CHAPTER VI

FINDINGS AND SUGGESTIONS

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6.0 Introduction

The Statement of the Problem "Global Knowledge Diffusion in Vocational Education and Training: A Scientometric Study" was examined to understand the two fundamental needs:

- To study the diffusion of knowledge in vocational education and training.
- To understand the collaboration relationship in vocational education and training.

Detailed analysis was done to explore the ways in which knowledge is diffused at the global level in vocational education and training to draw the results to fulfil the objectives of the study. This study has identified prolific countries, organisations/ departments and individuals in VET domain. The researcher had tried to study the pattern of collaboration and frequency distribution of publication in vocational education and training. Based on the analysis the present study reveals the following findings and suggestions mentioned below:

6.1 Findings

The detailed findings regarding publications, citations, countries, various indexes and laws are presented in this section

6.1.1 Publications

The publications brought out during the period of 1992-2016 were analysed on various parameters selected for the analyses. The results of the in-depth analysis of the publications output as per the objectives are presented in this section.

6.1.1.1 Year wise distribution of Publications

The researcher has analysed the research productivity in Vocational Education and Training as evidenced from the WoS. It was found that the highest publication of 805

papers was brought out in 2016, followed by 671 papers in 2015 and 440 papers in 2012. Last seven years (2010-2017) were the most productive years. The year 1995 was the least productive year. It has been found from the periodic analysis of quinquennial periods, that the growth of publications during the period 2012-2016 and 2007-2011 have the highest publication productivity. The publications output and the World Bank Economic data of the Global GDP Expenditure on R&D activities reflects a positive relation. Due to constant raise in the R&D expenditure during last decade, publication output has been on hike.

6.1.1.2 Relative Growth Rate and Doubling Time

Rsearcher has analysed the data to measure the growth of publications in relation their productivity size. It is also known as the continuous growth rate. The analyses reveal that mean Relative Growth Rate is 0.35 for the period of study. The Year 2006 observed lowest RGR 0.084 and the highest RGR 5.003 was observed in the year 1992. The doubling time was also calculated to know the period required to double the number of publication. The highest doubling time was in the year 2006 and 2014 which is more than 8.199 and 8.078 respectively.

6.1.1.3 Growth Model of Knowledge

The exponential growth model exhibits the periodic growth of knowledge in VET domain. If the growth rate is negative than it exhibits exponential decay or in case it is positive the exponential growth will be observed. The plotting of publication data formed J shaped curve which is nearly showing the exponential growth model of knowledge diffusion in VET during the period (1992-2016) of study. It is evident from the graph that last quinquennial periods reflect positive exponential growth in VET.

6.1.2 Growth of Citations

The analysis of citations received by the publications is another important indication of research impact. During the periods of study, it was observed that 64065 total citations were received during 1992-2016. A total number of 2562.6 average citations per year were received by the publication. The average citation per paper was found to be 9.53

CPP in VET domain. The year 2004 is the highly cited year. Whereas the year 2016 is the least cited year.

6.1.2.1 Year wise Growth of Citations

In the study it has been found that total of 64065 citations have received by the 6719 records. The year 2004 was the highly cited year when highest amount of citations ware received (4475), followed by the year 2007 (3899), 2008 (3340), 2009 (3321), 2005 (3290), 2010 (3214), 2002 (3210), and 2011 (3160). The output of these seven productive years are calculated together and it is found to be 43.56% of total citation share during each year. The least citations were received in the year 2016, as it is the recent year. This resulted in the lowest (-62%) CAGR. The year 2004 with 23.42 citations per paper (CPP) followed by the 2002 (22.92 CPP), 2000 (18.20 CPP), 1994 (17.91 CPP), 2005 (17.88 CPP), and 1993 (17.53 CPP). During these years the CPP was almost the double of the overall CPP (9.53).

6.1.2.2 Quinquennial Growth of Citations

It was the finding of the study that the maximum citation share (more than 26%) was attained during the quinquennial period of 2002-2006 and 2007-2011, respectively. Average Citations per Paper (CPP) was 15.07 during the period of 1992-1996 and the period 1997-2001(15.61 CPP), was almost the same during these periods. It has been that during the period 2002-2006, the average CPP was raised up to the 19.12 per paper. There was a decline in the CPP during 2007-2011, up to the 10.88 CPP. The decline in the CPP continues to lower down and it dips down at 2.50 CPP in 2012-2016. This is the lowest CPP as compared to the overall CPP of 9.53 obtained during the study period. The year 1997-2001 percentage share of citations was 19.11%, which is almost the same (17.58%) for the quinquennial period of 1992-1996. While during 2002-2006 the citation share was increased to 26.12% of the total share and continues to rise at the same rate during 2007-2011 (26.43%). There is a sharp decline in the citations (10.76%) during the quinquennial period of 2012-2016. It is notable to see that major share of citations 52.55% was only received in the period 2002-2006 and 2007-2011.

