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Exploring Research Patterns in Citation Analysis: A Study of Doctoral Theses available in Shodhganga Repository

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Abstract

This quantitative study investigates the availability and characteristics of doctoral theses on citation analysis hosted in the Shodhganga repository. The research aims to determine the number of citation analysis–based theses submitted across Indian universities and to analyze their distribution by subject area and institution. The study also examines the time span (year limitation) covered in these theses and explores the relationship between variables such as the number of theses, subject domain, and duration of study. Data were collected from Shodhganga using predefined search terms and filtered to include only theses that explicitly focused on citation analysis. Descriptive statistics were applied to classify and interpret the data, and the results were presented through tables, figures, and charts. The findings reveal significant variation in the number of theses examined across universities, a multidisciplinary use of citation analysis, and considerable differences in the temporal limits of the studies. Hypothesis testing further indicates that while the number of theses does not differs significantly across institutions, there is no significant relationship between subject area or study duration and the number of theses selected. This study provides valuable insights into research trends in citation analysis and opens avenues for further bibliometric investigations.

Keywords: Bibliometrics, theses, citation analysis, repository, and statistics.

Introduction

Citation analysis of theses involves a systematic examination of the bibliographical references appended to academic dissertations. It focuses on analyzing citations within scholarly works to determine their intellectual linkage with other research outputs or researchers. This is commonly achieved by counting and evaluating the citations listed at the end of each thesis or scientific document. These citations provide essential bibliographic information about the sources consulted by the researcher. Citation analysis serves multiple purposes, it helps in understanding the intellectual structure of a discipline, identifying authorship and collaboration patterns, measuring scholarly impact, tracing publication trends, and recognizing the most frequently used information sources. It also enables researchers to examine the distribution and preference of document types such as books, journals, e-resources, reports, doctoral theses, conference proceedings, standards, and patents.

In contemporary library and information science research, citation analysis has emerged as one of the most widely used bibliometric techniques for identifying core literature in a subject area. By assessing and interpreting the citations received by articles, authors, institutions, and other scholarly entities, citation analysis provides valuable insights into the quality, relevance, and influence of various information sources. Therefore, it plays a crucial role in evaluating research productivity and supporting evidence-based collection development in libraries.

Shodhganga Repositories: Shodhganga serves as a comprehensive digital repository of Indian theses and represents a unique and invaluable source of research information that may not be available through conventional publishing channels. The University Grants Commission (UGC), through its 2016 notification, mandated the electronic submission of all Ph.D. theses and dissertations to ensure open access and global visibility of India's scholarly output. This initiative aims to prevent duplication of research efforts and reduce the loss of valuable intellectual and financial resources caused by the underutilization of unpublished theses. The responsibility for establishing and maintaining the Shodhganga repository lies with the INFLIBNET Centre. The term "Shodh", derived from Sanskrit, signifies research or exploration, while "Ganga" symbolizes the sacred and perennial river of the Indian subcontinent, metaphorically representing the continuous flow of knowledge. The repository is built using DSpace, an open-source digital repository software developed by the Massachusetts Institute of Technology (MIT) in collaboration with Hewlett-Packard.

Shodhganga provides a dedicated platform for research scholars to deposit their doctoral theses and ensures open access to the academic community. The repository mirrors the academic

structure of each university, enabling seamless navigation for users to locate and deposit theses by university, department, centre, or affiliated institution. It also supports multiple retrieval mechanisms, including simple search, advanced search, and browsing by academic unit. The INFLIBNET Centre is developing a semantic web-based interface to enhance subject-specific browsing, intelligent search, and efficient knowledge discovery. This advancement is expected to significantly improve user experience and promote wider accessibility and utilization of India's intellectual contributions.

Review of Literature: Citation analysis of doctoral theses consistently demonstrates that scholars primarily rely on journal articles and books, though preferences vary markedly by discipline[1,2]. Books hold a prominent position alongside journals, enabling researchers to integrate foundational theoretical works with contemporary empirical studies[3,4]. By contrast, theses in natural sciences and engineering prioritize journal articles and conference proceedings to capture rapid advancements and experimental innovations[5,6]. Economics theses illustrate an intermediate pattern, merging the book-centric approach of social sciences with substantial journal use[7]. Authorship patterns further highlight these disciplinary distinctions. Single-authored works predominate in LIS and social science citations, embodying traditions of independent scholarship[8]. Natural sciences and engineering, however, feature extensive multi-authorship from collaborative teams, often spanning international partnerships. Even in LIS and social work, recent studies observe a gradual rise in collaborative citations, reflecting evolving norms toward interdisciplinary and team-based inquiry[9].

