

What do we know about Employee Productivity?: Insights from Bibliometric Analysis

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ABSTRACT

Purpose: It is an established conception that increased employee productivity plays an instrumental role in the sustained success of a business. Resultantly, organisations have pursued it with utmost priority. The study intended to present the academic patterns as well as structures concerning research in the field of employee productivity from the year 2002 to 2021 using bibliometric tools and applications. **Design/methodology/approach:** The Scopus database was used to extract the data for this study. To determine the current state of research on employee productivity, the most widely acknowledged indicators used for performing bibliometric analysis have been employed. A software application named VOS viewer is used for mapping bibliographic data. **Originality/value:** The term 'productivity' has gained popularity in the corporate quarters in recent years which has generated the interest of authors in analysing their research patterns. Moreover, no such retrospective bibliometric study on employee productivity is conducted so far.

Keywords: Employee Productivity, Bibliometrics, Bibliographic coupling, Bibliometric analysis, Co-Citation analysis, VOS viewer.

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INTRODUCTION

Employee productivity has been a matter of substantial interest to management experts since the beginning of management research during the Industrial Revolution and continues to be so in the twenty-first century in a Covid-19 environment. The belief that productivity has the ability to influence both employee and organisational performance, as well as an organisation's ability to maintain a competitive advantage over other businesses, has sparked a surge of interest in the subject among academics throughout the world.^[1] It is a critical aspect in enhancing, strengthening, and sustaining a business's overall success.^[2] It was difficult to comprehend and assess the definition of employee productivity. For example, the traditional definition of productivity has mostly focused on the ratio of input costs to the output value.^[3] In the field of management, productivity has been defined as a measure of efficiency and effectiveness. As a result, it's critical to recognise who the productive employees are. Employee Productivity can be defined as time spent actively by employees on tasks that require execution and production. Similarly, Coker (2011)^[4] defined employee productivity "as the level of employees' performance in relation to attendance, work quality, the capacity of performance and personal factors".

In the words of Naeem and Ozuem (2021) employee productivity indicates the extent to which the adoption of technology minimises the time and effort required to complete a specific work. Further, they stated that when health professionals use social platforms, they can learn from their experiences, wisdom and knowledge with colleagues and subordinates. This helps them to be more productive because they can help each other.^[5]

One of the most important objectives for several firms has been to improve employee productivity. This is because greater productivity offers different advantages to a firm and its personnel. For example, increasing productivity leads to economic expansion, high profits and better social advancement. The productive employees can also get greater earnings, better working conditions and more favourable opportunities for employment. In addition, it tends to optimise the competitive advantage of organisations by reducing costs and improving high production quality. It is therefore vital to look at the background to ensure the long-term success of the company. Numerous studies have concentrated on one or two methods of measuring productivity and because there are so many different methodologies, it can be difficult to compare the results. In general, there is a dearth of effective and standardised methods for evaluating productivity.^[6] Ramirez and Nembhard (2004)^[7] discussed various measures of the productivity of knowledge workers and identified various dimensions for measuring productivity such as quality, control and cost. The study posited that industry is highly

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reliant on the productivity of knowledge employees, which was hitherto mainly relied on the productivity of manual labour. A study by Cho and Erdem (2006)^[8] suggested that measuring the productivity of employees seeks to improve efficiency of organisations by increasing revenue for firms with a finite number of employees. Another study by Dorsett (2006)^[9] developed four approaches for improving employee productivity such as experimenting, observing, inquiring and analysing. In the first approach, employees can learn by performing the task, hence, it is a “learning by doing” approach. In the second approach, the employee learns by observing others performing the task and then replicating it. In the third approach, they used to inquire about the things to see what others think, look for other options and provide feedback and in the fourth approach, employees perform better if things are practiced in a particular manner. Likewise, Ruch (1994)^[10] identified five ways of measuring the productivity of employees such as defining productivity and guiding the behaviour, monitoring the performance and providing feedback, diagnosing issues, contributing to innovation and improving planning. They also argued that productivity is not the only criterion for assessing an individual’s or an organisation’s success. It is interdependent with other facets of organisational success such as personnel performance, financing decisions, innovation and competitive effectiveness any of which might result in organizational failure. On the contrary, Vallo and Mashau (2020)^[11] pointed out that if the wrong measure was adopted, it might lead to misleading results thereby severely affecting employee productivity. Therefore, employee productivity is considered to be a key indicator of performance.

REVIEW OF LITERATURE

As the costs of employee selection and training continue to increase, there is a need to emphasise on making the workforce productive. Employee productivity is of utmost importance as the industry depends on them and it has a direct impact on the performance of organisations. Ahmad *et al.* (2020)^[12] analysed the relationship between performance work practices and organisational performance. The study demonstrated that using high-performance work practices methods enhances organisational performance significantly and can result in improved employee outcomes, such as absenteeism and turnover, as well as increased labour productivity and financial performance, can be achieved. Moreover, recruitment, selection and training are positively associated with higher performance, productivity and lower turnover rates.

A Study by Singh (2019)^[13] posited that employees are considered a valuable asset to the company and it becomes difficult to retain those employees who perform at their best. In order to attain employee productivity, most companies

aim for better employee performance. The study analysed the relationship between organisational norms and employee productivity. The results depicted that employee productivity is supported by different factors i.e. customer-client relationship, profitability, leadership style and teamwork and these factors build up a support system for developing a positive relationship between organisational norms and employee productivity. High productivity was also reported with the increase in the age of the employees. On the contrary, a study by Van Dalen *et al.* (2010)^[14] specified that younger employees less than age 50 were more likely to demonstrate high productive levels exhibiting hard skills such as flexibility, physical and mental wellbeing and adoption of new technology rather than older employees more than age 50 emphasised more on soft skills such as commitment and social skills. Cropanzano and Wright (2001)^[15] defined happiness as the satisfaction derived from a job and concluded that if employees are happy at work, they are more productive. Consequently, happy employees are productive employees. Likewise, Mohammad (2019)^[16] posited that job satisfaction has a favourable impact on the productivity of employees.

Another study highlighted the strong association between work-life balance and employee engagement corresponding to high levels of employee productivity. Work-life balance has a significant impact on organisational productivity as well as the economy as a whole. It results in lower absenteeism, boosted productivity, and a more responsive and effective workforce.^[17] Organisations strive to increase the work engagement of their employee’s, as engaged employees are more productive. It can be strengthened through family-friendly policies and work-life balance practices and thereby contributing to the area of employee behaviour and improving employee productivity. Ferreira *et al.* (2019)^[18] highlighted that work engagement mediates the relationship between emotional exhaustion and negative affect and predicted the effect of presenteeism on the loss of productivity. The study asserted that health-related problems can be reduced by presenteeism affecting employee productivity. The results indicated that higher work engagement could result in low productivity loss corresponding to high levels of energy and mental resilience. Likewise, Wei *et al.* (2020)^[19] suggested that perceived honesty in leadership is one of the most important things that can make employees more productive at their job. The study adopted dual strategy orientations i.e. market orientation and innovation orientation. The innovation-orientation approach adopts new ways of performing work by exploring existing norms, resources and new products. The market innovation approach collects information about the market. The results demonstrated that managers might be able to integrate both market and innovation orientation when the integrity in leadership is high and yield a high level of firm performance. Leadership gives employees drive and creates a strong sense

of loyalty. A dynamic leader promotes employee productivity and performance because of the favourable workplace culture.

