A Bibliometric Study of Employee Turnover in the IT Sector Using the Web of Science (WoS) Database

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ABSTRACT
This study used bibliometric analysis to glance at publications on the topic of 'Employee Turnover' in the IT Sector between 2004 and 2023. 'Employee turnover' and the "Information Technology" are two crucial phrases that were used in the study. The data was obtained from the Web of Science database. The researchers examined eight performance analysis indicators such as most prolific authors publications, citation analysis of the most pertinent papers, cumulative publications by year, document types, subject disciplines, contributions from universities, top journals & publication houses to identify which domain has the most publications. Data analysis was done by establishing the minimum values for each indicator in VOSviewer software. Scientific mapping was also performed with an array of indicators, including bibliographic coupling authors, co-citation references, co-occurrence of all keywords, country documents, and country journal indicators. The most widespread kind of network visualization was used to display images of the examined links. Results list 336 papers in a list format. This study serves as a lens that focuses on the development of reasonable concerns and issues around employee turnover in the IT sector.
KEYWORDS: Employee Turnover, IT Sector, Bibliometric Analysis, Web of Science (WoS), VOSviewer

I.   INTRODUCTION
Employee Turnover
        Employee turnover emerges as a critical issue in the IT sector. Employee turnover is the perpetual cessation of workers inside of a company, whether voluntary or involuntary. The substantial employee turnover that has been observed in IT is a challenging factor in the loss of innovation. It is a time-consuming, expensive process as the expenses incurred include direct expenses like hiring and training as well as indirect expenses like lost enthusiasm and peer pressure (Sharma, Singh, & Arya, 2021). Employee turnover is a significant concern for knowledge loss, resulting in an organization's inability to sustain knowledge continuity (Hana & Lucie, 2011). Due to employee turnover, the chain of roles will be disrupted, the company's reputation will suffer, and staff morale will be reduced (Chandra & Margono, 2021). According to (Deepa & Stella, July 2012) employee turnover is a percentage of a company's average overall employee count to the number of personnel it must replace within a specific time frame. (S.Janani, Mar 2014) reported the following formula to determine employee turnover rate:
Employee Turnover rate =
(No. of separations/Total number of employees) * 100

Employee Turnover Rate in IT Sector
        As per the Business Today report, in the first quarter of the fiscal year 2022–2023, Infosys had the highest attrition rate among Indian IT bellwethers at 28.4%. The turnover rate at Wipro was 23.3 %, while the attrition rate at Tech Mahindra was reported to be 22%.

The following research questions regarding employee turnover in the IT industry are the focus of this research paper:

RQ 1: Which authors have the greatest number of articles published?

RQ 2: During which years have the most papers been published?

RQ3: Which categories of documents have published the most papers?

RQ 4: In which subject disciplines, journals have published the most research?

RQ 5: Which countries are publishing the maximum number of research papers?

RQ 6: Which journals have published the majority of papers?

RQ 7: Which publication houses are publishing the maximum number of research papers?

RQ 8: Which nations have collaborated on the most publications with other nations?

RQ 9: Which keywords co-occur with the most commonly used keywords?

RQ 10: Which cited authors are co-cited the most?

II. RESEARCH METHODOLOGY

Bibliometric Analysis

The bibliometric analysis investigates quantitative and statistical techniques to examine publishing trends in the dissemination of data. It is a set of tools that academics can use to analyze published data (McCain, 1996).

Search Strategy

The researchers used bibliometric analysis to analyze studies published on "Employee Turnover" AND "Information Technology" using the Web of Science (WoS) database. The WoS serves as the main data source for the VOSviewer computer program (version 1.6.15). The first search prompted 393 articles. The articles were searched with "All field" search criteria. The number of documents was reduced down to 378 after applying time period filter. The 378 documents from 2004 to 2023 were included in the bibliometric study. The documents were further refined by subject categories. The documents of 'management', 'computer science information science', 'business', 'information science', 'economics', 'industrial relations', 'social sciences interdisciplinary', 'psychology applied', 'operations research management science', 'computer science interdisciplinary applications', 'computer science software engineering, 'psychology multidisciplinary, 'educational research', 'public

administration', 'business finance', 'multidisciplinary sciences', 'psychology social', 'communication', 'psychology experimental', 'area studies', 'computer science cybernetics', 'developmental studies', 'humanities multidisciplinary', 'women studies', 'psychology developmental', 'social issues', 'social sciences mathematical models', 'social work', 'sociology' and 'urban studies'. 336 studies remained after applying the subject category filter. Thus, 336 studies were subjected to bibliometric analysis.The search has been done on 25th and 26th of March 2023.

As a rule, performance analysis and scientific mapping of the relevant literature are carried out while conducting bibliometric analysis (Uikey, Ghormade, & Linge, March 2023).

