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Knowledge-Based Intellectual Structure of Business Excellence Research (1995-2015)

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Abstract

This quantitative study is meant to explore the intellectual structure paradigm of organizational business excellence (OBE) as an emerging field of research. Advanced bibliometric analysis of co-citations is performed through synchronising the relationships between the research-articles published within the OBE domain. The prime objective was to develop an understanding of the field's fundamental composition, current inward integration, outward expansion, and future research directions. The Elsevier Scopus database of journal articles was retrieved for 1995-2015 period. Initially, descriptive analysis explored interesting findings about OBE as distinct research domain: (i) most influential authors both in terms of number of publications and citations; most productive years for publications; (iii) most productive journals. Further, Principal Component analysis (PCA) and Multi-dimensional Scaling (MDS) revealed 10 main research dimensions of OBE, for example, (i) the ways of achieving OBE; (ii) adoption of OBE philosophy across the organizations; (iii) measuring the implementation and performance of OBE. This research identified an emerging trend of applying OBE concepts across multidisciplinary fields. As the findings of this study suggest the vitality and future progression of the business excellence as a research field, therefore,

this study could be of great utility and of interest for all concerned stakeholders of OBE research.

Key Words: Organizational Business excellence, bibliometric analysis, co-citations, Multi-dimensional Scaling, Bibexcel, quality management

Introduction

The term ‘Intellectual Structure’ is frequently resonated in publications those focused to explore the patterns and trends in some established or emerging topic or field of research (Hoffman & Holbrook, 1993; S. P. Nerur, Rasheed, & Natarajan, 2008; Nosella, Cantarello, & Filippini, 2012; Ramos-Rodríguez & Ruíz-Navarro, 2004). Intellectual structure of a research field basically reflects its foundation, evolution, and diffusion over the time; publications’ focus, divergence and convergence of investigated themes; authors’ contributions, influential authors and articles, citations, co-citations networks and sub-fields within large body of knowledge (García-Lillo, Úbeda-García, & Marco-Lajara, 2017; Keng-Chieh, 2016; Surabhi, 2018). A systematic understanding of intellectual structure of certain field of study ultimately enhances the realization of the field’s fundamental composition, current inward integration, outward expansion, and future research directions. This paper herein is intended to explore the intellectual structure of OBE by hypothesising that OBE is gaining an appreciable amount of endorsement as an emerging distinct field of research.

The journey of human struggle for a better tomorrow is an everlasting phenomenon that cannot be easily positioned within limited boundaries given that the dimensions of this struggle are both many and highly varied (Rick Edgeman & Eskildsen, 2014) . That being said, materializing improvements that lead to enriched versions of life is constrained by the relative availability and abundance of necessary resources. The organizational intent to achieve better business outcomes with available human resources, financial capital, and core competences compels think-tanks to strategize and introduce improvement plans

(Muhammad Asif & Searcy, 2014; C.-C. Yang, 2009). Organizational compulsions to do the best job in order to realize outstanding value-added financial, societal, and ecological outcomes provided the foundation for the term organizational business excellence (Jessica Foote, Nolan Gaffney, & James R. Evans, 2010). The ultimate objective of organizational business strategies, human resource management practices, and innovative versions of business models is to achieve excellence in financial, human, societal and (sometimes) ecological outcomes (Hertz, Barker, & Edgeman, 2018).

Evolution is a distinguished feature of academic research, as opposed to stagnation and ultimate exclusion of a concept, theory, subject, field or school of thought. Maturity of an academic research field gives birth to new but somewhat allied subfields that are meant to address emerging challenges with new approaches and vision. The journey of Total Quality Management (TQM) has its foundation back in early twentieth century industrial quality control efforts with strong influence of basic management theories and practices. From successful Japanese implementation of Statistical Quality Control (SQC), introduction of British quality standards, business excellence awards, emergence of ISO and related certifications, wave of quality management, and finally the flagship of TQM we find an essentially continuous journey that materialized quality management as a field worthy of both industrial and academic attention (Albert, Goekhan, & Teresa, 2015). Many researchers have tried to reveal the concept of TQM by providing its operational definitions. For example; “Managing the entire organization so that it excels in all dimensions of products and services that are important to the customer” (Chase & Aquilano, 1992, p. 186); An ongoing process whereby top management takes whatever steps necessary to enable everyone in the organization in the course of performing all duties to establish and achieve standards which meet or exceed the needs and expectations of their customers, both external and internal (Miller, 1996, p. 157). Although, not all, but a large number of research studies found

positive association between TQM implementation and job related variables: job performance (Nair, 2006; Sadikoglu & Olcay, 2014; Steensen, 2010); job satisfaction (Keng, Nooh, Veeri, Lorraine, & Alex, 2007; Prajogo & Cooper, 2010); job involvement (Ooi, Veeri, Mohammad, & Nooh, 2007); operational and financial outcomes (Sadikoglu & Olcay, 2014; Zehir, Ertosun, Zehir, & Muceldilli, 2012), and customer satisfaction (Topalović, 2015).