Yas *et al.* (2020)^[20] in their study identified the problems associated with employee productivity and categorised them into different factors such as personal factors, miscellaneous factors (staff skills, customer services) organisational culture, personal problems, managers attitudes, job content and financial reward. The study presented the significant positive impact of the attitude of the manager, contents of the job and financial reward on employee productivity. Likewise, Naoum (2016)^[21] in his study identified factors affecting the productivity of employees including management and organisational factors. The former includes managerial skills, leadership styles, job satisfaction and motivational factors whereas the latter includes technology and innovation. Buchel (2000)^[22] suggested various aspects of employee productivity at organisational level. The study examined the various dimensions of productivity such as job satisfaction, health status, tenure, on-the-job training and the importance of stress on the wellbeing of employees. The results depicted employees living in rural areas with better health conditions are more satisfied than those in urban areas. The overeducated employees tend to be working for longer tenure and required on-the-job training. Hence, they are stress-free, satisfied and productive. Adejare *et al.* (2020)^[23] have also identified the factors including employee productivity, satisfaction, attrition and retention, profitability and survival of an organization influencing the practices of employee training. Moreover, they suggested employee training has become increasingly important for increasing overall productivity resulting in the overall development of employees and organisations.

The following are the *Specific Objectives* of this paper:

- To identify the field's most prolific and distinguished scholars.
- To rank universities' influence in research of employee productivity.
- To rank academic publications in the field of employee productivity research according to (a) the number of papers published and (b) the number of citations;
- To assess international collaborations on the basis of (a) the number of publications published and (b) citation analysis;
- To ascertain current trends in employee productivity.

The next sections comprise a literature review, a methodology section, results, discussion along with conclusion section, implications, limitations and finally, suggestions for future study.

METHODS

Bibliometric tools such as Citation, Keyword, Co- Citation, bibliographic coupling and Co-occurrences of keywords were used to investigate employee productivity literature across organisations. It is a form of network research that combines a systematic review of the literature with bibliometric analysis.

To perform a bibliometric study, the first step is to select the right database for document retrieval. For this purpose, the bibliometric data was collected from Scopus database. The data was administered to retrieve employee productivity-related bibliometric data: "Employee productivity" OR "Productivity" OR "Employees Productivity". This search strategy included a database from 1 Jan.2002 to 28 July, 2021. The inclusion criteria for this bibliometric data were resulting: a) research articles published on Employee Productivity topic; b) language of the publication was English; c) research articles by subject area including Business, Management, and Accounting, Social Sciences, Psychology, Arts and Humanities d) studies published from 2002 to 2021, were included as shown in Figure 1.

Bibliometric analysis is a quantitative examination of bibliographical materials. We choose to use papers from journals since they are regarded as "certified knowledge" and because they are the outcome of an evaluation process, giving credibility to the results. As a result, we didn't include proceedings papers, news or other forms of documents discovered in databases.

The author employed bibliometrics to resolve the issues identified. Using the software, the descriptive analysis was conducted to evaluate the types and characteristics of documents.

RESULTS

The results showed a total of 210 documents that were authored by 507 authors with 0.414 documents per author (Table 1). Most of the documents had multiple authors

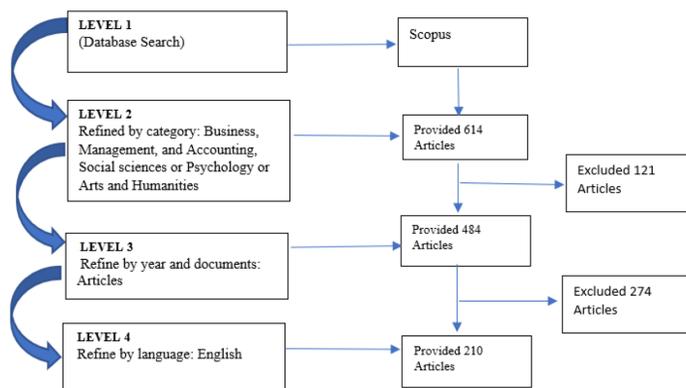


Figure 1: Delimiting Data.

Table 1: Overview of Published Scientific Documents on Employee Productivity.

Description	Results
<i>Summary of the bibliometric items</i>	
Timespan	2002:2021
Total Documents	210
Author's Keywords	675
Average citations per documents	12.94
Total Authors	507
Authors of single-authored documents	38
Authors of multi-authored documents	469
Documents per Author	0.414
Authors per Document	2.41
Co-Authors per Documents	2.48
Collaboration Index	2.73
Documents types	
Articles	210

($n= 469$) and the average citations per document was 12.94. The total of the author's keywords was 675 with 2.73 collaboration index.

Annual Publication

The research articles on Employee Productivity that were retrieved from 2002 to 2021 are shown in Figure 2. The publication per year has been categorised into four stages describing period-wise publication. In the first stage, from 2002 to 2003, the publication growth was very low indicating a low level of awareness of employee productivity. During this phase, the notion of employee productivity was associated with students' education measuring frustration, job satisfaction, job insecurity and layoff. The studies revealed that over-educated enjoyed various monetary and non-monetary benefits, despite this they were less productive but the threat of being laid off from the organisation made them productive.^[24] In the second stage, from 2004 to 2012 the number of research articles starts rising gradually. During the second phase, the research has focused on productivity with respect to knowledge workers, performance of organisation and employees.^[25-26] Then again, the third stage from 2013 to 2017 depicts a sluggish growth rate. The third phase measured the effect of compensation practices for enhancing the performance of employees and measured the effect of individual pay system practices on employee productivity.^[27] Similarly, employee productivity was associated with organisational trust and this relationship was measured through organisational citizenship behaviour.^[28]

In the fourth stage, the number of publications witnessed an upward and downward trend from 2018 to 2020. In this phase, the effect of wellness programs was examined on employee productivity. The study implies that corporations

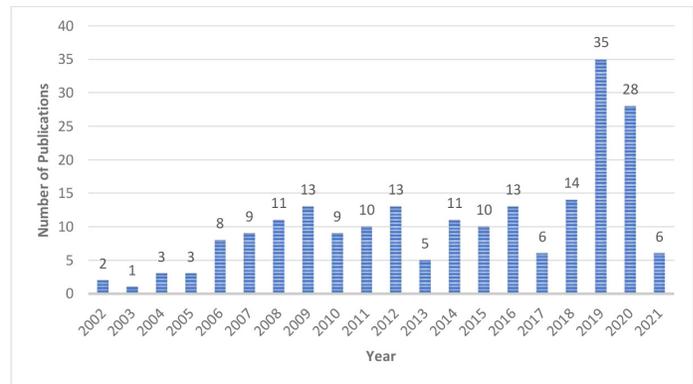


Figure 2: Annual Publication from 2002 to 2021 Year.

can boost productivity by implementing socially acceptable health practices that benefit both employees and the bottom line.^[29] The fifth phase witnessed a surge in the number of publications reported in 2019 and 2020. Under this phase, employee productivity was associated with stress management,^[30] attitudes, organisational culture, norms and leadership styles, working hours and gender diversity.^[31] This phase has discussed that various factors such as reduced stress, better employee attitudes, conducive culture, effective leadership and flexible working hours can improve the performance and productivity of employees. As COVID -19 pandemic affects the work of authors, reviewers, Editors and publishers till July 2021, only nine articles were published on employee productivity. These articles explored the aspects of working from home, work-life balance and employee engagement, the productivity of healthcare professionals and employees working hotel industry.

