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A Bibliometric Analysis on Performance Appraisal

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Abstract

One of the most significant techniques for evaluating employee performance is performance appraisal, which should be aligned with the organization's goals. This topic is vital in providing knowledge on the evolution of performance appraisal research articles. This study aims to assess the publications of research articles on performance appraisal over the past 20 years (2001 to 2020). Hence, the bibliometric analysis method was performed on articles retrieved from the Scopus database and a total of 1976 articles were analysed. Information obtained such as keywords, source type, number of citations, frequently used publication language, famous author and highest published articles. The annual trend indicated that the frequency of performance appraisal studies was the highest in the years 2008 and 2010. Furthermore, the nursing profession and the medical line were the most studied fields concerning performance appraisal compared to the other disciplines. Based on the keyword analysis, the field of study on performance appraisal needs to be further expanded to training, organizational commitment, fairness, general practice, turnover intentions, and COVID-19 pandemic impact performance appraisal. This study also contributed to the scholarly knowledge in performance appraisal and has identified research gaps to be addressed in the future.

Keywords: Performance Appraisal, Bibliometric Analysis, VOSviewer, Harzing's Publish or Perish, Scopus Database

Introduction

Essential performance appraisal in an organization often leads to conflicts among employees and supervisors (Ahmad, 2019; Rana & Singh, 2021). The goals and objectives of the organization should be used as a signpost to ensure an accurate evaluation of the performance appraisal procedure without conflicts (Ahmad, 2019). The purpose of performance appraisal is to provide feedback, compare before and after the performance, assess employee performance, decide on layoffs, promotions, training, and workplace changes (Adler et al., 2016; Aguinis & Burgi-Tian, 2021; DeNisi & Gonzalez, 2017; Mok, 2021; Murphy, 2020; Rana & Singh, 2021). Moreover, performance appraisal is also a method to determine the strengths and weaknesses of employees at their jobs (Aguinis & Burgi-Tian, 2021; Ahmad, 2019; Murphy, 2020).

Performance appraisal which is also regarded as an employee-focused performance process assesses the employee performance based on pre-determined annual work targets

(Ahmad, 2016; Islami et al., 2018). Periodic feedback on work targets in stages enables employee performance to be monitored more frequently and continuously to ensure positive work outcomes (Aguinis & Burgi-Tian, 2021; Budworth et al., 2019; Longenecker & Fink, 2017). Due to the latest technological developments, performance appraisal systems now use electronic and web-based performance appraisal systems to ensure prompt recording of employee performance information (Ullah et al., 2021). Such promptness allows employees to be more satisfied with the results of their performance appraisal based on the actual work results (DeNisi & Smith, 2014). Moreover, systematic performance appraisal enables employees to feel motivated to improve their job performances in a healthy, harmonious, and competitive environment.

In general, employees will be more motivated if the quality of their work is assessed systematically, clearly, and fairly (Behery, 2021; DeNisi & Smith, 2014; Longenecker & Fink, 2017). Clear feedback communicated to the employees helps them to plan, improve, perform better, and be motivated (Ahmad, 2016; Behery, 2021; Budworth et al., 2019; Chahar, 2020; Longenecker & Fink, 2017). According to Chahar (2020), supervisors should establish good communication and work environment during the performance appraisal process. Subsequently, employees will be more motivated to contribute by engaging with the organization (Memon et al., 2020). It also allows them to be more confident, dedicated, satisfied, and work longer with the organization (Memon et al., 2020). It has been proven in previous studies that an effective performance appraisal system can positively affect employee motivation and improve job performance (Chahar, 2020; Longenecker & Fink, 2017).

Nevertheless, some organizations practice subjective assessment. Subjective evaluation is often used to make some crucial decisions in an organization. The subjectivity of performance appraisal that led to the dissatisfaction of many employees prompted many researchers to conduct closely related studies on procedural errors, biases, and inaccuracies in a performance appraisal that often causes conflicts in organizations (Ahmad, 2019; Denisi et al., 2017). Hence, performance appraisal is a critical issue disputed among employees (Ahmad, 2019; Behery, 2021). However, it also carries valuable rewards for employees to increase work motivation for better productivity (Adler et al., 2016) and balance employee performance in line with organizational goals (Ahmad, 2016; Murphy, 2020).

On the other hand, the Social Exchange Theory explained that a fair process encourages employees to be more positive and motivated (Belsito & Reutzel, 2019). While an unfair performance appraisal process could urge employees to exhibit negative behaviors toward their jobs as they lose trust in supervisors (Belsito & Reutzel, 2019). Outcomes from performance appraisal enable the human resource management to examine whether employees require appreciation, training or counselling (Ahmad, 2016; Mok, 2021; Murphy, 2020; Rana & Singh, 2021). Therefore, the objectives of this study include examining and analysing the development of article publications together with the evolution of scientific research on performance appraisal published over 20 years. The research questions developed to guide this study are as below:

RQ1: What types of documents and sources are often used in article publications?

RQ2: What is the most commonly used language for such article publications?

RQ3: What are the areas associated with performance appraisal studies?

RQ4: What is the trend of publication in performance appraisal articles each year?

RQ5: Which country has the highest publication of articles?

- RQ6: Which institution has the most influential publications?
RQ7: Who is the most effective and productive author?
RQ8: Which sources are most active in publishing articles?
RQ9: What is the status of the latest article citation metrics analysis?
RQ10: Which article is the most popular and has the highest citations?
RQ11: What are the most popular author keywords in article publishing?

