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Visualizing the knowledge domain of Work Engagement through Bibliometric Analysis

Asif Altaf
Universiti Teknologi MARA, asifaltaf1987@gmail.com

Mohamad Noorman Masrek
Universiti Teknologi MARA, mnoorman@uitm.edu.my

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Asif Altaf
Faculty of Information Management, Universiti Teknologi MARA
Shah Alam 40450, Selangor, Malaysia
asifaltaf1987@gmail.com

Mohamad Noorman Masrek
Faculty of Information Management, Universiti Teknologi MARA
Shah Alam 40450, Selangor, Malaysia
mnoorman@uitm.edu.my

Abstract

The aim of this study is to carry out a bibliometric analysis of literature on work engagement based on the Web of science Core Collection. References to work engagement literature published between 1980 and 2020 have been included. Biblioshiny application was used to analyze the annual scientific productivity, top contributing authors and their impact, top contributing countries and institutions, most relevant sources of publication, most cited documents, and most frequently used keywords and collaboration among countries in work engagement research. The results of study show that Netherlands is the most productive country and that the Erasmus University is the most productive institution in this area. Bakker AB is the leading author of the maximum citation category. "Journal of Vocational Behavior" is the most widely cited journal in work engagement filed. The paper of Schaufeli WB (2006) is a popular and symbolic reference with the maximum citations (697). The five most frequent keywords used in work engagement research have also been revealed, namely: (1) work engagement, (2) engagement, (3) work, (4) job satisfaction, and (5) burnout. Furthermore, it was found that Netherlands, Finland, United States, Spain, and Peoples Republic China have engaged in the

most significant collaborations. These analyzes would provide the reader with an overview of the study commitment and developments over these years.

Keywords: Work engagement, Bibliometric analysis, Co-word, Document co-citation, Biblioshiny, Visualization analysis

Introduction

Work engagement is a healthy, satisfying, affective and motivating state of working well-being that can be seen as an epicenter of job burnout. Engaged workers have high levels of motivation and perform with enthusiasm. (Bakker et al., 2008). Most researchers believe that commitment involves a dimension of energy and identity. The engagement is thus distinguished by a high degree of vigor and a deep identification with the work (Bakker & Leiter, 2010). Kahn (1990) initially defined personal engagement as ‘‘the simultaneous employment and expression of a person’s ‘preferred self’ in task behaviors that promote connections to work and to others, personal presence, and active full role performances’’. Subsequent scholars introduced a concept of engagement to classify different kinds of relationships and perspectives: work engagement (Schaufeli et al., 2002), organizational engagement (Saks, 2006), and job engagement (Rich et al., 2010). Meta-analysis research have shown that work engagement affects optimistic employee behaviors such as workplace satisfaction and organizational engagement (Guest, 2015). Christian et al. (2011) carried out an analysis on the identification of an accepted concept of engagement, its uniqueness and the explanation of its theoretical framework of constructs. They find that engagement is linked to many important contexts and implications. Their findings indicate that the engagement to work is a valuable construct which needs more focus.

There are limited number of studies (Huihui & Congwei, 2020; Knight et al., 2017; Motyka, 2018; Sott et al., 2020) available on review of work engagement literature but most of these studies were limited to systematic reviews but till date there is no comprehensive bibliometric analysis were conducted, also the available studies don't reflect the current situation of international work engagement research developments.

Bibliometric analysis results are useful for studying global pattern growth and provide an overview of the vast number of publications that have substantial scientific data to assess the influence of studies (W. Li & Zhao, 2015). It shows recent developments, key subjects, current gaps and trends of cooperation among researchers in a certain field of study (Cebrino & Cruz, 2020; Gall et al., 2015). Finally, bibliometric analysis is now commonly used to guide research and management policy decisions (Zanjirchi et al., 2019), study grants, for example (Xie et al., 2018).

The paper used bibliometric analysis by Biblioshiny (The shiny application for R-bibliometrix from the Statistical Package (https://bibliometrix.org/Biblioshiny.html)). It has several features that are useful for a thorough bibliometric analysis. It is an application that provides a web-interface for bibliometrix tool (Patil, 2020). The analysis examined annual scientific productivity, the top authors and their impact, the most important countries and institutions, the most relevant publishing sources, the most cited publications and the most generally used keywords in study on work engagement. The main goal of this study is therefore to analyze the comprehensive research situation and research trends focused on work engagement over the last 40 years (from 1980 to 2020).