The most cited Employee Productivity articles (EP)

Identifying and analysing the most cited papers in a specific discipline gives more information about the scientific literature that the research in this field believes to be the most important. The number of citations a journal article receives indicates how influential it is.^[32] Table 2 shows the results of the 15 most cited articles of EP with more than 100 citations. This analysis shows the most-cited research articles of EP by top-notch researchers, as well as the number of citations and the percentage of citations per year. Table 2 shows a group of four articles that each have more than 100 citations. Many of these articles also get more citations each year, which shows that they are important for the growth of EP research.

The article measuring "knowledge worker productivity: A taxonomy" by Ramrez YW has received the highest number of global citations with 155 citations. Similarly, the article "Productivity of Older Workers: Perceptions of Employers and Employees" by Van Dalen (2010) received 145 citations whereas the article "The Economic Benefits of Green Buildings: A Comprehensive Case Study" by Ries received

Table 2: Most Cited Employee Productivity Articles.

Rank	Author	Title	Journal	TC	TC per year
1	Ramirez YW (2004)	<i>Knowledge Worker Productivity: A Taxonomy</i>	Journal of Intellectual Capital	155	8.15
2	Van Dalen HP (2010)	<i>Productivity of Older Workers: Perceptions of Employers and Employees</i>	Population Development Review	145	11.0
3	Ries R (2006)	<i>The Economic Benefits of Green Buildings: A Comprehensive Case Study</i>	The Engineering Economist	123	7.23
4	Phusavat K(2011)	<i>Interrelationships between intellectual capital and performance: Empirical examination</i>	Industrial Management and Data Systems	110	9.08
5	Probst TM(2002)	<i>Layoffs and Trade-offs: Production, quality, and safety demands under the threat of job loss.</i>	Journal of Occupational Health Psychology	99	4.71
6	Narayanan S(2009)	<i>A Matter of Balance: Specialization, Task Variety, and Individual Learning in a Software Maintenance Environment</i>	Management Science	95	6.71
7	Kuhnen CM(2012)	<i>Feedback, Self-Esteem, and Performance in Organizations</i>	Management Science	93	8.45
8	Shafer SM(2012)	<i>The effects of Six Sigma on corporate performance: An empirical investigation</i>	Journal of Operations Management	83	7.45
9	Naoum SG(2016)	<i>Factors influencing Labor productivity on construction sites: A state-of-the-art literature review and a survey</i>	International Journal of Performance and Productivity Management	60	8.57
10	Bchel F(2002)	<i>The effects of overeducation on productivity in Germany — the firms' viewpoint</i>	Economics of Education Review	60	2.85
11	Coker BL(2011)	<i>Freedom to surf: The positive effects of workplace Internet leisure browsing</i>	New Technology, Work and Employment	54	4.41
12	Burgess A(2005)	<i>Email training significantly reduces email defects</i>	International Journal of Information Management	49	2.72
13	Pendleton A(2010)	<i>Employee Stock Ownership, Involvement, and Productivity: An Interaction-Based Approach</i>	Industrial Labour Relations Review	47	3.61
14	Yu GC, 2006(2006)	<i>The effect of downsizing on the financial performance and employee productivity of Korean firms</i>	International Journal of Manpower	47	2.70
15	Powell A(2006)	<i>Antecedents to team member commitment from near and far: A comparison between collocated and virtual teams</i>	Information Technology and People	46	2.70

the third highest citations i.e., 123 respectively. Ries asserted that good physical work environment can lead to increased employee productivity, satisfaction, better health and safety and lower rates of absenteeism.^[33] There are around 11 articles having more than 50 citations. Van Dalen revealed that younger employees were more productive as compared to older employees. They possess hard attributes which include adaptability, physical and mental capability, and an ability to embrace new technical abilities.^[34]

Additionally, it is fascinating to examine which journals published the 15 most cited publications. As indicated in Table 2, all of these are well-known journals with a strong research impact, indicating their high quality. Management Science published two of the top fifteen most referenced articles (95) and one each in Journal of Intellectual Capital (155), Population Development Review (145), The Engineering Economist (123), Industrial Management and Data Systems (110), Journal of Occupational Health Psychology (99), Journal of Operations Management (83), International Journal of Performance and Productivity Management (60), Economics of Education Review (60), New Technology, Work and

Employment (54), International Journal of Information Management (49), Industrial Labour Relations Review (47), International Journal of Manpower (47), and Information Technology and People (46). As a result, it is reasonable to believe that the number of citations generated by these articles is highly correlated with the journal rankings in which they were published.

Table 2 illustrated the list of the top 15 cited documents.

Most Productive Countries and Institutions

The top 15 productive countries, their total publications and total citations are exported to reflect the country-wise publications. Table 3 arranges the countries according to the number of publications. The United States, being the most productive country, also has the most citations, with an average citation of 21.51, implying that each publication from the United States is cited by 21–22 publications on average. In this field, the UK has only written 39 papers, but they have the second most citations (355) and the highest average citations (20.88).

“Knowledge worker productivity: A taxonomy” (with 155 citations and published in 2004) and “Productivity of Older Workers: Perceptions of Employers and Employees” (with 145 citations and published in 2010) are the two papers with the most citations out of the 219 that were found. The United Kingdom, being the country with the second-highest number of publications (39), has an average citation rate of 20.88 and has been cited 355 times. Table 3 shows that the number of citations does not always correlate with the number of publications, as seen in the graph. High publication does not necessarily imply high citation; on the contrary, high citation might occur in the context of low publication.

As illustrated in Table 3, the USA (109 publications) and UK (25 publications), Australia (14 publications), India (13 publications), Canada (10 publications) and Malaysia (10 publications) followed by the Netherlands (9 publications), Indonesia (8 publications), Iran (7 publications) and South Africa (7 publications) are the top 10 most productive countries and their total number of publications is 161 which accounts for 73.51 % of all the 219 publications. Similarly, the USA (1264), UK (478), Netherlands (241), Australia (190), Canada (184) and Malaysia (140) reported the highest number of citations followed by Spain (28), Iran (20), South Africa (17), Saudi Arabia (14), Indonesia (11), China (11), Pakistan (9) and Nigeria (7).

It is also worth noting that the majority of the countries on the list are nearly economically developed. This could be attributed to busy company operations, a diverse cultural background, and a dense concentration of educational institutions. Further research found that out of 52 countries with 5 or more publications, 23 are developed. While other developing countries on the list, such as India, China, Malaysia,

Indonesia, Iran, Thailand, Poland, South Africa and Pakistan, are the most rapid developing countries.