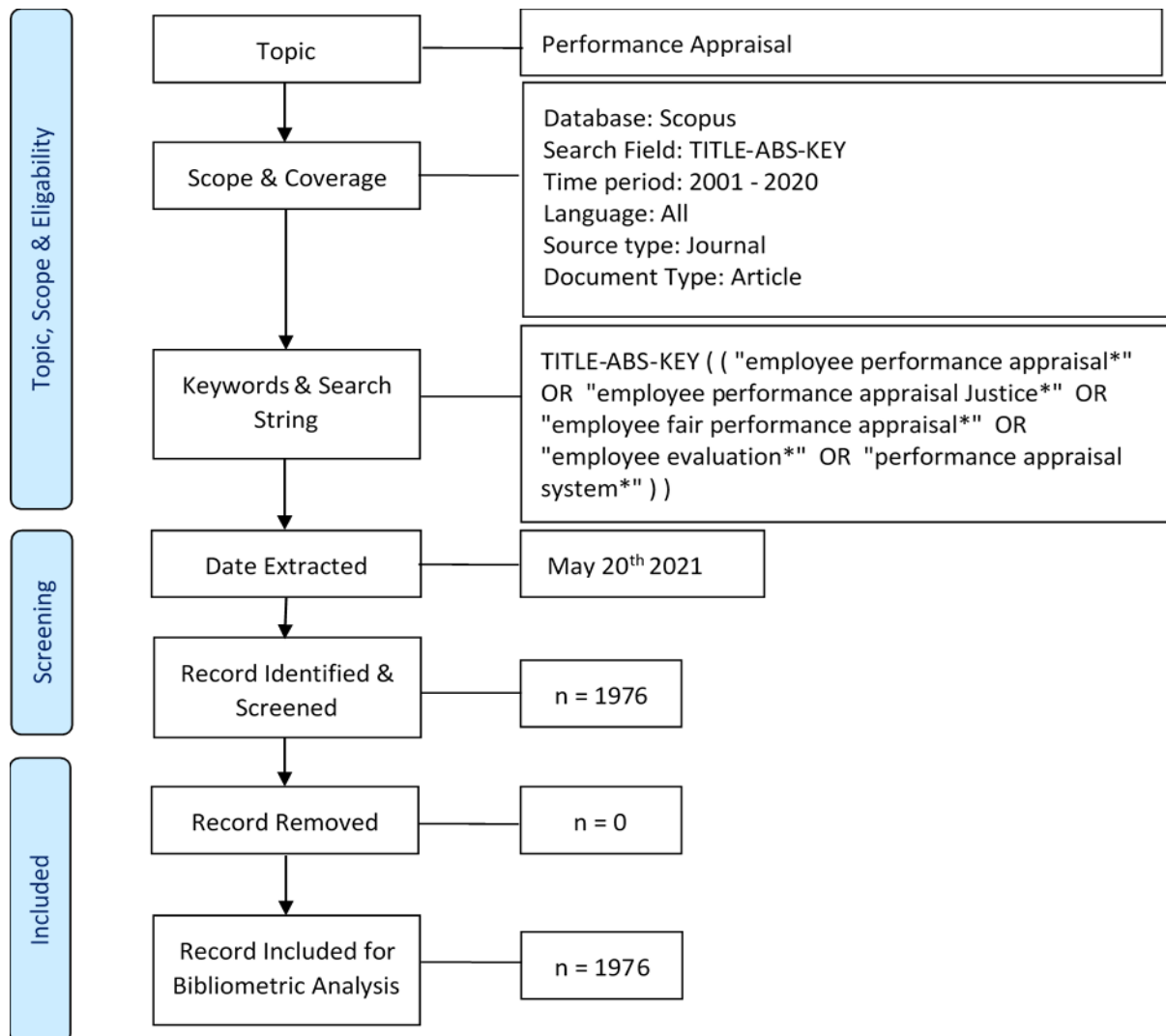
This study employed the bibliometric analysis, a quantitative method to review article publication trends for performance appraisal studies over 20 years (2001-2020). According to Pritchard (1969), bibliometrics analysis uses mathematical and statistical approaches to explore the trends of document publication and various types of communication media. A total of 11 research questions were constructed based on the study objectives and research questions to facilitate bibliometric analysis. The second section of this study describes the methodology of the study. The third section presents the findings obtained from the bibliometrics analysis, including the descriptive data and Vosviewer maps, followed by a brief discussion of the analysis. The final section comprises the conclusions, limitations, and propositions for future research.

Methodology

The collection of documents from the Scopus database was conducted on May 20th, 2021. The Scopus database is the most extensive database using a single abstract, indexed database and has the highest citations (Burnham, 2006). Document data search focused on document types, sources, language, field, year, country, institution, well-known authors, most active sources, popular articles, and keywords. However, analysis and document search only involved themes with titles, abstracts, and keywords related to performance appraisal from 2001 to 2020. The search through the Scopus database was performed using the TITLE-ABS-KEY (" employee performance appraisal*"OR" employee performance appraisal Justice*"OR" employee fair performance appraisal*"OR" employee evaluation*"OR" performance appraisal system*").

The screening was scrutinised to remove duplicates in the list of journal-sourced article type documents retrieved from the database. A total of 1976 articles from various journals were exported and stored in comma-separated values (.csv) and research information systems (.ris) files types from the Scopus database. The (.csv) files were analysed using Microsoft Excel software, while the (.ris) files will be analysed using Harzing's Publish or Perish (PoP) and VOSviewer software. The VOSviewer software was used to perform data mapping visualisation analysis (Van Eck & Waltman, 2020; Wong, 2018). Whereas the descriptive data were analysed using Microsoft Excel and citation analysis using Harzing's PoP software. Figure 1 illustrates the document search for this study using the protocol guide.

Figure 1. Search strategy flow diagram.
 Source: (Moher et al., 2009; Zakaria et al., 2021)



Results

This section shows the descriptive and visualisation mapping results, cumulatively up until May 20th, 2021 based on each research question as follows:

RQ1. What types of documents and resources are often used for article publication?

Only article type documents and journal sources focusing specifically on the search TITLE-ABS-KEY ("employee performance appraisal*" OR "employee performance appraisal Justice*" OR "employee fair performance appraisal*" OR "employee evaluation*" OR "performance appraisal system*") were included in this study. Based on the descriptive analysis, only 1976 article type documents and journal sources were identified in 20 years.

RQ2: What is the most commonly used language for such article publications?

Table 1 lists the 15 languages used to publish articles on performance appraisal. According to Table 1, most of the articles were written in English (94.11%, n = 1871), followed by German (1.71%, n = 34), Chinese (1.16%, n = 23), and Portuguese (1.16%, n =

23). Meanwhile, Czech, Danish, Lithuanian, Turkish, and Ukrainian were the languages with the least number of articles published (0.05%, n=1 each). No articles were available in two languages.

