



RESEARCH ARTICLE

A Bibliometric Analysis of Quality of Work-Life: Current Status, Development, and Future Research Directions

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ARTICLE INFO	ABSTRACT
Received: May 22, 2024	<p>The purpose of this research was to identify the current status of quality of work-life research and to identify key researched areas to layout directions for future research in quality of work-life. For this purpose a detailed bibliometric analysis was performed on a sample of 644 publications from Scopus database published between 1974 and 2019. The analysis revealed the publication trends based on publications by year, country, subject area, document type, document source, author, organization, and funding sponsors. Most influential publications were identified based on their citations. Most researched themes were identified through keywords and their co-occurrence, and based on their results, directions for future research were suggested. Analysis indicated that existing research on quality of work-life mostly revolves around organizational factors, and to some extent individual factors, hence, there is a need to focus more on its outcomes on national level. Although quality of work-life research was conducted across the globe, but there was lack of collaboration between authors. Moreover, citation and co-citation networks were also weak, indicating the lack of intellectual structure in quality of work-life research. Hence, global collaboration between authors should be enhanced.</p>
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INTRODUCTION

In general, an employee's satisfaction with one's working life is referred as one's quality of work-life (QWL). Because, QWL emphasizes the relationship quality of workers with their working environment (Raduan et al., 2006). As its conceptualization covers a broad spectrum of factors, researchers operationalized QWL differently in different time periods. From 1960s to 1980s, QWL was limited to desirability of working conditions. Later on, need satisfaction approach emerged during 1980s and 2000s. Currently, researches are using combination of both approaches as per their judgement (Gogoleva et al., 2017). Combination of these approaches yield a broad spectrum of QWL dimensions, such as; employee's apprehension towards job content, physical work environment, autonomy, promotions, benefits, pay, job security, participation in decision-making, teamwork, communication, occupational health and safety, work-life balance, and colleagues and managers support (Adhikari & Gautam, 2010; Lau, 2000) and several others. Conclusively, QWL is a combination of all those factors which are crucial to attract and retain skilled employees (Mazlan et al., 2018; Mosadeghrad, 2013; Sulaiman et al., 2015).

As QWL is equally important for both employees and organizations, researchers from different fields extensively researched it. Since the origin of QWL research, interest of researchers is continuously shifting. Although there is a vast amount of research on QWL but trends in QWL research are not fully explored. Previous researchers mostly focused on content analysis through bibliometric data, rather than detailed descriptive bibliometric analysis. As in the study of Gogoleva et al. (2017), a detailed bibliometric literature review of 387 publications was presented to explore research perspectives and problems in conceptualization and operationalization of QWL, and this research was limited to only organizational studies. To fill this research gap, this study was conducted to identify focused research areas and current status of QWL, and to suggest directions for future QWL research. Bibliometric analysis was used to identify publication trends, intellectual structure, and prospective research themes in QWL research.

In consideration of insufficient data on research trends in QWL research, following research questions were addressed in this research: (1) what is the current publication trend in QWL research? (2) Which funding sponsors are most interested in QWL research? (3) Which are the most influential publications on QWL? (4) Which themes involving QWL are mostly focused by researchers? (5) What is the current collaboration state in QWL research? (6) What is the intellectual structure of current research on QWL? (7) What areas involving QWL need additional study?

DATA AND METHODOLOGY

Bibliometric data was extracted through Scopus database in December 2019. A broader search string was constructed after reviewing previous studies on QWL, to extract bibliometric data from Scopus database. Although there are various dimensions of QWL but in this study focus was on those documents which focused on QWL as a whole. Hence, search string was based on various terminologies of QWL including; “quality of work life, quality of working life, work life quality, and working life quality”. Search string was constructed in a way that all those documents could be extracted which contain either of these terms in their title. Following this search strategy, total 724 documents were extracted from 1974 to 2020. Documents were reduced to 644 after excluding; documents of 2020, undefined documents, documents in languages other than English, and documents in press. A brief summary of search strategy and data filtration is provided in figure 1.

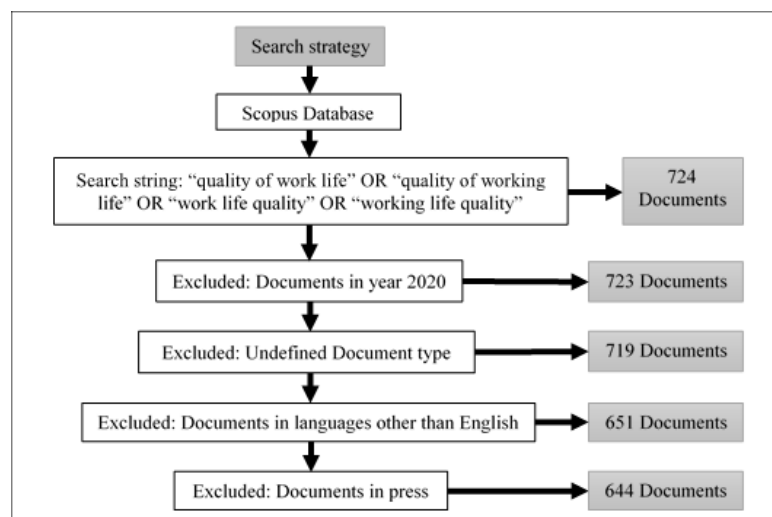


Figure 1: Search strategy and data filtration process of this research

Methods of analysis

Scientific field's structure can be identified by its research activity (Ronda-Pupo, 2017). Its combination with social network analysis can provide structure and central themes of any research

area (Tunger & Eulerich, 2018). Therefore, a bibliometric analysis enables us to identify current trends and future research avenues (Li et al., 2017). Hence a bibliometric analysis was conducted to analyze research structure of QWL.