The top influential institutions were taken according to the number of citations. Those institutions that were cited at least 25 times were chosen. As shown in Table 4, 7 of the 12 institutions, 7 of the institutions are from the USA, while the other 2 are from Netherlands and 1 publication from Thailand, Poland and Canada respectively. The University of Wisconsin-Madison, Kasetsart university, Marie Curie-Sklodowska University, New York University and Wake forest University have published just one paper in the field, despite the fact, they have received the highest three citations and average citations. As shown in Table 4, the top 12 productive institutions are Penn State University(USA), The University Of Wisconsin-Madison(USA), Utrecht University,(Netherlands), The Netherlands Interdisciplinary Demographic Institute (Netherlands), University of Pittsburgh(USA), Kasetsart University(Thailand), Marie Curie-Sklodowska University (Poland) have the highest number of citations whereas the Washington State University (USA), University of North Carolina (USA), New York University (USA), University of Pittsburgh (USA) and Wake Forest University (USA) have more than 80 citations. With respect to publications, Utrecht and Pittsburgh university has 3 publications while Penn state university, The Netherlands Interdisciplinary Demographic Institute, Washington State University and University of North Carolina have 2 publications each. The University of Wisconsin-Madison from USA, Kasetsart University from Thailand and Marie Curie-Sklodowska University from Poland have highest average citations with 1 publication each

Table 3: Top 15 influential Countries in the field of EP.

Rank	Country	Publications	Citations	AC
1	USA	109	968	21.51
2	United Kingdom	39	355	20.88
3	India	21	0.333	0.333
4	Netherlands	20	208	29.71
5	Australia	19	85	12.14
6	Canada	16	142	15.77
7	Malaysia	16	26	3.714
8	Indonesia	13	9	3.000
9	Iran	13	20	2.857
10	China	11	24	4.800
11	South Korea	10	77	25.66
12	Poland	8	8	4.000
13	South Africa	8	4	4.000
14	Italy	7	14	4.667
15	Pakistan	7	2	2.000

Table 4: Top 12 influential institutions in the field of EP.

Rank	Organization	Country	TP	TC	AC
1	Penn State University	USA	2	155	77.5
2	The University of Wisconsin-Madison	USA	1	155	155.0
3	Utrecht University	Netherlands	3	143	47.66
4	The Netherlands Interdisciplinary Demographic Institute	Netherlands	2	143	71.5
5	University of Pittsburgh	USA	3	123	41
6	Kasetsart University	Thailand	1	109	109.0
7	Marie Curie-Sklodowska University	Poland	1	109	109.0
8	Washington State University	USA	2	99	49.5
9	University of North Carolina at Chapel Hill	USA	2	94	47
10	New York University	USA	1	93	93.0
11	Wake Forest University	USA	1	82	82.0
12	University of Western Ontario	Canada	3	64	21.33

respectively. And the two USA institutions i.e., New York University and Wake Forest University ranked fourth and fifth in the average citations.

Bibliographic Coupling among the countries publishing Employee Productivity

Initially, Small introduced the co-citation relationship in 1973^[35] in supplement to the Bibliographic coupling. It is utilised to study the structure of literature in view of the aforementioned publications. If the two documents have appeared jointly in the third publication, then they are termed as co-cited. Another relevant topic to be addressed is the bibliometric coupling of countries and institutes publishing in employee productivity. According to Kessler (1963)^[36] when the two articles cite the same third article, it's called bibliometric coupling. All the 57 countries are grouped together into five clusters, each with a different colour.i.e. USA, UK, Australia, Canada and Malaysia. The presence of a link between two nodes indicates that they cooperate, and the width of the link indicates the strength of the relationship, i.e. the frequency of collaboration. The size of a node is determined by its TLS, which is the total of all the node's link strengths. Figure 3 depicts the results based on a publication threshold of 4 documents and the 57 countries that publish the same literature. The countries have been ranked according to the number of citations. In Figure 3, the United Kingdom,

Table 5: Bibliometric Coupling of the Top 10 Countries Publishing in Employee Productivity.

Rank	Country	P	Citations	Link	Total link strength	Total Cooperation strength
1	United States	58	1264	22	705	12.15%
2	United Kingdom	25	478	19	530	21.2%
3	Australia	14	190	18	632	45.14%
4	India	13	8	13	45	3.46%
5	Canada	10	184	17	279	27.9%
6	Malaysia	10	140	20	325	32.5%
7	Netherlands	9	241	9	70	7.77%
8	Indonesia	8	11	14	109	13.62%
9	Iran	7	20	8	10	1.42%
10	South Africa	7	17	14	132	18.85%

the United States of America, and Australia have the highest TLS, with the strongest link between the United States of America and Australia. To facilitate further examination of these countries collaboration relationships, Table 5 lists the top ten countries with the strongest cooperation linkages. Table 5 shows the top ten countries that use the same kind of literature for their publications.

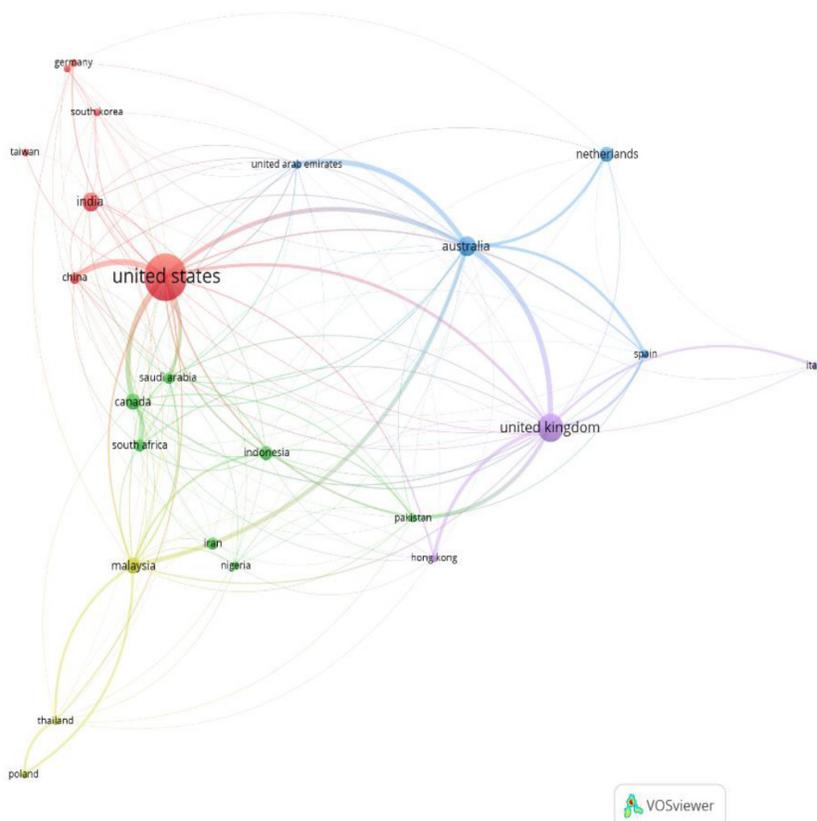


Figure 3: Bibliographic Coupling of countries of Employee Productivity.

