

Full Length Research

Comparative Evaluation of Citation Analysis of Mechanical Engineering Theses: A Study for Energy, Industrial & Production Engineering to M.Tech, Students 2011-2020 GNDEC.

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The present study is based on 11502 citations appended to the theses of 5 Energy Engineering, 343 Production Engineering, and 169 Industrial Engineering submitted to Engineering GNDEC for the award of theses between 2011 and 2020. According to the study journals 5069 other sources, 4349 others citation, Conference document 938 were the most preferred sources of Mechanical Engineering Researchers accounting for 11502 of total citations, followed by Book with 588 citations. Citation analysis is carried out on all journal articles published in the journal of Energy, Production Engineering & Industrial (ME) 2011-2020. The study concludes that, together with other approaches, citation analysis remains one of the most important tools to assess the usefulness of library holdings for M.Tech students in the activities of mechanical engineering.

Keywords: Citation Analysis, Production Engineering, Industrial Engineering, Energy Engineering, Theses Students, GNDEC.

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INTRODUCTION

Citation analysis is an interesting area of study. Citation analysis is the study of the references or citations that are included in the research communication. Citation analysis examines the use of references or literature in journals, theses, and other materials. The frequency of the journal title, type and age of the resources used, place of publication, language, and frequency of the author are all studied when analyzing citations to suggest ways to improve the library. Citation analysis involves looking at the pattern and frequency of citations in books and articles.

Citation analysis

Citation analysis and the application of citation-based approaches such as direct citation, co-citation, and bibliographic coupling to understand the structure of science have a long history. Bibliometrics that studies the citations to and from documents. Citation analysis applies many techniques such as citation counts that can assist establish scholarship

influence and patterns. Unlike traditional database searching by Author or Subject, citation searching as where journals such as journals, books, conference proceedings, symposiums, transactions, & theses have been cited by other authors.

Definitions of Citation Analysis:

Martin defined citation analysis, "As an activity involving analysis of citation and references which forms a part of primary scientific communication."

RavichandraRao "By citation Analysis one can evaluate and interpret citations received by articles, authors, institutions and another aggregate of scientific activity.

Literature Review

The vast majority of citation studies in the library literature examine the characteristics and information needs of M.Tech students using theses and dissertations as data sources. 2

Definition of a Journal: A Journal is a scholarly publication containing articles written by researchers, professors and other experts. Journals focus on a specific discipline or field of study.³ (Accessed on 14/02/2023)

Manpreet Singh (2022) M.Tech students use library resources, their age is an essential factor in the analysis of citations. The age of the resources utilized by postgraduate students in library studies is important in citation analysis. The Structural Engineering 147 (40.16%) and Soil Mechanics Structural Engineering 147 (40.16%) Environment 50 (13.66%) Geotechnical 113 (30.87%), 53 (14.84%), 4 K. P. Singh & Bebi (2013) a study on the citation analysis of PhD theses in sociology submitted to the University of Delhi during 1995-2010. The study presents an analysis of several parameters, like authorship pattern and forms of literature, country-wise scattering of citations, distribution of Indian and foreign citations and a ranked list of the top 30 sociology journals cited. The study presents an analysis of several parameters such as authorship pattern, forms of literature, country-wise scattering of citations, distribution of Indian and foreign citations, and a ranked list of the top 30 cited sociology journals. The study finds that the highest number of quotes were single-authored (83.94%). 67.23 % of quotes were from books, and only 22.20 % were from journals.⁵ K. Kumar & Reddy, T. R. (2012) explain the study on citations from master's these submissions to the V. University Tirupathi department of library and information science between 2000 and 2007, were analyzed for possible relationships between citing, citing articles, and bibliographic forms. Data were analyzed using frequency and percentage distributions (presented in charts, tables, and graphs), as well as measures of central tendency. According to the findings, journals were the most frequently used reference materials in the thesis.⁶ Anaehobi, E. S. & Muokebe Bibiana (2014) With the of document analysis, all of the master's theses were submitted to the Festus A. Nwako Library were extracted from them. A total of 87 documents were studied and 2949 citations were recorded. The analysis and organization of data were done through the use of frequency tables & percentages. The result indicated that Internet resources had the least citation with (12.14%), books (54.09%).⁷