Following studies of Ahmi and Mohamad (2019) and Baker et al. (2020), a bibliometric analysis of literature on QWL was conducted using various bibliometric tools such as; citation analysis, co-citation analysis, keyword co-occurrence analysis, and co-authorship analysis. These widely used tools are suitable for answering our research questions. Following works of Ahmi and Mohamad (2019) and Baker et al. (2020), different software packages were used, including; Microsoft excel, VOSviewer, and Harzing publish or perish. Microsoft excel provides various data analyzing features through its mathematical functions and graphs, which can facilitate in analyzing trends. VOSviewer facilitates in constructing and visualizing various bibliometric networks, such as; citation, bibliographic coupling, co-citation, and co-authorship networks. Its text mining features allows researchers to construct and visualize various other co-occurrence networks from body of literature as well (Eck & Waltman, 2019). Harzing publish or perish allows to extract several citation metrics of bibliometric data set (Harzing, 2007).

To perform this study, Microsoft excel friendly bibliometric data file was extracted from Scopus database based on final sample of 644 documents. Microsoft excel file was imported into VOSviewer to further analyze citation network, co-citation network, and keyword co-occurrence network. Another reference file was extracted from Scopus database to analyze citation metrics of data set in Harzing publish or perish.

ANALYSIS AND FINDINGS

To answer research question 1, publication trend in QWL was analyzed through publication frequency by year, country, subject area, document type, journal, contributing author, and organization. Trend was analyzed through bibliometric data collected from Scopus database.

Publications by year

To analyze publication trend in each year, publication frequency of documents in each year was observed from 1974 to 2019. Figure 2 presents the number of published documents on QWL per year. Figure 2 indicates a steady and fairly stable publication trend from 1974 to 2005. A sudden increase in publication frequency is observed in 2008 which again declined in 2010. But from 2011 onwards, a fairly stable and heightened increase in publications is observed. This trend line indicates ever increasing interest of researchers and organizations in QWL beginning from mid-21st century and onwards.

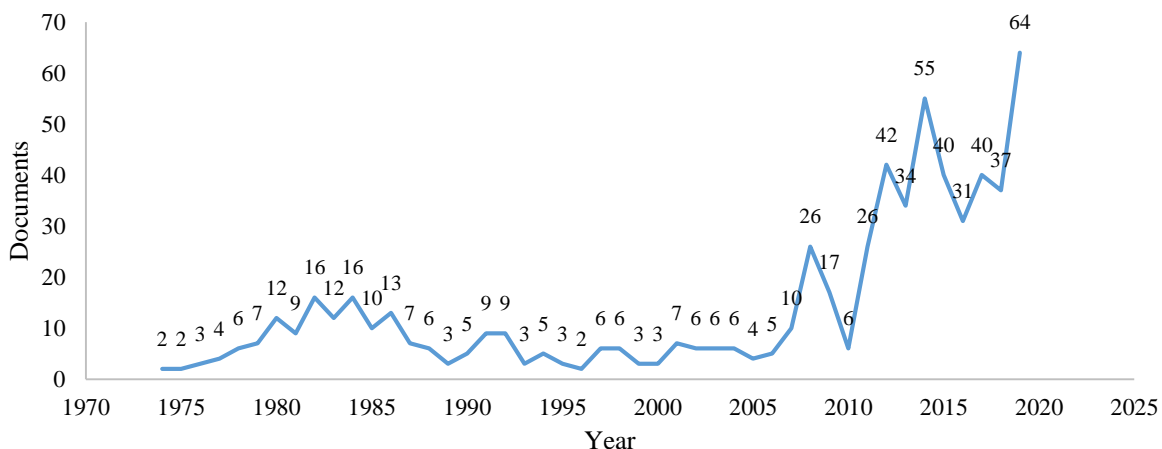


Figure 2: Frequency of published documents per year

Publications by country

QWL has attracted attention of researchers from across the globe. As 571 documents on QWL were contributed from 68 countries (countries of 73 documents are unidentified). Table 1 lists the top publishing countries on QWL. Only those countries are listed here which published at least 3 documents, yielding top 41 countries. United States (143), India (64), and Iran (62) are among the top three countries globally. Although two of these are from Asia (India and Iran), but United States alone have more publications than both of them combined. These statistics indicate that researchers of United States are distinctively more active in studying QWL than any other country.

Table 1: Top publishing countries on quality of work-life

Countries	Documents	Countries	Documents
United States	143	Italy	8
India	64	Taiwan	8
Iran	62	Spain	7
Canada	37	Bangladesh	6
United Kingdom	31	Belgium	6
Netherlands	26	Finland	6
Israel	22	South Korea	6
Malaysia	22	Germany	5
Australia	20	Hong Kong	5
Denmark	20	Russian Federation	5
Norway	16	Viet Nam	5
Indonesia	14	Colombia	4
Austria	13	Japan	4
Turkey	13	Portugal	4
France	12	Bahrain	3
Saudi Arabia	12	Croatia	3
Thailand	12	Mexico	3
China	10	Pakistan	3
South Africa	10	Switzerland	3
Nigeria	9	United Arab Emirates	3
Brazil	8		

Publications by subject area

QWL has attracted attention of researchers from various subject areas. As 644 documents on QWL were contributed from 26 subject areas. Table 2 lists the contributing subject areas on QWL. As the total number of documents by all subject areas are 1053, hence, 409 documents have been published in multidisciplinary sources. Business, management and accounting (20.51%) social sciences (17.28%), and medicine (13.39%) are among the top three contributing subject areas. Chemical

engineering, dentistry, immunology and microbiology, and physics and astronomy are the least contributing subject areas, with contribution of less than 1%. These statistics indicate that researchers of business, management and accounting are far more active in studying QWL than researchers of other subject areas.