6.1.2.3 Growth Model of Citations

As described in the section 5.5.3 the plotting of citation data reveals that it is neither the exponential nor the linear. There is a higher degree of deviation in citation pattern. The mathematical modelling of publications data as presented as in case of publications growth explained the nearly exponential growth. Whereas, the same has not happened in case of citations. Therefore, it is concluded that because the citations are time depended, it will result that older publications will have the greater citations as compared to the newly published.

6.1.3 Continental Landscape

It was found that the among all the six continents the European continent has the highest publication share 3827 records, which is the 56.96% share of the global output. The output of the North American continent is found to be the second highest share (34.71%), contributing 2332 publications. As far as Asian performance is concerned it is at the third place with 236 publications (3.51% knowledge share), in the production of knowledge. Followed by the continents of Oceania at fourth place with 183 publications (2.73% share), South America at fifth position with 102 records (1.51% share) and at sixth place is occupied by the African continent with 39 publications. European and North American continents are the pioneer in imparting vocational education and training. It shows that the continents with better provisions and infrastructure of VET are the higher knowledge producer.

Whiles examining the citation data at the continental level it was observed that more than 53% share of global citation is attracted by the North American continent with 34003 citations out of the 64065, total citation. The European continent was the second in receiving of the global citations 28407 out of the 64065 total citations. This consist of 44.34% share of global citations.

The continent of Oceania was at the third place with 1.83% (with 1171 citations), Asian continent was at the fourth place, with 361 citations (0.56%), followed by Africa with 75 citations (0.12%) and South America with 48 citations (0.07%) at the fifth and sixth positions respectively.

While comparing the citations per paper received by the contents it was observed that the North American continent has achieved the highest CPP rate 14.581 per paper followed. While knowledge diffused from Europe had received the CPP of 7.422 CPP, which is the second highest rate of CPP. Followed by Oceania with 6.398 CPP, Africa with 1.923 CPP, Asia with 1.529 CPP and South America with 0.470 CPP, at the third, fourth, fifth and sixth place respectively.

6.1.4 Country wise Landscape of Publications and Citations

The study was undertaken by the researcher to identify the most prolific countries of the world in the VET domain. As evident from the data analysis, 68 countries across the globe traced, are contributing to the process of knowledge diffusion. Among these countries, United States of America is highest ranked country contributing in the process of knowledge diffusion and dissemination in VET with 2249 records. USA has made the highest contribution 33.472% share. This is more than ¼ of the global share contribution by the USA. England is at the second position in terms of knowledge diffusion with 2222 publications. Which is also more than the ¼ share of global knowledge (33.070%). This can be determined now that USA and England are the two pioneer nations who produced the 66.542% share of world output jointly. In the line, Germany with 443 publications (6.593%), Netherlands 440 publications (6.549%%), are at the third and fourth position with less than 500 publications. Followed by Australia with 158 publications (2.352%), Spain with 144 records (2.143%), France with 100 publications (1.488%), had contributed more than one hundred papers are at the fifth, sixth and seventh place respectively. The Turkey 95 records (1.414%), Switzerland with 80 record

counts (1.192%) and Brazil with 70 publications (1.042%) are on the eighth, ninth and tenth position.

As we see Indian performance in the process of knowledge diffusion, we found that India is placed at the 21 positions among the leading countries. Indian output in VET is observed to be the 21 publications (0.313%), which is even not one percent of the global share. From the analysis, it was interpreted that the combined share of the top ten ranked nations of the world's (are USA, England, Germany, Netherlands, Australia, Spain, France, Turkey, Switzerland and Brazil). All of these had contributed the 89.314% share of knowledge (6001 records). Only10.686% of the global share (718 records) are jointly produced by the 58 countries of the world. This reflects the similar impression of Pareto's Law of income distribution (80:20) in VET domain

The citation retrieval pattern of countries was performed to identify the highly cited countries. It was observed that the USA was having half of the share (52.604%) of total citations received, which is highest among the countries. A total 33701 number of citations were received by the USA. It was observed that England is at the second position with 20083 citations (31.348% share), the third position is captured by the Netherlands 3404 (5.313%), followed by the Germany 1531 (2.390%) at fourth, Australia 900 (1.405%) at fifth place and Ireland 740 (1.155%) at the sixth position across the globe. The cumulative share of these countries is 94.215% of the global citation share.