Guru Nanak Dev College in Engineering

In 1956, Guru Nanak Dev Engineering College was established. On February 24, 1953, the Nanakana Sahib Education Trust resisted the trust deed with a pledge to strengthen the big weaker sector of Indian politics and which includes rural India, by a year admitting 70% of students from these areas. B. Tech., M. Tech. (Regular & Part Time), MBA, and MCA Programmers all are at the college, it is affiliated with Punjab Technical University, Jalandhar. The will Applied Science, Civil Engineering, Computer Engineering, Electoral Engineering, Electronics & Communication Engineering, Information Engineering, Mechanical Engineering, Production Engineering, BCA, BBA, MCA, and MBA in the Faculty of Engineering, one of six faculties at GNDEC. The institution has a well-established Air Conditioned Central Library in a collection of books, online books, print journals, online journals, online journals, back volume journals. The books are classified according to DDC 23rd latest edition through Web Dewey service. Library is fully computerized with e-Granthalaya software package which is an integrated multi-user library management system that supports all in-house operations of the Library. A terminal on the Campus Network can access the library's collection via Web OPAC. For interlibrary loan and document delivery services, a library is also connected with DELNET. The will IEEE, ASCE, ASME, J-Gate Engineering, Wiley eBook, Pearson Education Book, McGraw Hill Book, & EBSCO among the library's resources. The library shall be managed and administered by a Library Committee under the supervision and control of

the Board of Management. The Library's institutional repository on the free and open-source "D Space" platform provides the GNDEC community way to access academic materials.

Department of Mechanical Engineering

The study all thesis and submitted to the Departments of Mechanical Engineering in Energy, Industrial & Production Engineering GNDEC form 2011-2020.

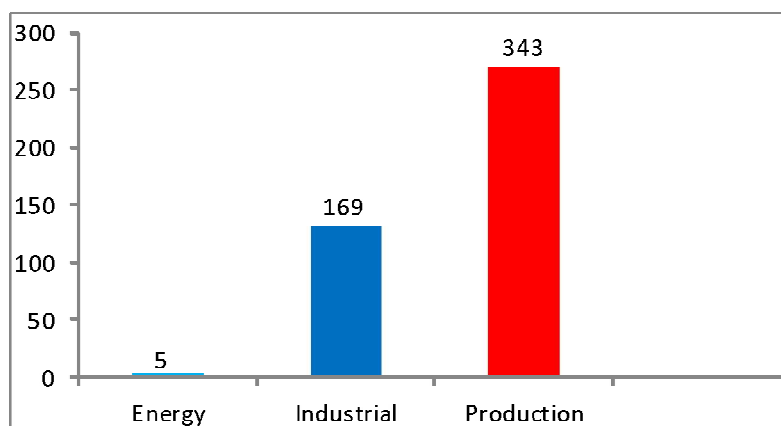
OBJECTIVES

1. To determine the yearly distribution of these, submit Industrial and Production.
2. To study if different sources of information were used by Mechanical M.Tech in conducting research.
3. To know the nature of authorship patterns.
4. To study bibliometrics, Citation Analysis and the Significance of Citations.
5. Identifying key journals in the field.

METHODOLOGY

Table 11 shows the thesis distribution by year in the department of Energy, Industrial & Production Engineering.. Each of the 11502 journals published by the journal from 2011 and 2020 were the title page and reference section. This is journal of data on the total number of articles and different sources cited, as well as dates of publication of such references, with an authorship pattern for each article.

M. Tech Theses:



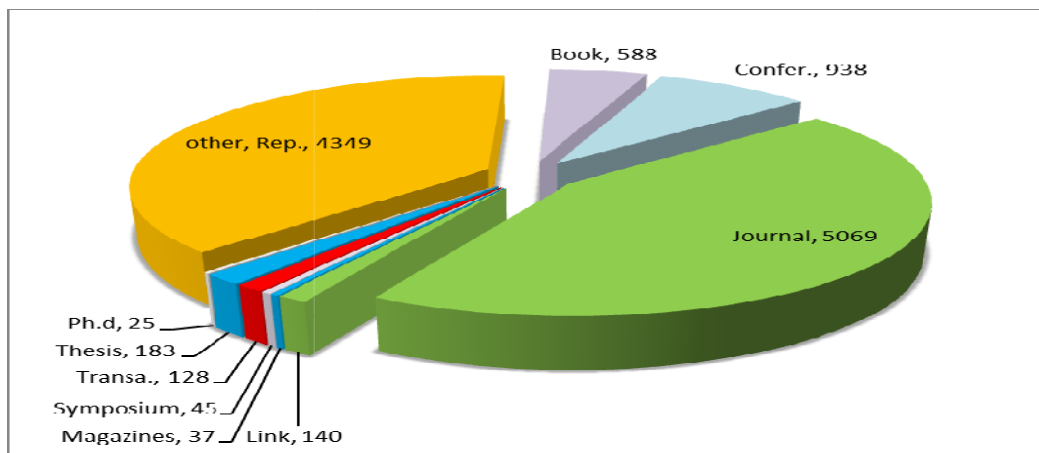
Distribution of Energy, Industrial & Production M.Tech Theses