Table 2: Subject areas on quality of work-life

Subject area	Documents	Percentage
Business, Management and Accounting	216	20.51%
Social Sciences	182	17.28%
Medicine	141	13.39%
Engineering	90	8.55%
Psychology	79	7.50%
Nursing	54	5.13%
Economics, Econometrics and Finance	51	4.84%
Arts and Humanities	42	3.99%
Computer Science	39	3.70%
Decision Sciences	30	2.85%
Environmental Science	24	2.28%
Health Professions	21	1.99%
Agricultural and Biological Sciences	13	1.23%
Biochemistry, Genetics and Molecular Biology	13	1.23%
Multidisciplinary	12	1.14%
Neuroscience	11	1.04%
Pharmacology, Toxicology and Pharmaceutics	7	0.66%
Materials Science	6	0.57%
Mathematics	6	0.57%
Chemistry	4	0.38%
Earth and Planetary Sciences	4	0.38%
Energy	4	0.38%
Chemical Engineering	1	0.09%
Dentistry	1	0.09%
Immunology and Microbiology	1	0.09%
Physics and Astronomy	1	0.09%
Total	1053	100%

Publications by document type

QWL has been published in various document types. As 644 documents on QWL have been published in 9 different document forms. Table 3 lists the document types in which QWL research has been published. Table 3 indicates that mostly documents have been published in article form (79.81%), others have been published in form of conference papers (8.23%), review (6.21%), and book chapters (6.21%). Very few have been published in form of note (0.62%), book (0.47%), letter (0.47%), editorial (0.31%), and erratum (0.16%).

Table 3: Document types on quality of work-life

Document type	Documents	Percentage
Article	514	79.81%
Conference Paper	53	8.23%
Review	40	6.21%
Book Chapter	24	3.73%
Note	4	0.62%
Book	3	0.47%
Letter	3	0.47%
Editorial	2	0.31%
Erratum	1	0.16%
Total	644	100%

Publications by document source

644 documents appeared in 159 document sources (13 document sources were unidentified). Table 4 lists top publishing sources with highest number of documents on QWL. To observe top document sources, only those document sources were included which published at least 3 documents, yielding top 51 document sources. Table 4 indicates that leading five documents sources on QWL are; Advances in Environmental Biology, International Journal on Disability and Human Development, Social Indicators Research, International Journal of Applied Business and Economic Research, and International Business Management. All of these document sources have fairly equal number of publications, but their focused subject areas are different from each other. Two of these sources are related to business and management, one related to environmental and biological sciences, one related to medicine and nursing, and one related to social sciences. Only two of these sources have QS rank 1 and 2 and other have 4, indicating lack of high quality research on QWL.

Table 4: Top publishing sources on quality of work-life

Document Source	QS	Publisher	Documents
Advances in Environmental Biology	Q4	American-Eurasian Network for Scientific Information Publications	11
International Journal in Disability and Human Development	Q2	Walter de Gruyter GmbH	10
Social Indicators Research	Q1	Kluwer Academic Publishers	10

International Journal of Applied Business and Economic Research	Q4	Serials Publications	9
International Business Management	Q4	Medwell Online	7
Life Science Journal	Q4	Zhengzhou University	7
Human Relations	Q1	SAGE Publications	6
Indian Journal of Public Health Research and Development	Q4	R.K. Sharma, Institute of Medico-Legal Publications	6
Industrial and Commercial Training	Q3	Emerald Group Publishing Ltd.	6
International Journal for Quality Research	Q4	University of Montenegro	6
International Journal of Applied Engineering Research	Q3	Research India Publications	6
BMC Health Services Research	Q1	BioMed Central	5
Employee Relations	Q2	Emerald Group Publishing Ltd.	5
International Journal of Economic Research	Q4	Serials Publications	5
International Journal of Manpower	Q2	Emerald Group Publishing Ltd.	5
International Journal of Recent Technology and Engineering	N/L	Blue Eyes Intelligence Engineering & Sciences Publication	5
Journal of Applied Behavioral Science	Q2	Sage Periodicals Press	5
Journal of Occupational Psychology	Q1	Wiley-Blackwell	5
Journal of Organizational Behavior	Q1	John Wiley & Sons Inc.	5
World Applied Sciences Journal	Q3	International Digital Organization for Scientific Information	5
Aarn News Letter	N/L	Edmonton, Alberta Association of Registered Nurses.	4
Advances in Human Factors Ergonomics	Q4	Elsevier BV	4
Applied Research in Quality of Life	Q3	Springer Verlag	4
European Journal of Social Sciences	Q4	European Journals Inc.	4
Group Organization Management	Q1	SAGE Publications	4
International Journal of Engineering and Advanced Technology	Q2	INSIGHT - Indonesian Society for Knowledge and Human Development	4

International Journal of Mechanical Engineering and Technology	Q3	IAEME Publication	4
Iranian Journal of Public Health	Q3	Iranian Public Health Association	4
Journal Of Business and Psychology	Q1	Kluwer Academic/Plenum Publishers	4
Journal of Business Ethics	Q1	Kluwer Academic Publishers	4
Journal of Business Research	Q1	Elsevier BV	4
Advances in Intelligent Systems and Computing	Q3	Springer Science + Business Media	3
Education Training	Q2	Emerald Group Publishing Ltd.	3
Human Factors and Ergonomics in Manufacturing	Q2	John Wiley & Sons Inc.	3
Human Resource Management International Digest	Q4	Emerald Group Publishing Ltd.	3
International Journal of Contemporary Hospitality Management	Q1	Emerald Group Publishing Ltd.	3
International Journal of Industrial Ergonomics	Q1	Elsevier BV	3
International Journal of Social Economics	Q3	Emerald Group Publishing Ltd.	3
Journal of Advanced Research in Dynamical and Control Systems	Q4	Institute of Advanced Scientific Research	3
Journal of Health and Human Resources Administration	N/L	Southern Public Administration Education Foundation	3
Journal of Nursing Administration	Q1	Lippincott Williams & Wilkins Ltd.	3
Journal of Organizational Change Management	Q2	Emerald Group Publishing Ltd.	3
Management Research News	Q2	Emerald Group Publishing Ltd.	3
Mediterranean Journal of Social Sciences	Q3	MCSER-Mediterranean Center of Social and Educational research	3
Middle East Journal of Scientific Research	N/L	International Digital Organization for Scientific Information	3
New Technology Work and Employment	Q1	Blackwell Publishing Inc.	3