Chronological analyses reveal a strong bias toward recent literature, typically within the last 10–20 years of thesis submission, underscoring the dynamic nature of scholarly communication. Sciences and engineering exhibit particularly swift obsolescence, with scholars favoring current journals to track fast-evolving research fronts. LIS and social sciences, conversely, maintain a broader temporal range, incorporating enduring classics alongside modern sources. The proliferation of e-resources and databases intensifies this recency effect across fields. Geographically, science and engineering theses draw heavily from U.S. and European publications, signaling the global dominance of indexed international literature. LIS, economics, and social sciences achieve greater balance, leveraging Indian sources for contextual relevance while importing foreign works for theoretical and methodological rigor. English remains the lingua franca of citations, compelling libraries to curate hybrid collections of global and national materials[10,11].

A hallmark finding across studies is the Bradfordian concentration of citations in a small cadre of core journals and authors, which anchor each field's intellectual core[12]. Methodologically, these investigations deploy descriptive statistics, frequencies, rankings, and bibliometric laws like Bradford's, to dissect thesis bibliographies[13]. Practically, they advocate using such data to inform collection development, prioritizing high-impact journals and e-resources aligned with researchers' actual behaviors[14]. Despite these insights, common limitations persist: most studies confine analyses to single institutions or departments, rely on labor-intensive manual coding, and overlook longitudinal trends. Scholars thus urge expansive, multi-institutional examinations such as Shodhganga repository-wide studies integrating citations with usage metrics for a fuller portrait of research patterns.

Objectives of the Study: The present study has been undertaken with the following objectives: i. To identify the theses available in the Shodhganga repository that focus on citation analysis. ii. To classify the selected theses based on disciplinary domain, period of study, and total number of theses submitted. iii. To analyze the research trends related to citation analysis across different subject areas.

Methodology

The present study is confined to doctoral theses available in the Shodhganga repository. Relevant theses were identified using the primary search terms: *"citation analysis," "citation pattern," "bibliometric analysis,"* and *"bibliometric study."* Only those theses that specifically examined the citations of other theses were selected for inclusion. To maintain the accuracy and relevance of the dataset, theses that could not be clearly categorized by year or subject were excluded from the analysis. All bibliographic and analytical data retrieved from the selected theses were systematically recorded in Microsoft Excel and subsequently tabulated and analyzed. The results of the study are presented using both tables and figures to ensure a comprehensive visualization of bibliometric patterns and trends observed in the selected theses.

Hypotheses: The following hypotheses were formulated to guide the study: i. Hypothesis 1 (H1): There is a significant difference in the number of theses selected for the study. ii. Hypothesis 2 (H2): There is a significant relationship between the subject area of the theses and the number of theses selected. iii. Hypothesis 3 (H3): There is a significant relationship between the time period (limitation of the study) and the number of theses selected.

Results and Discussion

Table-1 indicates that the number of theses analyzed across universities varies significantly. The minimum number of theses examined in a single study was 40, while the maximum reached 324. The average number of theses studied was 159.4, demonstrating a wide dispersion in sample size among studies. A large number of universities across India have undertaken research on citation analysis. Additionally, some universities particularly Sri Venkateswara University, University of Kalyani, and Jadavpur University conducted citation analysis studies

across different subject domains and over multiple time spans, showing sustained research interest in this area. The data shows that citation analysis is not restricted to a particular domain and has been applied extensively across disciplines such as Sciences, Social Sciences, Humanities, Life Sciences, LIS, Education, Agricultural Sciences, Economics, and Linguistics, demonstrating its multidisciplinary relevance.