English is the most preferred publication language because it is the language of international communication. The use of English in the publication of articles extends the reach of the articles to readers from across the globe. The use of a widely accepted language could increase citations and subsequently increase the "h" and "g" indexes. Moreover, most journals only accept English as the language of publication.

Table 1. Language

Language	Total number of publications (TP)	Percentage (%)
English	1871	94.11
German	34	1.71
Chinese	23	1.16
Portuguese	23	1.16
Russian	7	0.35
French	6	0.30
Italian	5	0.25
Spanish	5	0.25
Korean	4	0.20
Japanese	3	0.15
Polish	2	0.10
Czech	1	0.05
Danish	1	0.05
Lithuanian	1	0.05
Turkish	1	0.05
Ukrainian	1	0.05

RQ3: What are the areas associated with performance appraisal studies?

Table 2 reveals that most articles on performance appraisal were published in Medicine (44.03%, n = 870), followed by Psychology (19.84%, n = 392), Nursing (17.97%, n = 355), Social Sciences (17.36%, n = 343), and Business, Management, and Accounting (14.12%, n = 279). The area that contributed the least in performance appraisal was Chemical Engineering (0.35%, n = 7). Publications in other areas contributed between 0.56% to 3.24% of the articles. Based on the findings, performance appraisal is most commonly associated with Medicine due to the need to maintain integrity, quality, and life safety.

Table 2. Subject area

Subject Area	TP	Percentage (%)
Medicine	870	44.03
Psychology	392	19.84
Nursing	355	17.97
Social Sciences	343	17.36
Business, Management and Accounting	279	14.12
Engineering	64	3.24
Arts and Humanities	55	2.78
Computer Science	48	2.43
Economics, Econometrics and Finance	47	2.38
Health Professions	38	1.92
Biochemistry, Genetics and Molecular Biology	32	1.62
Decision Sciences	30	1.52
Multidisciplinary	29	1.47
Environmental Science	26	1.32
Agricultural and Biological Sciences	22	1.11
Dentistry	14	0.71
Mathematics	14	0.71
Neuroscience	12	0.61
Pharmacology, Toxicology and Pharmaceutics	11	0.56
Chemical Engineering	7	0.35

RQ4: What is the trend of publication in performance appraisal articles each year?

Table 3 illustrates the statistical trend of publications in performance appraisal over the past 20 years (2001 until 2020). Based on the trend, the highest number of articles (n = 136) were published in 2008 and 2010. Meanwhile, the lowest number of articles was published in 2017 (n = 56). Accordingly, Figure 2 depicts three phases of article publication, namely low, medium, and high phases. The low phase of publishing occurred between 2001 to 2006, while the publication trend increased from the year 2007 to 2013.

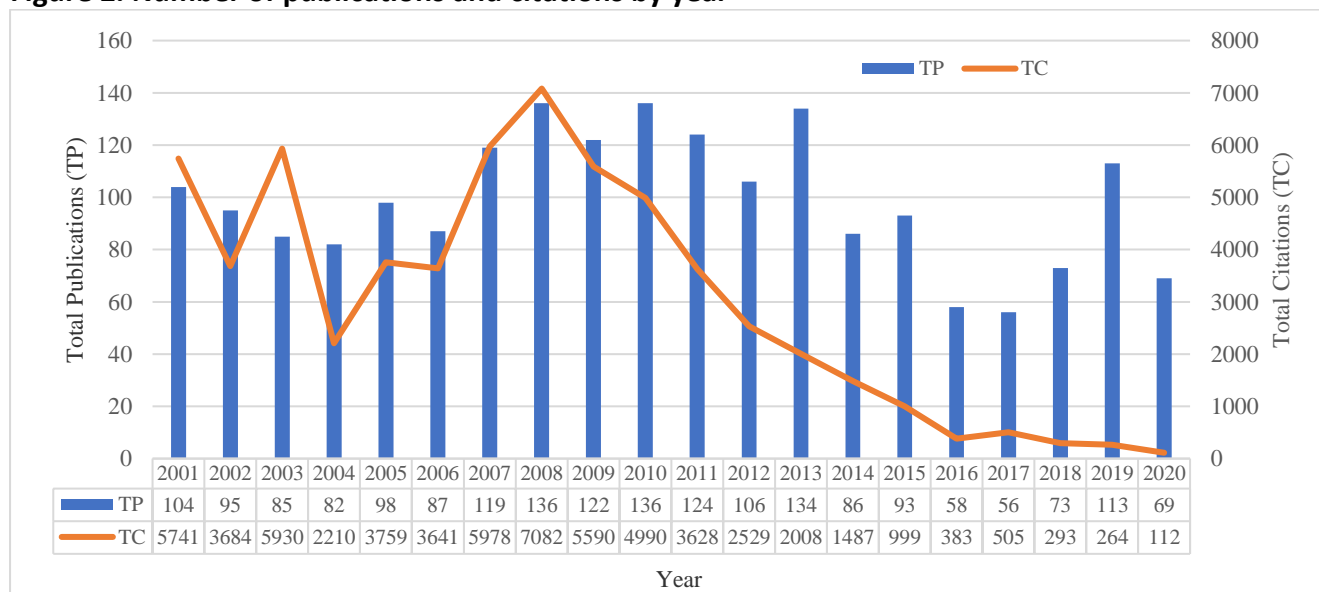
The highest number of articles were cited in the year 2008 with a total of 7082 citations. The second-highest number of citations was recorded in 2007 with 5978 citations, followed by 5930 citations in 2003. According to Figure 2, the trend of article citations indicated instability between 2001 to 2006. However, the number of citations increased from the year 2006 to 2008. Whereas, a continuous downward trend emerged between 2009 to 2020. Figure 2 also indicated a relatively high issuance between 2008 to 2013. Consequently, 2008 recorded the highest citation due to the increased allocation in the past five years.