Omega	Q1	Elsevier Ltd.	3
Organizational Dynamics	Q1	Elsevier Ltd.	3
Procedia Social and Behavioral Sciences	N/ L	Conferences and Proceedings	3
Research Journal of Applied Sciences Engineering and Technology	Q4	Maxwell Scientific Publications	3
Social Sciences Pakistan	Q4	Medwell Journals	3

QS: Quartile Score

Publications by author and organization

Based on dataset of this research, 160 authors from 160 organizations published documents on the subject of QWL. Table 5 lists the top contributing authors and table 6 list the top contributing organizations on QWL. In top publishing authors and organizations all those authors and organizations are listed who published at least 4 documents, yielding 27 authors, and 42 organizations. Table 5 indicates that Merrick (18), and Ventegodt (18) published most documents on QWL, followed by Andersen (15), and Kandel (14). Although Merrick, and Ventegodt published most of the documents on QWL, but Sirgy (458) is the most cited author on QWL.

Table 5: Top publishing authors on quality of work-life by publication frequency

Author	Documents	TC
Merrick, J.	18	10
Ventegodt, S.	18	10
Andersen, N. J.	15	9
Kandel, I.	14	9
Merrick, J.	10	9
Ventegodt, S.	9	9
Carayon, P.	7	171
Sirgy, M. J.	7	458
Frings-Dresen, M. H. W.	6	48
Smith, H. L.	6	38
Tamminga, S. J.	6	86
Dargahi, H.	5	52
Dupuis, G.	5	163
Efraty, D.	5	412
Hoonakker, P.	5	77
Singhapakdi, A.	5	135
de Boer, A. G. E. M.	5	44
de Jong, M.	5	44

Houtman, I. L. D.	4	46
Hymavathi, K.	4	4
Karsh, B. T.	4	152
Kompier, M. A. J.	4	46
Lawler, E. E.	4	180
Lee, D. J.	4	380
Sekhara Rao, K. S.	4	8
Taris, T. W.	4	46
Wagenaar, A. F.	4	46

TC: Total citations

Table 6 indicates that the most active top three organizations in field of QWL were Forsknings center for Livskvalitet, and Ministry of Social Affairs Israel, 18 documents each. Followed by the University of Kentucky, and University of Wisconsin-Madison, 17 documents each, then Tehran University of Medical Sciences with 16 documents. But highest citations were received by 8 documents of Virginia Polytechnic Institute and State University (608). Among top organizations with highest number of publications, only University of Wisconsin-Madison (393), and Tehran University of Medical Sciences (160) have noticeable citations.

Table 6: Top 50 publishing organizations on quality of work-life by publication frequency

Organization	Documents	TC
Forsknings center for Livskvalitet	18	10
Ministry of Social Affairs Israel	18	10
University of Kentucky	17	10
University of Wisconsin-Madison	17	393
Tehran University of Medical Sciences	16	160
Ariel University	14	9
National Institute of Child Health and Human Development	9	9
Interuniversity College	9	9
Research Clinic for Holistic Medicine	9	9
Scandinavian Foundation for Holistic Medicine	9	9
Nordic School of Holistic Medicine	9	9
Radboud University Nijmegen	9	130
Islamic Azad University	9	5
Nederlandse Organisatie voor toegepast natuurwetenschappelijk onderzoek- TNO	8	123
Virginia Polytechnic Institute and State University	8	608
Handelshøyskolen BI	7	1

Amsterdam UMC - University of Amsterdam	6	49
Universiti Teknologi MARA	6	15
Anna University	6	0
K L Deemed to be University	6	12
Universiteit van Amsterdam	5	46
Old Dominion University	5	135
Utrecht University	5	83
University of Tehran	5	37
Sathyabama Institute of Science and Technology	5	0
Payame Noor University	5	1
Université du Québec à Montréal	5	163
Indian Institute of Technology Roorkee	5	11
McMaster University	5	134
University of New Mexico	5	36
Bharath Institute of Higher Education and Research	5	0
Thailand National Institute of Development Administration	4	128
University of Pennsylvania	4	34
Hong Kong Polytechnic University	4	87
Queensland University of Technology QUT	4	42
University of Toronto	4	62
Radford University	4	39
Universiti Putra Malaysia	4	49
Universitat Wien	4	64
University of Sistan and Baluchestan	4	6
University of Houston-Downtown	4	159
Islamic Azad University, Isfahan Branch	4	2

TC: Total citations

Publications by funding sponsors

To answer research question 2, frequency and percentage of funded publications on QWL had been observed. Out of 644 documents, only 53 documents were funded by sponsors. Table 7 presents list of funding sponsors on QWL. Table 7 indicates that top three funding sponsors on QWL are; KWF Kankerbestrijding (5.66%), Canadian Institutes of Health Research (3.77%), and Deanship of Scientific Research, King Faisal University (3.77%). Most of the sponsors only funded one publication. Suggesting that KWF Kankerbestrijding interest in QWL research was highest until 2019.

Table 7: Funding sponsors on quality of work-life

Funding sponsor	Documents	Percentage
KWF Kankerbestrijding	3	5.66%
Canadian Institutes of Health Research	2	3.77%
Deanship of Scientific Research, King Faisal University	2	3.77%
Khon Kaen University	2	3.77%
National Institute of Development Administration	2	3.77%
National Science Foundation	2	3.77%
Tabriz University of Medical Sciences	2	3.77%
American Academy of Family Physicians Foundation	1	1.89%
Christopher D. Smithers Foundation	1	1.89%
City, University of London	1	1.89%
Conselho Nacional de Desenvolvimento Científico e Tecnológico	1	1.89%
Cornell University	1	1.89%
Covenant University	1	1.89%
Deanship of Scientific Research, King Saud University	1	1.89%
Departamento Administrativo de Ciencia, Tecnología e Innovación	1	1.89%
Economic and Social Research Council	1	1.89%
European Regional Development Fund	1	1.89%
Federal University of Agriculture, Abeokuta	1	1.89%
Fonds De La Recherche Scientifique - FNRS	1	1.89%
Ford Foundation	1	1.89%
Health Research	1	1.89%
Institute for Work and Health	1	1.89%
Iran University of Medical Sciences	1	1.89%
Irish Research Council	1	1.89%
Johns Hopkins University	1	1.89%
Kashan University of Medical Sciences	1	1.89%
Ministry of Health and Family Welfare	1	1.89%
Ministry of Higher Education, Malaysia	1	1.89%
National Center for Advancing Translational Sciences	1	1.89%
National Center for Research Resources	1	1.89%
National Council for Scientific Research	1	1.89%