Table 1 shows Production 343 (2.98%) Industrial 169 (1.46%) & Energy 5 (0.04%) thesis with a total of 11502 citations representing three Engineering disciplines: Energy Engineering, Production Engineering, Industrial Engineering. According to the table, research have used a maximum of 5069 Journals (44.07%) 4349 other Sources (37.81%) 938 Conferences (8.15%), 588 Books (5.11%) 183 Theses (1.59%) 25 (0.22) PhD.

Form Wise Distribution

S. No	No. of Citation	Mechanical	Age %	Citation	Age %
1.	Book	588	5.11	588	5.20
2.	Conference	938	8.15	1526	13.43
3.	Journal	5069	44.07	6595	57.85
4.	Link	140	1.21	6735	59.05
5.	Magazines	37	0.32	6772	59.38
6.	Symposium	45	0.39	6817	59.76
7.	Transactions	128	1.11	6945	60.85
8.	Thesis	183	1.59	7128	62.43
9.	Ph.d	25	0.21	7153	62.65
10.	others	4349	37.81	11502	99.97
	Total	11502	99.97%		99.97%

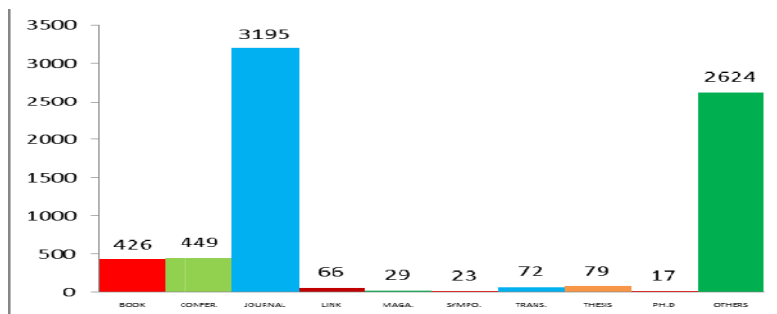
Table 2 the distribution of departmental theses from the GNDEC Energy, Industrial & Production Engineering submitted from 2011 to 2020. During the year 2011–20, the Journal received 5069 (44.07%), others received 4329 (37.81%), conferences received 938 (8.15%), &book received 588 (5.11%), Thesis (1.59%), links received 183 (1.21%), symposiums received 45 (0.39%), magazines received 37 (0.32%), & PhD received 25 (0.21%).

Form Wise Distribution

Form Wise Distribution

Year	Book	Confer.	Journal	Link	Maga.	Symp.	Trans.	Thesis	Ph.d	others	Citation
2010-11	89	66	382	05	11	05	01	07	03	172	741
2012-12	46	--	312	10	--	03	02	13	01	308	695
2013-13	53	51	458	10	--	03	29	09	02	245	860
2014-14	68	09	308	--	06	04	02	12	02	265	676
2015-15	45	62	335	12	--	04	11	11	02	243	726
2016-16	28	85	400	20	01	--	07	12	02	393	948
2017-17	49	78	610	06	--	03	08	09	04	463	1230
2018-18	--	37	090	--	--	01	02	03	01	077	211
2019-19	33	53	237	03	11	--	07	03	--	366	713
2020-20	15	08	063	--	--	--	03	--	--	092	181
Total	426 (6.11)	449 (6.44)	3195 (45.83)	66 (0.94)	29 (0.41)	23 (0.32)	72 (1.03)	79 (1.13)	17 (0.24)	2624 (37.58)	6981 (100)