Literature Review

Pritchard (1969) coined the word bibliometrics, which he described as the application of mathematical and statistical methods to books and other forms of communication. This concept has been expanded in recent years to include study of collections, databases, and websites (Welsh, 2015). Bibliometrics allows for the mapping and expansion of knowledge on a specific area of research by establishing links between the main publications, authors, institutions, themes, and other characteristics of the field under study. One important application of bibliometric methods is as a tool for research evaluation. Outstanding papers in bibliometric studies are often used to explain decisions on research strategies, grants, work offers, and promotions, as well as to guide and endorse research initiatives based on what is most important in the scientific literature (Bornmann & Leydesdorff, 2014; Gläser & Laudel, 2015). In addition, Bibliometric approaches can review the state of the art in the area under study, which is an essential step in investigating a research issue since it can reveal gaps in the literature that need to be filled as well as relevant studies to support the researchers' proposals (Bornmann & Leydesdorff, 2014). Because of the use of various bibliographic databases that vary in reach, data volume, and coverage, bibliometric indicators, when properly evaluated, may provide more consistency to the research project (Campbell et al., 2010). As a result, the researcher who designs a research project based on bibliometric analysis has the ability to explicitly and concisely present the goals and methods of his work by demonstrating which scientific gaps in the field will be filled as the study progresses.

As we mentioned earlier that there is no comprehensive bibliometric study has been conducted on work engagement so far. Therefore, available bibliometric studies on work engagement and related research areas of organizational psychology have been reviewed here. In a recent study (Cassar et al., 2020) on work stress, which is one of the most studied fields of organizational

psychology. Researchers have tackled the idea through a range of methodologies, based on a number of topics. They concluded that a more holistic effort is needed to have a deeper understanding. In the end, these would help practitioners to create effective approaches and useful policies.

Khan et al. (2016) touches the area of work engagement and conducted a study on keywords analysis. They used social network analysis technique for the study. The collected data from Web of Science and retrieved a total of 1406 articles using search strategy as topic and time span was 1990-2015. VOSviewer was used for visual analysis. The results showed that the keywords adopt a power law distribution and disclosed the fading, emerging, and central themes throughout the field of work engagement. Another study conducted by Wood et al. (2016) examined the work engagement using the social network analysis technique. Using Web of Science a total of 1406 articles were collected from the years 1990-2015. This study also found the existence of power of law distribution.

Cui et al. (2018) conducted a bibliometric study to provide broad information on organizational culture. Analysis was conducted using Web of Science and retrieved 1479 publications between years 2005 to 2106. Study findings provide information that Academy of Management Review is the most popular journal in the field and USA is the most productive country. It was also observed that majority of the scholar focused on performance, innovation and knowledge management areas.

Karakus (2018) identify the publications and their features in his bibliometric study on psychological capital. 288 publication were collected from Social Science Citation Index between the years 2003 to 2018. He observed sudden growth in number of publications on psychological capital after 2013. He conclude that Journal of Leadership & Organizational

Studies was the most productive journal, while the University of Nebraska and USA was the most productive institution and country respectively.

Sánchez-García et al. (2018) summarize and classify the existence research on entrepreneurs' well-being through bibliometric study. Data was collected from SSCI, Scopus and ProQuest. But after systematic scrutiny only 373 articles were include for analysis. Researchers observed a considerable growth in the literature of entrepreneurs' well-being.

Li et al. (2018) conducted a bibliometric analysis to examine the current research trends and status of work involvement of Chinese nurses. CNKI was used as data source to retiree papers on work involvement. 189 papers were included in the study from 65 Chinese journals. It was observed that majority (89.95%) of the studies were survey. It was conclude by the researchers that work involvement in china is still on initial stages but growing rapidly.

Another bibliometric study conducted by (Huihui & Congwei, 2020) to visualizes the domain of psychological contract. Web of science core collection was used to retrieve the data, resulting a total of 458 papers extracted. Citespace app was used to conduct visual analysis. So, community support and organization change was observed the research frontiers in psychological contract research were summarized.

Margiadi & Wibowo (2020) concluded in their bibliometric study that psychological capital is one of the significant theme of organization behaviour. Purpose of the study was to analyze the latest trends and themes to get directions for future research. Study reviewed 160 articles that are related to the topic and was further analyzed through Publish or Perish (PoP) software and VOSviewer. Journal of Leadership & Organizational Studies was observed as the leading cited

journal in the field, while the performance & positive psychology was the most frequent keywords.

Methodology

In this article, the reference data are primarily from the Web of Science Core Collection. Strategy for data retrieval was: the title is ‘‘work engagement’’, time span=1980 – 2020 (Retrieved date March 13, 2021). Researchers excluded the 2021 data because it would not be meaningful to compare incomplete data from 2 months of 2021 with data from complete years, also excluded types of literature for which full texts are unavailable, such as books, editorials and conference information. So, accurately retrieved reference type is ‘‘article’’. The search strategy yielded 1268 records, which was used for further analysis. The complete bibliographic data was retrieved from Web of Science Core Collection in Plain Text (.txt) file format. Initially, the bibliometrix R package (Version 3.0.2 released on 17/07/2020) was installed and loaded through R Studio. Then, Biblioshiny app was started by entering command “biblioshiny ()” in R console. Table 1 summarizes the parameter of analysis used in the study. Step by step description of complete method followed during this bibliometric study was presented in Fig. 1.