The following is a summary of performance analysis and science mapping indicators:
  i. Performance analysis of eight performance indicators: most prolific authors publications, citation analysis of the most pertinent papers, cumulative publications by year, document types, subject disciplines, contributions from universities, top journals, and publication houses
  ii. Scientific Mapping of indicators: bibliographic coupling authors, co-citation references, co-occurrence of all keywords, country documents, and country journals indicators
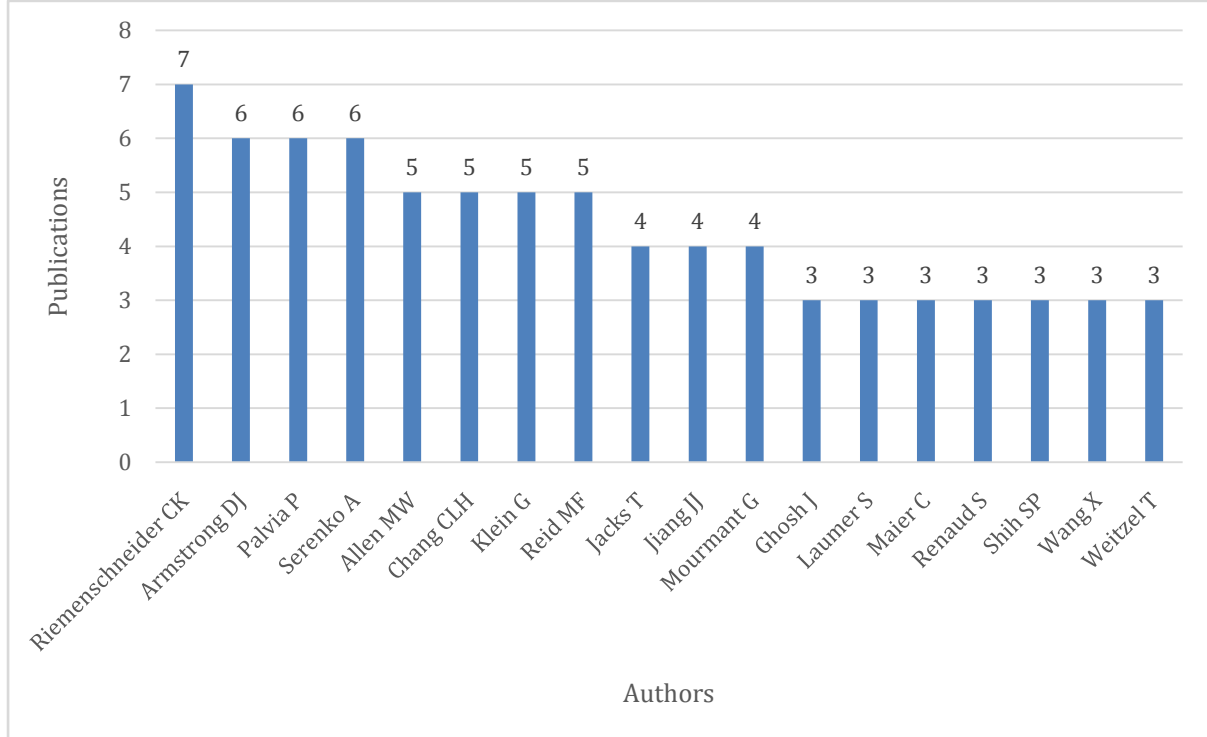
Extraction of Data

Data extraction is done using the WoS database. The subsequent few phases of the process are carried out sequentially. The first step is to access the WoS database and follow the instructions where the first row of keywords must be filled in. Employee turnover was selected as "all fields," and the IT sector was selected as "all fields" in the second row. There were 336 study results left after applying the period and subject area filters. The file was downloaded in tab-delimited form. With the use of this WoS data that was retrieved, all performance analysis indicators were calculated. VOSviewer, a computer application, was utilized to carry out a number of scientific assessments.

III. RESULTS
Performance Analysis (Employee Turnover in the IT Sector)
1) Number of papers published by most prolific authors

Source: Web of Science database

Figure 1: Maximum number of studies published by the most prolific authors with at least 3 papers

The WoS database was searched for data extraction studies on employee turnover in the IT sector. There were 849 authors in all who made their contributions. In this study, authors who have written at least three research publications are examined.

