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A Bibliometric Analysis of Employee Productivity

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ABSTRACT

Employee productivity is a key concept in the corporate world since it produces successful organizations. Different measures on employee productivity have been made throughout the years and employee productivity in manufacturing industries has been seen to have dropped at the quickest rate in recent years. Different perspectives have also been put forward by researchers throughout the years. Therefore, the objectives of this study are to analyse the evolution of article publications as well as the growth of academic research on the overall published employee productivity years. The bibliometric analysis was used in this study to analyse article publication trends for employee productivity studies across all time periods. Microsoft Excel, Harzing's Publish or Perish and VOSviewer software are used to analyse the bibliometric study. This research is conducted in quantitative techniques. Research on employee productivity has been widely conducted across the world and caused different ideas and gaps in certain fields. Additionally, this research filled the research gaps in employee productivity and added to the state of knowledge in that area.

Keywords: *bibliometric analysis, employee productivity, Harzing's Publish or Perish, Scopus database, VOSviewer*

INTRODUCTION

Employee productivity is a key concept in the corporate world since it makes organizations successful. Employee productivity is defined as the collaborative and shared efforts made by both employee and management with the goal of improving each individual's performance (Almaamari & Alaswas, 2021). According to Jamiu (2019), employee productivity is the key factor in an organization's growth and productivity. The inputs include labor, machinery, and raw materials. The products and services produced are considered as outputs. Previous researchers stated that employee productivity is a measurement or calculation of the relationship between inputs and outputs (Agarwal, Chanda & Kumar, 2020; Jamiu, 2019; Bojke, Castelli, Grasic & Street, 2017; Ailabouni, Painting & Ashton, 2009). However, different measures on employee productivity have been made throughout the years. According to Agarwal et al. (2020), employee productivity can be quantified quantitatively in numbers. Additionally, it can be measured in monetary terms such as price, profit, and cost if necessary. Bin, Lasi, and Darno (2020) mentioned that employee productivity is also measured by ta

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combination of competence, commitment, and the nature of the working environment. Furthermore, it is happening that one or more factors influence whether employee productivity rises or falls. The factors of employee productivity are universal and can be developed or gained from various aspects. The prospective factors which have been analysed by past researchers include salaries and wages (Boring, 2021; Basri, Karim, Ismail, Sulaiman, 2018), stress management (Bin et al., 2020; Mawanza, 2017; Helge, 2001), work environment (Almaamari & Alaswas, 2021; Zondo, 2020), technology (Aljaaidi, 2020; Wushe & Shenje, 2019), training (Ali, Yusoff, Ismail & Alhisani, 2019; Bharthvajan & Fabiyola, 2019), and many more. On the other hand, Daniel (2022), stated that employee productivity in the United States of America dropped at the beginning of 2022 is the quickest rate in 75 years as productivity expenditures increased while battling with an increase of Covid cases. As mentioned in the CNBC news, Wall Street had already expected a decline in productivity and an increase in unit labor expenses (Cox, 2022). Previous researchers have differing opinions regarding employee productivity (Cox, 2022; Daniel, 2022; Aljaaidi, 2020; Zondo, 2020; Bharthvajan & Fabiyola, 2019). Therefore, the objectives of this study are to analyse the evolution of article publications as well as the growth of academic research on published employee productivity overall years.

The following list of research questions was created to direct this investigation:

RQ1: What types of documents and sources are often used in article publications?
RQ2: What are the areas associated with employee productivity studies?
RQ3: What is the trend of publication in employee productivity articles each year?
RQ4: Which country has the highest publication of articles?
RQ5: Which institution has the most influential publications?
RQ6: What is the status of the latest article citation metrics analysis?
RQ7: What are the top author keywords in article publishing?

The bibliometric analysis, a quantitative technique, was used in this study to analyse article publication trends for employee productivity studies across all time periods. Bibliometrics study explores the trends in document publication and other forms of communication media using mathematical and statistical methods. In order to perform a bibliometric analysis, a total of 7 research questions were created based on the objectives. This study methodology is explained in the second section while the results of the bibliometrics study, including the descriptive data and VOSviewer maps, are presented in the third section, which is followed by a brief discussion of the analysis. The conclusions, restrictions, and suggestions for additional research are included in the last section.