Table 3. Year of publication

Year	TP	NCP	TC	C/P	C/CP	h	g
2020	69	30	112	1.62	3.73	6	8
2019	113	68	264	2.34	3.88	8	11
2018	73	55	293	4.01	5.33	9	12
2017	56	45	505	9.02	11.22	12	20
2016	58	44	383	6.60	8.70	11	17
2015	93	75	999	10.74	13.32	18	28
2014	86	66	1487	17.29	22.53	21	35
2013	134	112	2008	14.99	17.93	27	40
2012	106	82	2529	23.86	30.84	26	48
2011	124	98	3628	29.26	37.02	31	59
2010	136	110	4990	36.69	45.36	33	69
2009	122	101	5590	45.82	55.35	40	74
2008	136	109	7082	52.07	64.97	32	83
2007	119	101	5978	50.24	59.19	38	76
2006	87	74	3641	41.85	49.20	30	60
2005	98	69	3759	38.36	54.48	26	61
2004	82	55	2210	26.95	40.18	22	46
2003	85	62	5930	69.76	95.65	23	77
2002	95	64	3684	38.78	57.56	22	60
2001	104	72	5741	55.20	79.74	32	75
Total	1976						

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

Figure 2. Number of publications and citations by year



RQ5: Which country has the highest publication of articles?

Table 4 outlines the top 20 most productive countries in contributing journal articles on performance appraisal and figure 3 shows the distribution of geographical publications.

Of the list, the United States contributed the highest number of articles on performance appraisal, with a total of 777 articles. Followed by the United Kingdom with a total of 201 articles, and Australia (n = 81), China (n = 81), Netherlands (n = 73) and Canada (n = 66). Meanwhile, France and Japan were the two countries with the lowest publications with 15 articles each. The other countries contributed between 16 to 49 articles.

Figure 4 shows a visualisation map of the citation network by country. On the other hand, the United States also recorded the highest citations for 20 years with a total of 43818 citations. The second-highest country with high citations was the United Kingdom, with 5234 citations, followed by the Netherlands (n = 4492), Canada (n = 2832), Germany (n = 2075) and Australia (n = 1983). Pakistan was the country with the lowest citation, 112 citations. Moreover, the United States also recorded the highest h-index and g-index, 109 and 191 respectively. Whereas, some countries that published fewer articles recorded the highest average citations per publication, including France (CP = 69.50), Belgium (CP = 52), and Hong Kong (CP = 69.50). The lowest average citation per publisher was from Iran, with an average citation of 4.59.

Table 4. Top 20 countries contributing to publications

Country	TP	NCP	TC	C/P	C/CP	h	g
United States	777	689	43818	56.39	63.60	109	191
United Kingdom	201	179	5234	26.04	29.24	37	66
Australia	81	78	1983	24.48	25.42	22	43
China	81	57	981	12.11	17.21	14	30
Netherlands	73	73	4492	61.53	61.53	28	66
Canada	66	62	2832	42.91	45.68	23	53
India	49	26	241	4.92	9.27	9	14
Germany	38	36	2075	54.61	57.64	18	38
Brazil	27	21	170	6.30	8.10	5	12
Iran	27	17	124	4.59	7.29	7	10
Malaysia	25	17	173	6.92	10.18	8	13
Hong Kong	24	24	1668	69.50	69.50	19	24
Taiwan	24	24	343	14.29	14.29	11	17
South Korea	22	22	667	30.32	30.32	10	22
Belgium	20	20	1040	52.00	52.00	15	20
Italy	18	14	186	10.33	13.29	9	13
Pakistan	16	9	112	7.00	12.44	5	10
Spain	16	13	447	27.94	34.38	8	16
France	15	14	817	54.47	58.36	9	15
Japan	15	12	635	42.33	52.92	8	15

Figure 3. Distribution of Geographical Publications

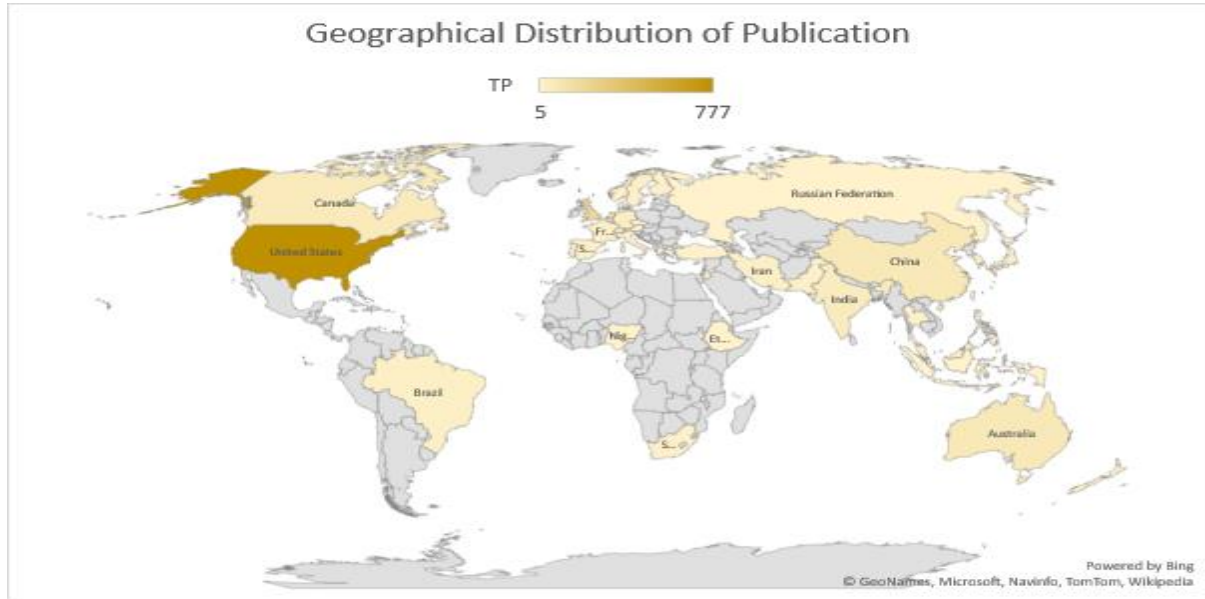
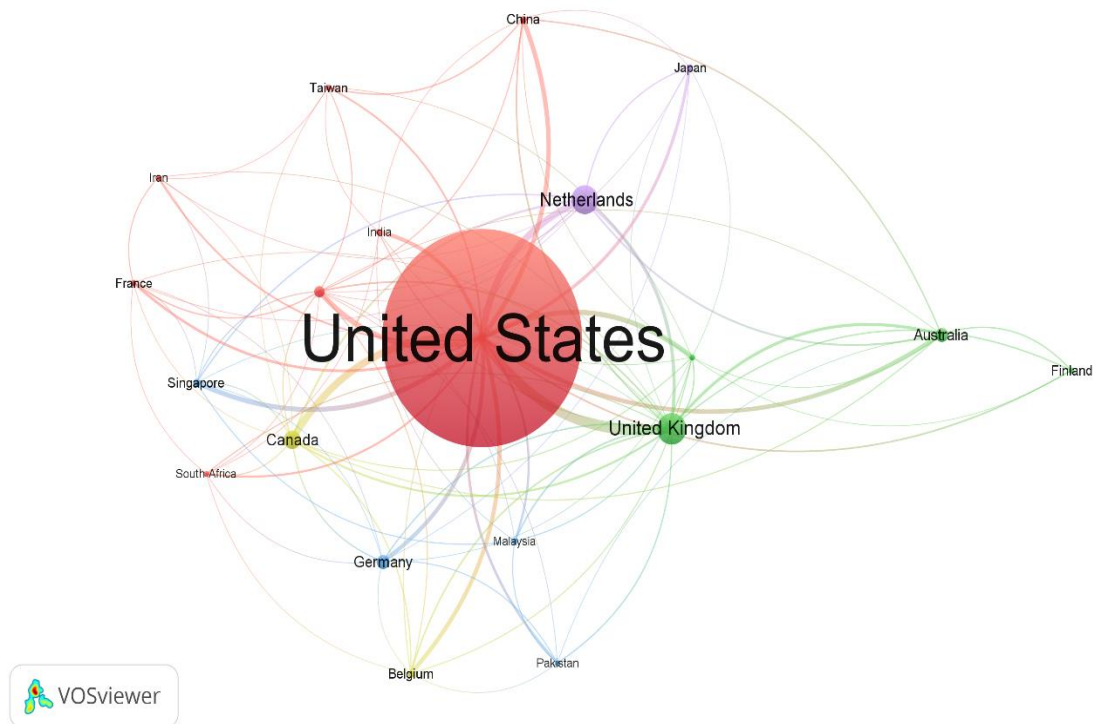