Conference, Symposium, Transaction, Magazine



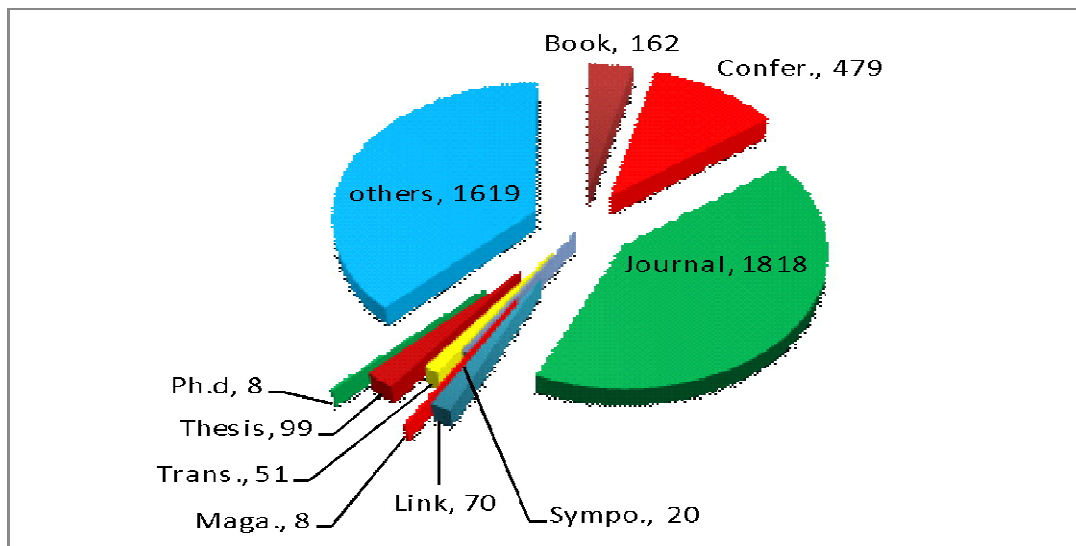
Form Wise Distribution

The table shows the total number of citations for the 6981 to 463 (17.61%) of citations occurring in the year 2017–17 and 92 (1.31%) in the year 2020. The shows 3 other sources account for 3195 of the citations in their theses (45.83%). In a mechanical engineering thesis, the findings for the sources provided provide production provides access to 45.83% of the others (37.58%) of the cited journal titles & conferences (6.44%). Journals get the highest number of citations used by researchers in industrial engineering accounting for 2624 (37.58%), followed by conferences with (6.44%) 479, books with (6.11%) 426, thesis 99, and theses with the least number of citations used by researchers (1.61%) 70.

Industrial Engineering

Year	Book	Confer.	Journal	Link	Maga.	Sympo.	Trans.	Thesis	Ph.d	others	Citation
2010-11	14	45	154	--	--	01	06	08	--	62	290
2012-12	26	72	147	--	--	--	10	16	03	170	444
2013-13	42	71	384	21	--	03	09	19	01	471	1021
2014-14	06	104	294	15	--	07	10	21	--	193	650
2015-15	21	38	298	07	--	03	10	01	03	290	671
2016-16	26	54	206	19	07	03	--	26	01	111	449
2017-17	05	19	127	03	--	01	03	01	--	122	281
2018-18	10	48	133	--	--	02	03	03	--	074	273
2019-19	01	17	040	04	01	--	--	02	--	061	131
2020-20	11	06	035	--	--	--	--	--	--	034	086
Total	162 (3.73)	479 (11.03)	1818 (41.88)	70 (1.61)	08 (0.18)	20 (0.46)	51 (1.17)	99 (2.28)	08 (0.18)	1619 (36.86)	4340 99.38