Included among subfields stemming from or highly related to quality management are Six Sigma, lean manufacturing, Just In Time (JIT), customer satisfaction, cost of quality, and OBE. Research studies focused to identify differences and similarities between TQM and other aforementioned fields concluded that although there is significance difference in operationalization, however, conceptually there are also some very common grounds. Further, research revealed that for a successful venture of organizational performance improvement initiatives, essentially, these programs should complement each other (Andersson, Eriksson, & Torstensson, 2006; Jens J Dahlgaard & Mi Dahlgaard-Park, 2006; Flynn, Sakakibara, & Schroeder, 1995). Organizational Business Excellence has strong research significance in terms of research focus and number of publications in recent decades. Being an emerging allied subfield of quality management, operation research, and organizational behaviour, an unconventional interdisciplinary research has also been evident aiming to address organizational business performance excellence (Cristina & Maria, 2006; Steensen, 2010). We argue herein that TQM movement disseminated the quality-consciousness among the organizations worldwide and promoted the concept of continuous quality improvement, whereas business excellence school of thought has no exception from continuous improvement theme. Secondly, it seems impossible to achieve business excellence at workplace without the engagement and involvement of each employee (TQM approach). The term *excellence* in management research articles' title was first introduced by

(Parker, 1969) and then followed by Devries (1986), however it was first used in article titles within an organizational business context in late mid-nineties (for details, see:Blazey, 1997; Davis, Khodabocus, & O Bray, 1996; Hewitt, 1997; Maisey & Pupius, 1997; Shergold & Reed, 1996).

The recently growing popularity of the business excellence among the academic researchers across TQM, Sustainability (CS), Corporate Social & Environmental Responsibility (CSER), and Knowledge Management (KM) domains provides strong evidence of business excellence as emerging field of research and practice(Gómez, Martínez Costa, & Martínez Lorente, 2017; Kassem, Ajmal, & Khan, 2016). While a significant amount of research has been published in the field of quality management, there has been very limited research evident in literature that is specifically focused to explore OBE as an independent research subfield entity (Dotun, 2001; Hussain & Waheed, 2010; Kanji, 2002; Vas, Andrew, & Ed, 2002). Secondly, the only visible bibliometric study of quality management literature evident was (Q.-Q. Lo & K.-H. Chai, 2012) but that was only limited to publications appearing in a single journal. Hence, our purpose herein is to explore the intellectual structure of the accumulated knowledge base of excellence as an emerging research subfield through analysing the bibliometric data of citations and co-citations using the multivariate analysis techniques of Factor Analysis (FA) and Multi-Dimensional scaling (MDS).

The remaining part of this paper is structured in following manner; section 2 is comprised of research methodology, description of Bibliometric statistics of complete and core datasets respectively. Section 3 provides research findings in details. Section 4 provides MDS analysis of clusters. Section 5 and 6 provide discussion and conclusions respectively. Finally, section 7 and 8 provide the research limitation and future directions.

2. Methodology

In this research study, bibliometric analysis of co-citations data is employed to explore the primary foundation, current perspective, and future trends in the research field of business excellence. This approach is consistent and aligned with methodological approaches used in similar kind of studies across the different disciplines (S. Nerur, Rasheed, & Pandey, 2016; S. P. Nerur et al., 2008; Tsay, Xu, & Wu, 2003; Wullianallur & Sridhar, 2010). Research studies those deployed such techniques argued that this quantitative technique was very effective to investigate the development within a research field scientifically (Castillo-Vergara, Alvarez-Marin, & Placencio-Hidalgo, 2018; Chiu & Ho, 2007; De Bakker, Groenewegen, & Den Hond, 2005; Ellegaard & Wallin, 2015; Li et al., 2016; Merigó-Lindahl, 2012; Merigó & Yang, 2017). Among three main approaches of bibliometric analysis: citation analysis, bibliographic coupling, and co-citation analysis, two are used herein (citation and co-citation) to investigate the development and evolution of intellectual structure of the relatively emergin. Citation analysis is comprised of quantitative tools such as frequency distributions, and visual presentations to explore the relationship between scientific publications, and pattern assessment of connected intellectual nodes on both horizontal and vertical temporal scales (Howard, 2004; S. Nerur et al., 2016; Pilkington & Meredith, 2009; Zuckerman, 1987). Co-citation analysis is a reverse approach to bibliographic coupling analysis that is based on the concept that two or more articles are co-cited by another article, the cited articles should be treated as similar in terms of subject or field domain (Jeong, Song, & Ding, 2014). Bibliographic coupling analysis is based on the idea that the two or more articles that cite the same article should be considered similar in terms of subject discussed; however, similarity does not imply an agreement or disagreement of opinions between the citing articles (Boyack & Klavans, 2010; Jarneving, 2007).

Over the years, bibliometric techniques are gaining popularity among the researchers across the different disciplines to discover the underlying characteristics, progression's patterns,

contributions, and dissemination of publications of any target field of research. A substantial amount of research studies has been published to demonstrate the evolution of intellectual structure of the focused research field using Bibliometric analysis across the disciplines. Few examples are: business economics (Castillo-Vergara et al., 2018; Merigó-Lindahl, 2012); tsunami research (Chiu & Ho, 2007); corporate social responsibility and corporate social performance (De Bakker et al., 2005); business models (Li et al., 2016); business accounting (Merigó & Yang, 2017); NIH/NIAID HIV/AIDS Clinical Trials (Rosas, Kagan, Schouten, Slack, & Trochim, 2011); human resource management (García-Lillo et al., 2017); consumer research (Hoffman & Holbrook, 1993); strategic management (S. P. Nerur et al., 2008); organizational ambidexterity (Nosella et al., 2012); Big data (Surabhi, 2018); Management and Organizational Studies (Acedo, Barroso, Casanueva, & Galán, 2006). The next section provides the description of entire process of bibliometric data collection and descriptive analyses.

