distributions, probability density functions, and normal distribution, reflecting the field's theoretical and methodological base. Related terms like maximum likelihood estimation, Monte Carlo methods, numerical methods and stochastic processes point to a focus on estimation, simulation, and statistical inference for truncated models. The second theme involves applied and empirical studies, with terms including probability, article, human, statistical model and computer simulation. This theme shows the use of truncated distributions in areas like human studies and empirical modelling, using computation and simulation.

The links between the clusters indicate interaction between theory and application, suggesting that methods inform real-world applications. The network demonstrates a structured field where statistical concepts support growing, diverse applications.

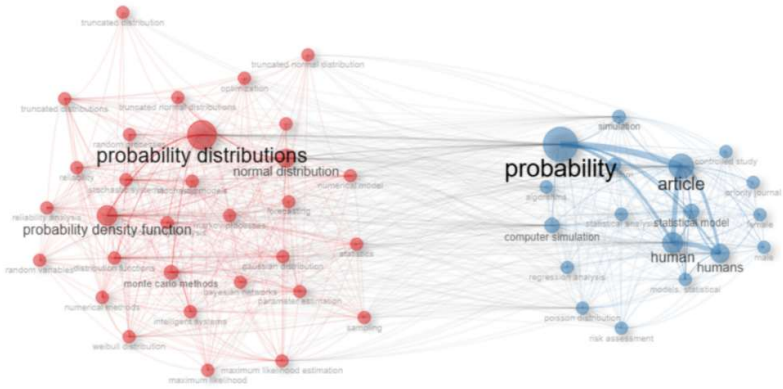


Figure 14: Co-occurrence Network Analysis

3.2.3 Thematic Map Analysis

Figure 15 displays a thematic map of truncated distribution research using centrality and density to locate core and changing themes. Probability distributions, probability density function and distribution functions are in the basic theme's quadrant, which means they are fundamental concepts relevant and still being worked on. Motor themes like probability, article and human are vital for applied and empirical studies due to their central role and development.

Niche themes such as normal distribution, numerical model and Weibull distribution are specialized but advanced, whereas maximum likelihood estimation, parameter estimation and Bayesian networks are in the emerging or declining themes group, which suggestions changes in methodology. In conclusion, the thematic map shows a stable, structured research area with key foundations, active research, and continuous methods updates.

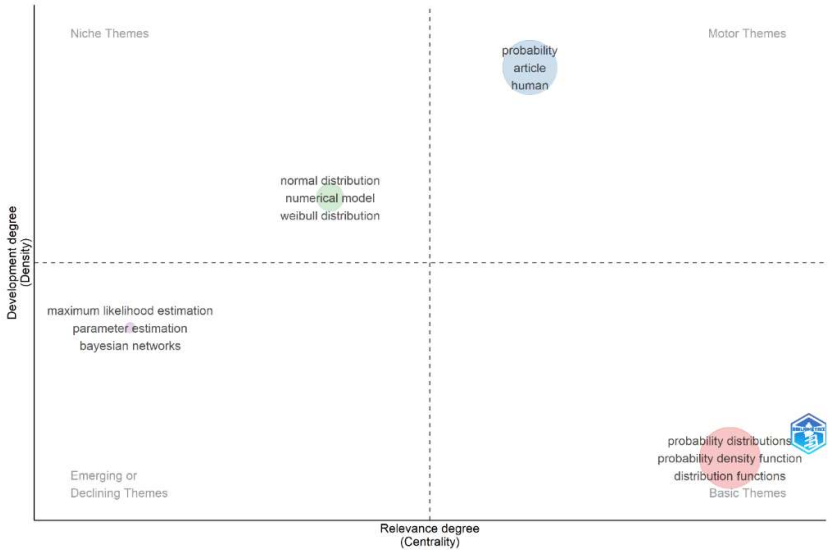


Figure 15: Thematic Map

3.2.4 Collaboration Network Analysis

Figure 16 presents a co-authorship network of authors researching truncated distributions. Nodes stand for authors, with size reflecting research output or influence. Links show co-authorship, and colours indicate separate collaboration groups. The network shows several clear collaboration groups, meaning research centres on a few core teams. Liu Y., Zhang Y., Aslam M., Elgarhy M, and Chesneau C. are important nodes in their groups, acting as key contributors. These authors have solid connections inside their groups, showing consistent research partnerships. The network also has limited connections between groups, suggesting collaborations stay inside research or regional groups. Smaller groups and single nodes are authors with specific or independent research. But, links between some groups point to new cross-group work, especially lately.