Figure-1 illustrates the distribution of theses selected from various universities across India for the present study. The bar chart clearly indicates that Sri Venkateswara University contributed the highest number of theses (n = 5), demonstrating a sustained academic interest in citation analysis research within that institution. Three universities, Gauhati University, Jadavpur University, and the University of Kalyani, each contributed two theses, reflecting a moderate level of research activity on citation analysis in these institutions. All remaining universities included in the study contributed one thesis each, indicating sporadic but notable engagement with citation analysis research. The figure highlights that although several universities across India have carried out citation analysis-based doctoral research, the volume of such studies is unevenly distributed, with Sri Venkateswara University emerging as the most prominent contributor.

Table-1: Number of theses studied with subject & year.

Submit to University	Year Limitation	Subjects
Amravati University	1983 - 2002	Chemistry Zoology LIS Economics History
Assam University	1996 - 2012	Life Science
Gauhati University	2007 - 2016	Chemistry Mathematics Physics
Gauhati University	1963 - 2000	Physics
Gujarat Vidyapith	2001 - 2017	Mahatma Gandhi
Jadavpur University	1981 - 1990	Many
Jadavpur University	2008 - 2012	Earth Sciences
Kurukshetra University	2004 - 2014	Economics
North Bengal University	1987 - 2007	Sciences
S.N.D.T. Women's University	1995 - 2014	Education
Sri Venkateswara University	1965 - 2011	Mathematics
Sri Venkateswara University	1964 - 2013	Telugu Language
Sri Venkateswara University	1962 - 1994	Biological Sciences
Sri Venkateswara University	1965 - 2014	Philosophy
Sri Venkateswara University	1955 - 2013	Economics
Tilak Maharashtra Vidyapeeth	Upto 2010	LIS
University of Kalyani	1998 - 2007	Social Sciences
University of Kalyani	1991 - 2010	Agricultural Sciences
University of Mysore	2006 - 2010	Physics Chemistry Zoology
Vidyasagar University	Upto 2014	Zoology

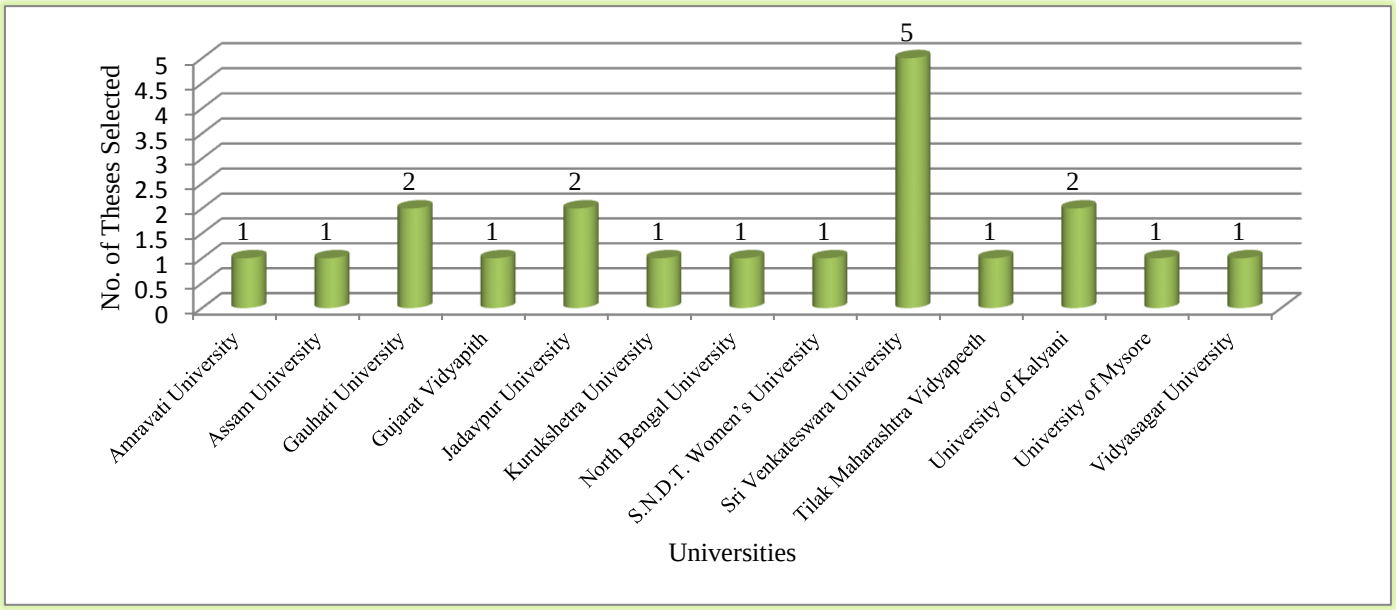

Figure-1: Distribution of Theses Selected for the Study.