2) Citation analysis of the 10 most pertinent papers

#	Author(s)	Title	Year	Journal	TC	Links
1	Ahuja et. al.	IT Road Warriors: Balancing Work-Family Conflict, Job Autonomy, and Work Overload to Mitigate Turnover Intentions	2007	MIS Quarterly	313	22
2	Pare et al.	The influence of high-involvement human resources practices, procedural justice, organizational commitment and citizenship behaviors on information technology, professionals, turnover intentions	2007	Group and organization management	291	16
3	Morris et. al.	Job characteristics and job satisfaction; understanding the role of enterprise resource planning system implementation	2010	MIS Quarterly	249	2

|						
4	Moqbel et. al.	Organizational members use of social networking sites and job performance an exploratory study	2013	Information technology and people	142	4
5	Kim et. al.	Factors Affecting state govt. information technology employee turnover intentions	2005	American review of public administration	125	10
6	Tanova et al.	Using job embeddedness factors to explain voluntary turnover in four European countries	2008	International journal of Human Resource Management	107	1
7	Rutner et. al.	Emotional dissonance and the information technology professional	2008	MIS Quarterly	104	20
8	Koch et al.	Bridging the work/ Social divide: the emotional response to organizational social networking sites	2012	European journal of information systems	95	4
9	Ghanpanchi et. al.	Antecedents to IT personnels Intentions to Leave: A Systematic Literature Review	2011	Journal of System and Software	92	13
10	Niederman et al.	Testing and extending the unfolding model of voluntary turnover in IT professionals	2007	Human Resource Management	60	13

Table 1: represents citation analysis of the ten pertinent papers that have received the most citations, in order of total citations (TC).

A maximum number of citations of a document, out of 336, 215 meet the threshold.The study selected top 10 document citations out of 208 as indicated in Table 1.
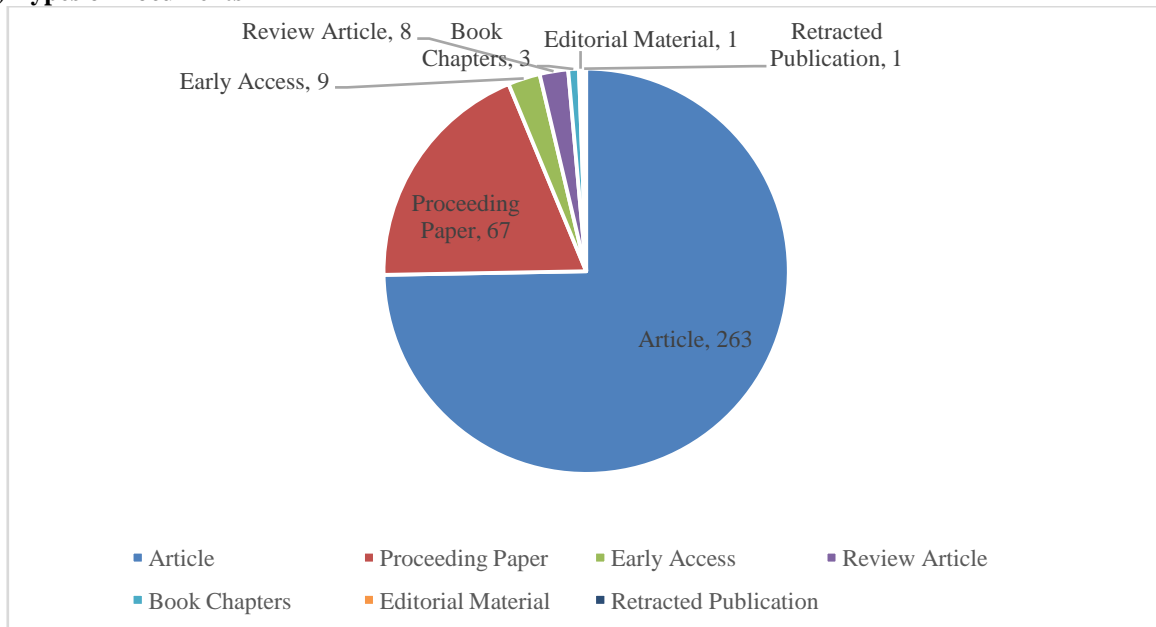
3) Year-wise Cumulative Publications
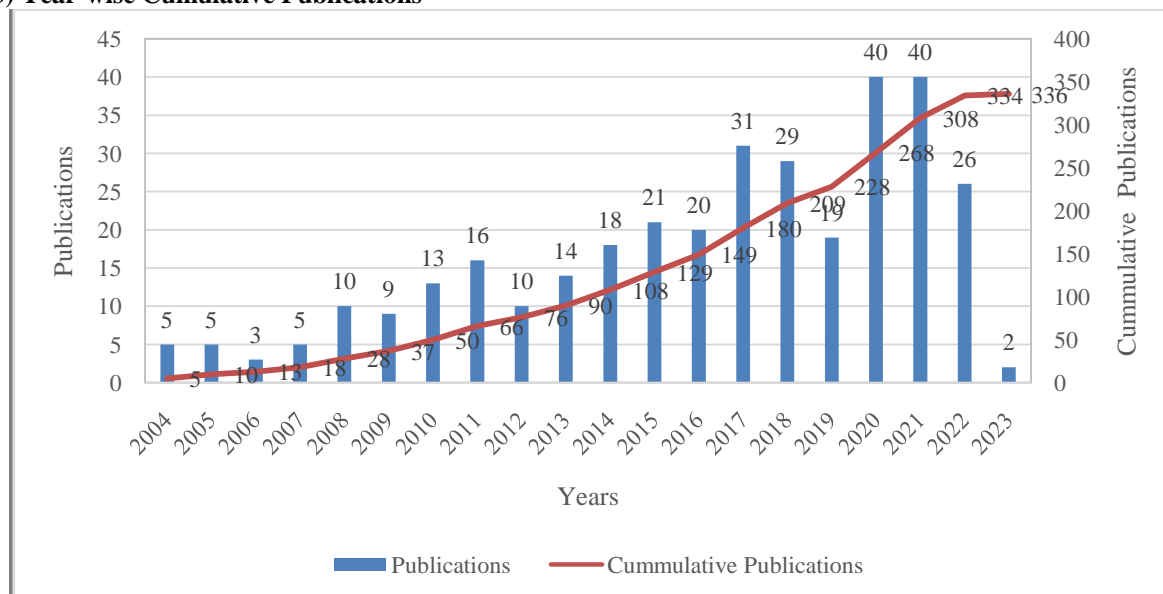
Source: Web of Science database