In general, Figure 16 demonstrates a somewhat collaborative research area. Core groups work well together, with expansion toward wider collaboration happening slowly. This hints at a developed field with set research communities, plus chances for more interdisciplinary and global collaboration in truncated distribution research later.

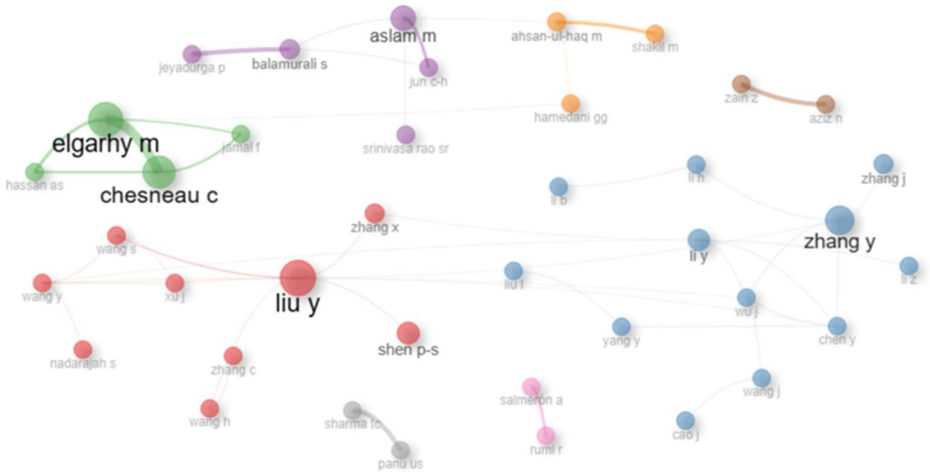


Figure 16: Collaboration Network Analysis

3.2.5 Historiograph

Figure 17 presents a historiography of research about truncated distributions, charting the development of key publications and their citations. The early studies, particularly those by Baklizi (2004) and Aslam (2007–2013), are central to the citation network, showing their major impact on later work. Later papers, like Baran (2014–2016), expand on earlier work, connecting foundational studies to current trends. More recent publications, such as Ahsan-ul-Haq (2016) and Athar (2020), have fewer links because they haven't been cited as long, but they suggest new research paths.

In summary, the historiography shows a continuous growth of research on truncated distributions, starting with strong base studies and growing through methodological expansions and uses.



Figure 17: Historiograph

3.2.6 Conceptual Structure Map

The conceptual structure map, created via multiple correspondence analysis (MCA), shows how key terms relate within truncated distribution research. Truncated distributions, truncated normal distributions, probability distributions, and probability density functions form the central cluster, confirming their key theoretical role. Related terms like maximum likelihood estimation, parameter estimation, numerical methods, and simulation emphasize the value of methodological and computational techniques. Terms about human, controlled study, and demographics relate to applied research built on core statistical ideas. In general, the map shows a clear research area, grounded in theory, aided by methods, and applied in diverse settings.