Conference, Magazine, Symposium, Transaction

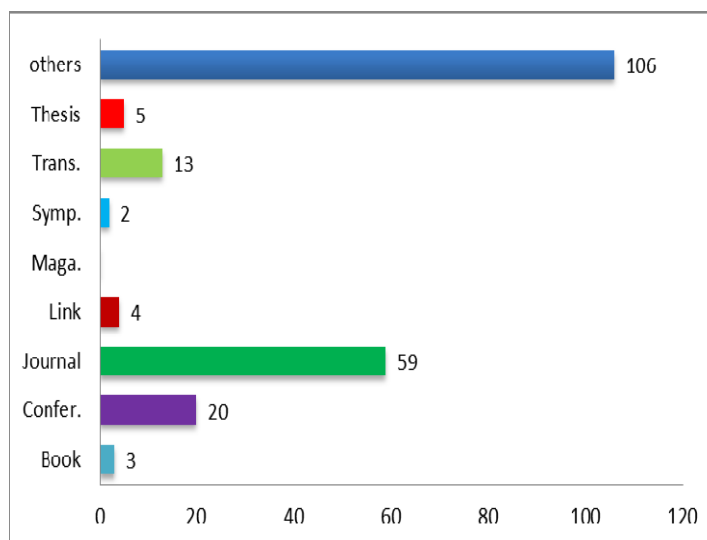


Form Wise Distribution

The total show total number of citations for 4340 & 471 (23.52%) of citations occurring in the year 2013–13 and 86 (1.98%) in the year 2020. The shows 4 other sources account for 1619 of the citations in their theses (36.86%). Journals get the highest number of citations used by researchers in Industrial Engineering Accounting (41.88%) 1818, followed by conferences with (11.03%) 479, books with (3.73%) 162, theses (2.2860%) 99, and theses with the least number of citations used by researchers (1.61%) 70.

Energy Engineering

	Book	Confer.	Journal	Link	Maga.	Symp	Trans.	Thesis	others	Citation
2014-14	--	06	21	--	--	01	01	01	30	60
2015-15	01	03	15	--	--	--	06	01	26	52
2016-16	--	03	11	04	--	--	--	03	21	42
2017-17	02	08	12	--	--	01	06	--	29	58
Total	03	20	59	04	00	02	13	05	106	212



Energy Engineering

Figure 5 Gives the total number of "citations" for the 212 to 30 (28.30%) of citations occurring in the year 2014–14 and 21 (19.81%) in the year 2016 to 16. Journals get the highest citations by authors in Energy Engineering Accounting (27.83%). 59, then others (50%) 106 Conference with (9.43%) 20, Transaction (6.13%) 13 and Thesis (2.35%) 05 Link (1.88%) 4 books with (1.41%) 3 Symposium (0.94%) with the fewest number of citations made by researchers 02.

Pattern of Authorship:

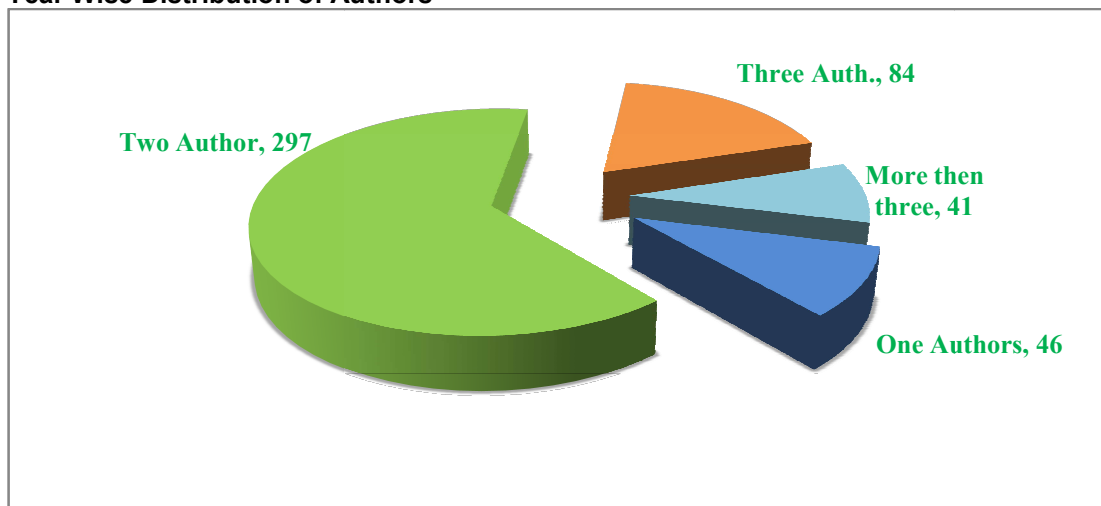
It's a good thing we know the most effective contribution in this area. To that end, information regarding all authors has been gathered, arranged and compiled in order to determine their type of authorship. Not only the basic publishing pattern but also the authors themselves are subject characteristics.