Figure 2: Year wise Cumulative Publications

The cumulative number of publications have been evaluated from 2004 to 2023. The results showed that the total number of cumulative publications had climbed progressively from 5 to 336throughout the years.

4) Types of Documents

Source: Web of Science database

Figure 3: Types of Documents wise publications

Articles, proceeding papers, and many other document types that were examined for this study utilizing the Web of Science database are listed in Figure 3. It is noteworthy that the majority of the publications are articles.

5) Subject discipline-wise publications
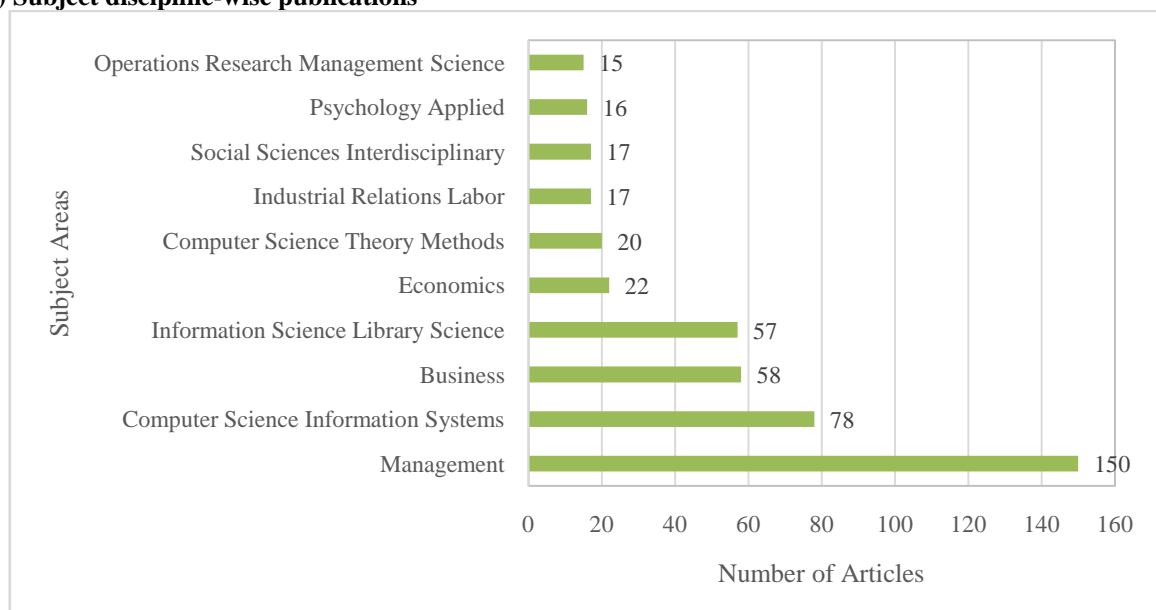
Source: Web of Science database

Figure 4: Top 10 number of publications according to subject disciplines

In Figure 4, the subject disciplines make it evident that the number of papers published comes from a variety of 44 subject fields such as management, computer science information systems etc.

6) Contributions from Top Universities

Source: Web of Science database

Figure 5: Contributions from Top Universities

Figure 5 displays Top 47 universities have published minimum of three papers related to the subject and top universities have published 13 papers.