METHOD

The collection of the documents was conducted on May 18th, 2022 from the Scopus database. The Scopus database is considered as one of the largest databases available that have the highest citations, a single abstract and an indexed database (Eck & Waltman, 2010). Data search focused on the collection of document types, sources, language, subject area, year, country, institution, well-known authors, most active sources, popular articles, and keywords. However, analysis and document search conducted for this paper cover article titles related to employee productivity from 1953 to 2022. The search that was performed through the Scopus database using the keywords of 'TITLE ((*employee* AND productivity*) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SRCTYPE , "j"))'. The list of journal-sourced article type documents that were extracted from the database performed a detail screening to eliminate duplicates. A total of 564 articles record was identified for this research. Additionally, the data was limited to articles for document type and journals for source type which caused 132 articles to be removed. A total of 432 articles generated from various journals were downloaded from the Scopus database and stored as research information systems (.ris) and comma-separated values (.csv) files. Microsoft Excel was used to analyse the (.csv) files, while Harzing's Publish or Perish (PoP) and VOSviewer software will be used to analyse the (.ris) data. Data mapping visualisation analysis was conducted with the help of the VOSviewer programme (Eck

& Waltman, 2010). While Harzing's PoP software was used to analyse the descriptive data and Microsoft Excel for citation analysis. Figure 1 shows how the protocol guide was used to conduct the collection of documents for this investigation.

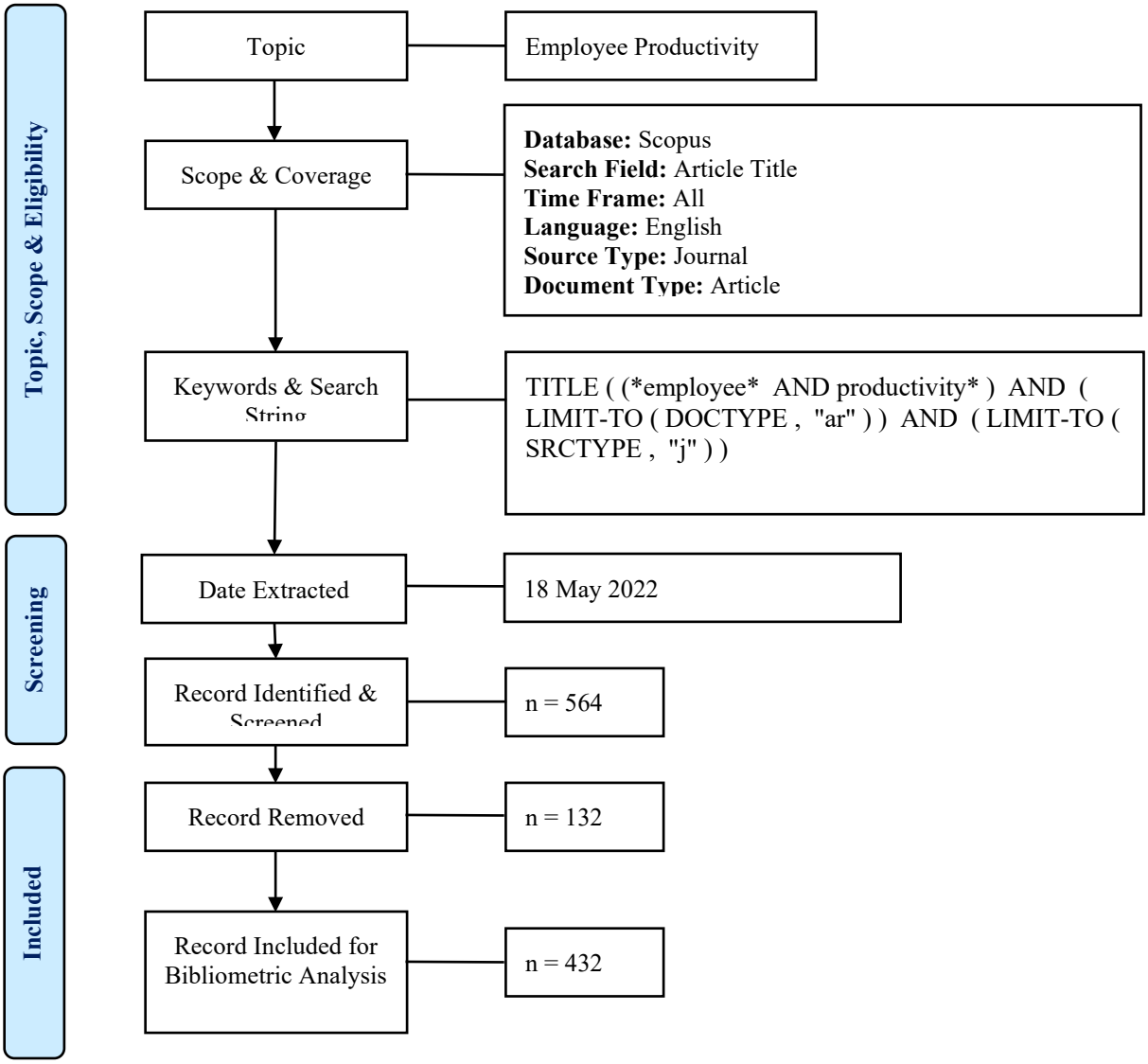

Figure 1. Flow diagram of the search strategy
Source: (Moher et al., 2009; Zakaria et al., 2021)

RESULTS

This section displays the accumulated descriptive and visual mapping results for each research question as collection of documents of May 18th, 2022 as follows:

RQ1. What Types Of Documents And Resources Are Often Used For Article Publication?