Year Wise Distribution of Authors

Year	Authors	Two Author	Three Author	More than three	Cum. Citation	Age%	Citation	Age%
2011-11	14	41	23	11	89	20.89	89	20.89
2012-12	04	38	4	--	46	10.79	135	31.68
2013-13	03	44	4	2	53	12.44	188	44.12
2014-14	10	48	7	3	68	15.96	256	60.08
2015-15	4	31	6	4	45	10.56	301	70.64
2016-16	2	20	2	4	28	6.57	329	77.21
2017-17	4	38	5	2	49	11.50	378	88.71
2018-18	--	--	--	--	--	--	--	--
2019-19	4	20	3	6	33	7.74	411	96.45
2020-20	1	10	--	4	15	3.52%	426	99.97
Total	46	297	84	41	426	99.97%		99.97 %

As shown in Table 6 most often mentioned works in production engineering are books (89%). This is consistent with previous citation analysis studies across engineering and its sub-branches. The other sources account for 68 (15.96%) of the thesis' citations.

Year Wise Distribution of Authors



According to the above table, 297 out of 426 (6.11%) used single-author books, while 41 out of 426 (6.11%) used citations from fourth-author books. In this study, only book authorship patterns were used. The authorship pattern in this study indicates that mechanical engineering favoured single authors' work.

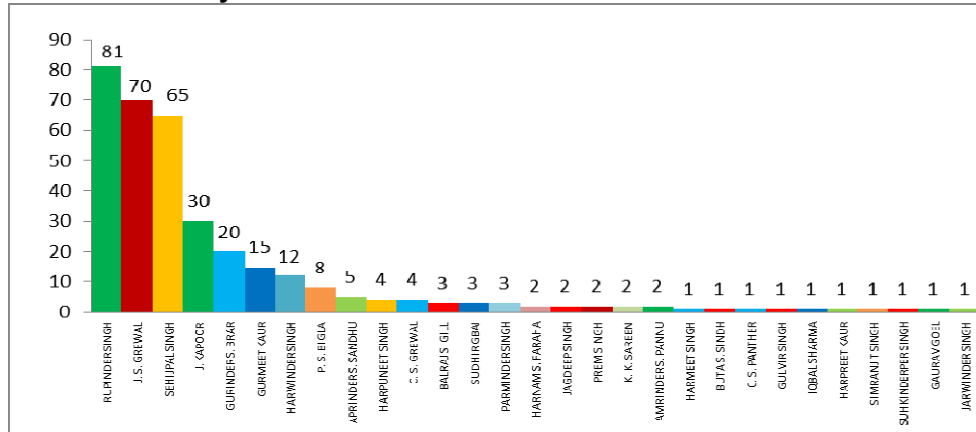
Guide of Faculty

S.No	Faculty Guide	Energy	Age%	Cultive.	Age%	Prod.	Age%	Cultive.	Age%
1.	Rupinder Singh	--	--	--	--	81	23.61	81	23.61
2.	Jasmaninder S. Grewal	--	--	--	--	70	20.40	151	44.01
3.	Sehijpal Singh	--	--	--	--	65	18.95	216	62.96
4.	J. Kapoor			--	--	30	8.74	246	71.7
5.	Gurinder S. Brar	--	--	--	--	20	5.83	266	77.53
6.	GurmeetKaur	--	--	--	--	15	4.37	281	81.9
7.	Harwinder Singh	--	--	--	--	12	3.49	293	85.39
8.	P. S. Bigla	01	20.00	01	20.00	08	2.33	301	87.72
9.	Aprinder S. Sandhu	--	--	--	--	05	1.45	306	89.17
10.	Harpuneet Singh	--	--	--	--	04	1.16	310	90.33
11.	Chandandeep S. Grewal	--	--	--	--	04	1.16	314	91.49
12.	Balraj S. Gill	--	--	--	--	03	0.87	317	92.36
13.	SudhirGbai	--	--	--	--	03	0.87	320	93.23
14.	Parminder Singh	--	--	--	--	03	0.87	323	94.1
15.	Harnam S. Faraha	--	--	--	--	02	0.58	325	94.68
16.	Jagdeep Singh	--	--	--	--	02	0.58	327	95.26
17.	Prem Singh	03	60.00	04	60.00	02	0.58	329	95.84
18.	K. K. Sareen	--	--	--	--	02	0.58	331	96.42
19.	Amrinder S. Pannu	--	--	--	--	02	0.58	333	97
20.	Harmeet Singh	01	20.00	05	20.00	01	0.29	334	97.29
21.	Buta S. Sindh	--	--	--	--	01	0.29	335	97.58
22.	Chantwant S. Panther	--	--	--	--	01	0.29	336	97.87
23.	Gulvir Singh	--	--	--	--	01	0.29	337	98.16
24.	Iqbal Sharma	--	--	--	--	01	0.29	338	98.45
25.	HarpreetKaur	--	--	--	--	01	0.29	339	98.74
26.	Simranjit Singh	--	--	--	--	01	0.29	340	99.03
27.	Suhkinderper Singh	--	--	--	--	01	0.29	341	99.32
28.	GauravGoel	--	--	--	--	01	0.29	342	99.61
29.	Jarwinder Singh	--	--	--	--	01	0.29	342	99.9
31.	Total	05	100			343	99.57%		