National Research University Higher School of Economics	1	1.89%
National Water Center, United Arab Emirates University	1	1.89%
Natural Resources Wales	1	1.89%
Old Dominion University	1	1.89%
Robert Wood Johnson Foundation	1	1.89%
Samfund og Erhverv, Det Frie Forskningsråd	1	1.89%
Schweizerischer Nationalfonds zur Förderung der Wissenschaftlichen Forschung	1	1.89%
Seventh Framework Programme	1	1.89%
Total	1	1.89%
U.S. Public Health Service	1	1.89%
Universiti Kebangsaan Malaysia	1	1.89%
University of Dammam	1	1.89%
Universität Bielefeld	1	1.89%
Workplace Safety and Insurance Board	1	1.89%
Total	53	100%

Citation network analysis

Third research question was aimed to identify the most influential publications on QWL. To answer research question 3, citation network of 644 articles was analyzed. Citation analysis is one of the most prevalent technique to measure the impact of a research publication (Ding & Cronin, 2011). Because, citation and referencing enable us to create intellectual linkages (Appio et al., 2014). In a citation analysis, an article's impact is determined through its number of citations by other publications. Harzing publish or perish was used to conduct citation analysis of publications. Table 8 presents the top 10 research publications on QWL by total citations.

According to total citations, Sirgy et al., (2001) have highest total citations (252) and citations per year (14). Then comes Gifford et al., (2002), and Igbaria et al., (1994), with 151 and 150 total citations and 8.88 and 6 citations per year, respectively. Most of these top 10 publications have been published in quartile 1 indexed journals, indicating the higher citation of high quality research.

Table 8: Top 10 publications on quality of work-life by total citations

Publication Title	Author (Year)	TC	QS	GS	TCY
A new measure of quality of work life (QWL) based on need satisfaction and spillover theories	M. J. Sirgy, D. Efraty, P. Siegel, D. J. Lee (2001)	252	Q1	1	14
The relationship between hospital unit culture and nurses' quality of work life	B. D. Gifford, R. F. Zammuto, E. A. Goodman (2002)	151	Q2	2	8.88
Work experiences, job involvement, and quality of work life among information systems personnel	M. Igbaria, S. Parasuraman, M.K. Badawy (1994)	150	Q1	3	6

Employee Participation in a Quality Circle Program. Impact on Quality of Work Life, Productivity, and Absenteeism	M. L. Marks, P. H. Mirvis, E. J. Hackett, J. F. Grady Jr. (1986)	12 4	Q1	4	3.76
The Quality of Working Life: Is Scandinavia Different?	D. Gallie (2003)	10 8	Q1	5	6.75
Computerization, productivity, and quality of work-life	R. E. Kraut, S. T. Dumais, S. Koch (1989)	10 8	Q1	6	3.6
Quality of work life: Theoretical and methodological problems, and presentation of a new model and measuring instrument	J. P. Martel, G. Dupuis (2006)	96	Q1	7	7.38
A human factors framework and study of the effect of nursing workload on patient safety and employee quality of working life	R. J. Holden, M. C. Scanlon, N. R. Patel, R. Kaushal, K. H. Escoto, R. L. Brown, S. J. Alper, J. M. Arnold, T. M. Shalaby, K. Murkowski, B. T. Karsh (2011)	95	Q1	8	11.88
Teacher quality of work life: Integrating work experiences, psychological distress and morale	P. M. Hart (1994)	88	Q1	9	3.52
Effects of Teacher Quality of Work Life in Secondary Schools on Commitment and Sense of Efficacy	K. S. Louis (1998)	83	Q1	10	3.95
Ethics institutionalization, quality of work life, and employee job-related outcomes: A survey of human resource managers in Thailand	K. Koonmee, A. Singhapakdi, B. Virakul, D. J. Lee (2010)	81	Q1	11	9

TC: Total citations, QS: Quartile score, GS: Google scholar rank, TCY: Total citations per year, TCA: Total citations per author

Keyword and co-occurrence analysis

An article's content is sufficiently represented by author's keywords. Therefore, keyword and co-occurrence analysis is required to identify research themes in a certain area (Comerio & Strozzi, 2019). A relationship exists between two concepts when two keywords appear together in an article, and this phenomenon is called keyword co-occurrence. Research question 4 focused on identifying the most focused themes in QWL research. To address this research question, keyword analysis and keyword co-occurrence analysis were conducted in Microsoft Excel and VOSviewer respectively. Co-occurrence analysis is usually used by scientometrists to distinguish knowledge in fields of management and strategy (Castriotta et al., 2019). Moreover, scientific researchers deploy this technique to observe performance and to track flow of innovation and information (Wormell, 2000).

To discover the most prevalent themes in QWL research, keyword occurrence and keyword co-occurrence analyses were conducted. From Scopus database 160 author keywords were extracted. These keywords and their occurrence frequency is presented in table 9. It suggests that "quality of work life" is the most frequent keyword in the QWL literature. The second most often keyword is "job satisfaction", suggesting that QWL research has mostly centered on determining the interrelationship

of QWL and job satisfaction. Top 10 most frequently occurred keywords suggest that researchers mostly focused on quality of work life, job satisfaction, and role of gender.