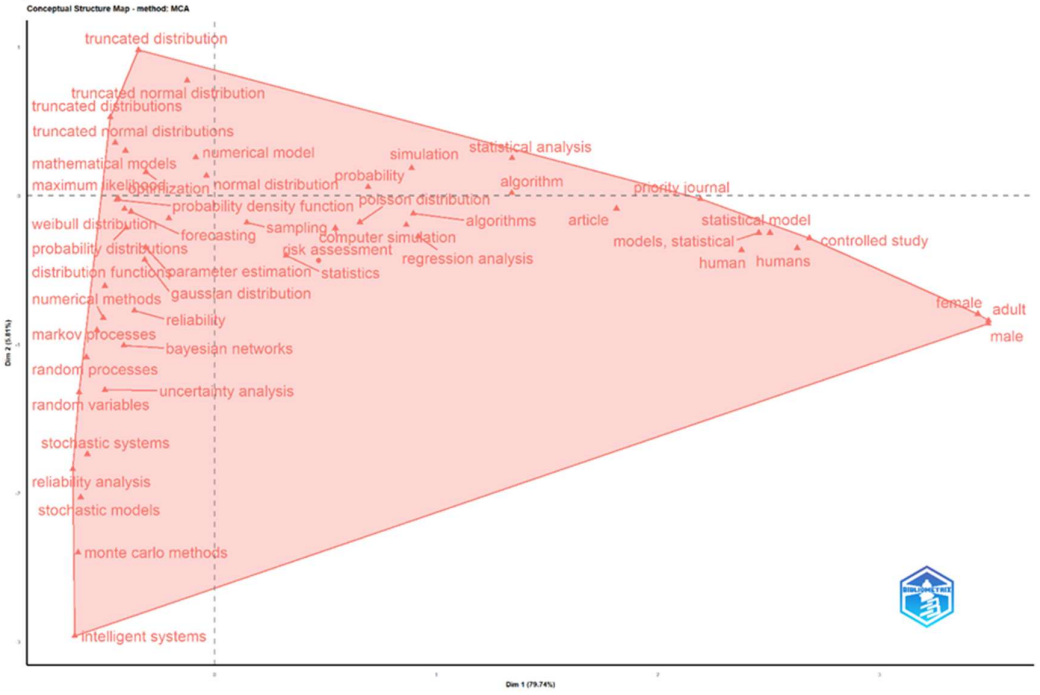


Figure 18: Conceptual Structure Map

3.3 Factorial Analysis

Figure 19 is a factorial analysis dendrogram showing how terms cluster hierarchically based on co-occurrence in research on truncated distributions. Terms with strong conceptual similarity merge at shorter linkage distances, especially those related to probability distributions, estimation, and statistical modelling. As linkage distance grows, smaller clusters form larger groups, showing connections between theory and applications. Distinct branches suggest clear research dimensions in the literature.

In conclusion, the dendrogram indicates a structured conceptual framework, verifying that research on truncated distributions is arranged around dominant, related thematic clusters

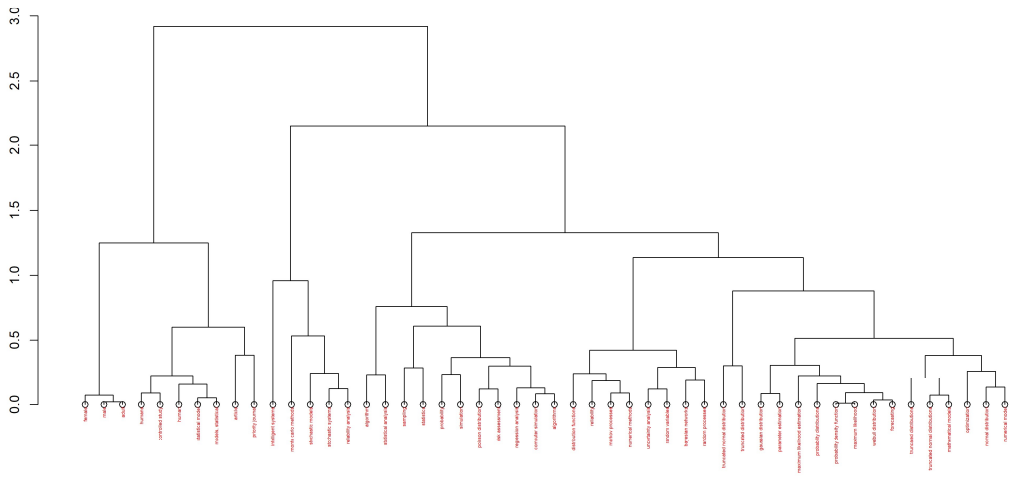


Figure 19: Factorial Analysis Dendrogram

3.4 Applications and Potential Directions for Future Research

Many studies indicate that truncated distributions are useful in fields where data have limited ranges. In economics, these models often deal with income and employment figures that have policy limits or reporting issues. It's important to model truncation well to get correct estimates, as (Zaninetti, L. (2019)) and (Ghosh, I., & Ng, H. K. T. (2025)) noted.

In medicine, truncated distributions help analyse time-to-event data when there are study delays or limited observation periods. They help estimate survival rates and treatment results more precisely, according to Tokmachev, M. S. (2018). In engineering, these models are used to assess product reliability when failure times are only seen after certain limits, which improves risk assessment, as Zhang, T., & Xie, M. (2011) noted.

The research also points out uses in finance, like modelling loss data and financial returns with missing extreme values, as Loaiciga, H. A., et.al. (1992) described. In environmental science, truncated models handle measurement limits in data (Greene, W. H. (2005)). With more large datasets available, truncated distribution methods could be helpful in data analysis, machine learning and various research fields dealing with limited data. To sum up, examined information supports the continued use of truncated distribution models in both established and new research areas.

3.5 Limitations and Future Scope

This study, while giving a good look at research on truncated distributions, has some limits because of the data that were used. First, the study only uses publications from the Scopus database. Though Scopus is big and well-known, it doesn't have everything. Studies in smaller journals, sources not in English or other databases might be missing. Because of this, some good work might not be included.

Second, the data come from titles, summaries, keywords and how often things are cited. This info might have mistaken from the authors or how it's been indexed. Also, citations change over time and usually favour older publications, which could make newer studies look less important than they are. The data are also limited by the words and rules used to search for it, which might leave out related studies that use different words or ways of doing things.