Only article type documents and journal sources that were focused specifically during the search and collection of documents. The keywords of search TITLE (*employee* AND productivity*) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SRCTYPE , "j")) were evaluated for this research. Only 432 journal sources and article-type documents from all years were found using the descriptive analysis as shown in Table 1 and Table 2.

Table 1. Document Type

Document Type	Total Publications (TP)	Percentage (%)
Article	432	100.00%
Total	**432**	**100.00**

Table 2. Source Type

Source Type	Total Publications (TP)	Percentage (%)
Journals	432	100.00%
Total	**432**	**100.00**

RQ2: What Are The Areas Associated With Employee Productivity Studies?

Based on Table 3, the majority of articles on employee productivity were published in the fields of business, management, and accounting (38.89 percent, n = 168), medicine (32.41 percent, n = 140), social sciences (16.67 percent, n = 72), economics, econometrics and finance (12.73 percent, n = 55), and health professions, physics and astronomy, and veterinary which had a 0.23 percent, n = 1 contribution to employee productivity, was the least productive area. Figure 2 illustrates the top 20 subject areas. The papers came from publications in different fields. According to the research, to remain competitive and address the shifting trends makes business as the industry with which employee productivity is most frequently connected (Hanaysha, 2016; Afshan, Chakrabarti & Balaji, 2014).

Table 3. Subject Areas

Subject Area	Total Publications (TP)	Percentage (%)
Business, Management and Accounting	168	38.89%
Medicine	140	32.41%
Social Sciences	72	16.67%
Economics, Econometrics and Finance	55	12.73%
Engineering	47	10.88%
Psychology	38	8.80%
Computer Science	25	5.79%
Decision Sciences	24	5.56%
Nursing	24	5.56%
Environmental Science	23	5.32%
Arts and Humanities	13	3.01%
Agricultural and Biological Sciences	8	1.85%
Energy	5	1.16%
Mathematics	5	1.16%
Pharmacology, Toxicology and Pharmaceutics	5	1.16%
Earth and Planetary Sciences	4	0.93%
Materials Science	4	0.93%
Multidisciplinary	4	0.93%
Biochemistry, Genetics and Molecular Biology	3	0.69%
Chemical Engineering	3	0.69%
Neuroscience	3	0.69%
Immunology and Microbiology	2	0.46%
Health Professions	1	0.23%
Physics and Astronomy	1	0.23%
Veterinary	1	0.23%

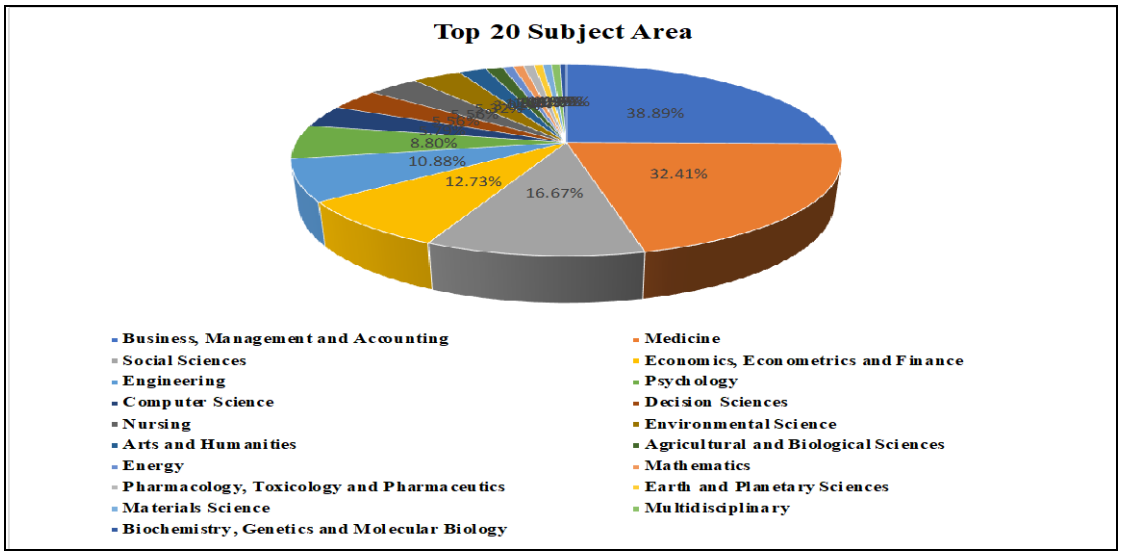

Figure 2. Top 20 Subject Areas

RQ3: What Is the Trend of Publication in Employee Productivity Articles Each Year?