2.1 Articles search and selection process

The term *excellence* is neither confined nor well-defined, also its usage is stuffed with contextual interpretations and meanings. Keeping in view the diversity of excellence concepts, the research field of excellence is mapped with four associated links: business excellence, performance excellence, organizational excellence, and enterprise excellence. The Elsevier Scopus database was explored to collect research publications and citation data for a period January 1995 to December 2015. Scopus ascertains the largest database of abstracts and citations from more than 22,000 peer-reviewed journals, and at least 5,000 publishers (<https://www.scopus.com>). The choice of Scopus against other available database like Web of Science (WoS) was based on at least couple of reasons as suggested in (Burnham, 2006). Firstly, Scopus's developers claim 99% precision and accuracy in matching the citing references and citing articles. Secondly, Scopus database is effectively manageable for

Statistical analyses, especially; use of Bibexcel software (used herein) is more convenient and efficient to handle Scopus bibliometrics data. To ensure the credibility of selected documents, the database search was restricted to journal articles only, while the retained publications were published in English language only. With an aim of being exclusively focus on core area of research, the document search was conducted based on title alone. This is in contrast to searching based on a combination of article title, abstract, and keywords. Based on the subject categorization of excellence within the broad domain of social science, the Scopus database of social science comprised of more than 5,300 journals.

During the data retrieval, 217 research papers were collected from Scopus database that were published in journals, and had business excellence, performance excellence, organizational excellence, or enterprise excellence in their titles. In the process of refinement another 12 research papers were discarded due to their mismatching with the theme of excellence defined for this study, hence the study retained 205 publications. Descriptive analysis comprised of authors, number, and percentage of citations for each listed article is provided in table 1.

S#	Author(s)	# of cit.	% of cit.	S#	Author(s)	# of	% of cit.
1	(Kanji, 1998)	114	6.96	55	(J. S. Oakland & Tanner, 2008)	11	0.67
2	(Ritchie & Dale, 2000)	64	3.91	56	(MacLeod & Baxter, 2001)	11	0.67
3	(Kanji & Wong, 1999)	50	3.05	57	(Grigg & Mann, 2008)	10	0.61
4	(Kanji & Wallace, 2000)	46	2.81	58	(Djerdjouri, 2004)	10	0.61
5	(Jones, 2002)	39	2.38	59	(Husain, Abdullah, Idris, & Sagir, 2001)	10	0.61
6	(Hardjono & Van Marrewijk, 2001)	33	2.01	60	(Q. Q. Lo & K. H. Chai, 2012)	9	0.55
7	(McAdam & Kelly, 2002)	31	1.89	61	(Black & Groombridge, 2010)	9	0.55
8	(Klefsjö, Bergquist, & Garvare, 2008)	30	1.83	62	(Aras & Crowther, 2010)	9	0.55
9	(Badri et al., 2006)	30	1.83	63	(Ateekh Ur & Subash Babu, 2008)	9	0.55
10	(Mele & Colurcio, 2006)	30	1.83	64	(F. Vouzas, 2007)	9	0.55
11	(More, Babu, & Hemachandra, 2008)	28	1.71	65	(Dereli, Durmuşoğlu, Delibaş, & Avlanmaz,	8	0.49
12	(Hafeez, Malak, & Abdelmeguid, 2006)	27	1.65	66	(Haffer & Kristensen, 2008)	8	0.49
13	(J. Oakland, Tanner, & Gadd, 2002)	27	1.65	67	(Tutuncu & Kucukusta, 2010)	8	0.49
14	(Kim, Kumar, & Murphy, 2010)	25	1.53	68	(Haffer & Kristensen, 2008)	8	0.49
15	(R. L. Edgeman, Bigio, & Ferleman,	25	1.53	69	(Kanji, 2008b)	8	0.49
16	(Dubrovski, 2001)	25	1.53	70	(Quist, Skälén, & Clegg, 2007)	8	0.49
17	(Montgomery, 2010)	24	1.47	71	(Koc, 2006)	8	0.49
18	(Lee, 2002)	23	1.40	72	(Walden, 2003)	8	0.49
19	(Savolainen, 2000)	22	1.34	73	(Prabhu, Robson, & Mitchell, 2002)	8	0.49
20	(Bennett & O'Kane, 2006)	21	1.28	74	(Rick Edgeman & Eskildsen, 2014)	7	0.43
21	(Kanji, 2002)	21	1.28	75	(Sampaio, Saraiva, & Monteiro, 2012)	7	0.43
22	(Martensen & Dahlgaard, 1999)	19	1.16	76	(Corbett & Angell, 2011)	7	0.43
23	Holliday BBDSGHJNSFD	18	1.10	77	(J. P. Antony & Bhattacharyya, 2010)	7	0.43
24	(Sharma & Talwar, 2007)	17	1.04	78	(Comm & Mathaisel, 2008)	7	0.43
25	(R. L. Edgeman, Dahlgaard, Dahlgaard,	17	1.04	79	(Ho, 1999)	7	0.43
26	(M. Asif, Searcy, Garvare, & Ahmad,	16	0.98	80	(M. Asif, Raouf, & Searcy, 2013)	6	0.37
27	(Talwar, 2011)	16	0.98	81	(Breja & Banwet, 2011)	6	0.37
28	(Corbett, 2011)	16	0.98	82	(J. P. Antony & Bhattacharyya, 2010)	6	0.37
29	(J. Foote, N. Gaffney, & J. R. Evans,	16	0.98	83	(F. K. Vouzas, 2009)	6	0.37
30	(Vora, 2002)	16	0.98	84	(Angell & Corbett, 2009)	6	0.37
31	(Al-Hassan, Chan, & Metcalfe, 2000)	16	0.98	85	(Saunders, Mann, & Grigg, 2008)	6	0.37
32	(Tutuncu & Kucukusta, 2007)	15	0.92	86	(Zink, 2008)	6	0.37
33	(Bauer, Falshaw, & Oakland, 2005)	15	0.92	87	(Wilcock, Karapetrovic, Boys, & Piche,	6	0.37
34	(Vermeulen, 2003)	15	0.92	88	(McAdam & Leonard, 2005)	6	0.37
35	(Prabhu & Robson, 2000)	15	0.92	89	(Doeleman, ten Have, & Ahaus, 2012)	5	0.31
36	(Park Dahlgaard, Dahlgaard, &	15	0.92	90	(Evans, Ford, Masterson, & Hertz, 2012)	5	0.31
37	(Jayamaha, Grigg, & Mann, 2009)	14	0.85	91	(Zink, 2011)	5	0.31
38	(Markič, 2006)	14	0.85	92	(Politis & Siskos, 2010)	5	0.31
39	(Dervitsiotis, 2003)	14	0.85	93	(Evans, 2010)	5	0.31
40	(Hays, 2002)	14	0.85	94	(Vorra & Bohoris, 2009)	5	0.31
41	(Hewitt, 1997)	14	0.85	95	(Kanji, 2008a)	5	0.31
42	(J. J. Dahlgaard, Chen, Jang, Banegas, &	13	0.79	96	(Allan, Sommerville, Kennedy, &	5	0.31
43	(Shergold & Reed, 1996)	13	0.79	97	(Zink, Schmidt, & Voß, 1997)	5	0.31
44	(Lu, Betts, & Croom, 2011)	12	0.73	98	(M. Asif & Gouthier, 2014)	4	0.24
45	(Yu, Hamid, Ijab, & Soo, 2009)	12	0.73	99	(Latham, 2013)	4	0.24
46	(Cauchick Miguel, 2008)	12	0.73	100	(M. Asif & Searcy, 2013)	4	0.24
47	(J. Antony, 2007)	12	0.73	101	(R. Edgeman, 2013)	4	0.24

