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Bibliometric Analysis of Learning Organization

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Abstract : Having the consideration of learning is a continuous effort put into the development of human capital and talent development for organizations of all kinds, scholarly interest in learning organization has consistently increased in the past decade due to its potential to create and disseminate valuable knowledge to enhance innovative performance and sustainable organizations. Knowing the increasing research in this field, this article analyzes and reports on various types of published works related to learning organizations. This study adopted a bibliometric analysis based on the data obtained from Scopus database as at date 24 January 2021. Keywords through search string are utilised for the search results and found 1,671 valid documents for further analysis. Authors have employed VOSviewer for data visualization purpose, Harzing Publish Or Perish and R for standard bibliometric indicators, particularly on the growth rate of publications, analysis of the citation, and research productivity. Findings revealed analysis of document type, source type, top language used, subject area, research trend, top countries, top influential institutions, most productive authors, most active source, top keywords used, and citation analysis. As this study is only using one of the major databases, Scopus, hence, there is a limitation in the search results. Another limitation is in the case where authors are having few registrations in the same database which will affect the accuracy of the productivity in authorship and affiliation details. In this paper, we identify future research directions and future research agenda in learning organization.

Keywords: Bibliometric analysis, learning organization, learning.

1. INTRODUCTION

In the acceleration of environmental change, technological advancement towards industrial revolution as well as globalization that have rendered a common occurrence of shift. Learning is the only constant in any organization or business context today and apparently to those that accept and proactively involve in learning organization practices will flourish. In order to gain and maintain competitive advantages, organizations must improve creative capacity and be able to learn more both internally and externally. Learning organization contributed to the development of a professional association, the foundation of which is the belief that organizational and transformation is strongly related (Siddique, 2017; Szabla, Pasmore, Barnes, & Gipson, 2017). The importance of a learning organization is reflected in the various benefits of developing a learning culture within the organization. This includes improving employee job satisfaction, increasing productivity and efficiency, training leaders at all levels, enhancing the adaptability of the entire organization, and people tend to be more

competitive force. The development of a sustainable organizational learning system establishes the foundation for an adequate settlement of issues and problems (Gachanja, Nga'nga', & Kiganane, 2020). Only where organizations promote a combination of employees and organizational learning are able to succeed in this part. Hence, this aspect calls for the maximum cooperation and commitment from the members of the organization.

Learning aspects of organizational level practices and planning is essential because it can improve workflow and innovation, provide new market insights, and improve overall performance in a dynamic environment (Khunsoonthornkit & Panjakajornsak, 2018). Hence, learning occurs in organizations through individual and collective collaboration at all levels (individual, team, and organization structure) through interconnectedness in the relationship with stakeholders. Scholars and practitioners generally focus on organizational learning and the learning orientation to enhance organization performance. In recent years, more attention has been given to learning through various modes in order to build a knowledge-based organization for continual improvement. Through strategic alliances, collaborations or partnerships, knowledge creation and transfer within and between organizations has become more and more common. The increasing interest in this phenomenon has prompted researchers to continue to study the potential mechanisms and learning practices of various organizations.

There are many studies related to learning organizations throughout these years to understand various aspect of learning in organization setting. Among the top articles in organization management are Crona and Parker (2012) examined a holistic framework to address learning in support of governance ; Bunderson and Reagans (2010) examined the impact of learning organization through power and status ; Bartsch, Ebers, and Maurer, (2013) investigated on learning in project-based organizations through the role of project teams' social capital ; Sung and Choi (2014) examined the effects of training and development investments on learning and innovation ; Lam, Kraus, and Ahearne (2010) studied the diffusion of market orientation ; Jo and Joo (2011) investigated knowledge sharing through the influences of learning organization culture and commitment ; practice-based view of knowing by Nicolini, Gherardi, and Yanow (2016) ; relationship of total quality management with learning orientation and market performance by Lam, Lee, Ooi, and Lin (2011) ; error management in learning by Frese and Keith (2015) ; influence of goal orientation to learn by Chadwick and Raver (2015) ; and Decuyper, Dochy, and Van den Bossche (2010) in grasping the dynamic complexity of team learning. There are studies in other fields like science, clinical, psychology and education too in the top ranking of learning organization publications.

The objective of this study is to identify the evolution and emerging themes of learning organization through a systematic, transparent, and reproducible methodology for future explorations. We address the following research questions – RQ1 : What is the current publication trend in learning organization? RQ2 : Which are the most influential articles on learning organization? RQ3 : Who are the leading authors in learning organization publications? RQ4 : Which countries lead in the number of publications in the field of learning organization? RQ5 : What are the important keywords used in the study of learning organization? RQ6 : Which institutions or affiliations are leading in the learning organization literature?

Research on learning organizations has been extensively conducted among researchers to further investigate the development of organizational growth in the industry. Therefore, the purpose of this study is to use bibliometric analysis to analyze the scientific literature published in the field of learning organization. Compared with conventional literature search and reviews, bibliometric techniques combined with scientific surveying and mapping software tools have the potential to classify and discover research trends (Aria & Cuccurullo, 2017; Ramanan, George, Chavan, Kumar, & Jayasubha, 2020). Believe that bibliometrics

can provide insights through quantitative and qualitative methods, so it will not be distorted by the cognitive biases of researchers (Zhang, Pu, Lv, Gao, & Ge, 2020). The following Table 1 provides a comparative analysis of attributes being examined in earlier bibliometric studies related to various research domain in learning setting.

Table 1. Features that examined in bibliometric analysis

Authors & Year	**Title**	**Features**
Anand & Selivanovskikh, 2020	International learning : a bibliometric review and research agenda	• Leading countries in the number of work published • Leading authors • Leading institutions or affiliations • Most cited publications • Important keywords and themes • Intellectual foundations and evolutions • Emerging research themes or trends Software application used :- VOS viewer
Almahendra & Ambos, 2014	Exploration and Exploitation: A 20-Year Review of Evolution and Reconceptualisation	• Number of articles by journal • Domination of quoted article • Domination of article by year • Citation analysis • Factor analysis of most cited article • Cluster group of most cited article • Visualization and pattern of article Software application used :- SITKIS and UCINET
Gaviria-Marin, Merigo, & Popa, 2018	Twenty years of the Journal of Knowledge Management: A bibliometric analysis	• Total number of publications • Core articles • Main researchers, universities and countries • Core journals used • Affiliations of

		researchers • Main topics in articles • Structural networks among the authors who published in this journal Software application used :- VOS viewer
Jerman, Bach, & Bertoncelj, 2018	A Bibliometric and Topic Analysis on Future Competences at Smart Factories	• Year of publication • Conferences and journal publishing papers • Most frequent phrases in papers • Cluster analysis of phrases • Mapping of cluster • Proximity plots of phrases in clusters • Distribution of papers across clusters over time Software application used :- Statistica Data Miner

As indicated in the above table, among the commonly examined features are year of publication, number of articles, top cited articles, leading authors, leading countries, leading institutions, most important keyword or phrases, distribution of clusters, and mapping analysis.
Therefore, the author introduces the purpose of this bibliometric analysis in this section, and the second section will detail the method used. The third part will introduce the analysis results related to bibliometric indicators. Last but not least, the summary of the research results identifies potential research areas in the future and puts forward some restrictions on this research.

2. METHODS

Bibliometric analysis is a quantitative research method that has been widely used in the field of library and information science research, and uses statistical tools to analyze published academic research (Vijayakumaran, Rahim, Ahmi, Rahman, & Mazlan, 2020). It is used to examine the knowledge structure and development of research fields based on analysis of related publications. Bibliometrics includes several descriptive statistics on citation data, analysis of authors, journals, institutions, countries and keywords based on citation and frequency analysis techniques. This methodology supports the identification of research clusters, provides insights into current research interests and reveals the latest trends of emerging topics in this field of study.
In consideration the fact that Scopus is a major database that largely consist of scholarly papers other than Web of Science, the study employed this database as a basis to extract

works on learning organization. This database has adequate supplies of publication details that include document type, source type, subject area, author, year, language, affiliation, country and keywords. Further specification has been done to relevant scholarly studies on the research domain examined, we have restricted the search on learning organization studies based on the title. Therefore, the following search process and search string being used in the search process : (TITLE("learning organization" OR "learning organisation" OR "learning organizations" OR "learning organisations"). Data search flow is based on the following procedures which run an identification review of literature, exclusion criteria, manual screening which applied inclusion and exclusion criteria, general text assessment for eligibility purpose, and analysis. Timeline in the search for scholarly articles included the past one decade and on the exclusion part, keywords that reflected in other than title section are excluded.