The statistical trend of publications on employee productivity during the previous 20 years from 2003 until 2022 is shown in Table 4. According to the trend, most articles (n = 45) were published in 2019. The fewest papers (n = 4) were released in 2003. Meanwhile, Figure 3 shows the low, mid, and high phases of article publication and citation in the recent 20 years. Between 2003 and 2009, the total publication was at a low point and from 2010 to 2019, the trend in publications increased. However, in the recent 3 years, total publication has declined from 41 to 23 publications. With a total of 45 citations, the year 2019 had the most articles cited and followed by the year 2020 with 41 citations. In addition, Figure 3 depicts the article citation pattern from 2003 to 2022. The highest total citations are in 2004 (n = 1067) while the lowest is in 2022 (n = 9). From 2005 until 2009, the citations have shown stability. Instability was seen from 2009 until 2022. However, from the year 2006 to the year 2008, the trend showed a stability in the citation. Due to the period of time allocated until recent years, 2004 had the highest citation.

Table 4. Year of Publication

Year	TP	NCP	TC	C/P	C/CP	*h*	*g*
2022	23	3	9	0.39	3.00	2	3
2021	34	15	116	3.41	7.73	6	10
2020	41	25	118	2.88	4.72	7	9
2019	45	27	179	3.98	6.63	7	11
2018	22	20	306	13.91	15.30	10	17
2017	15	13	76	5.07	5.85	6	8
2016	18	12	260	14.44	21.67	6	16
2015	12	11	283	23.58	25.73	6	12
2014	20	18	396	19.80	22.00	12	19
2013	12	11	172	14.33	15.64	7	12
2012	10	9	170	17.00	18.89	6	10
2011	13	11	215	16.54	19.55	7	13
2010	17	13	658	38.71	50.62	11	17
2009	8	7	199	24.88	28.43	6	8
2008	6	6	234	39.00	39.00	6	6
2007	6	5	232	38.67	46.40	4	6
2006	10	9	250	25.00	27.78	8	10
2005	11	8	227	20.64	28.38	7	11
2004	8	7	1067	133.38	152.43	7	8
2003	4	4	271	67.75	67.75	4	4
Total	**432**						

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

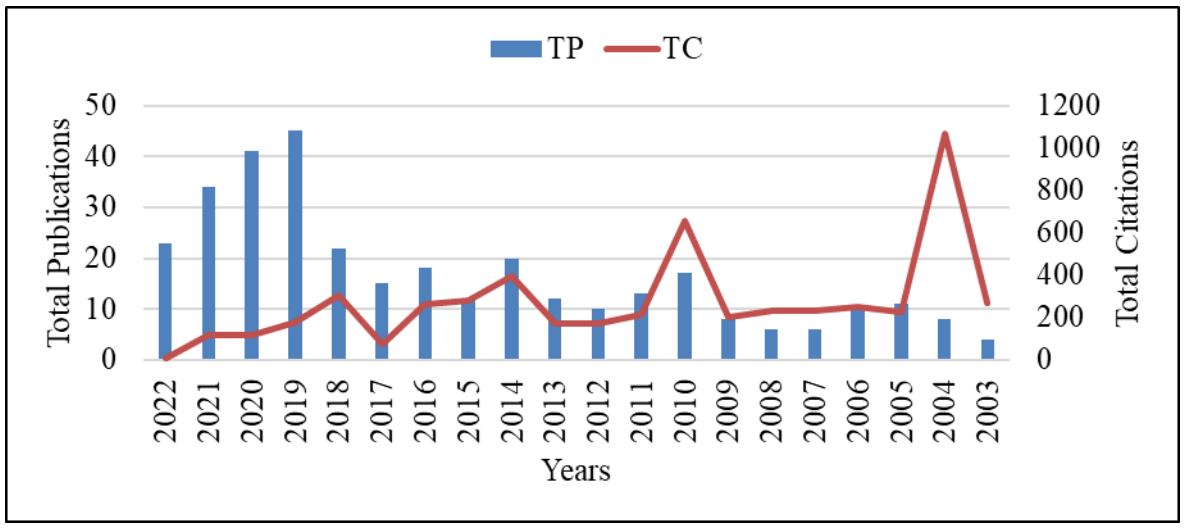

Figure 3. Total Publications and Citations by Years

RQ4: Which Country Has the Highest Publication of Articles?