48	(Boys, Wilcock, Karapetrovic, & Aung,	12	0.73	102	(Zárraga-Rodríguez & Alvarez, 2013)	4	0.24
49	(Hughes & Halsall, 2002)	12	0.73	103	(Abdullah et al., 2012)	4	0.24
50	(Seghezzi, 2001)	12	0.73	1010	(Alfaro-Saiz, Carot-Sierra, Rodríguez-	4	0.24
51	(Ritchie & Dale, 2000)	12	0.73	105	(Štok, Markič, Bertoneclj, & Meško, 2010)	4	0.24
52	(Mann, Adebajo, Laosirihongthong, &	11	0.67	106	(Politis, Litos, Grigoroudis, & Moustakis,	4	0.24
53	(C. C. Yang, 2009)	11	0.67	107	(Hsu, 2007)	4	0.24
54	(Akdere, 2009)	11	0.67	108	(Dalrymple et al., 1999)	4	0.24

Table 1 Set of core publications in business excellence research

The descriptive analysis presented in figure 1, suggested a temporal growth of the business excellence research over the studied period. There was a consistency in terms of published research within business excellence context.

Figure 1 No. of publications in excellence from 1996-2015

Seventy-five percent of the articles were published in the management and business domains of research while 25% of the articles were published in other fields, which were further subdivided in their relative percentage of contribution, figure 2.

Figure 2 Subject wise distribution of publications in the field of excellence research.

Figure 3 provides details of authors having at least 3 research articles having excellence included among the title words.

Figure 3 Authors with at least 3 publications in excellence research

Figure 4 provides the details of major source journals of business excellence research, having published at least 3 research articles.