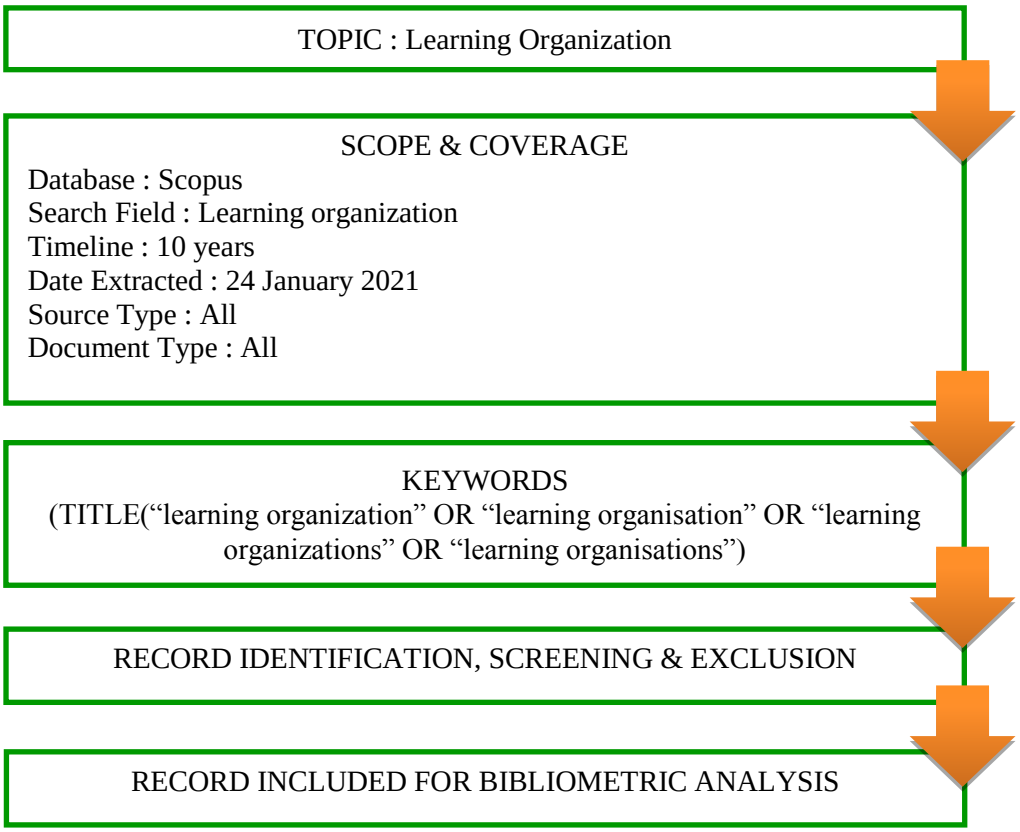

Figure 1 : Flow of search process

3. RESULTS

The data collected were analyzed to identify document types, source types, language of documents, subject areas, research trends, countries of publication, most influential institutions for publications, authorships, most active source title, citation analysis, and top keywords. Most of the findings presented are descriptive in terms of frequency and percentage. As for the publication trends, we presented data as per the number of retrieval documents per year including the average total citations per article and average total citations per year.

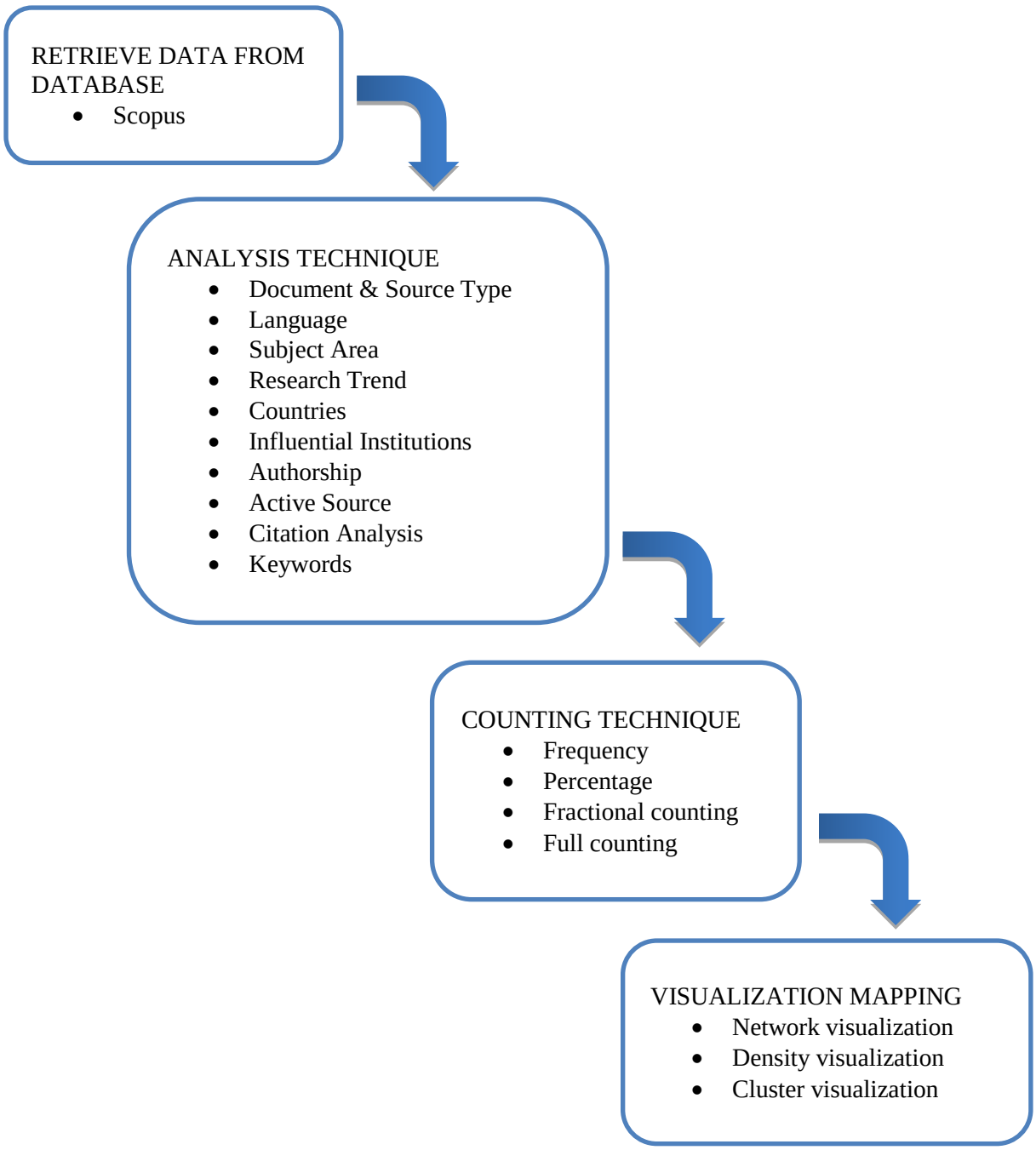

Figure 2. Flow of data processes

3.1 Document and Source Type

First of all, data obtained from database were analyzed to identify its document types and source types. Document types include of articles, conference paper, book chapter, review, book, editorial up to short survey and article in press. Conference paper which appeared under document type were of different kind from those listed under source type as within document type, the conference paper refers to papers presented in conferences and were assumed to be published as full journal articles. There are some conference papers which published either in conference proceedings or as a book chapter within source type although the document was originated from a conference paper.