7) Top Publication Houses

Source: Web of Science database

Figure 6: Top 10 Publication houses having the greatest number of papers published.

Figure 6 represents the top 10 publication houses from 73 various publishers ranked by the quantity of publications. The maximum numbers papers were published were 57 and the minimum with 11 publications by the publication houses were included in this analysis.

8) Top 10 countries with maximum number of papers published
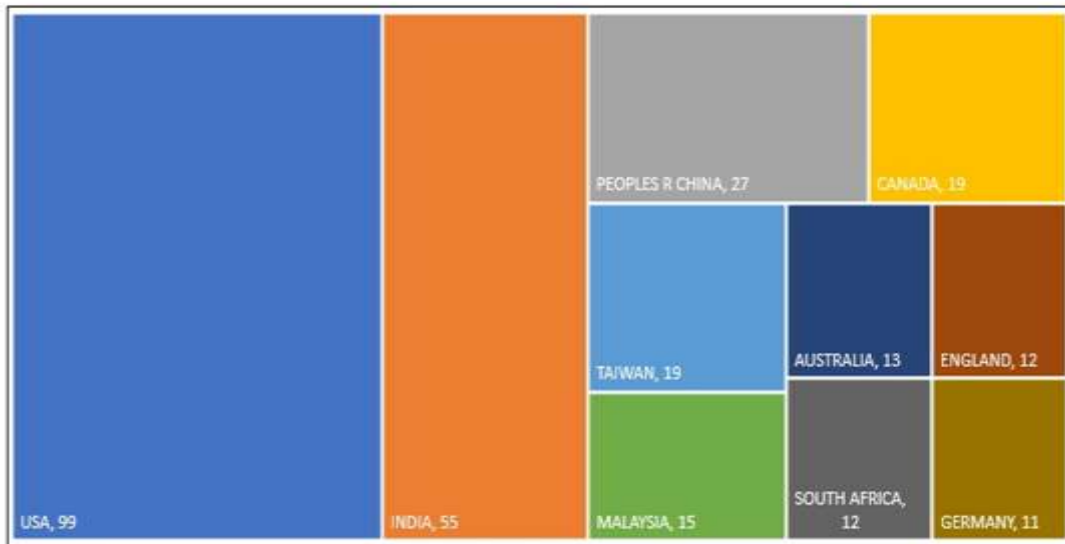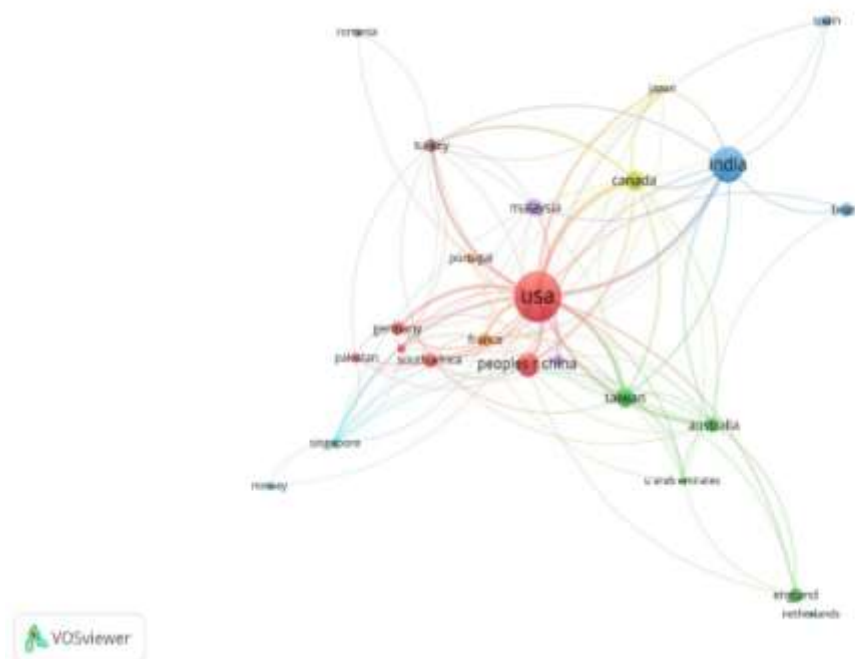

Source: Web of Science database

Figure 7: Top 10 countries having the greatest number of papers published

Figure 7 displays the top 10 articles from various countries that donated their research to these investigations.