Cumulative, Production**Production First**

S.No	Faculty Guide	Production	Age%
1.	Rupinder Singh	81	23.61
2.	Jasmaninder S. Grewal	70	20.40
3.	Sehijpal Singh	65	18.95
4.	J. Kapoor	30	8.74

Rupinder Singh got top place in the above table with 81 successful candidates, followed by Jasmaninder S. Grewal with 70, Sehijpal Singh with 65, and J. Kapoor with 30. Rupinder Singh, who in top spot in GNDEC, is also vying for third spot in the nation-wide ranking. In table 6 above, Rupinder Singh generated the most successful research, with 81 (23.68%), followed by Jasmaninder S. Grewal with 70 (20.46%), Sehijpal Singh with 65 (19%), J. Kapoor with 30 (8.77%), Gurinder S. Brar with 20 (5.84%), & GurmeetKaur with 15 (4.38%). During 2020, 271 research subjects successfully completed in 62 research guides. Prem Singh got the first 03 (60.00) in the table above. The by P.S. Bigla&Harmeet Singh with 01 (20.00).

Guide of Faculty**Guide of Faculty**

S.No	Faculty	Industrial	Age%	Citation	Age%
1.	Harwinder Singh	37	21.89	169	21.89
2.	Deepinder Singh	34	20.11	203	42
3.	Gurinder S. Brar	26	15.38	229	57.38
4.	Jagdeep Singh	15	8.87	244	66.25
5.	Aprinder S. Sandhu	13	7.69	257	73.94
6.	Harmeet Singh	10	5.91	267	79.85
7.	P. S. Bigla	10	5.91	277	85.76
8.	Harpuneet Singh	07	4.14	284	89.9
9.	Sehijpal Singh	05	2.95	289	92.85
10.	Prem Singh	03	1.77	292	94.62
11.	J. Kapoor	02	1.18	294	95.8
12.	Ravi I. Singh	02	1.18	296	96.98
13.	Jasmaninder S. Grewal	01	0.59	297	97.57
14.	Rupinder Singh	01	0.59	298	98.16
15.	Chandandeep S. Grewal	01	0.59	299	98.75
16.	Jatinder pal	01	0.59	300	99.34
17.	Suhkinderper Singh	01	0.59	301	99.93
	Total	169	99.93		99.93%

Industrial First

S.No	Faculty Guide	Industrial	Age%
1.	Harwinder Singh	37	21.89
2.	Deepinder Singh	34	20.11
3.	Gurinder Singh	26	15.38
4.	Jagdeep Singh	15	8.87
5.	Aprinder S. Sandhu	13	7.69
6.	Harmeet Singh	10	5.91
7.	P. S. Bigla	10	5.91