Table 5 highlights the ten collaborative countries with the strongest collaboration link. The total collaboration strength (TLS/P), which represents the degree of cooperation, is calculated. The United States, as the country with the greatest TLS and the most collaborative countries, has partnered with 22 countries, the most frequently with China, Germany, India, Israel, South Korea and Taiwan. China accounts for 25.83 percent of all collaboration between the United States and other countries. In the United Kingdom, 73 of 530 cooperation periods are with Hong Kong, accounting for 7.26 percent. In the United States and the United Kingdom, approximately half of the publications (with a total cooperation strength of 12.15 percent and 21.2 percent, respectively) are completed with other countries, whereas almost all of the publications in Australia, Malaysia and Canada are completed in collaboration with other countries (with total cooperation strength 45.14 percent, 32.5 percent and 27.9 percent respectively).

Bibliographic Coupling among the Institutes publishing Employee Productivity

Another critical part of the bibliometric analysis is determining how the universities and institutes that contribute are related to one another. In this part, we examined the bibliographic coupling (BC) of universities that contribute to the domain of employee productivity. Figure 4 depicts the results based on a threshold of 30 cited document of each university and the 53 institutes that publish the same literature. The picture depicts 7 clusters, each represented by a different colour. Each colour is determined by the bibliographic coupling of the respective universities. Universities in the green colour have strong bibliographic coupling with one another, and the same is true for the remaining clusters.

Link strength divided by TLS is how strong a group is together. The study found that 53 of 406 institutions had published at

Table 6: Top 10 institutions with the highest number of citations.

Rank	Institution	Country	P	Citation	Link	TLS	Cooperation Strength
2	Indiana University	USA	4	46	35	232	15.08%
3	Southern Illinois University	USA	1	46	35	232	15.08%
1	Utrecht University	Netherlands	3	143	30	261	11.49 %
8	York University	Canada	5	37	11	71	15.49%
5	Queen Margaret University	United Kingdom	1	33	39	103	37.86%
7	Michigan State University	USA	2	94	14	71	19.71%
6	University of North Carolina at Chapel hill	USA	2	94	14	76	18.42%
9	Northwestern University	USA	1	53	12	66	18.18%
10	Washington State University	USA	2	46	17	56	30.35%
4	University of Western Ontario	Canada	3	46	44	172	25.58%

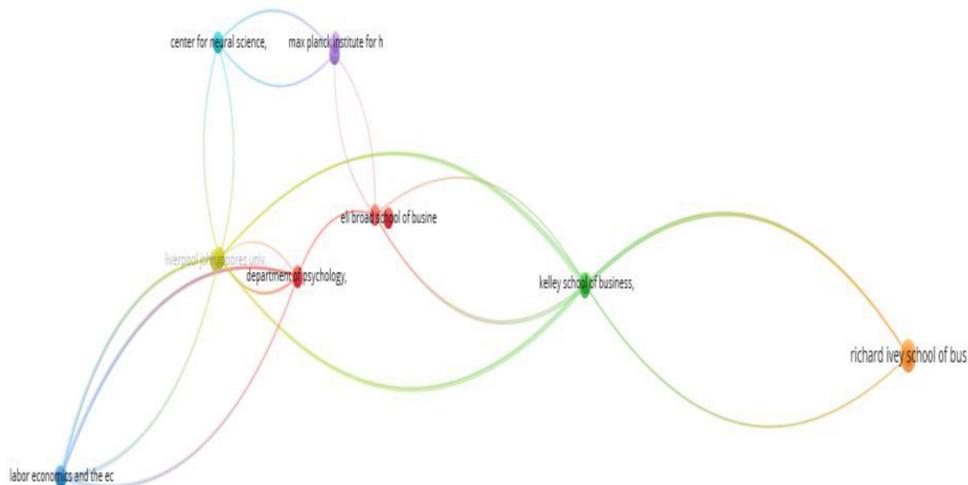


Figure 4: Bibliographic coupling of institutions of employee productivity.

Table 7: Most Productive Authors in the field of EP.

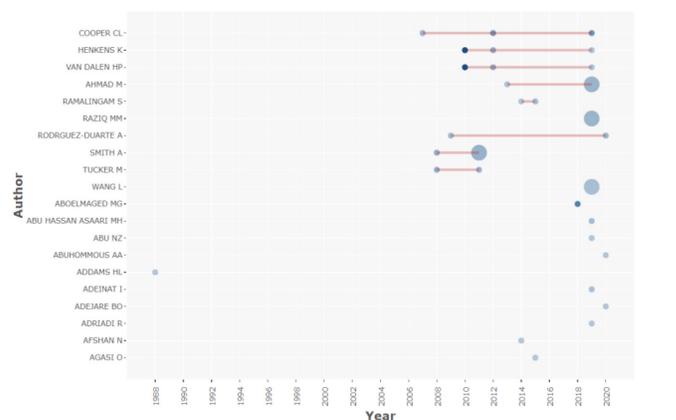
Rank	Author	Country	<i>h</i> -index	P	C	AC
3	Cooper CL	UK	3	3	85	28.33
2	Van Dalen HP	Netherlands	2	3	169	56.33
1	Henkens K	Netherlands	2	3	169	56.33
9	Tucker M	UK	2	2	52	26
8	Smith A	UK	2	2	52	26
7	Rodríguez-Duarte A	Spain	2	2	17	8.5
10	Wang L	USA	1	2	2	1
6	Raziq Mm	Pakistan	1	2	5	2.5
5	Ramalingam S	India	1	2	6	3
4	Ahmad M	Pakistan	1	2	5	2.5
12	Abu Hassan Asaari MH	Malaysia	1	1	3	3
11	Aboelmaged MG	UAE	1	1	28	28

least 5 papers in the area, and 316 of 406 institutions form the greatest connected network, as illustrated in Figure 4. The elements that are linked together are cooperators, and the greater the thickness of the link, the stronger the cooperation relationship is. The node's size indicates its entire link strength. Across the board, there are 14 institutions with a total link strength of more than 100.

The institutions have been ranked according to the highest total link strength. According to Table 6, there are 3 institutions with over 100 total link strengths. The number of links indicates the presence of cooperative institutions. York University has the most publications whereas Queen Margaret University has the most cooperators. Indiana University has collaborated with 35 institutions, and its total number of collaborations (TLS) is 232, indicating that it has collaborated with several institution's multiple times. They have collaborated 35 times with each other, therefore it is clear that Indiana and Southern Illinois universities have a great working relationship. For Indiana University whose TLS is 232, 15.08% of its cooperation is with Southern Illinois University. And 15.08% of Southern Illinois University cooperative works were done with Indiana University. University Of North Carolina At Chapel Hill and Michigan State University had the second strongest collaboration relationship and completed two papers together. Michigan State University, with 14 cooperators and 19.71% of the 71 times cooperation was with University of North Carolina at Chapel Hill. As for University of North Carolina at Chapel Hill, 18.42% of its cooperative works were accomplished with Michigan State University.

Most Productive Authors

Under this section, the publication is analysed from the author's point of view. The number of publications an author has in a certain time period is said to signify his or her scholarly

**Figure 5: Author's Production Over Time using Biblioshiny.**

engagement in particular research. The data was taken from Scopus, and the top 10 most productive authors were chosen. The authors have been chosen based on the total number of publications they have made. In total, 507 people have written about the subject and 13 people have been cited more than 100 times.

In Table 7, the top 10 most productive authors, their total publications and total citations, average citations with their *h*-index have been enumerated. TP signifies the total publications; TC signifies the total citations and the *h*-index signifies the number of publications of researchers and the number of citations of their work. It was found that just three authors had more than two publications in the area, whereas seven authors had two publications in the area.