Figure 4 Source journals of business excellence research

3. Findings

3.1 Findings from systematic literature search

A systematic literature search using the Scopus database provided 205 research journal articles, all having the title comprised of business excellence, organizational excellence, performance excellence, or enterprise excellence. The strategy of title words selection is adopted to find core set of articles with focus on excellence within organizational business performance. The four terms business excellence, organizational excellence, performance excellence, and enterprise excellence are used synonymously are used interchangeably in the management literature. The citation analysis depicted an infant but growing stage of research in excellence field as the citation network has been ever expanding both vertically and horizontally. Considering the number of citations as an indicator of the contributing role of a publication in developing a knowledge base of any research field, articles with at least four citations were selected as a core set of literature in OBE research. The rationale behind the decision to take at least four citations as criteria of inclusion of a publication in core set of publication was purely based on iterative procedure. We planned to include top 100 most influential publications as set of core publications; however, there were 11 publications ranked from 98th to 108th with exactly 4 citations, therefore, authors retained all these articles

in group-A to avoid selection biasedness. This process generated two groups of publications with 108 articles in the group-A and 97 articles in group-B, having at least 4 citations, and at-most 3 citations respectively. The core set of publications was further filtered by identifying the citation trend within the 108 articles of group-A, 4 articles were discarded due to their inability to satisfy at least one of prerequisite i.e. either these were not cited by any other article in the data set or these articles did not cite any other article from the group. Finally, this process yielded a refined group of 104 articles for applying the co-citation matrix analysis.

3.2 Findings from Factor Analysis

Advanced bibliometric co-citation matrix was extracted from the Scopus data set by using Bibexcel software (Persson, Danell, & Schneider, 2009). The generated a co-citation matrix comprised of R_i rows and C_j columns where the $r_i c_j$ matrix element shows the frequency of the number of times both the i th and j th articles are cited together. The co-citation matrix of 104 articles was standardized by transforming into correlation co-citation matrix in order to retrieve coefficients of similarities/dissimilarities between the publications with a common research theme and publications with a relatively different research focus respectively.

By using SPSS 20 statistical analysis package, renowned statistical technique of data reduction namely Factor Analysis (FA) was performed to extract the distinct aspects of intellectual structure of research in OEBC, and to cluster the similar articles contributing to a common knowledge base in the field. The correlation co-citation matrix was analyzed by applying the Principal Component Analysis (PCA) method with Varimax rotation, rotated solutions, and the number of fixed factors equal to 10. Fixing the number of factors at 10 was resulted from the examination of a scree plot of 20 total factors suggested all factors beyond the 10th most statistically important one were able to explain insignificant percentages of the total variation (<1%). The PCA yielded a set of ten factors contained 81 articles with

60.565% explained variance. Since each further incremental factor was explaining an insignificant percentage of the variation, therefor, only ten factors were retained as subfields of OBE research.

Table 2 Results of factor analysis with items and factor loadings.

Publication	MDS	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Evans, J.R.(2010)	P93	0.852									
Badri,et al.(2006)	P9	0.771									
Walden,J.(2003)	P71	0.758									
Corbett,L.M.(2011)	P28	0.758									
Akdere,M.(2009)	P53	0.748									
Evans,et al.(2012)	P89	0.747									
Jayamaha,et al.(2009)	P37	0.744									
Latham,J.R.(2013)	P99	0.736									
Bennett,D.; O'Kane,J.(2006)	P20	0.686									
Asif,et al.(2014)	P98	0.661									
Asif,et al.(2013)	P79	0.650									
Doeleman,et al.(2012)	P88	0.650									
Lo,et al.(2012)	P60	0.646									
Husain,et al.(2001)	P55	0.640									
Corbett, L.M.; Angell, L.C.(2011)	P75	0.632									
Angell,L.C.; Corbett,L.M.(2009)	P83	0.628									
Bauer,et al.(2005)	P33	0.601									
MacLeod,A.;Baxter, L.(2001)	P56	0.568									
More,et al.(2008)	P11	0.556									
Dahlgaard,et al.(2013)	P41	0.546									
Oakland, J.S.; Tanner, S.J.(2008)	P54	0.543									
Haffer,R.;Kristensen,K.(2010)	P65		0.773								
Haffer,R.;Kristensen,K.(2008)	P67		0.749								
Prabhu,V.B.; Robson,A.(2000)	P35		0.747								
Oakland,et al.(2002)	P13		0.738								
Prabhu,et al.(2002)	P72		0.692								
Ritchie,L.;Dale,B.G.(2000)	P2		0.664								
Black,S.;Groombridge,J.(2010)	P61		0.595								
Ritchie,L.;Dale,B.G.(2000)	P50		0.592								
Boys,et al.(2005)	P47		0.553								
Sampaio,et al.(2012)	P74		0.535								
Kim,et al.(2010)	P14		0.535								
Foote,et al.(2010)	P29		0.510								
Kanji,G.K.(2008)	P68			0.911							
Hsu,S.H.(2007)	P106			0.879							
Kanji,G.K.(2008)	P95			0.854							
Kanji,G.K.(1998)	P1			0.836							
Kanji,G.K.; Wallace, W.(2000)	P4			0.784							
Koc,E.(2006)	P70			0.682							
Derehi,et al.(2011)	P64			0.590							
Zink,K.J.(2008)	P85			0.57							
Politis,Y.;Siskos,Y.(2010)	P92			0.534							
Kanji,G.K.;Wong,A.(1999)	P3			0.510							
Ho,S.K.M.(1999)	P78				0.847						
Shergold,K.;Reed,D.M.(1996)	P42				0.815						
Montgomery,D.C.(2010)	P17				0.746						
Hafeez,et al(2006)	P12				0.704						
Martensen,A.; Dahlgaard,J.J.(1999)	P22				0.621						
Quist,et al.(2007)	P69				0.618						
Savolainen,T.(2000)	P19				0.616						
McAdam,R.;Kelly,M.(2002)	P7				0.536						
Klefsj��,et al.(2008)	P8				0.530						
Hughes,A.;Halsall,D.N.(2002)	P48				0.514						
Mele,C.;Colurcio,M.(2006)	P10				0.501						
Grigg,N.;Mann,R.(2008)	P57					0.750					
Talwar,B.(2011)	P23					0.695					
Yang, C.-C.(2009)	P51					0.650					
Saunders,et al.(2008)	P84					0.633					
Cauchick Miguel, P.A.(2008)	P45					0.517					
Hardjono,T.W.;Van	P6						0.749				
Marrewijk,M.(2001)	P90						0.682				
Abdullah,et al.(2012)	P30						0.631				