Future studies could fix these problems by using more than one database to get better coverage and avoid bias. Using more search terms and better keywords could help find more studies that are related. Also, using both data analysis and careful reviews of the literature could give a more thorough look at how good the methods are and what the theories add. There's also

room to look at new ways of using truncated distributions in fields like machine learning, big data, environmental models and studies that cross different subjects. This could make future studies more useful and relevant.

4. Conclusion

This work gives a broad look at the study of truncated probability distributions. It mixes theory with a study of literature from Scopus between 2000 and 2025. The results present steady growth in the number of works, which shows that scholars are paying more attention to truncated data and their use in different fields. The increase in publications, along with consistent citation trends, suggests that research on truncated distributions has become a mature area of study.

The numbers show that basic theoretical works are still very important to the field. Key writers, journals, and highly cited papers create a solid base for ongoing method development. At the same time, new writers, schools, and countries are appearing, showing that the research is becoming more global. Studies of partnerships demonstrate a slow move toward work across institutions and countries, especially in applied and interdisciplinary studies.

Studies of themes and networks show a clear research structure with core ideas related to probability distributions, estimation and modelling. These basic themes are joined by growing research into uses in fields such as economics, medical statistics, survival analysis, engineering and finance. New themes show ongoing changes to methods and adaptation to real-world data, helped by better computing tools and simulations.

In general, this study says that truncated distributions are still key for studying restricted data. By charting the history, themes and partnerships in the literature, this paper gives useful info for researchers wanting to understand the field, find key works, and look into future research. The results also point to chances for more method innovation and more uses of truncated distribution models in new areas like big data, machine learning and empirical research.

References

[1]. Abdian S., Shahri M. H. & Khadivar, A. (2023). A Bibliometric Analysis of Research on Big Data and Its Potential to Value Creation and Capture. *Iranian Journal of Management Studies*, 16(1), 1–24.

[2]. Amemiya, T. (1984). Tobit models: A survey. *Journal of Econometrics*, 24(1–2), 3–61. https://doi.org/10.1016/0304-4076(84)90074-5

[3]. Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetric*, 11(4), 959–975.

[4]. Donthu N., Kumar S., Mukherjee D., Pandey N. & Lim W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296.

[5]. Greene, W. H. (2005). Censored data and truncated distributions. *Available at SSRN 825845*

[6]. Ghosh, I., & Ng, H. K. T. (2025). Hidden Truncation Models: Theory and Applications. *Wiley Interdisciplinary Reviews: Computational Statistics*, 17(1), e70019.

[7]. Gul, A., Mohsin, M., Adil, M., & Ali, M. (2021). A modified truncated distribution for modelling the heavy tail, engineering and environmental sciences data. *Plos one*, 16(4), e0249001.

[8]. Johnson, N. L., Kotz, S., & Balakrishnan, N. (1994). *Continuous univariate distributions* (Vol. 1, 2nd ed.). Wiley.

[9]. Loaiciga, H. A., Michaelsen, J., & Hudak, P. F. (1992). TRUNCATED DISTRIBUTIONS IN HYDROLOGIC ANALYSIS 1. *JAWRA Journal of the American Water Resources Association*, 28(5), 853-863.
[10]. Lee, L. F. (1983). Generalized econometric models with selectivity. *Econometrica*, 51(2), 507–512. https://doi.org/10.2307/1912003
[11]. Maddala, G. S. (1983). *Limited-dependent and qualitative variables in econometrics*. Cambridge University Press.
[12]. Nadarajah, S. (2009). Some truncated distributions. *Acta applicandae mathematicae*, 106(1), 105-123.
[13]. Nadarajah, S. (2008). A truncated inverted beta distribution with application to air pollution data. *Stochastic Environmental Research and Risk Assessment*, 22(2), 285-289.
[14]. Pender, J. (2015). The truncated normal distribution: Applications to queues with impatient customers. *Operations Research Letters*, 43(1), 40-45.
[15]. Sun, J. (1995). Empirical estimation of a distribution function with truncated and doubly interval-censored data and its application to AIDS studies. *Biometrics*, 1096-1104.
[16]. Tokmachev, M. S. (2018, October). Modelling of truncated probability distributions. In *IOP Conference Series: Materials Science and Engineering*, 441, 1, p. 012056. IOP Publishing.
[17]. Zaninetti, L. (2019). The truncated Lindley distribution with applications in astrophysics. *Galaxies*, 7(2), 61.
[18]. Zhang, T., & Xie, M. (2011). On the upper truncated Weibull distribution and its reliability implications. *Reliability Engineering & System Safety*, 96(1), 194-200.