Figure 4 displays the distribution of geographical publications, and Table 5 lists the top 20 most productive countries that have contributed journal articles on employee productivity. With a total of 137 articles, the United States contributed the most articles about employee productivity to the list. India came in second with 28 articles overall, followed by the United Kingdom (n = 26), Iran (n = 24), Indonesia (n = 20), and Malaysia (n = 16). With only 5 articles each, countries of Belgium, France, Germany and Poland had the lowest number of publications. Between 6 and 15 articles were supplied by the other countries. A network visualisation map of the citation by countries is shown in Figure 5. The United States is leading in total citations with a total of 4128 citations, followed by the United Kingdom as the second-highest citation country with 856 citations, the Netherlands (456), Australia (424), and Canada (271). Poland had the fewest citations, with just 12 total citations. The greatest h-index and g-index, at 35 and 61, respectively, were both recorded by the United States. The highest average number of citations per publication was found in the Netherlands (CP = 38.00), Germany (CP = 35), the United Kingdom (CP = 32.92), the United States (CP = 30.13), and Belgium (CP = 29.40). Iran had the lowest average number of citations per publisher, with 1.00 citations on average.

Table 5. Top 20 Countries contributed to the publications

Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
United States	137	117	4128	30.13	35.28	35	61
India	28	13	37	1.32	2.85	4	4
United Kingdom	26	22	856	32.92	38.91	13	27
Iran	24	11	24	1.00	2.18	3	3
Indonesia	20	10	60	3.00	6.00	5	7
Malaysia	16	6	76	4.75	12.67	5	8
Australia	15	14	424	28.27	30.29	9	15
Netherlands	12	11	456	38.00	41.45	7	12
Canada	11	9	271	24.64	30.11	5	11
South Africa	9	7	24	2.67	3.43	3	4
Sweden	9	6	210	23.33	35.00	6	9
Hong Kong	8	5	51	6.38	10.20	5	7
South Korea	8	7	132	16.50	18.86	6	8
Pakistan	7	6	35	5.00	5.83	4	5

Country	TP	NCP	TC	C/P	C/CP	*h*	*g*
Finland	6	4	128	21.33	32.00	4	6
Spain	6	5	129	21.50	25.80	3	6
Belgium	5	3	147	29.40	49.00	3	5
France	5	5	57	11.40	11.40	3	5
Germany	5	4	175	35.00	43.75	3	5
Poland	5	3	12	2.40	4.00	2	3