Guide of Faculty

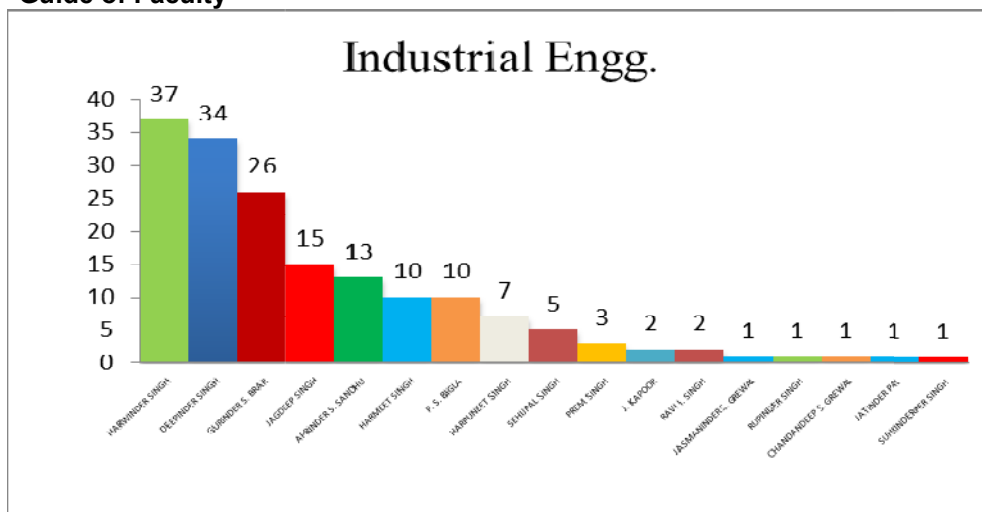
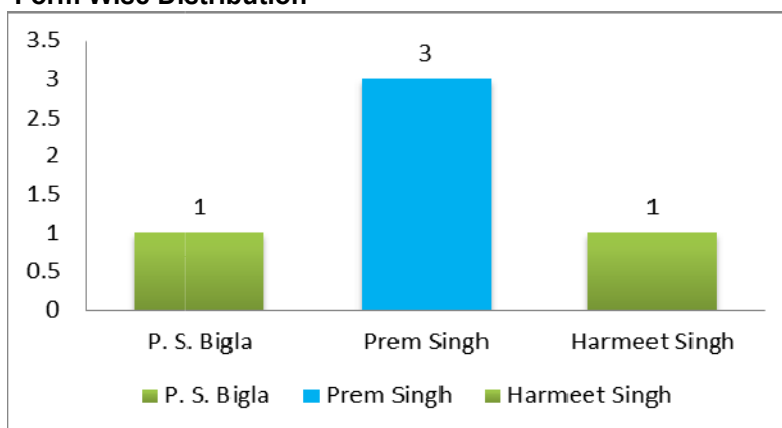


Table-7 gives form wise distribution of citation analyses and has shown that 5069 (44.07%) citations out of total 11502 citations are journals. A rank list is prepared on the basis of the frequency of citations used. It is followed by the year 2011-2020 which received Deepinder Singh (20.11%) 34, Gurinder S. Brar (15.38%) 26, Jagdeep Singh (8.87%) 15, Aprinder S. Sandhu (7.69%) 13, P. S. Bigla & Harmeet (5.91%) both 10, Jasmaninder S. Grewal, Rupinder Singh, Chandandeep S. Grewal, Jatinder pal & Sukinderpal Singh (0.59%) received. Harwinder Singh got first place in the above table with 37 successful candidates, followed by Deepinder Singh with 34 candidates. Above table with 10 (5.91%) successful candidates, followed by Harmeet Singh & P.S. Bigla with candidates.

Guide of Faculty

S. No	Faculty	Energy	Age%	Cumulative	Age%
1.	P. S. Bigla	01	20.00	01	20.00
2.	Prem Singh	03	60.00	04	80.00
3.	Harmeet Singh	01	20.00	05	20.00
	Total	05	100%		100%

Form Wise Distribution



According to the graph, the total number of citations was 5 (100%) in 2014-14 and 86 (1.98%) in 2020. It is followed by the years 2014–2017, which received P. S. Singh (1.0%), Harmeet Singh 1 (1.0%), and Prem Singh 3 (60.00%) for the most successfully generated research.

FINDINGS

1. The majority of scholars in the faculty of faculty are aware of to identify the criteria for -searching the Mechanical.
2. The majority of students select journals as the best research tool for information search.
3. The majority of research students find good-quality information in journals.

CONCLUSION

To better understand the information sources used by the M.Tech Citation Analysis of These students at the GNDEC this study used citation analysis. Citations in the fields of energy, industrial, & production engineering were studied from 2011–2020 with an average of 11502 (99.97%) citations. A study shows that the highest number of citations (41.88) occurred in the years 2011-23. The lowest number of citations was 25 (0.21%) in the year 2020. According to one study, the highest number of citations (41.88%) 1818 occurred between 2011- 2020. The lowest number of citations was in Magazine & Ph.D. 08 (0.18%) in the year 2020. According to one study, the highest number of citations 03 (60.00%) occurred from 2014-2017. The other sources most preferred were periodicals and journals. The shows that the total number of citations for the 212 to 30 (28.30%) of citations occurring in the year 2014–14 and 21 (19.81%) in the year 2016-16. Suggestions for futureresearch might include analyzing M. Tech Theses to develop improved information skills you.

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