Table 1: Parameter of Analysis adapted from (Oliveira et al., 2019)

Parameter	Description
Most cited countries	Position in the citation ranking, country name, number of publications, number of citations
Most cited Institution	Position in the citation ranking, institution name, country, number of publications, number of citations
Most cited Journals	Position in the citation ranking, name of the journal, publishing area, SJR or JCR, ISSN, number of publications, number of citations
Most cited Authors	Position in the citation ranking, name of the author, institution, H-index, number of publications, number of citations, evolution of citations in the field of study over the years
Most cited Articles	Position in the citation ranking, title of the article, authors, journal, year of publication, number of citations, evolution of citations over the years

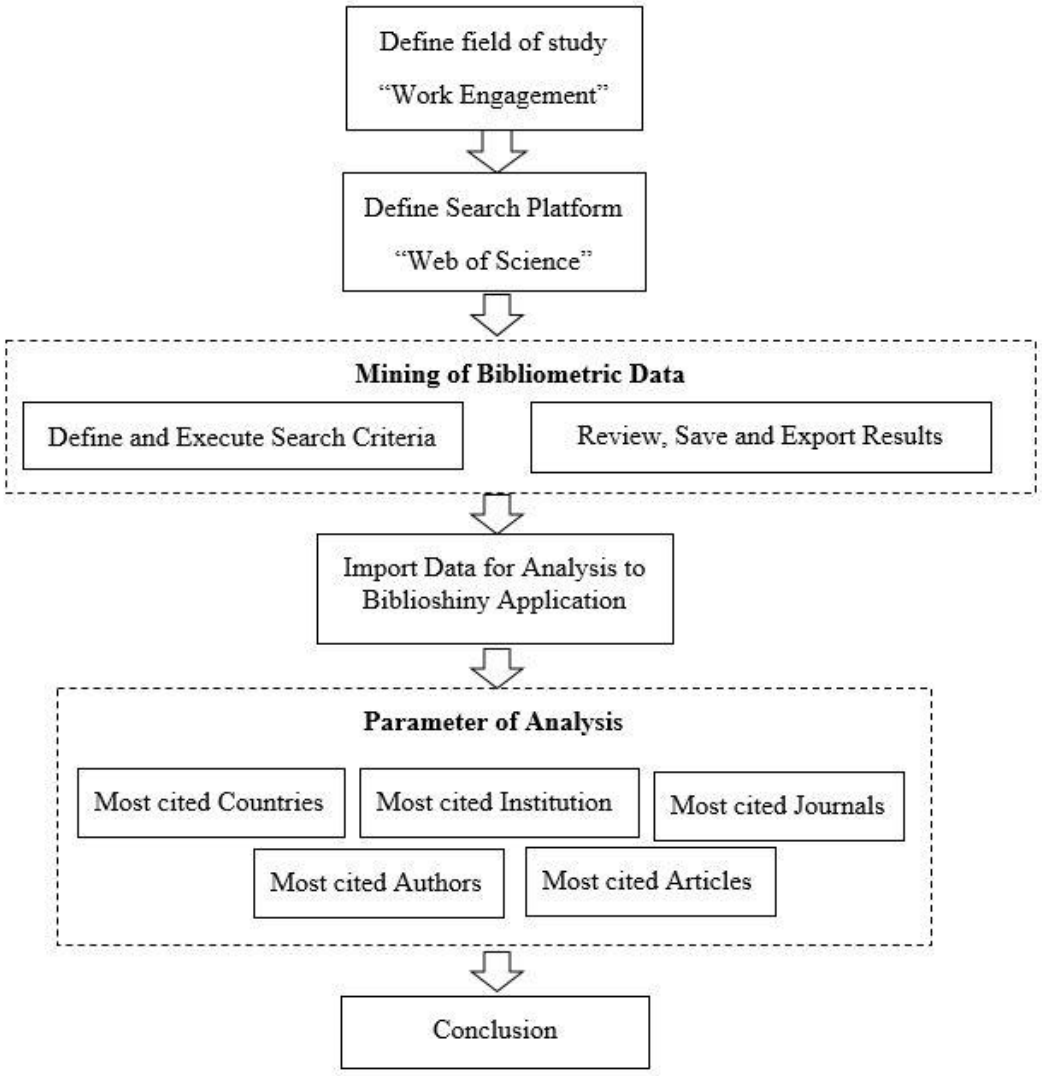

Fig 1. Stages of the method followed to visualizing the work engagement bibliometric analysis

Result and Discussion

Data Main Information

The analysis of 1268 documents on work engagement revealed that these documents were published in 458 sources (Journals) over the period of 40 years from 1980 to 2020 (see Table 2

and Fig 2). These documents were contributed by 2,967 authors with a total of 4,218 author appearances. The analysis disclosed that authors writing on work engagement had collaboration index of 2.5 with 3.33 authors per document and they contributed only 9.8% (124) single authored documents.