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

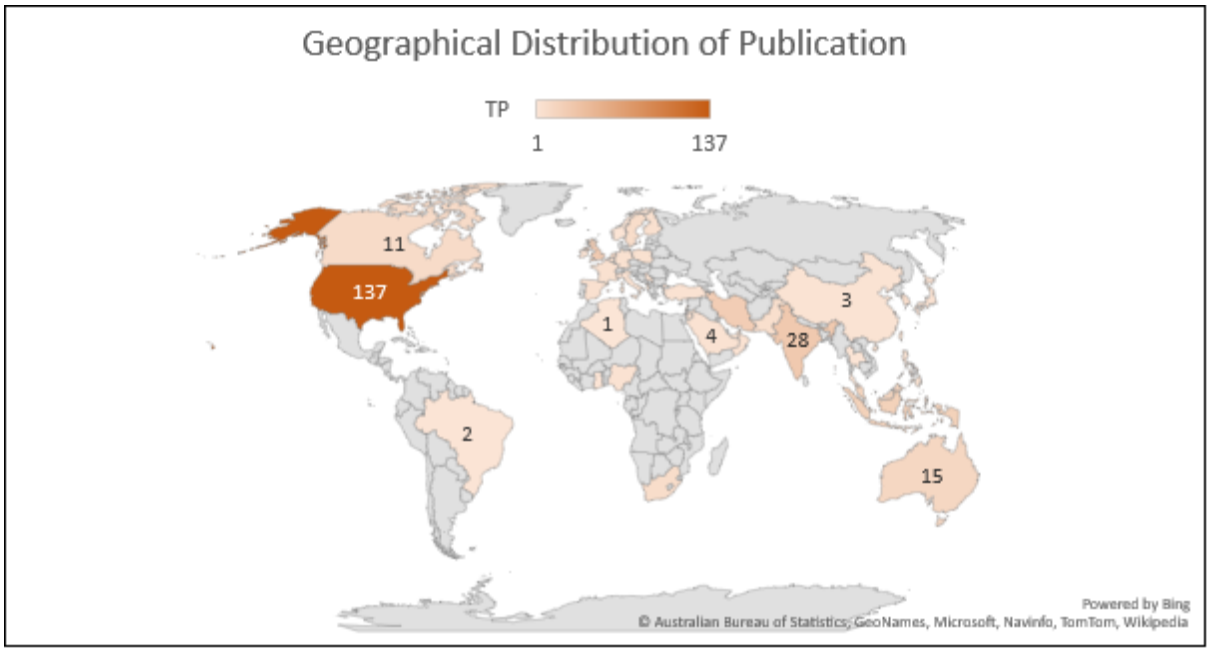

FIgure 4. Distribution of Geographical Publication

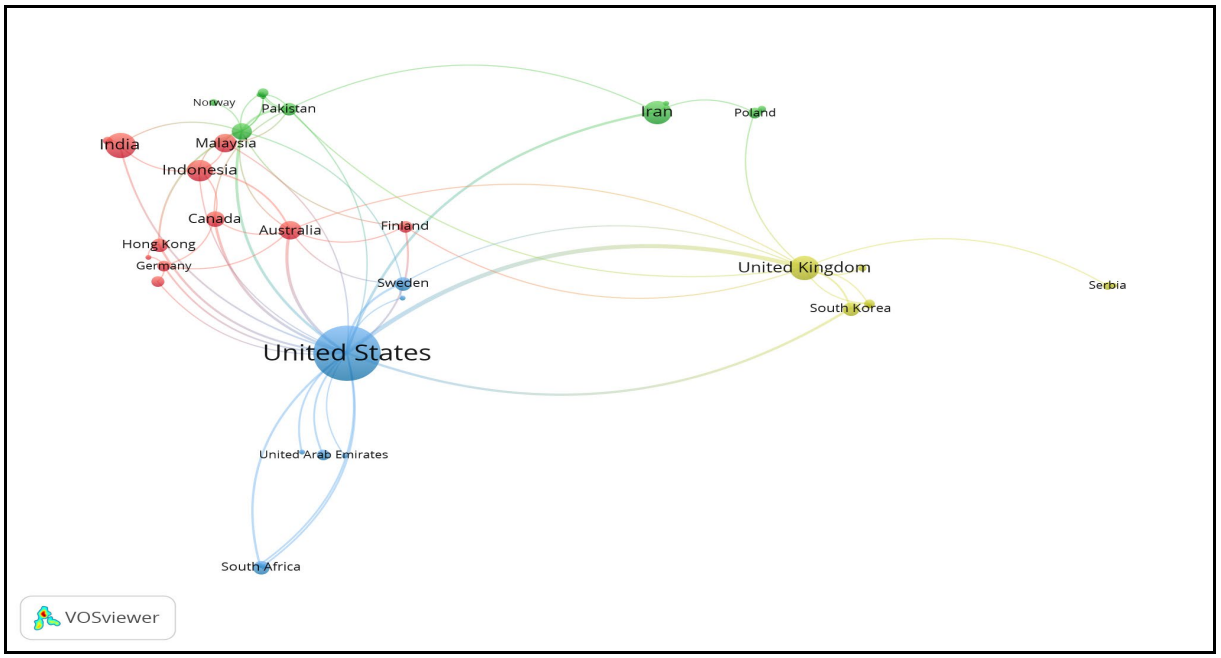

Figure 5. Network visualisation map of the citation by countries

RQ5: Which Institution Has the Most Influential Publications?

Table 6 includes the top 15 institutions with a minimum of 5 publications published. The university with the greatest number of published publications on employee productivity, with (n = 5) is Hong Kong Polytechnic University and Islamic Azad University. While the lowest number of publications published is from Integrated Benefits Institute, Villanova University, Universiteit van Amsterdam, Harvard Medical School, and London School of Economics and Political Science with (n = 3) total publications. The institution with the second-highest number of articles published was gathered by 8 institutions which is Tufts Medical Center, Amsterdam UMC - Free University Amsterdam, Karolinska Institutet, Texas A&M University, Massachusetts Institute of Technology, Healthways, Inc, Payame Noor University, and Islamic Azad University, Isfahan Branch with (n = 4) total publications.

Table 6. Most influential institutions with minimum of five publications

Affiliation	Country	TP	NCP	TC	C/P	C/CP	*H*	*g*
Hong Kong Polytechnic University	Hong Kong	5	3	19	3.80	6.33	3	4
Islamic Azad University	Iran	5	2	8	1.60	4.00	2	2
Tufts Medical Center	United States	4	4	527	131.75	131.75	4	4
Amsterdam UMC - Free University Amsterdam	Netherlands	4	4	99	24.75	24.75	3	4
Karolinska Institutet	Sweden	4	1	43	10.75	43.00	1	4
Texas A&M University	United States	4	4	27	6.75	6.75	3	4
Massachusetts Institute of Technology	United States	4	4	600	150.00	150.00	4	4
Healthways, Inc	United States	4	4	70	17.50	17.50	3	4
Payame Noor University	Iran	4	3	6	1.50	2.00	2	2
Islamic Azad University, Isfahan Branch	Iran	4	2	4	1.00	2.00	1	2
Integrated Benefits Institute	United States	3	3	35	11.67	11.67	3	3
Villanova University	United States	3	2	6	2.00	3.00	1	2
Universiteit van Amsterdam	Netherlands	3	3	98	32.67	32.67	3	3
Harvard Medical School	United States	3	1	123	41.00	123.00	1	3
London School of Economics and Political Science	United Kingdom	3	2	18	6.00	9.00	2	3

Notes: TP=total number of publications; NCP=number of cited publications; TC=total citations; C/P=average citations per publication; C/CP=average citations per cited publication; h=h-index; and g=g-index.