Table 9: Frequency of keyword's occurrence

Keyword	f	Keyword	f	Keyword	f	Keyword	f
Quality of work life	191	Education	17	Patient care	9	Work satisfaction	7
Job satisfaction	168	Human experiment	17	Perception	9	Working life	7
Human	150	Job stress	17	Qualitative research	9	Behavior	6
Quality of life	136	Major clinical study	17	Social support	9	China	6
Article	105	Stress psychological	17	Work-life balance	9	Clinical trial	6
Quality of working life	97	Burnout	16	Analysis of variance	8	Demography	6
Adult	78	Cross-sectional studies	16	Career	8	Exploratory factor analysis	6
Female	75	Organization	16	Health status	8	Health care delivery	6
Humans	73	Surveys	16	Income	8	Health personnel	6
Male	70	Turnover intention	16	Job involvement	8	Health survey	6
Questionnaire	62	Leadership	15	Multicenter study	8	Human resources	6
Psychological aspect	42	Nursing staff hospital	15	Organizational performance	8	Information technology	6
Middle aged	36	Priority journal	15	Public health	8	Interpersonal communication	6
Nurse	32	Ergonomics	14	QOL	8	Inter professional relations	6
Work environment	30	Mental stress	14	Quality of work	8	Job security	6
Productivity	28	Surveys and questionnaires	14	Regression analysis	8	Manpower	6
Controlled study	27	Young adult	14	Structural equation modeling	8	Mental health	6

Workplace	27	Hospital	13	Work life	8	Netherlands	6
Employment	26	Quality of work life	13	Absenteeism	7	Nurse attitude	6
Psychology	26	Attitude of health personnel	12	Attitude	7	Occupational risks	6
Cross-sectional study	25	Employees	12	Health care	7	Oncology	6
Nurses	25	Health care organization	12	Health personnel attitude	7	Organizational culture	6
Personnel management	25	Management	12	Hospital personnel	7	Organizational innovation	6
Job performance	24	Performance	12	Human development	7	Personnel, hospital	6
Questionnaires	23	Quality control	12	Human relation	7	Physician	6
Nursing staff	21	Quality of work-life	12	Industry	7	Psychological capital	6
QWL	21	Staff	12	Life satisfaction	7	Public relations	6
Work	21	Wellbeing	12	Malaysia	7	Quality of health care	6
Employee	20	Burnout, professional	11	Manager	7	Registered nurse	6
Nursing	20	India	11	Medical education	7	Saudi Arabia	6
Organizational commitment	20	Aged	10	Occupational safety	7	Statistics and numerical data	6
Iran	19	Decision making	10	Personal experience	7	University hospital	6
Occupational health	19	Gender	10	Personnel	7	Academic staff	5
Organization and management	19	Health	10	Philosophy	7	Adaptation, psychological	5
Working conditions	19	Health care quality	10	Public sector	7	Adolescent	5
Review	18	Information processing	10	Quality	7	Affective commitment	5
Satisfaction	18	Motivation	10	Statistics	7	Alberta	5
United states	18	Personnel turnover	10	Stress	7	Attention	5

Workload	18	Human resource management	9	Work engagement	7	Bangladesh	5
Canada	17	Methodology	9	Work experience	7	Cancer survivors	5

f: Frequency

Author’s keyword co-occurrence was analyzed in VOSviewer, through network visualization. Out of 982 keywords, 103 met threshold of at least 3 keyword co-occurrences. Figure 3 illustrates author keyword’s co-occurrence network on QWL. It indicates that total 12 clusters of keywords were generated by VOSviewer. Every cluster is represented by different color and contains most frequently co-occurred keywords. Cluster 1 and 2 contains the highest number of co-occurred keywords. Cluster 1 contains 17 keywords, focusing on Bangladesh, gender, human resource management, income, job stress, Malaysia, nurses, nursing, oncology, organizational commitment, organizational justice, public sector, quality of work life, stress, turnover intention, work environment, and workload. Cluster 2 contains 16 keywords, focusing on academic staff, affective commitment, china, confirmatory factor analysis, exploratory factor analysis, higher education, job involvement, organizational citizenship, quality of work life, Saudi Arabia, structural equation modelling, teachers, and universities.

Cluster 3 contains 14 keywords, focusing on compensation, employees, faculty members, hospital, Iran, nurse, performance, productivity, quality, quality of work-life, work, work life, work life quality, working life. Cluster 4 contains 11 keywords, focusing on emotional intelligence, employee engagement, job design, quality of working life, textile industry, Netherlands, turnover, well-being, work engagement, work satisfaction, and work-life balance. Cluster 5 contains 10 keywords, focusing on absenteeism, burnout, health, job insecurity, job performance, mental health, psychological capital, quality of work life, turnover intentions, and Vietnam. All other clusters have less than 10 keywords, focusing on somewhat similar concepts.