Figure 4. Visualisation map of citation network by country



RQ6: Which institution has the most influential publications?

Table 5 lists the top 21 most influential institutions with a minimum publication of 10 articles. According to the table, Texas A&M University is the institution with the highest number of published articles on performance appraisal ($n = 18$). The Harvard Medical School was the institution with the second-highest number of published articles ($n = 17$). Followed by the University of Georgia ($n = 16$), Michigan State University ($n = 16$), Maastricht University

(n = 15), and the University of Iowa (n = 15). The other institutions recorded 10 to 14 articles in performance appraisal.

As for the average citations per publication for 20 years, Universiteit van Amsterdam, the Netherlands, scored 159.86 citations despite having only 14 articles. Contrarily, Texas A&M University published the highest number of articles (n = 18), with a lower average citation per publication of 151.67. The institution with the lowest average citation per publication was the N.H.S. Education for Scotland, with only 8.36 citations compared to V.A. Medical Centre (average per publication of 24.10 citations) with the lowest number of articles (n = 10).

Table 5. Most influential institutions with a minimum of ten publications

Institution	TP	Country	NCP	TC	C/P	C/CP	h	g
					151.6	151.6		
Texas A&M University	18	United States	18	2730	7	7	15	18
	1							
Harvard Medical School	7	United States	17	1313	77.24	77.24	14	17
	1				120.4	120.4		
University of Georgia	6	United States	16	1927	4	4	13	16
Michigan State University	1				151.3	151.3		
	6	United States	16	2421	1	1	15	16
	1							
Maastricht University	5	Netherlands	15	426	28.40	28.40	10	15
	1							
University of Iowa	5	United States	15	1283	85.53	85.53	10	15
Universiteit van Amsterdam	1				159.8	159.8		
	4	Netherlands	14	2238	6	6	11	14
The University of Manchester	1	United Kingdom	14	289	20.64	20.64	9	14
	4							
The University of Sheffield	1	United Kingdom	13	487	37.46	37.46	8	13
	3							
	1							
Universiteit Gent	3	Belgium	13	745	57.31	57.31	11	13
	1				109.5	119.4		
Florida State University	2	United States	11	1314	0	5	11	12
Virginia Commonwealth University	1					107.6		
	2	United States	11	1184	98.67	4	8	12
	1							
Monash University	2	Australia	12	148	12.33	12.33	8	12
University of Minnesota Twin Cities	1							
	2	United States	12	886	73.83	73.83	11	12
NHS Education for Scotland	1	United Kingdom	10	92	8.36	9.20	6	9
	1							
The University of Arizona	1	United States	11	1462	1	1	9	11
	1				132.9	132.9		

	1				117.2	117.2		
University of Toronto	1	Canada	11	1290	7	7	8	11
University of Melbourne	1	Australia	11	294	26.73	26.73	9	11
Pennsylvania State University	1					103.3		
	0	United States	8	827	82.70	8	8	10
Cornell University	1							
	0	United States	9	651	65.10	72.33	8	10
VA Medical Centre	1							
	0	United States	8	241	24.10	30.13	6	10

RQ7: Who is the most effective and productive author?

The top 20 most productive authors with the publication on performance appraisal are listed in Table 6. The leading author has published eight articles, while the author with the least number of articles published four. The famous author identified in this study was Filip Lievens with eight articles over 20 years. The eight articles by this author were cited 492 times, with the average citation per article publication at 61.50. However, Timothy A. Judge only published six articles but yielded the highest citations of 3751, with the average citation per article publication at 625.17 citations for 20 years. On the other hand, authors Adam M. Grant, Russell S. Cropanzano, and Lawrence Alan Witt also scored the highest average citations per article, between 137.17 to 369.40. Furthermore, among the 20 listed authors, the authors Toni C. Talbot and Martina Weber who have published five articles each do not have any citations. Contrarily, Alexander P.J. Ellis who published the least number of articles recorded 164 citations with an average of 41 citations per article.