The most influential authors of the Employee Productivity Studies were the Cooper CL, Van Dalen HP and Henkens K published 3 papers with 85, 169 and 169 cited papers. Authors Henkens K and Van Dalen, with a combined total of 169 citations, are the most relevant when considering the importance of their work based on citation counts. Similarly, Henkens K, Van Dalen and Cooper CL are the authors with the highest average citations. Seven authors have published 2 articles in the field of EP. Of these, seven authors, Tucker M and Smith A has the highest number of average citations. One interesting fact is that Aboelmaged MG (2018) outperforms the other authors in terms of citations (45) for a single paper titled "Knowledge sharing through enterprise social network (ESN) systems: motivational drivers and their impact on employees' productivity" published in the Journal of Knowledge Management. One of the most important articles on EP is without a doubt this one. The author can be called the most important person in the field of EP (although the author is not the most productive one). On the basis of the *h*-index, Cooper CL is the most predominant one with 3 *h*-index. Out of 12 authors, five authors have 2 *h*-index whereas other 6 authors have 1 *h*-index. Further, the most influential authors belong

Table 8: Most Productive Journals in the field of EP.

Rank	Journal	TC	TP	TCA	Country	Year
1	Management Science	215	3	71.6	USA	2009
2	Journal of Intellectual Capital	155	1	155.0	UK	2004
3	Population and Development Review	143	1	143.0	UK	2010
4	International Journal of Manpower	141	13	10.84	UK	2006
5	Journal of Operations Management	124	2	62	Netherlands	2012
6	Engineering Economist	123	1	123.0	UK	2006
7	Industrial Management and Data Systems	109	1	109.0	UK	2011
8	Journal of Occupational Health Psychology	99	1	99.0	USA	2002
9	Facilities	97	5	19.4	UK	2007
10	International Journal of Productivity and Performance Management	90	6	15	UK	2006
11	International Journal of Information Management	86	2	43	UK	2005
12	International Journal of Workplace Health Management	72	8	9	UK	2008
13	Economics of Education Review	60	1	60.0	UK	2002
14	New Technology, Work and Employment	56	2	28	UK	2011
15	Industrial and Labor Relations Review	47	1	47.0	USA	2010

to countries such as the UK, Netherlands, UAE, Pakistan, India, Spain and Malaysia respectively.

In Figure 5, the author's production over period of time is shown. With the support of Biblioshiny software, the impact of the author was examined.

The productivity of the author has increased here over the course of the year. The larger the circle in each year, the greater the productivity of the author in that year. As seen in Figure 5, Ahmad M, Raziq MM, Smith A and Wang L has the larger circle representing the greater productivity of the author in a particular year. Cooper CL has the highest author's production with 3 highest cited publications. Out of 3 articles, the article titled "Job and work attitudes, engagement and employee performance: where does psychological well-being fit in?"^[37] published in Leadership and organization development journal has been cited 45 times with 4.5 total

citations per year in the year 2012. Henkens K (2010) and Van Dalen (2010) has the second-highest production with an article titled "Productivity of older workers: perceptions of employers and employees" published in Population and Development Review has been cited 143 times with 11.91 total citations per year. Ahmad M (2019) has the third highest production with an article titled "Linking e-HRM practices and organizational outcomes: empirical analysis of line managers perception"^[38] published in Revista Brasileira De Gestao De Negocios has been cited 5 times with 1.66 total citations per year. Rodriguez-Duarte A (2009) has the fourth-highest production with an article titled "The effects of training on performance in service companies: a data panel study"^[39] published in International Journal of Manpower has been cited 14 times with 1.07 total citations per year. Smith A (2008) and Tucker M (2008) have the fifth-highest production with an article titled "User Perceptions in Workplace Productivity and Strategic FM Delivery" published in Facilities has been cited 34 times with 2.42 average citation. Wang L (2019) has the sixth highest production with article titled "Employees mobile cyberslacking and their commitment to the organization" published in Journal of Computer Information Systems has been cited 2 times with 0.50 average citation.

Most Productive Journals

The importance of journals in the domain of employee productivity was determined by their productivity (the number of articles published) and the number of citations. The most productive journals have been identified on the basis of total citations. Table 8 lists the 15 most important employee productivity journals, along with the number of publications, citations, total citations per article, publishing country and inception of the journal.

The journals that have the greatest number of citations on the topic of employee productivity were Management Science (215), Journal of Intellectual Capital (155), Population and Development Review (143), International Journal of Manpower (141), Journal of Operations Management (124), Engineering Economist (123) and Industrial Management and Data Systems (109). The research articles on employee productivity have been published in various journals belonging to different domains such as management, economics, psychology, and education indicating how important the subject is and how it is capable of explaining economic and business occurrences, behaviours, and interactions. As the name suggests, seven research articles on Employee Productivity were published in the International Journal of Productivity and Performance Management.

The number of publications by each journal is another factor used to determine the influence of journals. According to the total number of publications, the most relevant journal

Table 9: ABDC 2019 and AJG 2021 Journal of Quality Analysis.

Sl.no.	Source	ABDC	AJG	Impact factor
1	Management Science	A*	4*	4.883
2	Journal of Intellectual Capital	B	2	10.2
3	Population and Development Review	A	NA	3.338
4	International Journal of Manpower	A	2	3.2
5	Journal of Operations Management	A*	4*	6.970
6	Engineering Economist	C	NA	0.861
7	Industrial Management and Data Systems	A	2	3.329
8	Journal Of Occupational Health Psychology	A	4	7.25
9	Facilities	A	1	1.97
10	International Journal of Productivity and Performance Management	B	1	2.77
11	International Journal of Information Management	A*	2	14.098
12	International Journal of Workplace Health Management	NA	NA	1.10
13	Economics of Education Review	A	2	2.238
14	New Technology, Work and Employment	NA	3	4.321
15	Industrial and Labor Relations Review	NA	NA	4.543

is International Journal of Manpower, with 13 publications, followed by the International Journal of Workplace Health Management with 8 publications, the International Journal of Productivity and Performance Management with 6 publications, and Facilities with 5 publications. Because the majority of these journals do not specialise in EP, there are few publications on the subject. Surprisingly, journals with fewer publications have a higher number of citations.

The majority of the journals were published in the UK, 3 journals were published in USA and 1 journal was published in Netherlands. Journal of Intellectual Capital (155.0) and Population and Development Review (143.0) has the highest cites per article followed by Engineering Economist (123.0), Industrial Management and Data Systems (109.0), Journal of Occupational Health Psychology (99.0) and Economics of Education Review (60.0) each with 1 publication except Management Science which has 71.6 cites per article with 3 publications.

Journal Quality Analysis

Under this, we used the ABDC 2019 and AJG 2021 to assess the quality of an article. The Australian Business Deans Council (ABDC) represents 39 business faculties and schools in Australia. The ABDC publishes a ranking list of journals in

the majority of the fields in which these institutions conduct research. The list was based on the grade of journals developed by the Australian Government Research Council under the Excellence in Research Australia (ERA) program. The ranking divides journals into four categories: A* (present roughly the top 5–7 percent of journals), A (present roughly the next 15–25 percent of journals), B (present roughly the next 35–40 percent of journals), and C (present the remaining recognised quality journals).^[40]

The American Journal of Business and Management (AJG) rates the quality of business and management journals. It categorises journals into 1, 2, 3, 4, and 4* categories in chronological order, with 4* being bestowed to the highest-quality journal. Academic researchers frequently use both ABDC and AJG lists as a recruiting tool in business schools.