Scientific Mapping
9) Country-wise Citations

Figure 8: Nations collaborated the most publications with other nations

Figure 8 demonstrates the countries' co-authorship Out of 60, 24 countries meet the threshold with a minimum number of 3 documents of a country. The calculation of the strength of the ties between the nations is displayed above, and the required minimum for each country is three papers. The total link strength is the highest as a result of this. The WoS database is being used to examine this work, and the VOSviewer tool is being used to conduct additional analysis on the co-authorship of writers. The VOSviewer helps to clarify the relationships among the numerous scientific mapping markers. Following the examination of the tab-delimited file stated above, the relationships or connections between the co-authorship of countries have been explored. The VOSviewer obtained this file from the Web of Science database. The three different visualisations that the VOSviewer shows are Network visualization, Overlay visualization, and Data visualization. Overlay visualization with frames and coloured, curving line is preferred for a better picture presentation and to better understand the study undertaken. By looking at the colour, which portrays the data as the most popular or desirable attribute, VoSviewer analyses the data. In the figure above, the USA is shown as the top country in a large frame.

Country	Documents	Citations	Total Link Strength	Country	Documents	Citations	Total Link Strength
USA	99	3681	301	Turkey	10	268	56
India	54	374	85	New Zealand	8	50	27
Peoples R China	27	256	41	Spain	7	131	5
Canada	19	626	117	Portugal	6	23	5
Taiwan	19	323	63	Pakistan	5	14	9
Malaysia	15	106	17	Singapore	5	60	32
Australia	13	437	44	South Korea	5	45	11

England	12	386	14	Norway	4	96	2
South Africa	12	115	21	Romania	4	7	2
Germany	11	229	33	Japan	3	19	34
Brazil	10	77	8	Netherlands	3	63	1
France	10	191	35	U Arab emirates	3	13	15

Table 2: Nations collaborated the most publications with other nations

10) Co-citations cited references

Figure 9: Co-citations cited references
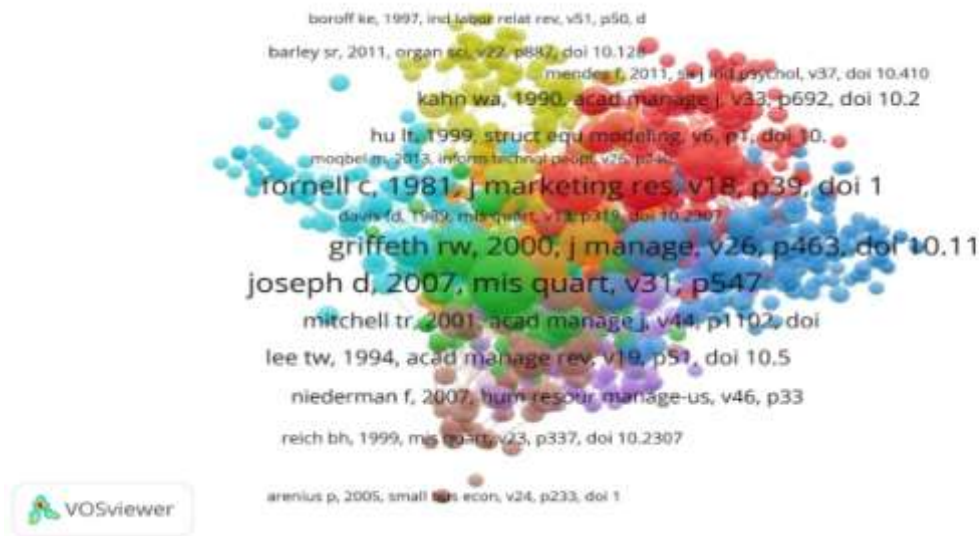
The VOSviewer obtained this file from the Web of Science database. The three different visualisations that the VOSviewer shows are the Network visualisation, Overlay visualisation, and Data visualisation. Out of 16177 references cited in co-citations, 969 meet the required threshold.
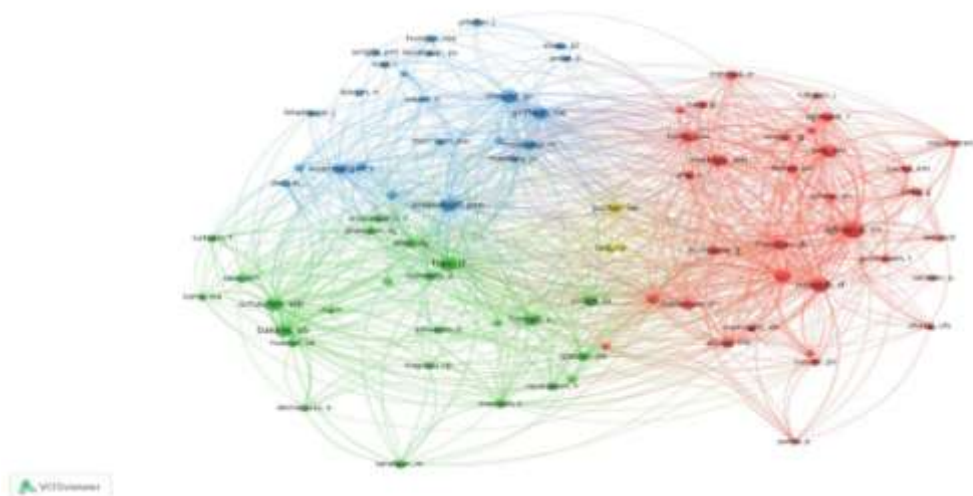
11) Co-citations Cited Authors