Table 6. Most productive authors

Authors	Affiliation	Country	TP	NCP	TC	C/P	C/CP	h	g
Lievens, F.	Singapore Management University	Singapore	8	8	492	61.50	61.50	8	8
Archer, J.	Monash University	Australia	6	6	107	17.83	17.83	5	6
Dexter, F.	University of Iowa	United States	6	6	54	9.00	9.00	4	6
Hindman, B.J.	University of Iowa	United States	6	6	54	9.00	9.00	4	6
Judge, T.A.	Fisher College of Business	United States	6	6	3751	625.17	625.17	6	6
Witt, L.A.	University of Houston	United States	6	6	823	137.17	137.17	6	6
Cameron, N.	NHS Education for Scotland	United Kingdom	5	4	47	9.40	11.75	3	5
Ferris, G.R.	Florida State University	United States	5	5	642	128.40	128.40	5	5
Grant, A.M.	University of Pennsylvania	United States	5	5	1847	369.40	369.40	5	5
Kacmar, K.M.	McCoy College of Business	United States	5	5	787	157.40	157.40	5	5

Shaneberger, K.	Surgical Services Holland Hospital	United States	5	2	3	0.60	1.50	1	1
Talbot, T.	Human Resource Management Services, LLC	United States	5	0	0	0.00	0.00	0	0
Weber, M.	Recht in der Gesundheits- und Krankenpflegeausbildung	Germany	5	0	0	0.00	0.00	0	0
Arah, O.A.	UCLA Fielding School of Public Health	United States	4	4	169	42.25	42.25	4	4
Coberley, C.R.	Concert Genetics, Inc, Franklin	United States	4	4	106	26.50	26.50	4	4
Cropanzano, R.	Leeds School of Business	United States	4	4	1148	287.00	287.00	4	4
Duffin, C.	Royal College of Nursing	Great Britain	4	2	3	0.75	1.50	1	1
Dunning, D.G.	UNMC College of Dentistry	United States	4	2	6	1.50	3.00	1	2
Durham, T.M.	University of Nebraska Medical Center	United States	4	2	6	1.50	3.00	1	2
Ellis, A.P.J.	Eller College of Management	United States	4	4	164	41.00	41.00	4	4

RQ8: Which sources are most active in publishing articles?

Table 7 reveals the 20 most active sources that contributed to publishing research articles related to performance appraisal. The minimum number of articles published by respective journals was 11 articles, while the maximum number was 222 articles. The Journal of Applied Psychology was the most active journal with 222 articles and 34703 citations. Moreover, the publisher from the American Psychological Association was identified as the most popular publisher in performance appraisal having published articles from the Journal of Applied Psychology and the Journal of Occupational Health Psychology. Articles published through the American Psychological Association were also observed to score the highest citations, namely the Journal of Applied Psychology (34703) and the Journal of Occupational Health Psychology (1617). The lowest citation among these 20 sources was from Pflege Zeitschrift with 0 citations for the 17 articles published by Springer Nature. Overall, a majority of the articles in the field of performance appraisal were published in the Journal of Applied Psychology because this journal specialises in publishing articles related to human behavior and its relationship with occupational and organizational phenomena.

Table 7. Most Active Source Titles

Active Source Titles	TP	Publisher	TC
Journal of Applied Psychology	222	American Psychological Association	34703
Nursing Standard Royal College of Nursing Great Britain 1987	24	Royal College of Nursing Publishing Co.	44
Nursing Management	23	Wolters Kluwer Health	96
Education For Primary Care	20	Taylor & Francis	84
Journal of Nursing Administration	19	Wolters Kluwer Health	440
Journal of Occupational Health Psychology	18	American Psychological Association	1617
Nursing Times	18	Emap Media Ltd.	17
Journal of Psychology Interdisciplinary and Applied	17	Taylor & Francis	337
Pflege Zeitschrift	17	Springer Nature	0
Work	17	IOS Press	100
Journal For Nurses in Staff Development	16	Wolters Kluwer Health	101
Medical Education	16	Wiley-Blackwell	562
Health Service Journal	15	Emap Healthcare Ltd.	19
Journal of Occupational and Environmental Medicine	15	Wolters Kluwer Health	447
Journal of Nursing Management	14	Wiley-Blackwell	283
International Journal of Human Resource Management	13	Taylor & Francis	263
Psychological Reports	13	SAGE	50
Health Care Manager	12	Wolters Kluwer Health	77
Academic Medicine	11	Wolters Kluwer Health	164
Nursing Management Harrow London England 1994	11	Royal College of Nursing Publishing Co.	17

RQ9: What is the status of the latest article citation metrics analysis?

Table 8, metric citations were analyzed using Harzing's Publish or Perish software by importing research information systems (.ris) exported from the Scopus database. Accordingly, the analysis findings show a total of 1976 publications of articles with 60813 citations, with the average citation for each article being 30.78 citations. Meanwhile, the average citation for each year was 3040.65. Meanwhile, the average citation for one author was 26058.33 over ten years. Thus, the study's findings also show that the performance appraisal survey achieved 124 h-index and 205 g-index.

Table 8. Metric Citations

Metrics	Data
Publication years	2001-2020
Citation years	20 (2001-2020)
Papers	1976
Citations	60813
Citations/year	3040.65
Citations/paper	30.78
Citations/author	26058.33
Papers/author	991.69
h-index	124
g-index	205

RQ10: Which article is the most popular and has the highest citations?

Table 9 indicates the top 20 articles with the highest citations in performance appraisal. The article with the highest citation over 20 years was a meta-analytical research article written by Judge et al. (2001) entitled "*The job satisfaction-job performance relationship: A qualitative and quantitative review.*" This article also scored the highest average annual citation of 102.9.