MarkiÄ, M.(2006)	P43	0.522	
Lu,D.et al.(2011)	P44	0.756	
Yu,et al.(2009)	P27	0.593	
Asif,et al.(2011)	P21	0.587	
Kanji,G.K.(2002)	P100	0.587	
Asif,M.;Searcy,C.(2013)	P25	0.551	
Vora,M.K.(2002)	P101	0.507	
Seghezzi,H.D.(2001)	P49		0.628
Alfaro-Saiz,et al.(2011)	P103		0.572
Wilcock,et al.(2006)	P86		0.536
Edgeman,et al.(2005)	P15		0.719
Dalrymple,et al.(1999)	P107		0.680
Al-Hassan,et al.(2000)	P31		0.516
Edgeman,R, et al.(1999)	P26		0.509
Comm,C.;Mathaisel,D.(2008)	P77		0.505
Allan,et al.(2000)	P96		0.699

Table 3 Summary of Principal Component Analysis results

Factors	# of articles	% of variance	Primary theme	Secondary theme
F1	21	26.913	The ways of achieving OBE	Emerging models of OBE
F2	12	6.936	Adoption of OBE philosophy across the organizations	Organizational initiatives for OBE
F3	10	6.296	Measuring implementation & performance of OBE	Organizational self-assessment
F4	11	5.146	TQM role in developing the OBE	Quality management perspectives
F5	5	4.124	Awareness & understanding of OBE	International landscape of OBE
F6	4	3.402	Organizational values and OBE	Social dimensions
F7	6	2.925	Organizational Sustainability & OBE	Integration of sustainability & OBE
F8	3	2.682	ISO certifications & OBE	ISO 9000 series
F9	5	2.369	Organizational leadership & OBE	Strategic aspects of OBE
F10	2	2.194	Environmental perspective & OBE	Environmental performance
Total	79	60.565		

3.1.1. The ways of achieving OBE (F1)

The dominating theme of factor 1 included the strategic and operational ways of achieving the business excellence (for details, see; Angell & Corbett, 2009; Bennett & O'Kane, 2006; Bourreau, Gensollen, & Moreau, 2012; Corbett & Angell, 2011; Evans, 2010; Latham, 2013; Walden, 2003). The supplemented subject of interest was to introduce quality models to facilitate the organizational processes essential to materialize the business excellence (for

details, see; M. Asif & Gouthier, 2014; Badri et al., 2006; J. J. Dahlgaard et al., 2013; Husain et al., 2001; Jayamaha et al., 2009; MacLeod & Baxter, 2001; J. S. Oakland & Tanner, 2008). Research studies within factor 1 reflect a strong linkage with the intellectual knowledge base of the QM research field. However, the spread of intellectual aspects is evident both in horizontal and vertical directions (for details, see; Akdere, 2009; Corbett, 2011; Evans, 2010; More et al., 2008).

3.1.2. Adoption of OBE philosophy across the organizations (F2)

Factor 2 is composed of articles mainly focused on initiatives taken to ensure successful usage of business excellence programs across the organizations aimed at better performance outcomes (for details, see, Haffer & Kristensen, 2008; J. Oakland et al., 2002; Ritchie & Dale, 2000). The contextual aspects and organizational characteristics essential to achieve a successful results oriented adoption of OBE are the crux of these articles (for details, see; Boys et al., 2005; J. Foote et al., 2010; Prabhu & Robson, 2000).

3.1.3. Measuring implementation and performance of OBE (F3)

This cluster of articles provides theoretical foundation of measuring the organizational performance in the context of business excellence (Kanji & Wong, 1999; Politis & Siskos, 2010; Sampaio et al., 2012). The unprecedented work of Kanji in developing the field of OBE much aligned within the description of both conventional and innovative approaches of achieving and measuring the business excellence performance (Hsu, 2007; Kanji, 2008b; Kanji & Wallace, 2000).

3.1.4 TQM role in developing the OBE (F4)

The ever growing field of Total Quality Management (TQM) played a leading role in the horizontal and vertical expansion of quality management sub-fields such as business excellence (Hafeez et al., 2006). From the temporal analysis of business excellence

development, it was predicted that the trend will continue into the future with more extended scope and dimensions (Ho, 1999; Hughes & Halsall, 2002).

3.1.5. Awareness & understanding of OBE (F5)

The articles within cluster 5 are exclusively focused on the dissemination of awareness, understanding, and adoption of OBE worldwide (for details, see; Grigg & Mann, 2008; Mann et al., 2011; Saunders et al., 2008). Further, a temporal analysis of OBE evolutionary development has been provided with aim to devise promotional strategies for OBE awareness creation (for details, see; Talwar, 2011).