Figure 10: Top 20 most cited authors' network visualisation

Figure 10 determines the relationships between the most referenced authors of different countries on this particular topic. 1548 authors out of 11214 meet the requirement.

#	Authors	Citations	Total Link Strength	#	Authors	Citations	Total Link Strength
1	Igbaria, M	123	5137	11	Mobley, Wh	64	2469
2	Joseph, D	95	4262	12	Hom, Pw	61	2851
3	Hair, Jf	88	3736	13	Fornell, C	58	2590
4	Moore, Je	81	3416	14	Thatcher, Jb	54	2519
5	Meyer, Jp	78	3607	15	Judge, Ta	51	2043
6	Podsakoff, Pm	76	3401	16	Eisenberger, R	50	2653
7	Lee, Tw	75	3226	17	Porter, Lw	50	1878
8	Bakker, Ab	71	3315	18	Hackman, Jr	47	2076
9	Schaufeli, Wb	71	3198	19	Ahuja, Mk	45	2112
10	Griffeth, Rw	66	2801	20	Mowday, Rt	45	2015

Table 3: Top 20 most Cited Authors

12) Co-occurrence of all keywords

Figure 11: Keywords co-occur with the most commonly used keywords

The keywords, a minimum of 5 co-occurrences, and out of 1785 keywords, about 91 of them meet the threshold. Following the examination of the tab-delimited file stated above, the relationships or connections between the co-occurrence of keywords have been explored in Figure 11. The most often used keywords are connected to one another, with the names of the keywords showing up in darker circles.

Keywords	Occurrences	Total Link Strength	Keywords	Occurrences	Total Link Strength
Turnover	95	696	Management	33	234
Job-Satisfaction	79	683	Satisfaction	33	298
Performance	79	663	Voluntary Turnover	31	268
Turnover Intention	60	492	Information-Technology	29	214
Impact	56	458	Meta - Analysis	29	271
Employee Turnover	55	438	Information Technology	26	168
Job Satisfaction	54	473	Attitudes	24	241
Work	54	480	Consequences	23	209
Model	52	436	India	23	209
Organizational Commitment	51	466	Technology	22	157
Antecedents	41	380	Employees	21	189
Commitment	38	315	Information-Technology Professionals	21	185
Turnover Intentions	34	313	Mediating Role	20	185

Table 4: Keywords co-occur with the most commonly used keywords

13) Bibliographic coupling sources /journals
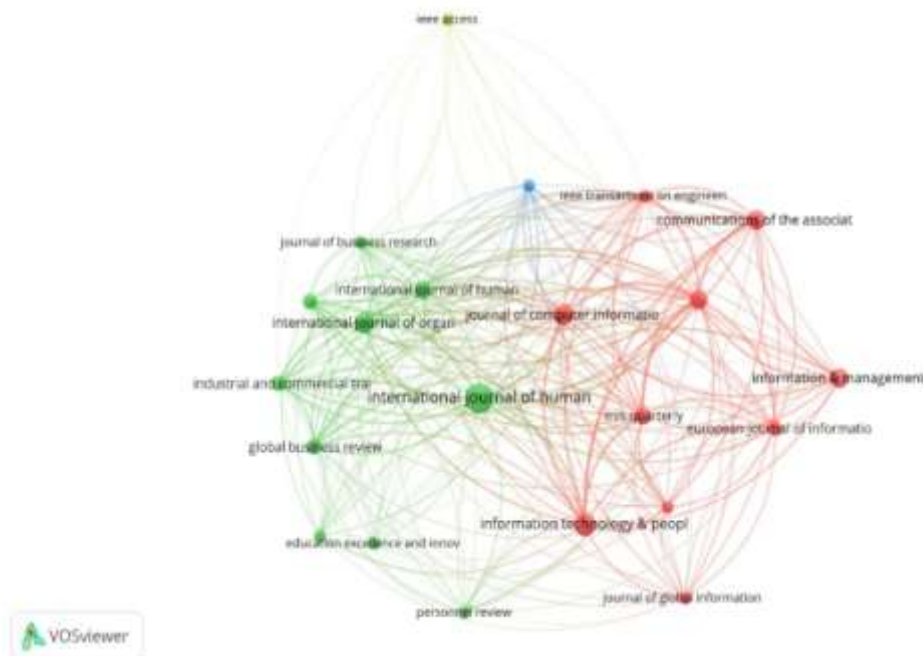
Figure 12 : Bibliographic coupling of top 10 journals' network visualisation

The top 10 journals' bibliographic couplings were chosen and are displayed in the Figure 12. The minimum number of documents considered for study by each source was three.