Table 9. Articles with the highest citations

	Authors	Title	Year	Citations	Citation Per Year
1	T.A. Judge, J.E. Bono, Thoresen, Patton	The job satisfaction-job performance relationship: A qualitative and quantitative review	2001	2058	102.9
2	C.K.W. De Dreu, L.R. Weingart	Task versus relationship conflict, team performance, and team member satisfaction: A meta-analysis	2003	1556	86.44
3	M. Rotundo	The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: a policy-capturing approach.	2002	739	38.89
4	R. Cropanzano, D.E. Rupp, Z.S. Byrne	The relationship of emotional exhaustion to work attitudes, job performance, and organizational citizenship behaviors	2003	721	40.06
5	A.M. Grant	Does Intrinsic Motivation Fuel the Prosocial Fire? Motivational Synergy in Predicting	2008	717	55.15

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6	D.L. Joseph, D.A. Newman	Emotional Intelligence: An Integrative Meta-Analysis and Cascading Model	2010	707	64.27
7	S.C. Payne, S.S. Youngcourt, J.M. Beaubien	A meta-analytic examination of the goal orientation nomological net	2007	675	48.21
8	T.A. Judge, R. Ilies	Relationship of personality to performance motivation: A meta-analytic review	2002	655	34.47
9	D.S. Chiaburu, D.A. Harrison	Do Peers Make the Place? Conceptual Synthesis and Meta-Analysis of Coworker Effects on Perceptions, Attitudes, O.C.B.s, and Performance	2008	585	45
10	T.W.H. Ng, D.C. Feldman	The Relationship of Age to Ten Dimensions of Job Performance	2008	560	43.08
11	H. Liao, K. Toya, D.P. Lepak, Y. Hong	Do They See Eye to Eye? Management and Employee Perspectives of High-Performance Work Systems and Influence Processes on Service Quality	2009	508	42.33
12	L.A. DeChurch, J.R. Mesmer-Magnus	The Cognitive Underpinnings of Effective Teamwork: A Meta-Analysis	2010	490	44.55
13	J. Hogan, B. Holland	Using theory to evaluate personality and job-performance relations: A socioanalytic perspective	2003	485	26.94
14	M. Ahearne, J. Mathieu, A. Rapp	To empower or not to empower your sales force? An empirical examination of the influence of leadership empowerment behavior on customer satisfaction and performance	2005	484	30.25
15	A.M. Grant	The Significance of Task Significance: Job Performance Effects, Relational Mechanisms, and Boundary Conditions	2008	469	36.08

16	H.-H.D. Nguyen, A.M. Ryan	Does Stereotype Threat Affect Test Performance of Minorities and Women? A Meta-Analysis of Experimental Evidence	2008	426	32.77
17	M.R. Bartick, G.L. Stewart, Piotrowski	Personality and job performance: test of the mediating effects of motivation among sales representatives.	2002	410	21.58
18	G. Chen, B.L. Kirkman, R. Kanfer, D. Allen, B. Rosen	A multilevel study of leadership, empowerment, and performance in teams	2007	410	29.29
19	F.W. Bond, D. Bunce	The Role of Acceptance and Job Control in Mental Health, Job Satisfaction, and Work Performance	2003	394	21.89
20	A. Erez, T.A. Judge	Relationship of core self-evaluations to goal setting, motivation, and performance	2001	382	19.1

RQ11: What are the most popular author keywords in article publishing?

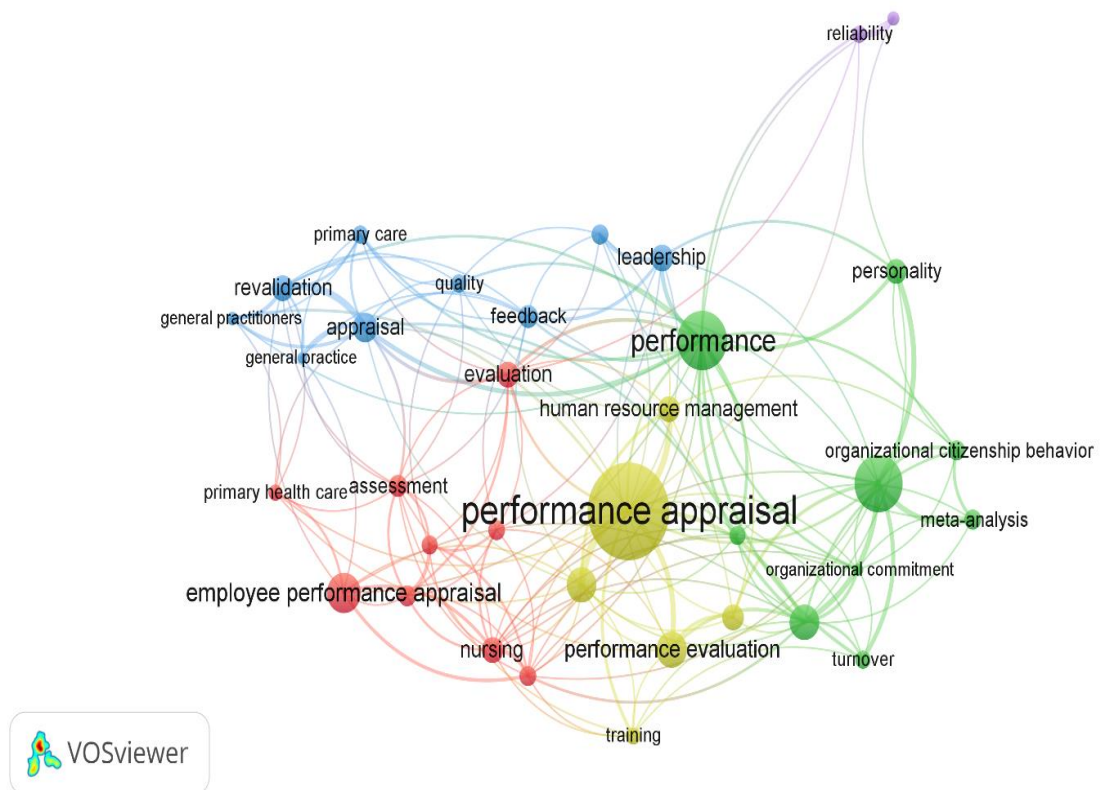
Table 10 and figure 5, summarise the author's keywords in five clusters. Each of the clusters were colour coded with namely red, green, blue, yellow, and purple clusters. The red cluster is comprised of nine keywords. The employee performance appraisal keyword scored the highest frequency of 36. However, the highest relationship strengths in the red cluster were observed in Nurses and Nursing. As for the green cluster, there were nine keywords. The keyword with the highest frequency was performance, with the highest relationship strength of 49. Meanwhile, the lowest frequency was scored by organizational commitment, 7 times. The blue cluster is comprised of nine keywords. The keyword with the highest frequency was appraisal with 24. The second most frequent keyword was leadership, followed by revalidation. Meanwhile, the keyword with the lowest frequency was general practice with a frequency of 6.