We discovered 13 papers in Grade A (ABDC) and 2 (AJG) journals, as well as 6 papers in Grade B (ABDC) and 1 (AJG) journal, among the 210 total publications. It's also fascinating to see which journals published the top 15 publications. As shown in Table 9, all of these journals are well-known and have a high research impact, indicating that they are of excellent quality. Management Science has published two of

Table 10: Co-Citation of Journals in Employee Productivity.

Sl.No.	Source	Citations	Total Link Strength
1	Academy of Management Journal	173	3215
2	Academy of Management Review	69	1490
3	Administrative Science Quarterly	38	765
4	Harvard Business Review	58	732
5	Human Relations	35	459
6	Human Resource Management	44	516
7	International Journal of Human Resource Management	34	586
8	Journal of Applied Psychology	172	2145
9	Journal of Business Ethics	87	2332
10	Journal of Business Research	36	755
11	Journal of Construction Engineering and Management	35	0
12	Journal of Management	76	1307
13	Journal of Marketing	33	686
14	Journal of Occupational and Environmental Medicine	33	41
15	Journal of Operations Management	36	400
16	Journal of Organizational Behavior	48	856
17	Journal of Personality and Social Psychology	42	453
18	Management Science	61	758
19	Personnel Psychology	54	966
20	Strategic Management Journal	87	1860

the 15 most frequently cited papers (4.219). As a result, it's reasonable to believe that the number of citations produced by these papers is linked to the journal rankings in which they appeared. Table 9 depicts the ABDC 2019 and AJG 2021 Journal of Quality Analysis.

Management Science, Journal of Operations Management and International Journal of Information Management are A* journals and Journal of Intellectual Capital and International Journal of Productivity and Performance Management are B category journals in ABDC list. Only 1 journal i.e Engineering Economist is C category journal in ABDC list. According to AJG list, Management Science and Journal of Operations Management are 4* journals and Journal of Occupational Health Psychology is 4 grade journal whereas New Technology, Work and Employment is 3 grade journal. Of 15 journals, 5 journals are 2 grade and 2 journals are 1 grade in AJG list. According to impact factors, International Journal of Information Management ranked first, with the highest impact factor (14.098), Journal of Intellectual Capital ranked second with 10.2 impact factor, Journal of Occupational Health Psychology ranked third with 7.25 impact factor, Journal of Operations Management ranked fourth with 6.970 impact factor and Management Science ranked fifth with 4.883 impact factor, on the other hand, Engineering Economist has

0.861 has lowest impact factor respectively. Of 15 journals, 3 journals have more than 3 impact factor and 2 journals have more than 2 and 1 impact factor.

Co-Citation of Journals in Employee Productivity

The most popular bibliometric analysis method is co-citation analysis. Two publications cited together in one article are co-cited. It's quite likely that these two references share something when the other two publications are co-cited by the other articles. Co-citation analysis is employed as an advanced bibliographical technique for the discovery of the co-citation pairs which enable scientists to gain insight into the cumulative tradition, knowledge and intellectual framework of scientific study.^[41-42]

The most relevant articles were analysed on the topic of employee productivity. Out of the total of 5019 journals, authors have selected those journals which are having 25 minimum number of citations in each paper meeting the threshold value of 36 journals. We assessed the overall number of citations per journal for the top contributing journals in this field.

Table 10 endorses the results presented in Figure 6. The results predict that an article published in the top 10 journals would be cited within the articles published in the journals.

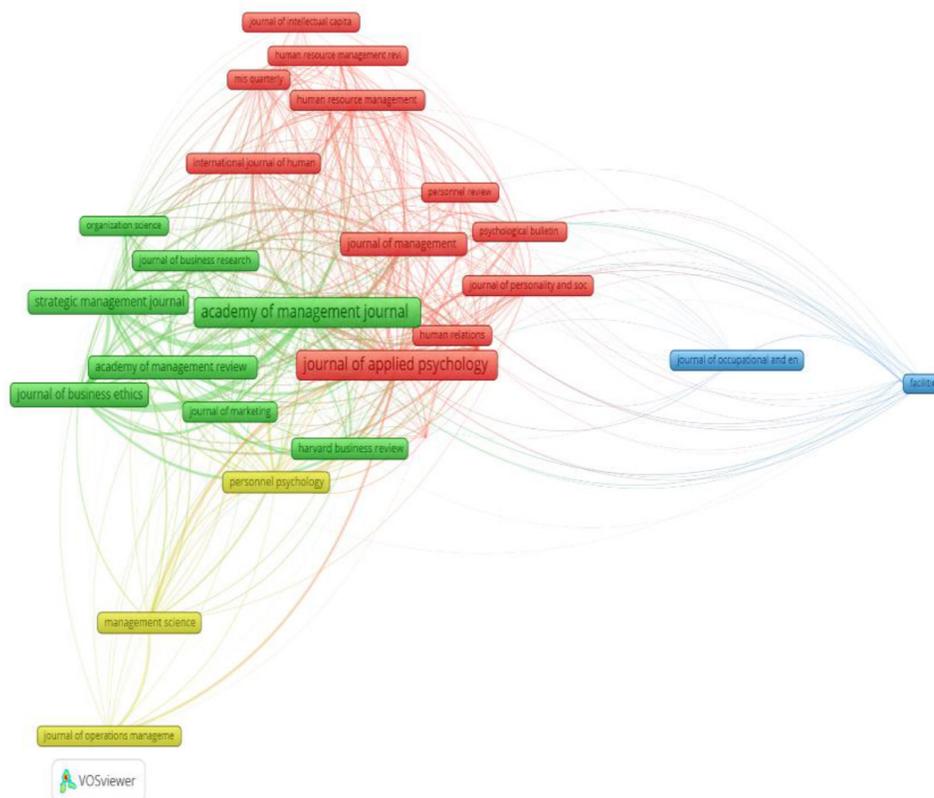


Figure 6: Co-Citations of Journals in Employee Productivity.

feedback, motivation and attitude. In this case, it can be seen that two of the clusters (red and yellow) are closely linked, which shows that their subjects of research (human resource management, personality, psychology, human behaviour) are closer, whereas the red cluster is composed of journals whose principal subjects of research are connected with aspects of management and the green cluster is composed of occupational and environmental medicines.

Most Popular Keywords

The keywords of the authors provided insights into the main topics of study in employee productivity. The study on employee productivity through the author's keywords analysis will examine the relationships between research subjects and trace their conceptual structure. The author's keyword co-occurrence network illustrates which of the author's keywords frequently appear together. The cognitive structure of a field can be represented by co-word analyses.

The keywords of the author of the set of 210 articles were originally extracted. A threshold of 5 minimum co-occurrences of a keyword was selected to obtain analytical results. 44 keywords meet the threshold of 690 keywords. The more often used keywords are shown by larger circles and fonts, while the less frequently used keywords are denoted by smaller circles and fonts, and the distance between the two articles indicates the strength of the association.