Table 2: Data main information

Description	**Results**
Timespan	1980:2021
Sources (Journals)	458
Documents	1268
References	37705
Author's Keywords	2536
Authors	2967
Author Appearances	4218
Authors of single-authored documents	105
Authors of multi-authored documents	2862
Single-authored documents	124
Co-Authors per Documents	3.33
Collaboration Index	2.5

Analysis of publication output

In Fig. 2, publications where distributed between 1980 and 2020. The distribution was split into two phases. The years 1980-2009 are the first phase and the years 2010-2020 are the second phase. The second phase is a quick stage of growth. In 2005, the number of publications published was 3 and the trend continued to rise until 2010 (14 publications). Then there was an accelerated growth between 2010 and 2020 (from 14 to 238 publications). In 2020, the number of publications are 17 times higher than in 2010. As seen in Fig. 2, the number of publications tends to grow annually at a steady pace in recent years, showing that research into work engagement has reached a stable stage of maturity. Concluding that there have been further

researchers interested in this field and further R&D work has been carried out, and a vast number of scientific papers have been published.

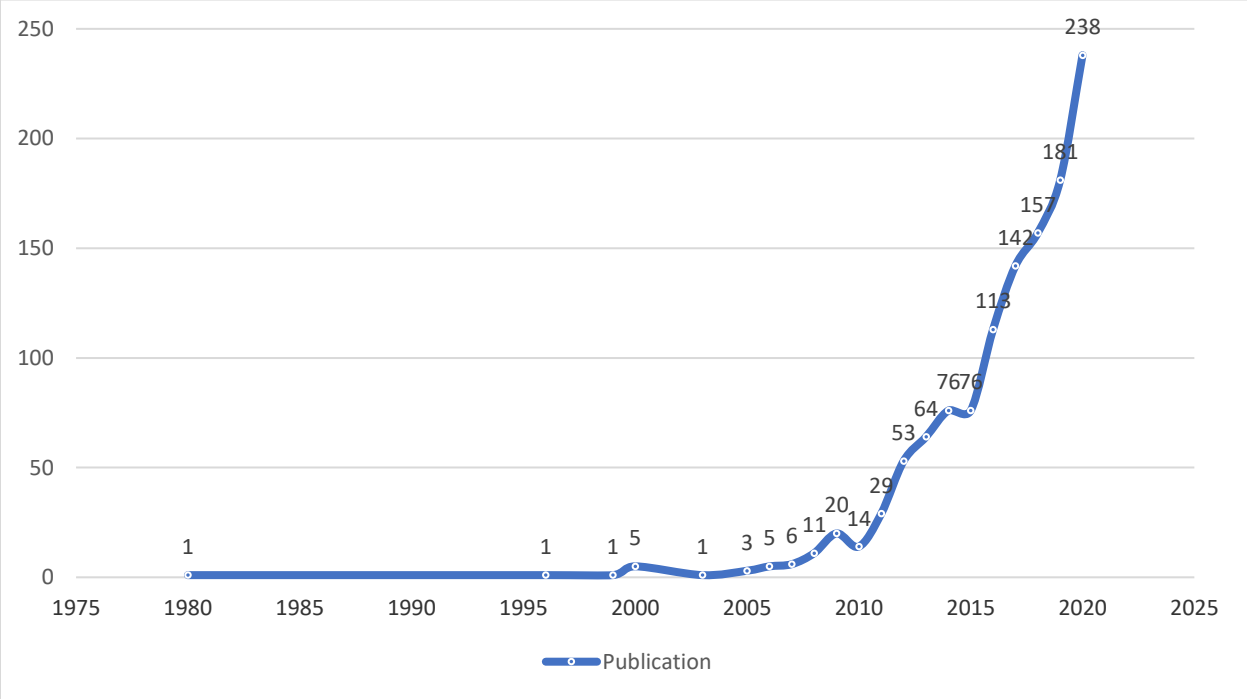

Fig. 2: 1980–2020 the number of publications

Analysis of country and institution distribution

Country/institution maps have been developed with Biblioshiny (Fig. 3). Countries/institutions involved in research on work engagement have been spread worldwide. This distribution map would provide valuable knowledge for researchers to identify conveniently where their collaborating colleagues are from various areas of the world.