This study revealed 12 types of documents that have been published related to learning organization. As per Table 2, majority of the publications were from article (1,024)

representing more than 50% which is 61.28%, followed by conference paper (326) with 19.51%. Book chapter contributed 175 publications taking up 10.47% while the rest other types of documents collectively represented 8.74%, in which each type was below 5.00% of total documents. Few lowest types of documents with less than 0.50% show not much of significance.

On the other hand, Table 3 presents six source types. Journal article stands the highest source type with 1,141 (68.28%), followed by conference proceeding with 270 (16.16%). Book and book series contributed 15.38% collectively while remaining trade journal is below 1.00%.

Table 2. Document Type

Document Type	**Frequency**	**Percentage (%)**
Article	1024	61.28%
Conference Paper	326	19.51%
Book Chapter	175	10.47%
Review	78	4.67%
Book	22	1.32%
Editorial	19	1.14%
Note	10	0.60%
Erratum	9	0.54%
Letter	2	0.12%
Retracted	2	0.12%
Short Survey	1	0.06%
Article in press	3	0.18%
Total	1671	**100.00**

Table 3. Source Type

Source Type	**Frequency**	**Percentage (%)**
Journal	1141	68.28%
Conference Proceeding	270	16.16%
Book	188	11.25%
Book Series	69	4.13%
Trade Journal	1	0.06%
Undefined	2	0.12%
Total	**1671**	**100.00**

3.2 Languages of Documents

Following Table 4 shows the top eleven languages used in publications. More than 90% of the total number of publications were in English (94.56%), taking up 1,600 publications. Nonetheless, some documents were published in other international languages such as Portuguese (1.00%), Spanish (0.95%), Chinese (0.77%), French (0.65%), German (0.53%) and so on as listed in the table.

Table 4. Top eleven languages in publications

Language	**TP**	**Percentage (%)**
English	1600	94.56%
Portuguese	17	1.00%
Spanish	16	0.95%
Chinese	13	0.77%
French	11	0.65%

German	9	0.53%
Russian	5	0.30%
Turkish	4	0.24%
Japanese	3	0.18%
Lithuanian	2	0.12%
Slovak	2	0.12%

Notes: TP = total number of publications

3.3 Subject Area

This study tabled the published documents based on its subject area. It is found most of the studies in learning organization were in the area of Social Sciences (742) representing 44.40% of total documents, second highest was from Business, Management and Accounting (658) with 39.38% while third place from Computer Science area (344) with 20.59%. The rest other subject areas covering learning organization setting are tabulated in Table 5 according to subject alphabetical order.

Table 5. Subject Area

Subject Area	**TP**	**Percentage %**
Agricultural and Biological Sciences	29	1.74%
Arts and Humanities	60	3.59%
Biochemistry, Genetics and Molecular Biology	28	1.68%
Business, Management and Accounting	658	39.38%
Chemical Engineering	6	0.36%
Chemistry	3	0.18%
Computer Science	344	20.59%
Decision Sciences	95	5.69%
Dentistry	1	0.06%
Earth and Planetary Sciences	12	0.72%
Economics, Econometrics and Finance	141	8.44%
Energy	19	1.14%
Engineering	201	12.03%
Environmental Science	54	3.23%
Health Professions	25	1.50%
Immunology and Microbiology	3	0.18%
Materials Science	14	0.84%
Mathematics	80	4.79%
Medicine	118	7.06%
Multidisciplinary	14	0.84%
Neuroscience	42	2.51%
Nursing	31	1.86%
Pharmacology, Toxicology and Pharmaceutics	10	0.60%
Physics and Astronomy	15	0.90%
Psychology	104	6.22%
Social Sciences	742	44.40%
Veterinary	1	0.06%

Notes: TP = total number of publications

3.4 Research Trends

Year of publication has been restricted by author to ten years or one decade only. The first part analysis will examine research productivity based on the number of documents published each year. The number of documents published per year would tell researcher about the pattern and popularity of this study over the time. Table 6 has shown there is an average growth of publication in learning organization in the last ten years. The performance of publication is quite consistent throughout these years. Year 2020 has recorded the peak followed by year 2017. The annual scientific production also indicated the number of publications still increasing. Hence, there is still a potential to expand further in this research area and scope of study.

Table 6. Year of Publication

Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2020	189	0.63	0.63	1
2019	153	2.31	1.16	2
2018	135	5.39	1.80	3
2017	176	4.99	1.25	4
2016	132	5.67	1.13	5
2015	143	7.69	1.28	6
2014	152	7.32	1.05	7
2013	156	7.01	0.88	8
2012	148	9.16	1.02	9
2011	142	9.82	0.98	10
2010	145	11.40	1.04	11
TOTAL	**1671**			

Notes : N = number of publications ; MeanTCperArt = average total citations per article ; MeanTCperYear = average total citations per year

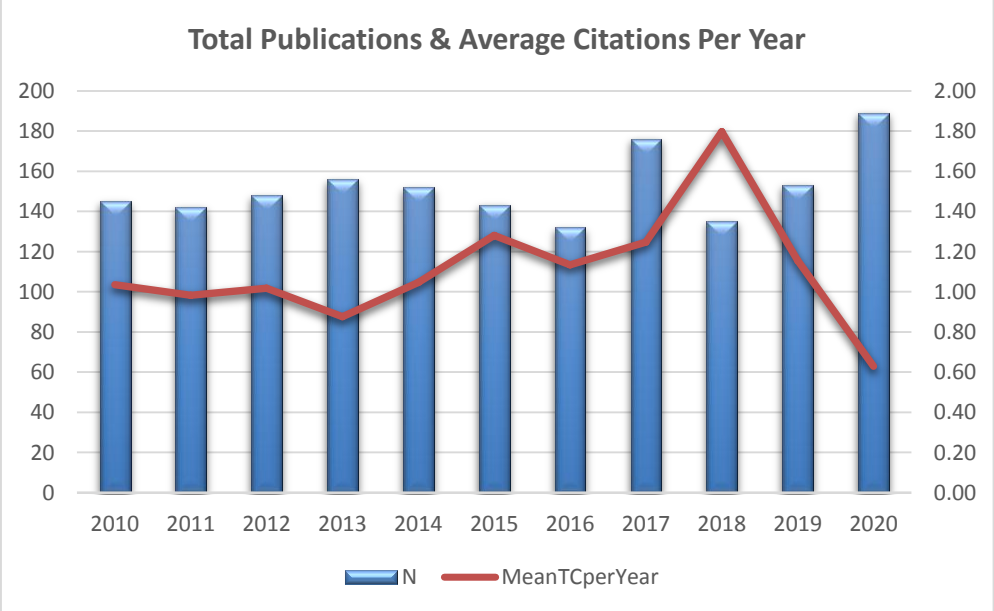

Figure 3. Total publications and average citations per year

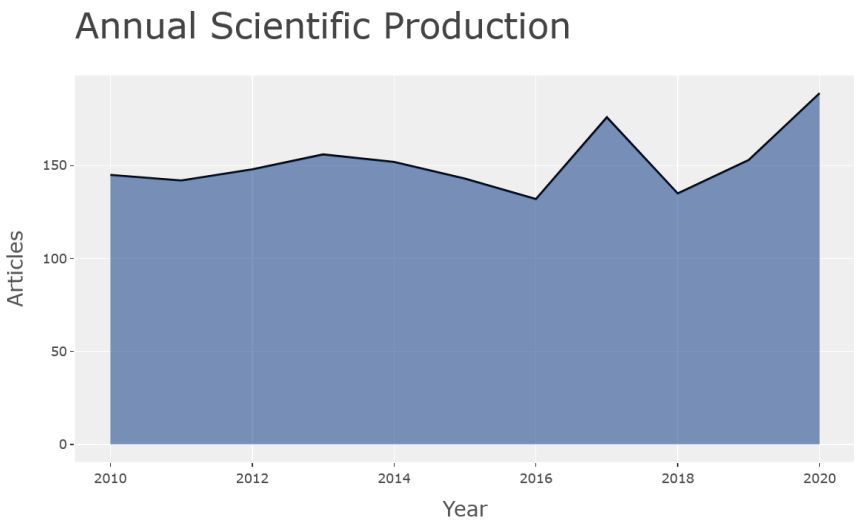

Figure 4. Annual Scientific Production

3.5 Countries of Publication

Evaluation for publications by countries based on the affiliation institution of the author is carried out in this paper. A total of 41 countries identified that were involved in the publication on learning organization for the past one decade under Scopus. Table 7 shows the top active countries contributed to the publications and United States emerged as the top country that published the most number of publications (367) representing 21.96% of total publications. This is followed by United Kingdom with 174 total number of publications taking second place, covering 10.41%. Remaining countries are below 100 publications.