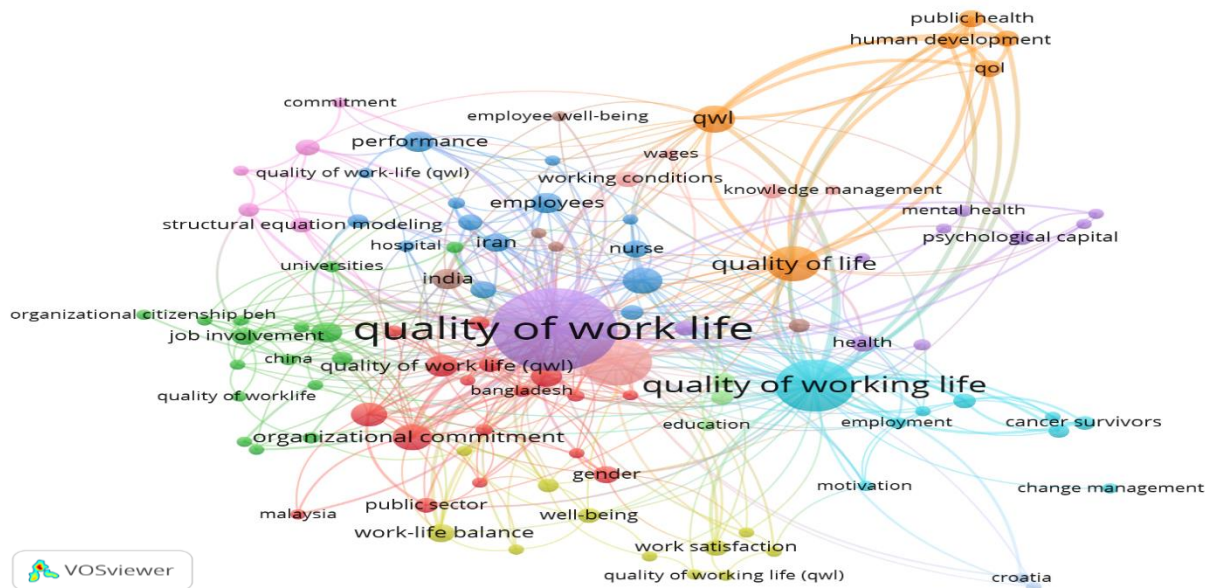


Figure 3: Network visualization of author’s keyword co-occurrence network on quality of work-life

Co-authorship analysis

To answer research question 5, the current state of collaboration on QWL research was analyzed. Research collaboration between researchers is the most professional form of intellectual networking in scientific research (Cisneros et al., 2018). Global collaboration networks enable developing countries to participate in the knowledge generation process along with developed countries (Palacios-Callender & Roberts, 2018). Exchange of two different perspectives facilitate the advancement and maturity of ideas. Moreover, when researchers from different disciplines work on a research, a better quality paper with fewer mistakes could be published (Tahamtan et al., 2016).

Figure 4 presents the co-authorship network of authors on QWL. A threshold of at least one co-authored document was applied. Out of 1331 authors, only 23 met threshold, and three clusters of co-authorship were generated in VOSviewer. Every color represent different cluster. Figure 4 indicates that there are three group of authors who mostly co-authored. Cluster 1 is the largest with 10 authors, then comes cluster 2 with 7 authors, and cluster 3 with 6 authors. Co-authorship network suggests that Karsh combines cluster 1 to cluster 3 and Smith combines cluster 2 with cluster 3. All other authors mostly co-authored within their own cluster. These results suggest that research collaboration network in QWL was quite weak, and more global collaborations are required.

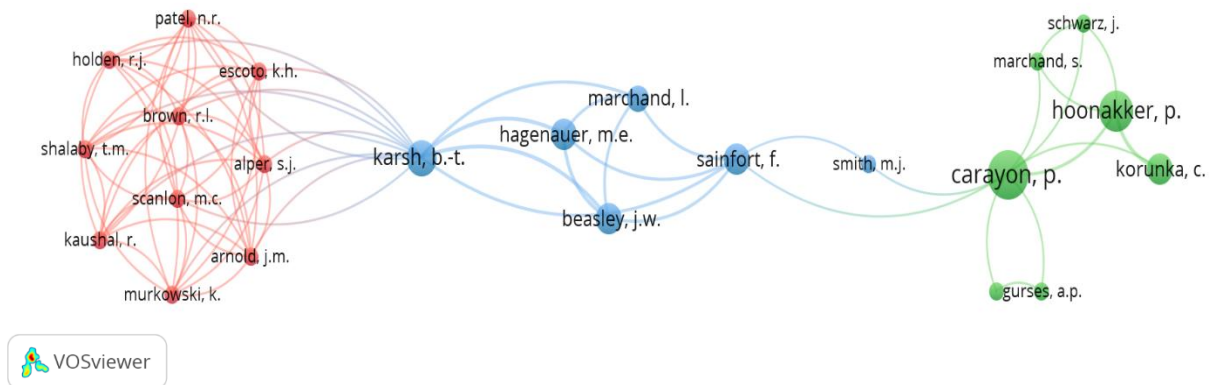


Figure 4: Network visualization of co-authorship network of authors on quality of work-life

Co-citation analysis

Small (1973) defines co-citation as the number of times two articles are cited together. In bibliometric network analysis, co-citation analysis can reveal a field's intellectual structure (Rossetto et al., 2018). It is also useful for revealing the structure, directions, and developments in a research domain (Liu et al., 2015). Sixth research question focused on understanding the intellectual structure of research on QWL using co-citation analysis. Using co-citation analysis, two authors represented by nodes are connected when they are co-cited by any other author. When two publications are cited together, they are considered similar as they might have similar subject (Hjørland, 2013). Figure 5 presents citation network, whereas, figure 6 presents co-citation network of authors. In citation network, only those authors are included which had at least 3 documents and minimum 1 citation. Out of 1313 authors, only 58 met threshold and 43 were connected, generating 9 clusters of citations. Every cluster is represented by different color. Cluster 1 contains 9 authors, cluster 2 contains 9 authors, cluster 3 contains 7 authors, cluster 4 contains 7 authors, cluster 5 contains 6 authors, and cluster 6 contains 5 authors.

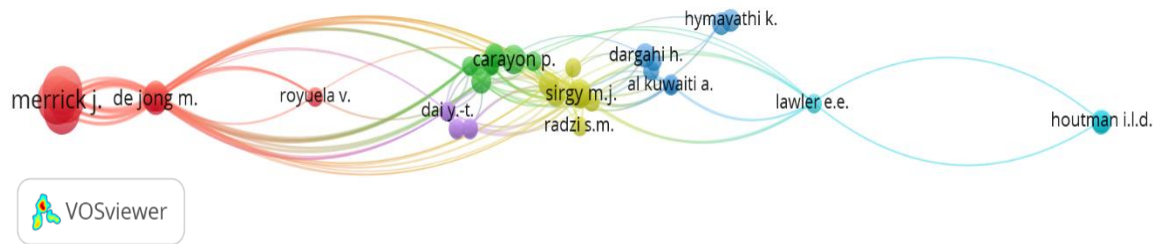


Figure 5: Network visualization of citation network of authors on quality of work-life

In co-citation network, only those authors are included which had at least 15 citations. Out of 21646 authors, only 216 met threshold, and 6 clusters of co-cited authors were generated by VOSviewer. Every cluster is represented by different color. Largest cluster is Cluster 1, which contains 69 authors and is represented by red color, cluster 2 contains 52 authors, cluster 3 contains 50 authors, cluster 4 contains 27 authors, cluster 5 contains 12 authors, and cluster 6 contains 6 authors. The co-citation network indicates that out of 6 clusters, authors in first five clusters had the same subject matter and only authors of sixth cluster worked on different subject matter.