3.1.6. Organizational values and OBE (F6)

Technological development and sophistication achieved in tangible resources by the organization could not stand alone in their journey toward business excellence: in parallel, organizational values and soft aspects are equally important. Well-conceived integrations of core organizational values within the prevailing culture is key to success (for details, see; Abdullah et al., 2012). The recent evolution of the notion of sustainable and responsible organizations has opened a new horizon for modern era organizations. A significant shift is evident in organizations' strategic approaches to becoming socially relevant and both socially and environmentally responsible (for details, see; Hardjono & Van Marrewijk, 2001).

3.1.7. Organizational Sustainability and OBE (F7)

Factor 7 is a collection of articles largely focused on the prerequisite enablers of OBE, critical capabilities needed to deliver OBE, and measurement of OBE performance (for details, see; Lu et al., 2011; Vora, 2002). The strong positive linkage between business excellence and organizational sustainability has a driving role in devising innovative strategies to achieve better and sustainable excellence (M. Asif et al., 2011; Kanji, 2002).

3.1.8. ISO standards and OBE (F8)

Factor 8 is formed of articles those mainly focused on the role, effectiveness, and functioning of ISO standards in the evolution of quality management systems; these components are essential in achieving business excellence across the organization. As, Quality management is a continuous process that demands the development of Quality Management Systems (QMS) system and framework from its perceived enablers: ISO standards, quality models, and the EFQM Excellence Model (Alfaro-Saiz et al., 2011; Seghezzi, 2001; Wilcock et al., 2006).

3.1.9. Lean, Six-sigma, leadership and OBE (F9)

Factor 9 is comprised of articles that establish a linkage between hard aspects of quality management and OBE. Improvement of production and manufacturing processes through control of unwanted process variation can improve both operational performance and overall organizational performance. A well-crafted synergy between advanced manufacturing quality assurance techniques and OBE is presented herein (Al-Hassan et al., 2000; Comm & Mathaisel, 2008; R. L. Edgeman et al., 2005). The role of leadership in promoting the organizational culture, essential for successful OBE, is emphasized and elaborated (for details, see; Dalrymple et al., 1999; R. L. Edgeman et al., 1999).

3.1.10. Environmental management systems and OBE (F10)

Articles forming factor 10 reflect the importance to organizational approaches to ecological concerns. The environment in which organizations function is a critical external enabler of business excellence. Organizations that pursue business excellence must prioritise environmental responsibilities. The organizational commitment towards the natural environment has a positive reciprocity to the prolific success of the organization in achieving business excellence and long term sustainability (Allan et al., 2000).

4.0 Multidimensional Scaling (MDS)

Multidimensional Scaling is a prolific statistical method to map the data elements (herein i.e. publications) according to their theoretical similarity- dissimilarity with other data elements (Chen & Paul, 2001; Hoffman & Holbrook, 1993; Ramos-Rodríguez & Ruíz-Navarro, 2004). The Pearson's correlation coefficients matrix of co-citation's data (i.e. proximities) was used to develop MDS. The MDS figure 5 displays the proximity and non-proximity between the co-cited articles. The articles having higher number of citations within the factor/cluster have higher tendency to be located at center (Calabretta, Durisin, & Ogliengo, 2011; Shafique, 2013). The articles clustered within a specific factor in MDS matched with the Factor Analysis (FA) results.

Figure 5 Multidimensional Scaling (MDS) of core publications.

5.0 Discussion

Excellence is the highly desired distinction and the ultimate goal of doing a job, delivering a service, producing a product or a combination of aforementioned tasks within the

organizations. Business excellence, being a focus of almost all organizations across the sectors, is an attractive and fascinating field for the groups of both practitioners and academics. This focus of this research was to reveal OBE as a research field. The analysis of publications' bibliometric data of citations and co-citations explored several main research streams in OBE field, along-with the characterizing this very domain of research in view of its publications' trends, patterns, and progression over time, most influential authors, most productive outlet in terms of publications' frequency etc. The descriptive analysis revealed a consistent publications' pattern over the last couple of decades, this finding supports the vital existence of OBE as a valuable research field. The analysis revealed that although the two research domains, namely, management and business were remained at top in hosting the OBE focused publications, however, several interdisciplinary fields were also among research contributors. The analysis regarding most influential authors, within OBE research, revealed that there were twenty authors having at least three publications... while the three most influential identified authors were Edgeman, R.L. (11 publication), Kanji, G.K.(7 publications), and Maan, R.(5 publications). The findings regarding most productive outlet identified Total Quality Management and Business excellence, Total Quality Management, and TQM Journal as three top source outlets.

Factor Analysis of bibliometric data (i.e. 108 core publications) highlighted the dominated research themes (i.e. 10 themes with a representation of 60.6% explained variation) provided an in-depth insight into past, present, and future trends of research within OBE domain.