Table 7. Top 20 Countries contributed to the publications

Country	**TP**	**Percentage %**
United States	367	21.96%
United Kingdom	174	10.41%
Australia	95	5.69%
China	89	5.33%
Germany	73	4.37%
India	67	4.01%
France	57	3.41%
Canada	53	3.17%
Netherlands	50	2.99%
Spain	50	2.99%
Sweden	47	2.81%
Italy	46	2.75%
Brazil	45	2.69%
Indonesia	43	2.57%
Norway	41	2.45%
Russian Federation	41	2.45%
Iran	35	2.09%
Malaysia	33	1.97%
Taiwan	32	1.92%

Japan	27	1.62%

Notes: TP = total number of publications

3.6 Most influential institutions for publications

There are quite a number of influential institutions participated in the research related to learning organization. Table 8 shows that Universidade Federal de Santa Catarina, a public university in Florianopolis, Brazil has the highest number of publications on learning organization. The University of Georgia from United States become the second highest followed by Norges teknisk-naturvitenskapelige universitet from Norway.

Table 8. Most influential institutions with minimum of seven publications

Institution	**TP**	**Percentage %**
Universidade Federal de Santa Catarina	14	0.84%
University of Georgia	13	0.78%
Norges teknisk-naturvitenskapelige universitet	10	0.60%
UCL Institute of Education	9	0.54%
University of Toronto	9	0.54%
University of Ottawa, Canada	9	0.54%
Nottingham University Business School	9	0.54%
Pennsylvania State University	8	0.48%
Beijing Normal University	8	0.48%
Rijeka University	8	0.48%
Columbia University in the City of New York	8	0.48%
Universidade de Sao Paulo - USP	7	0.42%
RMIT University	7	0.42%
Universidad de La Rioja	7	0.42%
Maastricht University	7	0.42%
Texas A&M University	7	0.42%
University College London	7	0.42%
University of North Texas	7	0.42%
University of California, Berkeley	7	0.42%
Griffith University	7	0.42%
Universiteit Gent	7	0.42%

Notes: TP = total number of publications

3.7 Most Productive Authors

Table 9 shows the most productive authors who have contributed towards the research on learning organization that were indexed under Scopus database. Top author with 13 publications (0.78%) is named Simon Reese from University of Maryland, United States while second placement by Karen E. Watkins, Professor of Human Resource and Organizational Development in University of Georgia with 9 publications (0.54%). The third most productive author publishing on learning organization is Anders Ortenblad from Nord University, Norway, who is a professor organization and leadership. These top three most productive authors in learning organization are focusing on organization development, leadership, innovation, organizational theory and active learning.

Table 9. Most Productive Authors

Author Name	**TP**	**Percentage %**
Reese, S.	13	0.78%
Watkins, K.E.	9	0.54%
Örtenblad, A.	7	0.42%
Gil, A.J.	6	0.36%
Rupčić, N.	6	0.36%
Santa, M.	6	0.36%
Song, J.H.	6	0.36%
Sidani, Y.	5	0.30%
Zubr, V.	5	0.30%
Baruch, Y.	4	0.24%
Chawla, D.	4	0.24%
Filstad, C.	4	0.24%
George, B.	4	0.24%
Giassi, A.C.C.	4	0.24%
Joshi, H.	4	0.24%
Kong, E.	4	0.24%
Kools, M.	4	0.24%
Maler, L.	4	0.24%
Marsick, V.J.	4	0.24%
Moss, P.	4	0.24%
Nurcan, S.	4	0.24%
Parisi, G.I.	4	0.24%
Sessa, V.I.	4	0.24%
Tani, J.	4	0.24%
Tortorella, G.L.	4	0.24%
Wermter, S.	4	0.24%

Notes : TP = total number of publications

Table 10 below showing authors metric and collaboration frequency as retrieved from biblioshiny. Total number of authors was 4,517 with appearances 5,077 and collaboration index is 3.50 in this field. Authors' productivity through Lotka's law is as shown in Table 11 and Figure 5.

Table 10. Authors Metric and Collaboration

Authors Metric	**Frequency**
Authors	4517
Author Appearances	5077
Authors of single-authored documents	441
Authors of multi-authored documents	4076
Authors Collaboration	**Frequency**
Single-authored documents	505

Documents per Author	0.37
Authors per Document	2.70
Co-Authors per Documents	3.04
Collaboration Index	3.50

Table 11. Frequency of publications by authors

Documents written	Number of Authors	Proportion of Authors
1	4134	0.915
2	287	0.064
3	59	0.013
4	25	0.006
5	3	0.001
6	5	0.001
9	1	0.000
11	1	0.000
13	1	0.000
14	1	0.000

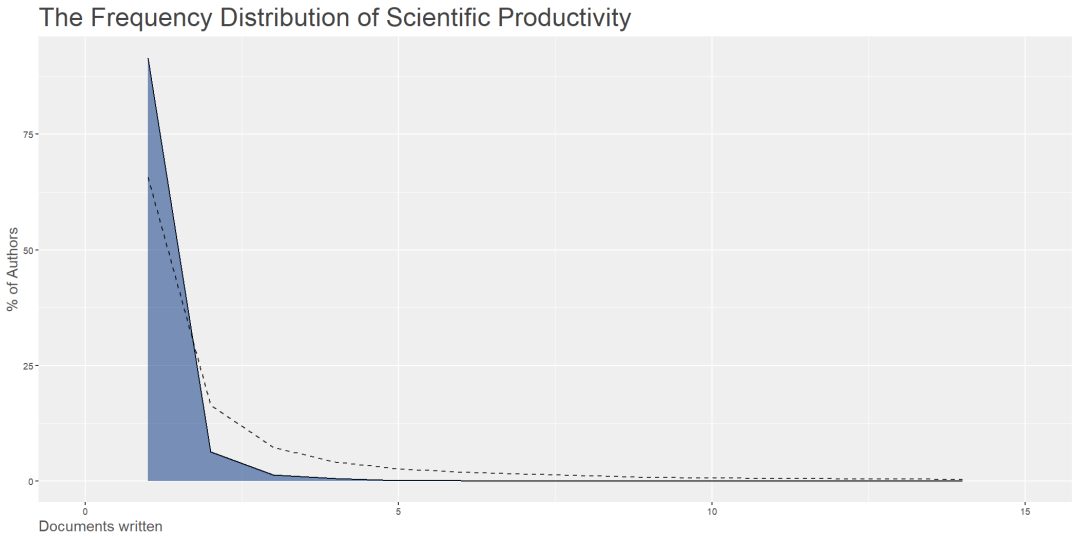

Figure 5. Authors' productivity through Lotka's law

3.8 Most Active Source Title

Table 12 listed the most active source title in learning organization. As it is obviously related to learning organization domain, hence, the source title which reflected learning organization ranked first place with 97 numbers (5.80%) in the total number of publications of the top eleven most active source title. It is then followed by development and learning in organizations as the most common title in the search for this area with 24 total publications. Figure 6 and Figure 7 showing the frequency or number of documents for relevant sources and most cited sources.