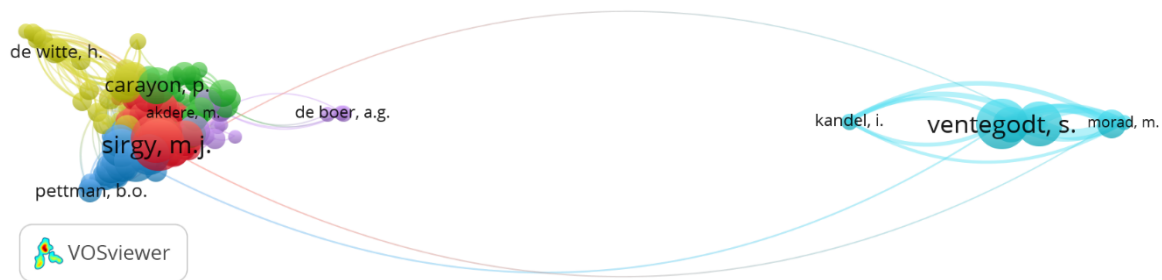


Figure 6: Network visualization of co-citation network of authors on quality of work-life

CONCLUSION

QWL is a broad and ever enriching concept. It is evolving since its introduction. But most importantly it is crucial to attract and retain professional and skilled workforce (Mazlan et al., 2018; Mosadeghrad, 2013; Sulaiman et al., 2015). Hence, many researchers studied it to understand the factors which could enhance or reduce it. To generate a comprehensive report on these research trends in QWL and identify future research areas, a bibliometric analysis of QWL research was required, and to address this gap this research was conducted.

The results of bibliometric analysis suggest that first research on QWL in Scopus was published in 1974. But the interest of researchers was negligible until 2008, and it strengthened and kept on increasing from 2011 onwards. Research trends further suggest that until now United States is the leading contributor of QWL research, followed by India and Iran. The QWL research was mainly produced in the area of Business, management, and accounting, followed by social sciences, and medicine. This published research was mainly in the form of articles, conference papers and reviews. Although QWL research was majorly in the field of business, management, and accounting, but the leading publication sources were from field of life science. Still, two out of top five publication sources were from the field of business, management, and accounting. But only one of these sources was in quartile score 1.

Bibliometric analysis further indicates that both Merrick and Ventegodt were the lead authors in terms of number of publications, and Sirgy was the most cited author. Furthermore, mostly publications were under the affiliations of Forsknings center for Livskvalitet, and Ministry of Social Affairs Israel. But most cited publications were produced by Virginia Polytechnic Institute and State University. Although an enormous research was being conducted on QWL since 1974, but still the funding for QWL research was quite low. Until now only 53 publications were funded, and KWF Kankerbestrijding was the lead funding sponsor. Although interest of funding agencies was low throughout the history of QWL research, but still few remarkable publications were produced on QWL, which proved to be influential for future research in QWL. The publication by Sirgy et al., (2001), titled; "A new measure of quality of work life (QWL) based on need satisfaction and spillover theories", was the most cited research paper throughout the history of QWL research.

Keyword and co-occurrence analysis indicated that the most researched variables in QWL research along with QWL were job satisfaction, quality of life, psychological aspect, work environment, productivity, and various other work related factors. Keywords further indicate that most researched demographics were humans, adults, females, males, middle aged people, and nurses. Some of these keywords combinations were more frequently studied than others. The largest studied combination of keywords indicates that QWL was frequently studied with human resource management, income, job stress, organizational commitment, organizational justice, turnover intentions, work environment and workload. Furthermore, these keywords combinations were mostly researched in Bangladesh and Malaysia and these studies were based on gender and nurses. To conclude, the most researched factors in QWL were not same as the most researched combination of factors in QWL research.

The co-authorship network indicated that not many researchers collaborated. Only three clusters of collaborations were derived from analysis. The largest collaboration cluster included only 10 authors, and there was no inter collaboration between authors of these three clusters. So, research collaboration between researchers on QWL was quite low. Furthermore, citation and co-citation indicated that intellectual structure in QWL research was not that strong. Because only few researchers were cited by other cited researchers, and a particular set of authors were frequently co-cited by other researchers. The intellectual structure further indicates that most of the research in QWL is not influential and does not present remarkable findings to be cited by other researchers.

DIRECTIONS FOR FUTURE RESEARCH

Directions for future research are provided based on the findings of this research and to address seventh research question. Considering the results of this study future researchers should focus on the factors which has been neglected in the previous studies on QWL. Specifically personal factors which could affect QWL, as previous studies mostly focused on the organizational factors. There is also need to focus on consequences of lower QWL on national prosperity indicators, such as general wellbeing of citizens. Furthermore, there is a great need to enrich collaboration in QWL research globally. For this purpose governments and funding agencies should emphasize on sponsoring QWL research. So that researchers should also work on developing new indicators of QWL and identify personal factors to enrich existing theories and frameworks on QWL. These collaborations and sponsorships will not only enrich the current research on QWL, but also enrich the citation and co-citation network in QWL research. Organizations and government agencies should take QWL research more seriously, because QWL is one of the key components in attracting skilled workforce in organizations, which ultimately facilitates organizational competency and performance, and organizations' output quality ultimately defines wellbeing of any country in a long run.

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