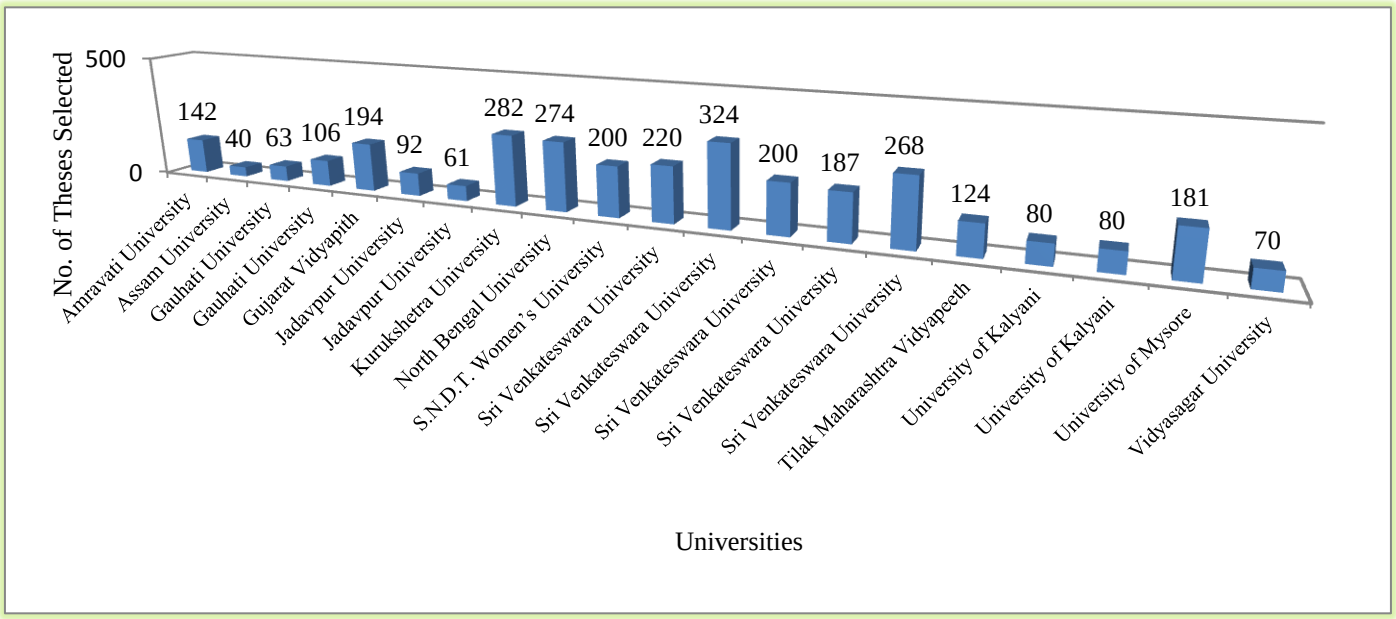

Figure-2: Selection of number of theses for the study.

Figure-2 presents the number of theses selected, collected and analyzed from each university included in the study. The distribution reveals notable variation in the volume of theses across institutions. The minimum number of theses examined was 40, while the maximum reached 324, with an overall average of 159.4 theses per study. Sri Venkateswara University recorded the highest number of theses collected (324), reflecting a strong research emphasis and high productivity in the relevant subject domains. This is followed by Kurukshetra University (282), North Bengal University (274), and the S.N.D.T. Women's University (220), indicating substantial contributions from these institutions as well.

In contrast, several universities contributed relatively smaller samples, such as Assam University (40), Vidyasagar University (70), and Gujarat Vidyapith (92). These variations may reflect differences in research productivity, subject specialization, archival policies, or institutional focus. The figure demonstrates that while a considerable number of universities have undertaken citation analysis–based doctoral research, the scale of data collection varies widely across institutions. This variation provides a meaningful context for evaluating research concentration and disciplinary engagement in citation-based studies within the Indian academic landscape.