Table 12. Most active source title

Source Title	TP	%
Learning Organization	97	5.80%
Development And Learning In Organizations	24	1.44%
Handbook Of Research On The Learning Organization Adaptation And Context	21	1.26%
Lecture Notes In Computer Science Including Subseries Lecture Notes In Artificial Intelligence And Lecture Notes In Bioinformatics	19	1.14%
Proceedings Of The European Conference On Knowledge Management Eckm	15	0.90%
Journal Of Workplace Learning	13	0.78%
Action Learning Research And Practice	12	0.72%
Ceur Workshop Proceedings	12	0.72%
Communications In Computer And Information Science	11	0.66%
Advances In Intelligent Systems And Computing	9	0.54%
Espacios	8	0.48%
European Journal Of Training And Development	8	0.48%
International Journal Of Educational Management	8	0.48%
International Journal Of Learning And Change	8	0.48%
Journal Of Knowledge Management	8	0.48%
Management Learning	8	0.48%
Procedia Social And Behavioral Sciences	8	0.48%
European Journal Of Education	7	0.42%
Advances In Developing Human Resources	6	0.36%
Human Resource Development Review	6	0.36%
International Journal Of Applied Business And Economic Research	6	0.36%

Notes: TP = total number of publications

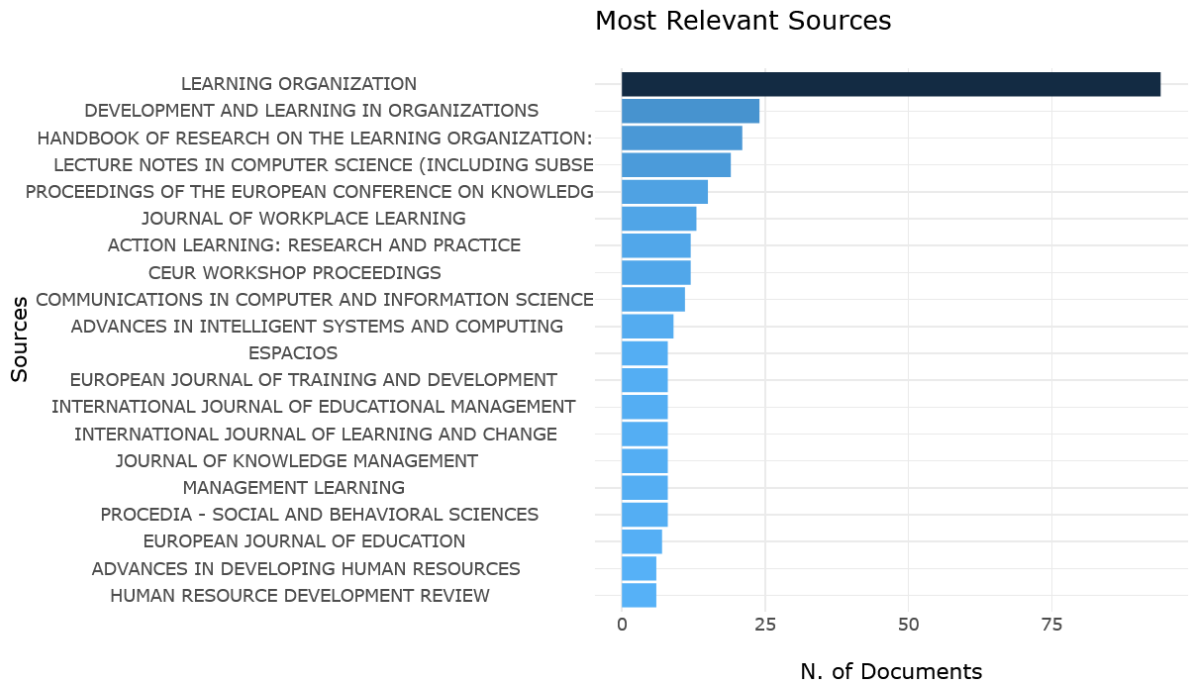

Figure 6. Most active and relevant source title

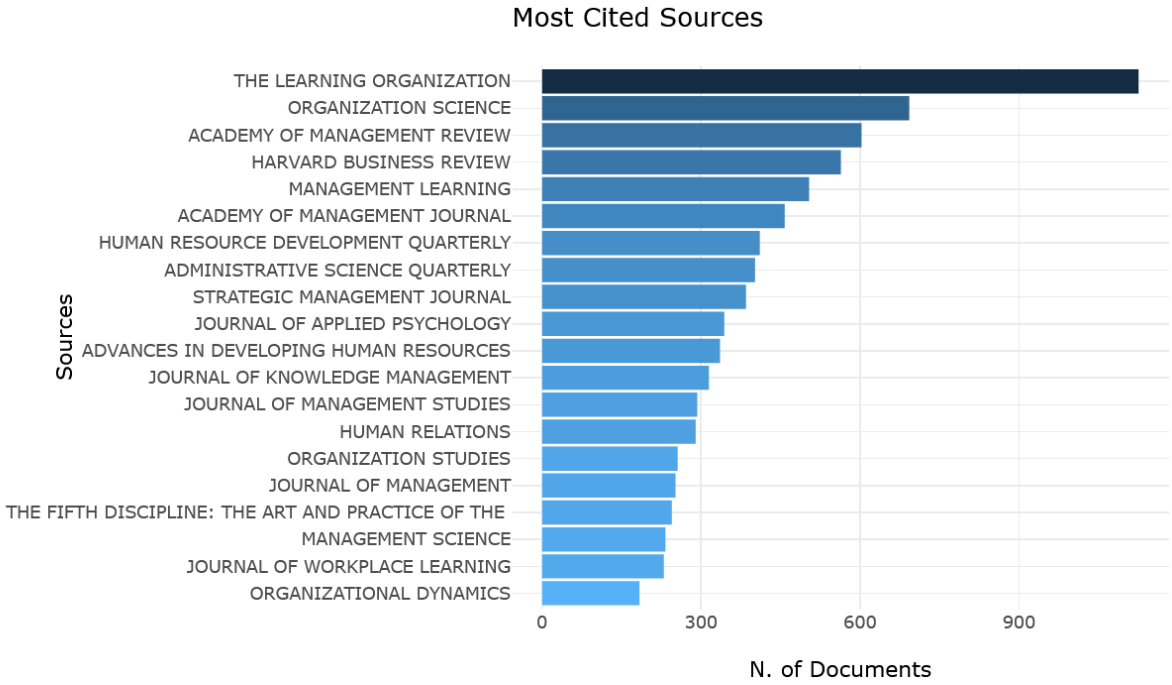

Figure 7. Most cited source titles

3.9 Citation Analysis

Harzing's Publish or Perish software being used to seek the citation metrics from the retrieved documents as at 24 January 2021. The Table 13 shows total number of citations with average citation per year for all retrieved data. As shown, there are 10,537 citations report in the last 10 years (2010 – 2020) for 1671 retrieved articles with an average of 957.91 citations per year. Meanwhile, Table 14 presented 20 most cited articles based on the number of times being cited. In addition to total citations as reported by Scopus database, the table also reflected citation per year for each article. The document entitled "Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance" by Crona and Parker in 2012 has received the highest number of citations (214 citations or an average of 23.78 citations per year). In view of co-citation network, two top cited learning organization theories were Senge (1990) and Watkins (1993).