Business excellence is a common goal that every organization wants to realize, but the way to achieve it defines the fate of efforts to achieve excellence. The findings suggest that the sheer amount of publications addressed the issue to achieve OBE. Mostly, articles clustered within the Factor 1 presented fruitful thoughts through exploring the real-time practices adopted by the organizations to align them with business excellence approach. In this regard, several

research studies (F1) published with aim to facilitate, guide, and lead organizations to transform their existing knowledge about quality management models and other associated phenomenon to business excellence programs. The success of any organizational initiative to improve the business performance efficiency is strongly associated with the organizational approach, contextual aspects, and the commitment, hence none of such initiatives could bring similar outcome to all adopting organizations. The FA generated the second factor (F2) mainly comprised of publications those addressed adoption experience of investigated organizations within different sectors. Mostly, progressive organizations always remain vigilant and behave proactively in adopting and practicing innovative business strategies to ensure maximum advantages, however, measuring the performance of such initiatives is a challenging task. The vitality of performance measuring phenomenon within OBE research is also evident form a large number of publications within this very domain. The FA explored third factor (F2) that is a cluster of publications those mainly addressed different organizational approaches towards measuring the performance and effectiveness of their OBE programs. The concept of OBE may not standalone, as many integrated and interrelated management theories and philosophies, but is based on some well-established fields of knowledge (e.g. TQM). The TQM philosophy of continuous improvement could be considered as an essential component of OBE, as excellence is neither a time bound nor one-time achievement but essentially a continuous process. The FA identified a cluster of publications (F4) those effectively strived to establish that the theme of OBE is stemming from TQM school of thought. The publications those formed fifth factors (F5) were mainly addressed the phenomenon of awareness and understanding of OBE philosophy among the stakeholders. Research studies explored that awareness about OBE is spreading at an appreciable pace across the organizations worldwide. The FA analysis further explored a couple of factors (F6-F7) comprised of similar studies those addressed the role of

organizational values and organizational sustainability towards OBE. Several studies comprehend the importance of organizational values and a sustainable setup as essential ingredients for ensuring successful result-oriented OBE initiatives. Organization for International Standardization (ISO) is envisioned with processes' standardization throughout the organization to realize better performance outcomes. The main objective of ISO is to encourage organisations to develop an effective and integrated Quality Management System (QMS) to perform efficiently and effectively. There were number of publications identified and clustered (F8) through FA which discussed the role of ISO standards in creating a fertile field for successful launching and realizing the benefits from OBE philosophy. Several quality management tools and techniques have been proposed over the last three decades (e.g. Lean, Six-sigma etc.) to enhance the organizational performance. A few numbers of studies (F9) were conducted to identify a potential role of these established QM techniques to facilitate, smoothen, and strengthen the practice of OBE programs. The criticality of leadership role for the successful OBE program was also discussed with findings that success of such initiatives is heavily relied on effective leadership involvement. The FA identified a couple of studies (F10) from dataset of core publications that were to establish a relationship between organization's responsible roles towards ecological, environment concerns and the performance on OBE fronts. These studies suggested a positive relationship between environment consciousness and OBE programs success. Although, a reasonable amount of diversity in researched topics under the umbrella of OBE is witnessed through this study, however, still a long journey for OBE research is ahead to establish itself a prominent research domain.

6. Conclusions

The combination of advanced bibliometric analysis methods, conventional literature review and sophisticated statistical multivariate techniques, for instance FA and MDS, revealed

interesting facts about OBE as an emerging research field. The analyses explored three key aspects of business excellence research that are considered essential for any research field to survive, self-reliance, chronological development, and interdisciplinary expansion. The self-reliance and chronological development features of business excellence are evident from the articles reported within factors: TQM role in developing the OBE (F4), and awareness & understanding of OBE (F5). Characterized with sound theoretical foundation of quality management as parent field, OBE research is gradually developing its customized theoretical frameworks, academic definitions, and interpretation of practical interests (F1-F3). The more inspiring aspect of findings (F7-F10) was the growing trends of integrating business excellence thoughts with other emerging research fields, such as Knowledge Management (KM), Innovation Management (IM), Organizational sustainability (OS), and Corporate Social and Environmental responsibility (CSER). The literature search and analysis findings suggested an increasing interest of both academicians and practitioners in theoretical and operational aspects of research in business excellence. Further, the diversity of allied sub-fields of OBE research underscores massive potential for future interdisciplinary research.

7. Research Limitation

This study used citations and co-citation analyses of publications' bibliometric data. Like any other analysis methodology, this methodology also has no exception from limitations. Merigó and Yang (2017) discussed these limitations in-depth; herein few additional limitations are identified to supplement those. The method assumed that the most frequently co-cited articles addressed the same issue. It might be true for main subject under study; however, there is every chance that these may differ on sub-field level. In this study, conventional literature review methods are supplemented with bibliometric techniques to minimize such discrepancies. The choice of selecting most influential publications could be exposed to selection bias. Thirdly, as the citations and co-citations data changes over time, hence, there

is every possibility that of changes in inter-networks behavior between the publications over long time. Finally, the accuracy of statistical results has strong dependence on the degree of accuracy and consistency of citations database.

8. Future Research Directions

The suggestions for future research direction provided herein are multifold. Firstly, the bibliometric data analysis for this particular paper contained citations and co-citations of publications within OBE; however, in future this study could be replicated by using Bibliographic Coupling data to explore Intellectual structure of OBE. Findings of bibliometric analysis could be compared with the findings of Meta-analysis and conventional literature review, if such studies are available for the research field under investigation.

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