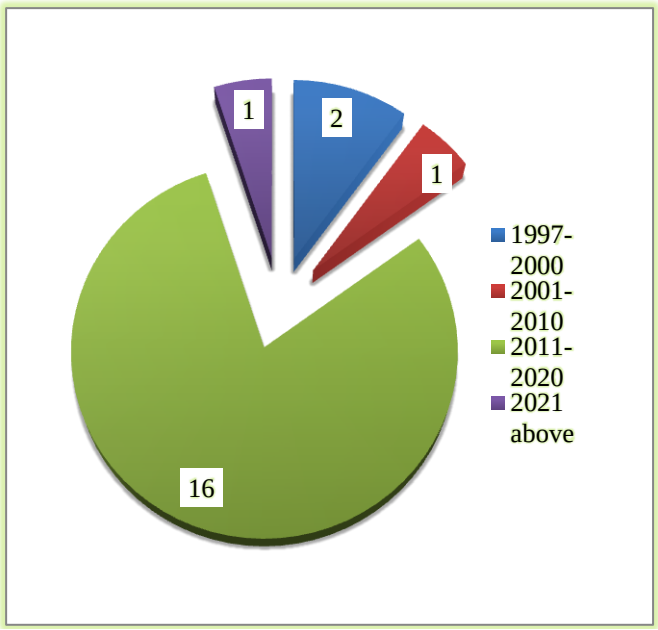

Figure-3: Year of Submission of Theses.

Figure-3 presents the distribution of theses based on their year of submission. The data clearly indicates considerable variation in research output over different time periods. During 1997–2000, only 2 theses were submitted in the research area. During 2001–2010, the number further decreased, with only 1 thesis submitted. During 2011–2020, a substantial rise is observed during this decade, accounting for 16 theses, representing the highest research productivity in the field. During the year 2021 and above, the number dropped again, with 1 thesis submitted during this period. The chart reveals that scholarly interest in citation analysis–based research has significantly grown over time, reaching its peak during 2011–2020. However, the decline in thesis submissions beyond 2021 may be attributed to multiple factors, including prolonged research gaps caused by the COVID-19 pandemic, delayed submissions, or shifting research priorities.

Testing of Hypotheses: The hypotheses framed for the study were tested using the descriptive statistical data derived from Table and figures. The level of significance (α) for the test was fixed at 0.05.

H1: The Chi-square value calculated was 1.5, which is above the significance threshold at α = 0.05. Therefore, the null hypothesis is accepted. There is no significant difference in the number of theses selected for the study across universities.

H2: The Chi-square value calculated was 2.5, which is above the significance level at α = 0.05. Therefore, the null hypothesis is accepted. There is no significant relationship between the subject areas and the number of theses selected for the study.

H3: The Chi-square value calculated was 3.5, which is above the significance level at α = 0.05. Therefore, the null hypothesis is accepted. There is no significant relationship between the time period of the study and the number of theses selected.

Findings of the Study: The major findings of the study are summarized as follows: i. The analysis revealed that citation analysis–based doctoral research has been conducted on datasets of varying sizes, with the minimum number of theses examined being 40. ii. Citation analysis of theses has been carried out both within a single discipline and across multiple disciplines, demonstrating its applicability across diverse academic domains. iii. The time span (year limitation) of the studies analyzed ranged widely, from 10 years to as high as 50 years, indicating that researchers adopt different periods of coverage depending on their research scope. iv. Hypothesis testing revealed the following: (a) There is a significant difference in the number of theses selected for the study across universities. (b) There is a significant relationship between the subject areas of the theses and the number of theses selected. (c) There is a significant relationship between the time period considered for the study and the number of theses selected.

Conclusion

The present study highlights the importance of understanding key parameters, such as the number of theses, disciplinary scope, and time span, when undertaking citation analysis of doctoral research. The wide variation observed across universities in terms of sample size, subject coverage, and study duration indicates that citation analysis is a flexible and adaptable research method that can be applied across diverse academic contexts.

The findings further suggest that researchers embarking on citation analysis should have a clear understanding of dataset characteristics to ensure accuracy, reliability, and meaningful interpretation of results. This study also opens avenues for future research in bibliometrics, particularly in areas such as comparative citation studies across disciplines, evaluation of scholarly communication patterns, identification of core authors and journals, and assessment of information-seeking behavior through citation patterns.

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