Table 13. Citations Metrics

Metrics	**Data**
Publication years	2010 – 2020
Citation years	11 (2010 – 2021)
Papers	1671
Citations	10537
Citations/year	957.91
Citations/paper	6.31
Citations/author	2.54
h-index	41
g-index	61
hI, norm	27
hI, annual	2.45

Table 14. Highly cited articles

No.	Authors	Title	Year	Cites	Cites per Year
1	B.I. Crona, J.N. Parker	Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance	2012	214	23.78
2	S. Decuyper, F. Dochy, P. Van den Bossche	Grasping the dynamic complexity of team learning: An integrative model for effective team learning in organisations	2010	199	18.09
3	J. Saltz, R. Gupta, L. Hou, T. Kurc, P. Singh, V. Nguyen, D. Samaras, K.R. Shroyer, T. Zhao, R. Batiste, J. Van Arnam, S.J. Caesar-Johnson, J.A. Demchok, I. Felau, M. Kasapi, M.L. Ferguson, C.M. Hutter, H.J. Sofia, R. Tarnuzzer, Z. Wang, L. Yang, J.C. Zenklusen, J.J. Zhang, S. Chudamani, J. Liu, L. Lolla, R. Naresh, T. Pihl, Q. Sun, Y. Wan, Y. Wu, J. Cho, T. DeFreitas, S. Frazer, N. Gehlenborg, G. Getz, D.I. Heiman, J. Kim, M.S. Lawrence, P. Lin, S. Meier, M.S. Noble, G. Saksena, D. Voet, H. Zhang, B. Bernard, N. Chambwe, V. Dhankani, T. Knijnenburg, R. Kramer	Spatial Organization and Molecular Correlation of Tumor-Infiltrating Lymphocytes Using Deep Learning on Pathology Images	2018	161	53.67
4	J.S. Bunderson, R.E. Reagans	Power, status, and learning in organizations	2011	144	14.40
5	M. Bennis, S.M. Perlaza, P. Blasco, Z. Han, H.V. Poor	Self-organization in small cell networks: A reinforcement learning approach	2013	133	16.63
6	S.K. Lam, F. Kraus, M. Ahearne	The diffusion of market orientation throughout the organization: A social learning theory perspective	2010	120	10.91
7	D. Nicolini, S. Gherardi, D. Yanow	Introduction: Toward a practice-based view of knowing and learning in organizations	2016	117	23.40

8	M. Frese, N. Keith	Action errors, error management, and learning in organizations	2015	108	18.00
9	S.Y. Sung, J.N. Choi	Do organizations spend wisely on employees? Effects of training and development investments on learning and innovation in organizations	2014	105	15.00
10	V. Bartsch, M. Ebers, I. Maurer	Learning in project-based organizations: The role of project teams' social capital for overcoming barriers to learning	2013	103	12.88
11	H.-I. Ha, M. Hendricks, Y. Shen, C.V. Gabel, C. Fang-Yen, Y. Qin, D. ColÃ³n-Ramos, K. Shen, A.D.T. Samuel, Y. Zhang	Functional Organization of a Neural Network for Aversive Olfactory Learning in Caenorhabditis elegans	2010	90	8.18
12	A. Uematsu, B.Z. Tan, E.A. Ycu, J.S. Cuevas, J. Koivumaa, F. Junyent, E.J. Kremer, I.B. Witten, K. Deisseroth, J.P. Johansen	Modular organization of the brainstem noradrenaline system coordinates opposing learning states	2017	79	19.75
13	S.J. Jo, B.-K. Joo	Knowledge sharing: The influences of learning organization culture, organizational commitment, and organizational citizenship behaviors	2011	74	7.40
14	P. Moss, G. Dahlberg, S. Grieshaber, S. Mantovani, H. May, A. Pence, S. Rayna, B.B. Swadener, M. Vandenbroeck	The Organisation for Economic Co-operation and Developments International Early Learning Study: Opening for debate and contestation	2016	72	14.40
15	S.-Y. Lam, V.-H. Lee, K.-B. Ooi, B. Lin	The relationship between TQM, learning orientation and market performance in service organisations: An empirical analysis	2011	71	7.10
16	G. Mandler	Organization and repetition: Organizational princi pies with special reference to rote learning	2014	64	9.14
17	A.R. Congleton, S. Rajaram	The influence of learning methods on collaboration: Prior repeated retrieval enhances retrieval organization, abolishes collaborative inhibition, and promotes post-collaborative memory	2011	64	6.40
18	A.N. Barry, U. Shinde, S.	Structural organization of	2010	63	5.73

	Lutsenko	human Cu-transporting ATPases: Learning from building blocks			
19	O. Thomassen, A. Espeland, E. SÃ¸fteland, H.M. Lossius, J.K. Heltne, G. BrattebÃ¸	Implementation of checklists in health care; learning from high-reliability organisations	2011	58	5.80
20	I.C. Chadwick, J.L. Raver	Motivating Organizations to Learn: Goal Orientation and Its Influence on Organizational Learning	2015	56	9.33

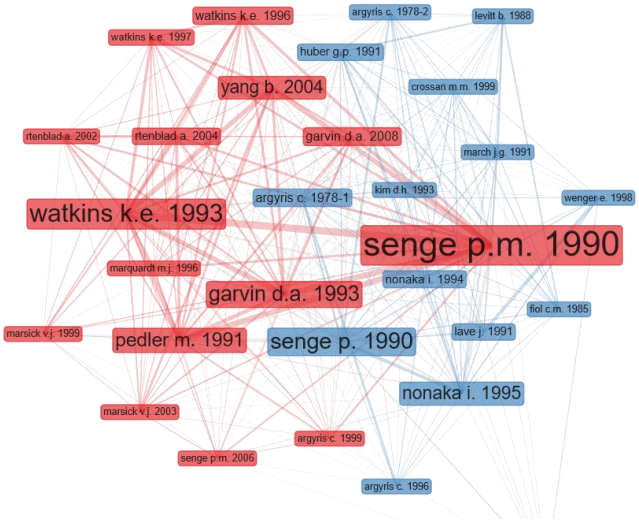

Figure 8. Co-citation network

3.10 Keywords

As per top keywords analyzed using Harzing Publish or Perish software, top 20 keywords are being listed as shown in Table 15. The most common keywords which appeared more than 100 times been used are learning, learning organization, organizational learning, learning organisations, knowledge management, and followed by a focus on humans. In the multiple correspondence analysis with keyword cluster, it is noticeable most learning organizations are putting effort on information technology, information management and information system learning while another cluster is showing learning perspectives are focusing on humans and education.

Table 15. Top Keywords

Author Keywords	**TP**	**Percentage (%)**
Learning	230	13.76%
Learning Organization	201	12.03%
Organizational Learning	179	10.71%
Learning Organizations	178	10.65%
Knowledge Management	157	9.40%
Human	145	8.68%
Humans	107	6.40%
Article	99	5.92%

E-learning	92	5.51%
Education	71	4.25%
Societies And Institutions	67	4.01%
Learning Systems	65	3.89%
Leadership	60	3.59%
Organization	56	3.35%
Learning Organisation	55	3.29%
Innovation	52	3.11%
Female	51	3.05%
Male	50	2.99%
Students	50	2.99%
Organizational Culture	47	2.81%