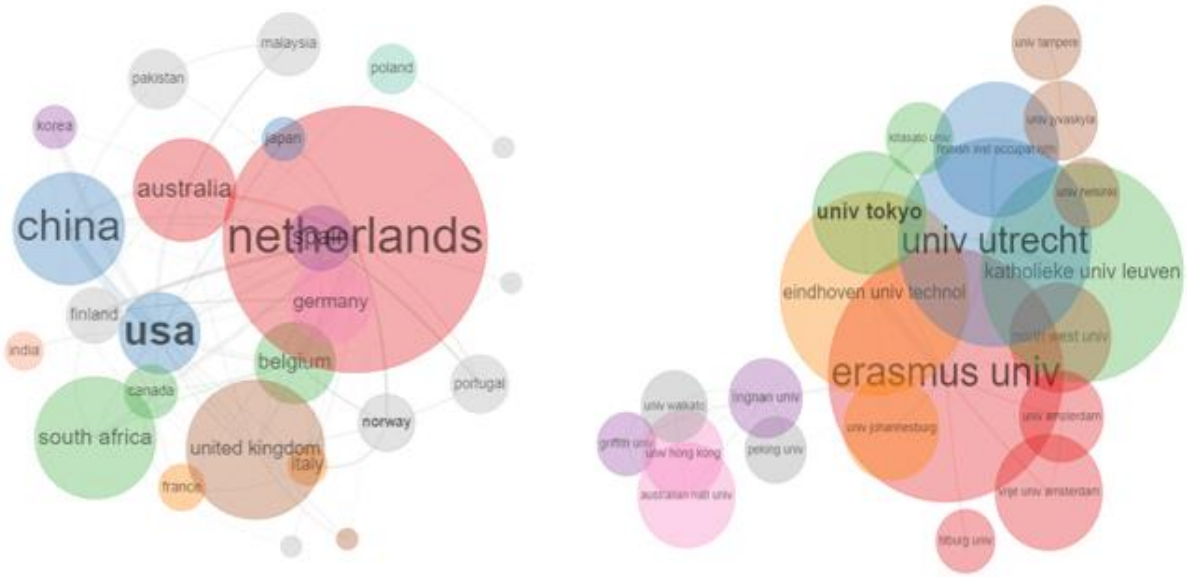

Fig. 3: Country/institution map

Most prolific countries

The statistical results showed that 1268 papers were distributed between 56 countries. 1037 articles have been written by the top 10 countries. Netherlands, United States and People Republic China were the top three countries in Table 3 and Fig. 3. Netherlands, United States and Peoples Republic China published 206, 180, and 170 papers respectively, they were ranked the first, second and third, accounting for 43.85% of the total papers. This demonstrates that Netherlands, United States and People Republic China, are well ahead of other nations, and were three major research powers in the area of work engagement.

Table 3: Top 10 productive countries and institutions

Rank	Country	Publication	Institution	Publication
1	Netherlands	206	Erasmus Univ	84
2	United States	180	Univ Utrecht	73
3	Peoples Republic China	170	KU Leuven	35

4	South Africa	86	University of Tokyo	32
5	Australia	83	Eindhoven Univ Technol	31
6	Spain	77	North West University	31
7	Germany	66	Univ Johannesburg	24
8	India	58	Eastern Mediterranean Univ	22
9	Italy	56	Vrije Univ Amsterdam	22
10	Belgium	55	Finnish Institute of Occupational Health	20

Most prolific institutions

Statistical analysis found that 1309 research institutions had published these 1268 publications. The top ten research institutions have written 374 papers, comprising 29.50% of all papers published. According to Fig. 3, Erasmus Univ. headed the first large research group. There were four research institutions from the Netherlands in these top 10 institutions, which demonstrate that the Netherlands has substantial research contribution capacities and good research and development skills. We may also derive another point from Fig. 3. that there are relatively few ties between countries or institutions. Fewer connections suggest less collaboration between these countries or institutions or because there is no real desire to cooperate. International coordination must also be more increased in the future.

Most Preferred Journals

The study observed that research on work engagement was being published in top quartile journals. Table 4 depicts that Frontiers in Psychology has published the highest number (51) of research papers, followed by Journal of Vocational Behavior (31) and International Journal of Environmental Research and Public Health (30). Frontiers in Psychology remained the most popular journal to publish research on the topic so far, but the citation data depict that Journal of Vocational Behavior got the highest citations (3430) among all top 10 journals followed by European Journal of Work and Organizational Psychology (1116). Journal of Vocational

Behavior journal also contributed the highest h-index (25) and g-index (31) and m-index (1.6). The data also reveals that all these journals started contributing towards work engagement research after 2006.

Table 4: Top-10 most productive journals with impact

Source	H_Index	G_Index	M_Index	TC	NP	PY_start
Frontiers in Psychology	8	12	1	228	51	2014
Journal of Vocational Behavior	25	31	1.6	3430	31	2006
International Journal of Environmental Research and Public Health	7	10	1.2	136	30	2016
European Journal of Work and Organizational Psychology	14	27	1.3	1116	27	2011
Journal of Psychology in Africa	7	10	0.6	133	23	2011
Social Behavior and Personality	8	13	0.8	195	23	2012
International Journal of Human Resource Management	12	22		920	22	2008
Journal of Nursing Management	11	19		473	19	2010
Journal of Occupational and Environmental Medicine	9	15	1	245	18	2013
Journal of Occupational and Organizational Psychology	13	16	1	1559	16	2009

Most Productive Authors

The performance of the top 10 prolific authors based on their publications and citations as shown in Table 5. The analysis of the most prominent researchers on work engagement indicated that the number of publications by these authors ranged from 10 to 70. The top researcher was BAKKER AB with 70 publications along with a total of 12679 citations. BAKKER AB also contributed the highest h-index (44) and g-index (70) and m-index (2.6). Second most prolific author in terms of publication was SCHAUFELI WB with 50 publications and 10660 citations, followed by DEMEROUTI E with 29 publications and 4482 citations. INOUE A was at last in top ten list with 10 publications and 141 citations.