#	Source	Documents	Citations	Total Link Strength
1	International Journal of Human Capital & Information Technology Professionals	13	37	1021
2	Information Technology & People	8	271	1028
3	International Journal of Organizational Analysis	7	55	683
4	Journal of Computer Information Systems	7	48	1118
5	Information & Management	6	378	544
6	Mis Quarterly	5	856	870
7	International Journal of Human Resource Management	5	279	566
8	European Journal of Information Systems	4	247	559
9	Journal of Business Research	3	112	362
10	Computers In Human Behavior	3	85	465

Table 5: Bibliographic coupling of top 10 journals

IV. CONCLUSION

The Web of Science (WoS) database was used by the researchers to analyse studies published on "Employee Turnover" AND "IT Sector" using bibliometrics. For this study, the researchers carried out performance analysis and scientific mapping. By setting the minimum values for each indicator in the VOSviewer software, data analysis was carried out. 849 writers were compiled in Figure 1 demonstrating the most well-known author is Riemenschneider CK, who has published seven papers. Table 1 represents citation analysis of top ten prolific authors with Ahuja et al. who had 313 citations and 22 links in 2007, Pare et al. in 2007 had 291 citations and 16 links, followed by others. Peaking at 40 publications in 2020 and 2021, Figure 2 shows cumulative publications by year from 2004 through 2023 increased steadily. Notable facts about the publications included in Figure 3 with types of documents out of 336, as 263 articles, 67 proceeding papers and 9 early access or review articles. Figure 4 shows a diversity of 44 subject disciplines, top ten are chosen for study. The management subject has published the most content with 150 publications.

Contributions from Leading Universities, Figure 5 displays 548 universities from around the globe. The State University System of Florida has published 13 publications, followed by Baylor University 11, University Of North Carolina 10, Indian Institute of Management IIM System 9, while 47 universities have published at least three papers on the topic. Figure 6 represents that the maximum number of papers published were 57 by Emerald Group Publishing, 32 by Elsevier, 30 by Taylor & Francis, 21 each by Sage and Springer Nature and so on. 331 papers mostly published in English language were included in this analysis. Out of 61 countries, Figure 7 shows the top 10 articles from various nations. With 99 papers published, the United States of America leads the world; it is followed by India (55), the People's Republic of China (27), Canada (19), Taiwan (19), Malaysia (15), Australia (13), England (12), South Africa (12), and Germany (11).

For scientific mapping, Figure 8 shows the USA has 3681 citations, 99 distinct document kinds, and a total of 301 links from other nations and so on. Table 2 shows the top 24 countries with documents, citations, and total link strength. Figure 9 presents co-citations cited references. The co-citations of the most cited authors network are displayed in Figure 10. Out of the 20 most cited authors listed in Table 3, Igbaria, M. is the author who is most frequently cited, with 123 citations and a total link strength of 5137. Joseph, D. is second, with 95 citations and a total link strength of 4262, and Hair, Jf. is third, with 88 and a total link strength of 3736 followed by others.

The co-occurrence of keywords is shown in Figure 11. In Table 4 presents the most often used keyword, turnover, occurs 95 times, and the link strength is 696. The following keyword, with 79 occurrences and 683 total links, is job satisfaction. Turnover intention, with 60 occurrences and 492 total link strength, employee turnover, with 55 occurrences and 438 total link strength, and so on. Figure 12 displays the network of bibliographic coupling of top 10 journals. Table 5 presents the leading International Journal Of Human Capital And Information Technology Professionals which has 13 documents, 37 citations and a total link strength of 1021. Information Technology & People which has 8 documents, 271 citations and a total link strength of 1028. International Journal of Organizational Analysis has 7 documents, 55 citations and a total link strength of 683 followed by other journals.

This bibliographic study's objective is to create an organised and comprehensive perspective on the research on employee turnover. This study inspires future researchers to approach such an intriguing subject in an approachable way by using bibliographic analysis. This study produced an array of outputs and generated graphs by employing the VOSviewer program and the Web of Science database. The research questions were clearly answered in the graphs, which made it straightforward to analyse the data and make inferences. The researchers investigated 336 papers for the authors, citations, total number of publications, countries, years and the other indicators that have had the biggest impact on the emergence of reasonable concerns and problems with employee turnover in the IT industry.

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