Notes: TP = total number of publications

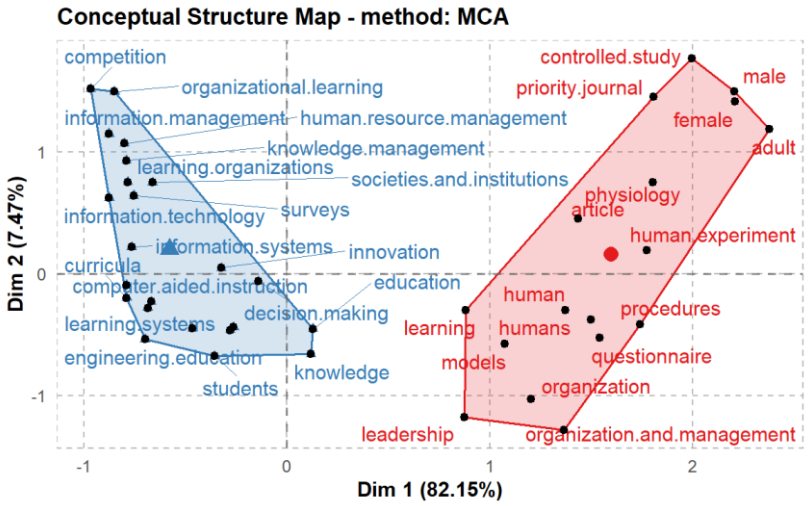

Figure 9. Multiple correspondence analysis, conceptual map and keyword cluster

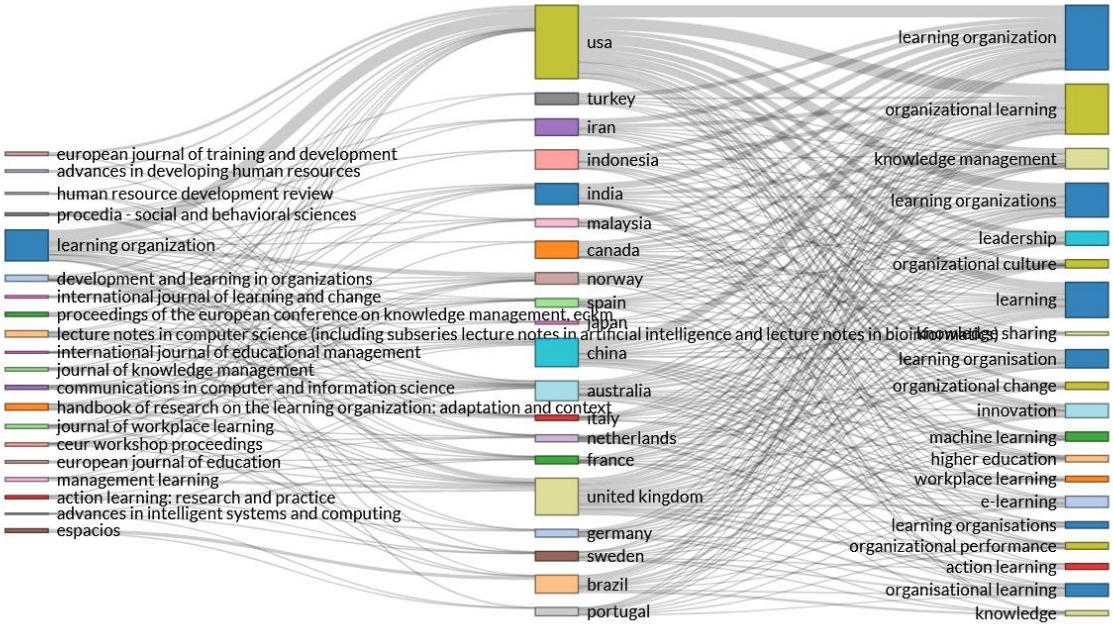

Figure 10. Three fields plot between sources – countries – keywords

3.11 Visualisation Map

Following figures using VOSviewer, a software tool for constructing and visualizing bibliometrics networks to present visualization mapping of author keywords, co-occurrence network based on keywords (binary and full counting), co-authorship by countries, citation by countries, citation by documents, and mapping of co-authorship. The colour, size of the circles, font size and thickness of connecting lines represent the relationships with each other. Keywords with the same colour indicating they are commonly listed together.

From the visualization maps, it can be seen the most common keywords are learning, learning organization, organizational learning and knowledge management. Learning organization and learning perspective are clustered around organization development like empowerment and learning orientation. Knowledge management is clustered together with information technology, education, training, e-learning, and computing. On the human side, the emphasis in on organizational culture, leadership, healthcare management, public relation, and quality improvement. Till then, minority portion has started on the machine learning, robotic and neural networks.

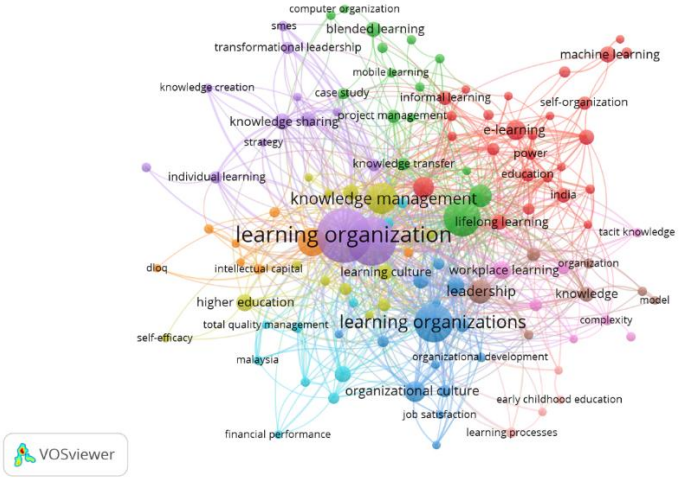

Figure 11. Network visualisation map of the author keywords

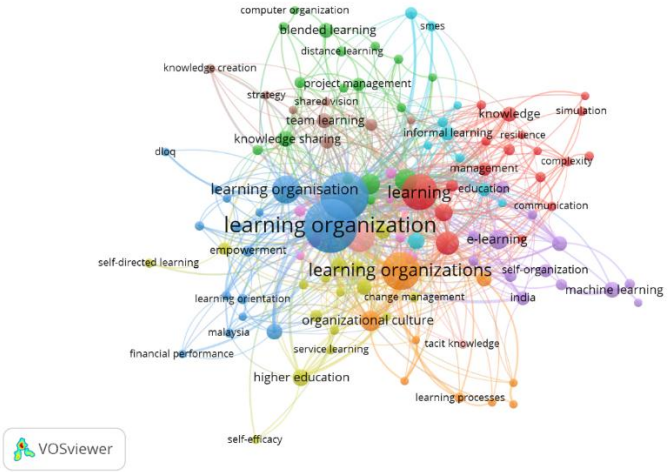

Figure 12. Visualization map of co-occurrence network based on keywords (binary counting)

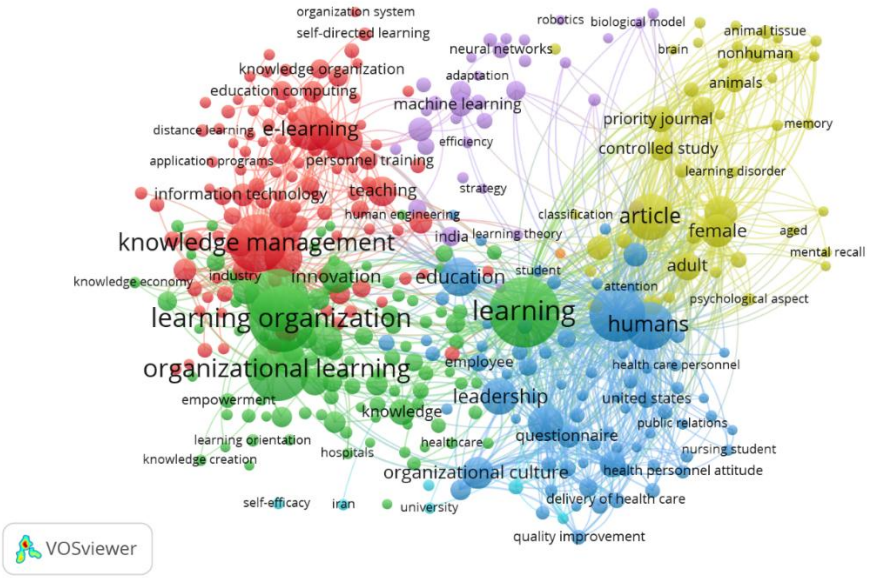

Figure 13. Visualization map of co-occurrence network based on keywords (full counting)

Figure 14 showing network visualization map of international collaboration among countries. The thickness of the connecting lines between any two countries indicates the strength of collaboration and countries with similar colours are grouped into one cluster. Main country for learning organization research publications is the United States.