Table 5: Top-10 most productive authors with impact

Author	H_Index	G_Index	M_Index	TC	NP	PY_start
Bakker AB	44	70	2.6	12679	70	2005
Schaufeli WB	32	50		10660	50	2005
Demerouti E	20	29		4482	29	2005
Shimazu A	14	25	1	827	25	2008
Kawakami N	13	21	1	471	22	2009
Karatepe Om	13	21	1	793	21	2009
Salanova M	14	17	0.8	4446	17	2005
Hakanen JJ	8	11	0.5	3151	11	2006
Xanthopoulou D	9	11	0.6	2823	11	2007
Inoue A	7	10	0.5	141	10	2009

Analysis of the Top Cited Author

White & McCain (1998) first proposed the concept of author co-citation. Authors' co-citation maps are often used to determine the quota for scientific competence and relevance. Co-citation links represent a similar association between the research directions of two scholars. The thicker the links between the two authors, the more their scholarly study is related. The larger the node, the greater the value of the author. A co-citation cluster thus represents these authors' similar research directions and relevance. A co-citation map with Biblioshiny has been developed (Fig. 4). The analysis of the author's co-citation map shows that the links in the map are moderate. Some nodes have been closely connected; some nodes have been disconnected. Each node represented one author; each node represented the number of co-citations and the relations between the two nodes showed the co-citations between such two authors.

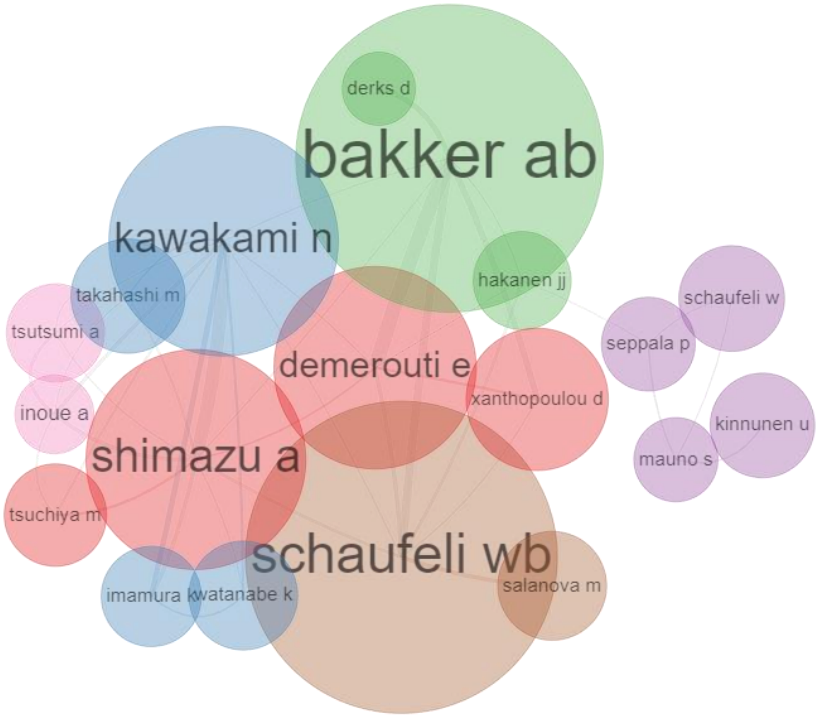

Fig. 4: Author co-citation map

It was observed from Fig. 4 that the biggest node mirrored BAKKER AB, which was cited in 12679 papers. The other nine highly cited authors were SCHAUFELI WB (10660), DEMEROUTI E (4482); SHIMAZU A (827); KAWAKAMI N (471); KARATEPE OM (793); SALANOVA M (4446); HAKANEN JJ (3151); XANTHOPOULOU D (2823); INOUE A (141). This indicates that research by these authors has a substantial influence on the field of work engagement and future development; they constitute the "core strength" in this area. In Fig. 4, five significant and apparent co-citation clusters have been identified. BAKKER AB had the first large co-citing cluster; SCHAUFELI WB, who were a key player in this community, was the second large co-citing cluster. DEMEROUTI E was in the middle of the third cluster group and SHIMAZU A represented the fourth collaboration group, while KAWAKAMI N led the fifth

group. The study showed that these individual authors played an important role and had a major influence on research into work engagement.

Most Cited References

Table 6 summarizes, along with year of publication, citations, author and journal information, the top ten most cited references. SCHAUFELI WB (2006) reference ranked in first place with the most citations (697), followed by another two documents of SCHAUFELI's (2004) and (2002) with 563 and 492 citation respectively, suggesting that till now SCHAUFELI WB was the most influential author in the work engagement field. Other most cited references were KAHN WA (1990) and BAKKER A.B (2007) with 377 and 369 citations respectively. CHRISTIAN MS (2011) was at the end of top ten list with 283 citations.