As shown in Figure 7, Employee Productivity (104 occurrences) and productivity (56 occurrences) are the most used author's keywords, followed by job satisfaction (13 occurrences). The meaning of the term productivity of employees cannot be assured. This term often misleads health promotion, training, and corporate social responsibility; although, productivity equally often reflects the productivity of employees. According to this research, the author keywords network is divided into four separate groups: group 1 (red colour), group 2 (green colour), group 3 (blue colour), group 4 (yellow colour), group 5 (purple colour), group 6 (light blue), group 7 (orange) and group 8 (brown).

Group 1 includes 5 keywords, such as employee's productivity, job satisfaction, employee behaviour, employee attitude, managers, productivity rate, human resource management and wellbeing. This analysis indicates that this group includes publications that focus on employee productivity related to job satisfaction and human resource management demonstrating the fact that on a whole the concept of employee productivity is applied to all the domains in human resource management at each and every level such as top, middle and lower level, demonstrating the significant contribution at both individual and organisational level.

Group 2 includes 4 keywords such as productivity, efficiency, performance, social media, universities and higher education. Again, in this group, employee productivity is mainly associated with productivity and performance. This group indicated the fact, both performance and productivity are complementary to each other. The keywords in group 3 include workplace health, health, and productivity, health promotion, workplace, personal health, absenteeism and stress. This group indicated that the activities of health promotion through various programs such as absenteeism and stress i.e. eustress and distress at the workplace influence the productivity of employees. The keywords in group 4 include employee productivity, motivation, knowledge management, human capital, service quality, employees and skills. This group indicated that motivated, knowledge-oriented and skilled employees always tend to be productive. The keywords in group 5 include employee involvement, construction industry and competitive advantage. This indicates that when employees are totally involved in their work, it will yield a competitive advantage over other firms for improving their productivity. The keywords in group 6 include presenteeism, health and corporate social responsibility. In this group, health and presenteeism are positively and significantly associated with each other, the rate of presenteeism will increase if the employees are physically or mentally healthy. Likewise, the activities of corporate social responsibility have brought a significant change in the behaviour of employees resulting in improved productivity. The keywords in group 7 include leadership, gender diversity and innovation. Employees from different backgrounds, including those who are minorities, bring new ideas to the table and help drive innovation. The keywords in group 8 include employee motivation and organisational culture. When organisations establish a strong culture of appreciation and recognition, employees become more motivated and productive.

DISCUSSION AND CONCLUSION

The objectives of this study were to examine the research on employee productivity by bibliometric analysis of bibliographic coupling, citations, co-citations and co-occurrence of author keywords. It used a bibliometric approach to analyse 210 scholarly publications published between 2002 and 2021 in 147 journals. This article makes three significant contributions: it identifies the most notable researchers, universities, countries and journals on the topic of employee productivity. To get to these conclusions, we did a bibliometric analysis, evaluating the most influential research, prolific authors and relevant journals via document co-citation analysis. We also examined how productivity grew over time via an evaluation of author keyword usage. The study discovered a consistent increase in employee productivity research during the study period. The current study analysed contributions from institutions, journals

and scholars. One objective of this study was to determine the most prolific authors in the field of employee productivity studies between 2002 and 2021. Cooper CL was the most prolific author in terms of publication count and *h*-index. Assessing individual scholar's achievement enables educational institutions to compete in the worldwide university ranking system. Additionally, it assists academic administrators in establishing standards for annual faculty evaluations, salary, teaching loads, research funds and promotion. Additionally, the volume of published publications is a critical indicator of an academic institution's excellence.^[43]

The findings of the study indicated that Penn State University (USA), the University of Wisconsin-Madison (USA), Utrecht University (Netherlands), the Netherlands Interdisciplinary Institute (Netherlands), the University of Pittsburgh (USA), Kasetsart University (Thailand) and Marie Curie-Sklodowska University (Poland) were among the universities with the most prolific research on employee productivity. Acquiring a global leadership position in the evolving field of employee productivity can help a university improve its public image in the world's most popular ranking systems, such as the Australian Business Deans Council (ABDC) and the American Journal of Business and Management (AJG). As previously reported, our study discovered that top-tier journals obtained a greater share of citations than lower-tier publications. Journal of Intellectual Capital, Population and Development Review and Engineering Economist was the most influential journals in terms of average total citations.

The findings of the study suggested that roughly two-thirds of publications in the field of employee productivity were in high-ranking journals. Notably, only a tiny fraction of social media research was published in "C" rated journals, whereas the majority of studies were published in journals with a high impact factor (A* and A-rated journals). Management Science and Journal of Operations Management are A* and 4* journals in the ABDC and AJG list respectively. International Journal of Information Management (14.098) and Journal of Intellectual Capital (10.2) are the highest impact factor journals respectively, The number of articles and citations of individual authors in a selective list of high-quality journals is increasingly used to determine their recruitment, tenure and promotion.

While employee productivity research has become a prominent issue in management, inter-country collaborations on research were uncommon, with a few notable exceptions. Interestingly, the most prolific inter-country collaborations on employee productivity were identified in countries such as the United States of America and the United Kingdom. Between 2002 and 2003, employee productivity research appeared to be in its infancy, however between 2004 and 2012, the number of studies starts rising gradually. Between 2013 and 2017,

topical coverage in areas focusing on employee productivity studies depicted a sluggish growth rate. The period from 2018 to 2020 witnessed upward and downward movement in the number of publications. During 2019 and 2020 witnessed a surge in the number of publications. Due to the increasing relevance of employee productivity, topics such as work satisfaction, performance, and training have emerged as key concerns for industry researchers and practitioners.

Limitations

This study is not free of constraints. There is a paucity of research on the concept of employee productivity. To begin, the current study eliminated papers presented at major conferences, books, book chapters, and dissertations. This should result in a better understanding of developing patterns in employee productivity. Second, certain restrictions are inherent in the nature of bibliographic databases and the bibliometric technique in general. The bibliometric study was limited to data acquired from the Scopus online database, as it contains the necessary information. Due to the limitations of the bibliometric co-citation methodology, evidence is drawn from widely cited papers, whereas less frequently cited documents may have a less significant impact on the research. Another weakness of this study is its reliance on the Scopus database, which may have resulted in the omission of a few papers indexed by WoS. For this study, it was not possible to merge both datasets since VOS viewer only supports the usage of bibliographic data from one database, not both. However, there is considerable overlap between the two datasets, and we encourage further work that includes bibliometric analysis of both databases.

Managerial Implications

The article provides insightful information to help academicians, managers and policymakers comprehend the concept of employee productivity and its application in the workplace. Our findings have significant implications for future studies. They illustrate the conceptual framework, and an individual or researcher new to this field of study can quickly gain an overview of the articles and the evolution of the research subjects to date. Managers must understand the importance of employee productivity in organisations. They should emphasis more on making an inclusive work environment. The relevance of employee productivity is felt during COVID-19 pandemic. Employees are considered a valuable asset to the company and it becomes difficult to retain those employees who perform at their best. In order to attain employee productivity, most companies aim for better employee performance. It is considered to be a key indicator of performance. Hence, there is a need to emphasise more on the notion of employee performance aiming the productivity.

Future study is thus suggested to use mixed-method approach for analysing employee productivity.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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