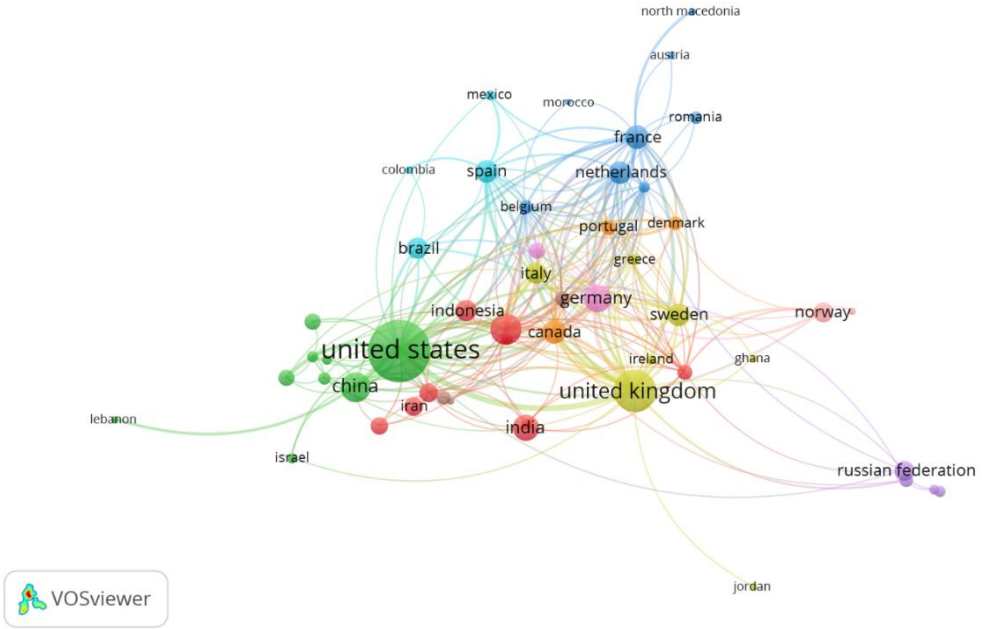

Figure 14. Network visualization map of the co-authorship by countries

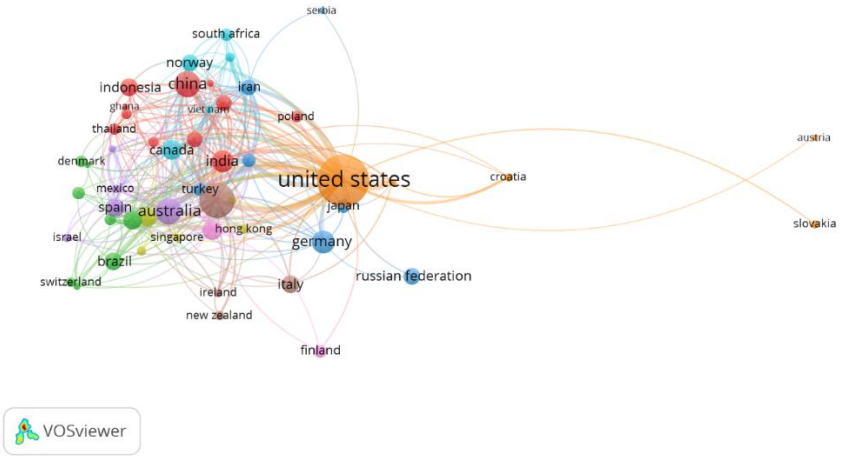

Figure 15. Network visualization map of the citation by countries

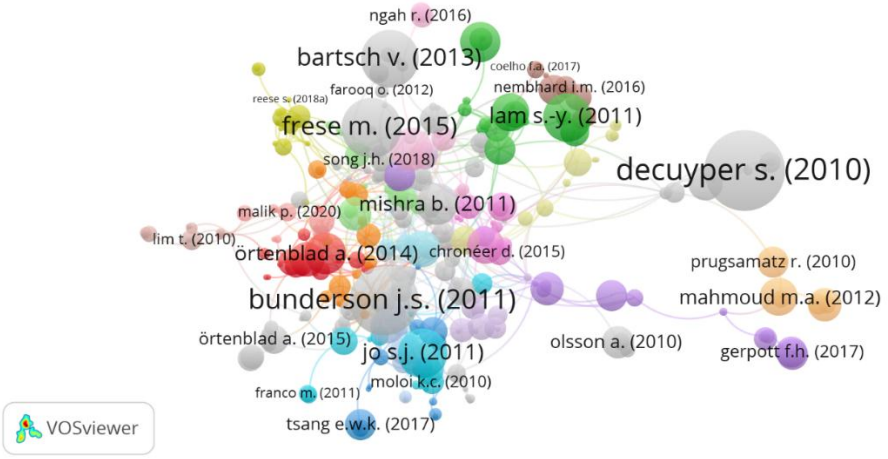

Figure 16. Network visualization map of the citation by documents

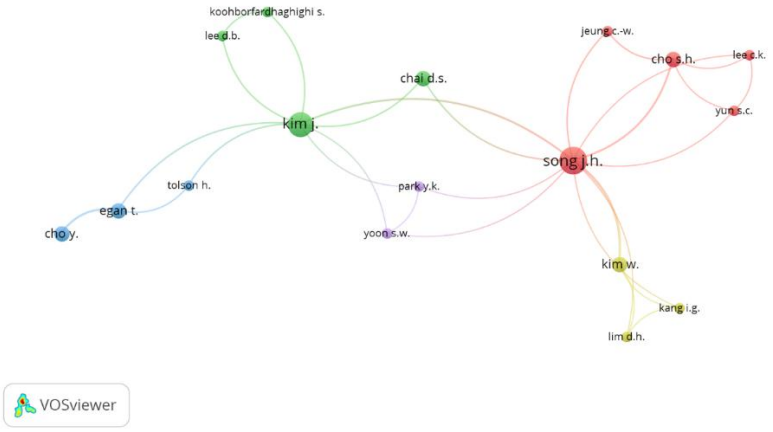

Figure 17. Network visualization map of the co-authorship

Notes: Unit of analysis = Authors; Counting method: Fractional counting; Minimum number

of documents of an author = 1; Minimum number of citations of an author = 3

4. CONCLUSION

Concern over continuous learning in a learning organization, this has attracted a considerable amount of attention from scholars worldwide to investigate and examine further on learning organization to deal with issues on the level of organizational learning. In response, this study has initiated a review of all kinds of learning organization scholarly works published for the past ten years (2010-2020). Overall, this bibliometric analysis study details 1,671 documents extracted from Scopus database. English language is the most commonly used language in the documents and the most common subject area in learning organization is under Social Science category. As per the research questions for this paper, firstly, it is shown there is an average growth of publication in learning organization in the past one decade and year 2020 recorded the highest number of publications. The document entitled "Learning in support of governance: Theories, methods, and a framework to assess how bridging organizations contribute to adaptive resource governance" has received the highest number of citations, which mean it is the most influential article that is being referred. Senge and Watkins model of learning organization are commonly cited by most top authors. According to the results, this work shows that United States and United Kingdom strongly positioned as the leading countries in the learning organization publications with the highest productivity and influence. Most common keywords are identified in this bibliometric analysis. In relation to the analysis of the institutions, it is observed that Universidade Federal de Santa Catarina has the highest number of publications pertaining to learning organization.

This article reviews the literature of learning organizations through the unique combination of various bibliometric techniques. In this way, we have identified the future research directions and future research agenda in learning organizations. Learning is a continuous effort and never-ending story. Scholarly interest in learning organization has been increasing and it is still a nascent domain that can be continually addressed. There are other areas that researchers may examine further like blended learning, lifelong learning, informal learning, machine learning, mobile learning and so on. In this paper, we demonstrate bibliometric methods can be used for quantifying structural indicators and through qualitative methods. Likewise, we use explicit and transparent methodology that could assist novice researchers and doctoral candidates to perform a simple bibliometric analysis paper in future. This is absolutely important by being transparent about judgment calls and decisions in the literature, theory, measurement, analysis as well as reporting of data results in order to produce high quality research (Aguinis, Ramani, & Alabduljader, 2018). In any kind of research analysis articles, despite valuable insights offered, there are still some limitations to consider. First of all, the study employed specific keywords to scholarly works that published by Scopus only. Although Scopus is among the largest platform of databases that indexed all scholarly works, it does not perfectly cover all available works and sources. There are other major databases like Web of Science and even Google Scholar. Hence, some false results are anticipated in this area. Another limitation is authors employed Scopus's definition to determine the ranking of authors and affiliations presented in this study. There are authors who spelled their names differently in few accounts in the same database. In that case, it will result to the accuracy of the productivity in the authorship and affiliation details.

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Conflicts Of Interest
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