Table 6: Top 10 highly cited references

Cited References	Citations	Year
SCHAUFELI WB, 2006, EDUC PSYCHOL MEAS, V66, P701, DOI 10.1177/0013164405282471	697	2006
SCHAUFELI WB, 2004, J ORGAN BEHAV, V25, P293, DOI 10.1002/JOB.248	563	2004
SCHAUFELI W.B., 2002, J HAPPINESS STUD, V3, P71, DOI [10.1023/A:1015630930326, DOI 10.1023/A:1015630930326]	492	2002
KAHN WA, 1990, ACAD MANAGE J, V33, P692, DOI 10.2307/256287	377	1990
BAKKER A.B., 2007, J MANAGE PSYCHOL, V22, P309, DOI DOI 10.1108/02683940710733115	369	2007
PODSAKOFF PM, 2003, J APPL PSYCHOL, V88, P879, DOI 10.1037/0021-9010.88.5.879	333	2003
SCHAUFELI WB, 2002, J HAPPINESS STUD, V3, P71, DOI DOI 10.1023/A:1015630930326	319	2002
BAKKER AB., 2008, CAREER DEV INT, V13, P209, DOI [DOI 10.1108/13620430810870476, 10.1108/13620430810870476]	299	2008
DEMEROUTI E, 2001, J APPL PSYCHOL, V86, P499, DOI 10.1037//0021-9010.86.3.499	295	2001
CHRISTIAN MS, 2011, PERS PSYCHOL, V64, P89, DOI 10.1111/J.1744-6570.2010.01203.X	283	2011

Analysis of Keyword Co-occurrence

An evaluation of the author's keywords in work engagement study will help to identify the key topics and the research horizons. As keywords represent current research topics, issues and new research frontiers. A keyword co-occurrence map (Fig. 5) was created with Biblioshiny. A large node designates high co-occurrence frequency of keywords. The top ten keywords from Fig. 5 were easily extracted according to co-occurrence frequency; they are shown in Table 4. It was revealed that work engagement was at the top in most frequent keywords with 833 co-occurrences, followed by engagement (159), work (107) and job satisfaction (85). Job was at the last in most frequent keywords list with only 37 co-occurrences.

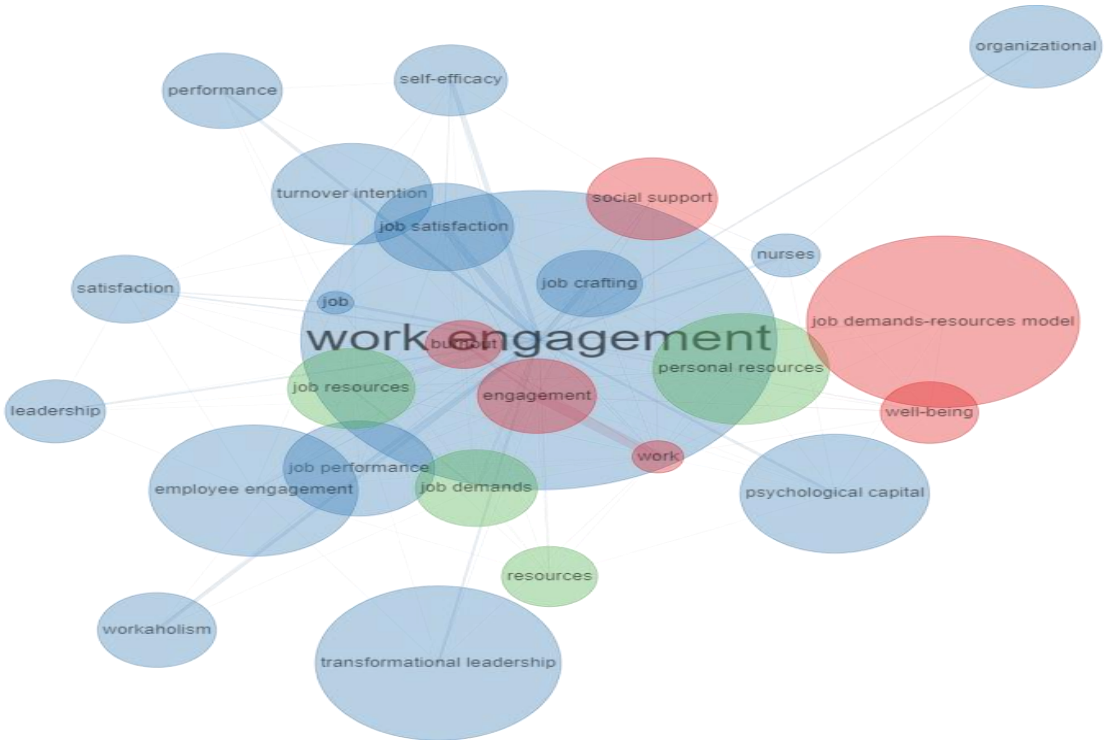

Fig. 5 Keyword co-occurrence map

World Collaboration Map

World collaboration map includes papers about the work engagement of individual or multiple publications in each country. It also aims at monitoring collaboration and networking among countries. International collaborations are shown in Fig. 6. The blue color on the map reflects collaboration in research between countries. Furthermore, the pink border between the countries shows the degree of the collaboration between the authors. It is important to see if countries with the highest number of publications on work engagement participated. Since the Netherlands, Finland, United States, Spain and the People Republic of China have been engaged in the most significant collaboration with countries that are often very remote from each other and thus have been unable to develop the theme, the partnership will lead to a policy sharing.