RQ6: What Is the Status of The Latest Article Citation Metrics Analysis?

Table 7 shows the metric citations by using Harzing's Publish or Perish software and research information systems (.ris) exported from the Scopus database. The results of the analysis reveal a total of 432 publications of papers with 8223 citations, with an average of 19.03 citations for each article. The average number of citations per year was 119.17. For all years, one author received an average of 3702.52 citations. The results of the study also demonstrate that the employee productivity survey attained a 47 h-index and an 81 g-index.

Table 7. Citations Metrics

Metrics	Data
Papers	432
Number of Citations	8223
Years	69
Citations per Year	119.17
Citations per Paper	19.03
Cites_Author	3702.52
Papers_Author	210.95
Authors_Paper	2.92
h_index	47
g_index	81

RQ7: What Are the Top Author Keywords In Article Publishing?

Table 8 and Figure 6 summarise the top author keywords used in the publications. The highest keyword with (45.83 percent, n = 198) is productivity, followed by (30.32 percent, n = 131) for human and article is (28.01 percent, n = 121). The lowest author keywords used is organization and management with 9.26 percent and the total publications is 40. Adult and male keywords are even with (18.52 percent, n = 80), while United States and workplace were also evenly used by (10.42 percent, n = 45). Figure 5 illustrates the frequencies of keywords used by the authors altogether.

Table 8. Top Keywords

Author Keywords	Total Publications (TP)	Percentage (%)
Productivity	198	45.83%
Human	131	30.32%
Article	121	28.01%
Humans	82	18.98%
Female	81	18.75%
Adult	80	18.52%
Male	80	18.52%
Efficiency	76	17.59%
Employee	65	15.05%
Middle Aged	55	12.73%
Absenteeism	50	11.57%
Employee Productivity	49	11.34%
United States	45	10.42%
Workplace	45	10.42%
Organization And Management	40	9.26%

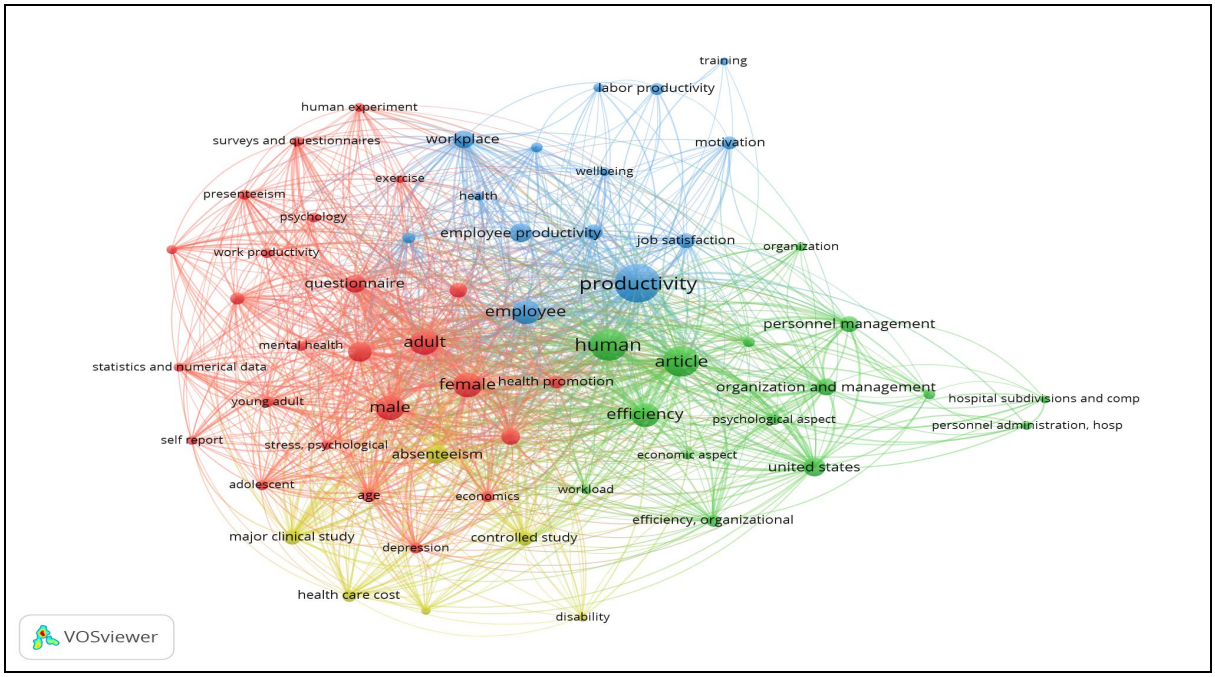

Figure 6. Network visualization map of the author keywords

DISCUSSION

The employee productivity bibliometric analysis provided some important and recent data pointing to the most recent improvements in employee productivity. There was a clearer trend in the development of employee productivity between the years of 1953 and 2022. The findings of the bibliometric study