The fourth cluster which was yellow had six keywords. Performance appraisal which was the keyword with the highest frequency, 128, was also the keyword with the highest relationship strength. Meanwhile, the last cluster which was the purple cluster had only 2 keywords, namely reliability and validity. Both the keywords scored low frequency and correlation. Figure 5 displays all clusters on the Vosviewer map, with the most frequently used author clusters and keywords. The most prominent clusters were the green and yellow clusters. Moreover, the most popular and frequently used keywords were performance, performance appraisal, job performance, job satisfaction, employee performance appraisal, performance management, and performance evaluation.

Table 10. Top 35 author's keywords based on frequency, relationship strength, and cluster.

Item	Author's Keywords	Occurrences	Total Link Strength
Cluster 1 - Red (Employee performance appraisal)			
1	Assessment	16	16
2	Competence	13	13
3	Competency	14	10
4	Education	15	13
5	Employee performance appraisal	36	14
6	Evaluation	20	17
7	Nurses	14	21
8	Nursing	20	21
9	Primary health care	10	8
Cluster 2 - Green (Performance)			
1	Performance	63	49
2	Job performance	60	40
3	Job satisfaction	31	34
4	Meta-analysis	14	13
5	Organizational citizenship behavior	14	13
6	Organizational commitment	7	13
7	Personality	19	16
8	Stress	13	12
9	Turnover	12	13
Cluster 3 - Blue (Appraisal)			
1	Appraisal	24	37
2	Feedback	17	16
3	General practice	6	10
4	General practitioners	8	12
5	Leadership	21	18
6	Management	14	10
7	Primary care	12	11
8	Quality	12	9
9	Revalidation	20	25
Cluster 4 - Yellow (Performance appraisal)			
1	Performance appraisal	128	54
2	Performance management	31	27
3	Human Resource Management	20	17
4	Performance appraisal system	20	11
5	Performance evaluation	32	19
6	Training	11	10
Cluster 5 – Purple (Reliability)			
1	Reliability	11	11
2	Validity	9	9

Figure 5. Network map visualisation of the frequency of author's keywords, minimum 5 keywords with 35 items and 5 clusters (full count)



Discussion

Bibliometric analysis of this performance appraisal study provided some essential and up-to-date information leading to the latest developments in performance appraisal. The 20-year period provided a more holistic, accurate, and clear trend in the development of performance appraisal. The bibliometric analysis results revealed that most of the performance appraisal articles were published in English ($n = 1871$ publications) compared to the other languages. The number of citations for the past 20 years for articles written in English was 60813, with an average annual citation of 3040.65. Moreover, performance appraisal was primarily studied in Medicine, Psychology, Nursing, Social Sciences, and Business, Management, and Accounting. However, the annual trend indicated that the frequency of performance appraisal studies was the highest in the years 2008 and 2010.

A majority of the performance appraisal studies were performed in European countries compared to Asian countries. The highest and most popular government to publish performance appraisal study articles was the United States. Meanwhile, the most influential institution in publishing articles related to performance appraisal was Texas A&M University, located in the United States. Nevertheless, the Van Amsterdam University of the Netherlands scored the highest average annual citation of 159.86 compared to Texas A&M University. Based on the analysis, the top author to publish articles related to performance appraisal was Filip Lievens. Nevertheless, the author who received the highest article citation was Timothy A. Judge, with an average annual quotation of 625.17 over the past 20 years. His popular article entitled "*The job satisfaction-Job Performance relationship: A qualitative and quantitative review*" was the article with the highest citations. Moreover, the Journal of

Applied Psychology published by the American Psychological Association was the most popular journal publishing article on performance appraisal assessments.

On the other hand, the most popular keywords used included performance, performance appraisal, job performance, job satisfaction, and employee performance appraisal. Based on these keywords, the current study also determined less studied areas that were poorly linked to performance appraisal, namely training, organizational commitment, justice, and general practice. Furthermore, the nursing profession and the medical line were the most studied fields concerning performance appraisal compared to the other disciplines. Previous researchers preferred to assess the medical professions due to their high workload.

As for the trends of performance appraisal studies, the number of publications has declined lately probably due to the shift in focus on current issues like Covid-19. However, performance appraisal studies should not be side-lined because it is the cornerstone of organizational and employee performance. Moreover, article citations have decreased sharply from 2009 to 2020. Studies on performance appraisal should be continued despite the pandemic so that it could lead to its implementation and to rectify challenges faced by the organizations during the Covid-19 pandemic, especially when many are working from home (Aguinis & Burgi-Tian, 2021).

Conclusion

The study explored all performance appraisal related articles from the Scopus database alone. Information obtained such as keywords, source type, document type, number of citations, the highest country published the document, frequently used publication language, famous author and highest published article, etc. are vital in providing knowledge on the evolution of performance appraisal research articles.

In addition, one of the limitations of this study is that it only accessed the database from Scopus. So, future studies are recommended to involve more databases of other document publications such as Web of Science, Google Scholar, dimension, etc. to obtain more extensive data. Moreover, the publication data for this study was only accessed cumulatively up until May 20th, 2021. As a result, subsequent studies might continue to seek for data by extending the study duration.

Based on the keyword analysis, the field of study on performance appraisal needs to be further expanded and linked to training, organizational commitment, fairness, general practice, turnover intentions, and COVID-19 pandemic impact performance appraisal. The COVID-19 pandemic impact performance appraisal would be apt because a majority of the performance appraisal studies were conducted in the medical sector. Finally, it is also recommended that performance appraisal should be extended to other forward agencies such as the security forces and other government sectors.

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