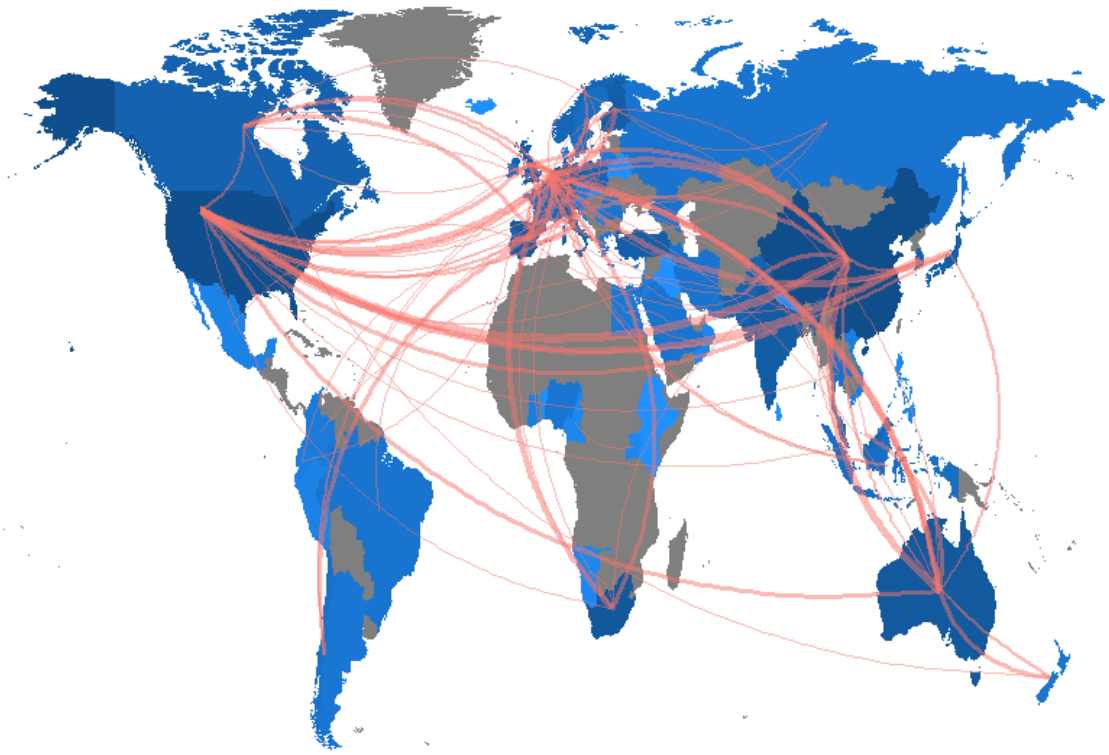

Fig. 6 Country collaboration map

Conclusion

To sum up, the Biblioshiny application with the data source of Web of Science Core Collection conducted a comprehensive bibliometric analysis of work engagement research literature from 1980 to 2020. Various visual maps were developed after analysis and the following valuable conclusions were drawn from those maps. The following are listed:

1. In recent years, annual publications in the area of work engagement continue to rise at a steady pace.
2. The Netherlands, United States, and Peoples Republic China are three leading countries in work engagement research. In the future, more international coordination also needs to be improved.
3. The most prominent researchers from work engagement filed were identified. The most cited authors created five distinct clusters. BAKKER AB reflected the first cluster. Each cluster has various guidelines and strengths for study.
4. Journal of Vocational Behavior, Journal of Occupational and Organizational Psychology, and European Journal of Work and Organizational Psychology were recognized as top reprehensive publications in the area of work engagement with over 1000 citations.
5. Analysis of the cited references revealed highly cited documents. The most frequently cited reference was from SCHAUFELI WB (2006), followed by another two documents of SCHAUFELI's (2004) and (2002). Next most cited references were KAHN WA (1990) and BAKKER A.B (2007).
6. Key words co-occurrence analyses provided a list of most frequent keywords during these years, these were (1) work engagement, (2) engagement, (3) work, (4) job satisfaction, (5) burnout.

7. Furthermore, upon analysis of world collaboration map it was revealed that Netherlands, Finland, United States, Spain, and Peoples Republic China have engaged in the most significant collaborations.

Besides the aforementioned findings, our analysis is also of the opinion that researchers in this area can find valuable knowledge and references.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest concerning the research, authorship, and/or publication of this article.

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