revealed that the majority of articles on employee productivity were published in the business and management fields by 38.89 percent with 168 total publications. The least productive field was gained by three different fields which is health professions, physics and astronomy, and veterinary that contributed to employee productivity by 0.23 percent with 1 publication each. Additionally, according to the statistical pattern of papers published on employee productivity during the last 20 years, the year 2019 saw the most articles published with 45 articles, while the year 2003 saw the fewest articles published which is 4 articles. From the trend of publication, it shows that the highest total citations are in 2004 by 1067 citations while the lowest is in 2022 with 9 citations. Furthermore, with a total of 137 articles, the United States contributed the most articles about employee productivity to the list. This implies that English is the primary language used in the majority of the articles. Poland received the fewest citations, only 12 in total, while the United States had the most overall citations, amounting to 4128 total citations. Respectively, the United States recorded the highest h-index and g-index, at 35 and 61. The Netherlands had the highest average number of citations per publication with 38.00 citation average, while Iran had the lowest average number of citations per publication with 1.00 citations average. Research on employee productivity has not been conducted in several countries and the extended of the other factors have not yet developed.

According to the analysis, the institutions with the most significant publications on worker productivity are Islamic Azad University and Hong Kong Polytechnic University with a combined total of 5 publications each. Meanwhile, the Integrated Benefits Institute, Villanova University, Universiteit van Amsterdam, Harvard Medical School, and London School of Economics and Political Science have the fewest total publications which is 3. This indicates that there is a shortage of publication that has contributed towards employee productivity as there are same institution are linked to the same amount of total publication. The analysis shows the stability of publication by numerous institutions globally. The analysis of citation metrics showed a total of 432 publications of articles with 8223 citations, averaging to 19.03 citations per article. There were 119.17 citations on average per year. One author averaged 3702.52 citations throughout all years. The study's findings also show that the employee productivity survey achieved an h-index of 47 and a g-index of 81. The author uses a lot of similar keywords in their publications. Productivity is the most popular keyword 45.83 percent with 198 total publications, while management and organisation with 9.26 percent and 40 total publications are the least popular keywords for authors. Based on the study, productivity was also used in various publications that were also poorly linked to employee productivity. Despite the many unexpected situations, studies on employee productivity should be continued. This might result in its implementation inside the organization and the resolving of issues that organizations encountered during the unexpected situations and the other issue which may arise. There are numerous other elements that can affect employee productivity and influence the outcomes.

CONCLUSION

The study examined every publication on employee productivity in the Scopus database. Information of the evolution of employee productivity research articles from the many years depends on data gathered on factors like keywords, source type, document type, number of citations, highest country where the document was published, frequently used publication language, well-known author, and highest-published article. The limits of keywords during the collections of data give effect towards the analysis. The argument that this study mainly used the Scopus database is another one of its limitations. In order to gain more comprehensive data, it is advised that future studies include other databases of other document publishing, such as Web of Science, Google Scholar, and etc. Moreover, the published data for this study was only cumulatively accessed until May 18th, 2022. As a result, further research may lengthen their study periods in an effort to collect more data. Based on the keyword analysis, it is necessary to link training, organizational behavior, turnover rate, and the COVID-19 pandemic's effects on employee productivity to the field of study on employee productivity. Given that the most of employee productivity studies were carried out in a variety of industries, it would be appropriate to examine how the COVID-19 pandemic has affected employee

productivity. The extension of employee productivity to other advanced organizations, such as the security forces and other government sectors also need to be considered. In conclusion, bibliometric analysis gives a new insight and details of employee productivity throughout the years and by many indicators such as total publication, total citation, h-index, g-index and many more. The results of this study explore the employee productivity by different countries, authors, keywords and many more. Additionally, this research filled research gaps in the field of employee productivity and added to the current knowledge in that area.

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AUTHORS' CONTRIBUTION

Annuar, N. and Md Sabri, S. conceived and planned the research. Abdul Rahman, A. S. carried out the research and data preparation. Md Sabri, S. contributed to the interpretation of the results. Abdul Rahman, A. S. and Annuar, N. took the lead in writing the manuscript. All authors provided critical feedback and helped shape the research, analysis and manuscript.

CONFLICT OF INTEREST DECLARATION

We certify that the article is the Authors' and Co-Authors' original work. The article has not received prior publication and is not under consideration for publication elsewhere. This research has not been submitted for publication nor has it been published in whole or in part elsewhere. We testify to the fact that all authors have contributed significantly to the work, validity and legitimacy of the data and its interpretation for submission to Jurnal Intelek.

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