6.1.5 Publication Efficiency Index of Leading 25 Countries

The analysis shows that only four countries were performing exceptionally well. These countries received the PEI >100. The highest PEI was attained by Norway (158.515%). The second place was occupied by the USA with PEI of 157.158%. Scotland is the third to have the PEI greater than hundred (152.175%), followed by the New Zealand at fourth position (113.687%). This can be concluded that the publication efforts of these countries are greater than the other countries across the Global. Russia was having the least PEI (03.495%).

6.1.6 Relative Citation Index and Citation Per Paper

The data was analysed to find out the RCI of the leading twenty-five countries of the world. The result showed that the top position is obtained by Denmark with RCI of 2.15. Norway is at the second place with RCI of with the RCI of 1.58. USA at the third place with RCI of 1.57, followed by Ireland (1.52), Portugal (1.31) and New Zealand (1.13) in the list of having the RCI more than the one, when compared to the global citation rate. Other countries having the citation rate less than the world's citation rate are England (0.94), Finland (0.94), Netherlands (0.81), Switzerland (0.80), Sweden (0.72), Scotland (0.61), Australia (0.59), Canada (0.52), Nigeria (0.43), Mexico (0.39), Germany (0.37), Japan (0.36), Poland (0.26), Italy (0.25), Croatia (0.21), France (0.20), Turkey (0.19), Spain (0.05) and Brazil (0.05).

The data analysis to draw the CPP of leading countries resulted that Denmark (20.52) is the first place, Norway (15.11) is at second place, USA (14.98) is on third, Ireland (14.50) on fourth, Portugal (12.55) at fifth, and New Zealand (10.84) at sixth position to have the highest CPP.

6.1.7 Prolific Authors and Authorship Pattern

It was observed that during 1992-2016, 16,053 authors have contributed 6719 publications. The researcher assigned the rank to the authors on the basis of arraigning the number of papers contributed them in order of decreasing productivity. The highest share of 26 publications (0.3870%) was contributed by the Chan, F., and Anonymous authors. The second passion was occupying by the Murray, T.S., with 16 publications (0.2381%), followed by the Benbow, C.P., at the third place with 15 publications (0.2232%), Becker, D.R., Brug, J., Drake, R.E., Salmela-Aro, K., and Hyland, T., at the fourth place with 14 documents each (0.2084%). The fifth rank is occupied by the de Bruijn, E., Nurmi, J.E., and Winch, C., with 13 publications respectively. Five authors with 12 publications were at the sixth position. 4 authors contributing 11 articles each

were in the Seventh place. Ten authors each have diffused 10 publications which have been ranked at eighth position. It was observed that only 31 authors were able to contribute their output in the double-digit up to the rank 8. The ninth rank was attained by the authors produced 9 records. thirteen authors contributing eight papers each were ranked Tenth.

Authorship Collaboration Pattern revealed that single-authored publications are having the major share (29.25%). Followed by the two author publications (24.66%), three authors with 18.32% share, multi-authored articles share is 18.59%, mega-authored publications were 9.18% of the global knowledge. As far as the citation pattern is concerned single-authored publication shares is 10672 citations, two authored publications are 14127 citations, three authored publications is14347 citations and multi-authored publications received 15158 citations and mega authored records received 9761 citations. Collaboration pattern shows that when the co-authors are increased the citations also get increased. Europe and North American output among continents are the highest. About 70% of the publications are coauthored that means VET domain is highly collaborative. The highest number of records was diffused in the year 2016. Multi-authored records in the year 2011 received highest citations (1240)

6.1.8 Lotka's Law

During the study authors publication productivity in the VET was analysed to test the applicability of Lotka's law in the VET domain. The value of *n* was not the same as determined by the law. The analysis revealed that lotka's law does not fit in the VET domain.

6.1.9 Degree of Collaboration

To ascertain the degree of collaboration among the single and multiple authors, the data was analysed. It was the outcome of the analysis that the domain of VET is highly collaborative as the "multiple authors" contribution was found to be the 70.75 % in VET and as compared to the single author's contribution 29.25% publications by single authors. The result revealed that the overall degree of collaboration of Global Knowledge

Diffusion in VET is 0.707 which clearly indicates its dominance upon multiple authors contribution. Thus, we can conclude that the knowledge diffusers are more inclined towards collaboration.

6.1.10 Prolific Organisations

During the analysis, most prolific organisation based on their output was identified. It is noted that the highest number of publications 149 were contributed by the University of London (UK), achieving the highest rank among all. The second place was occupied by the University of California System (USA) with 109 records, University of Amsterdam (Netherlands) is the third country to produce the highest number of paper (80 publications). University of Wisconsin System (USA) was found to be the fourth with 71 records. The fifth rank with 69 documents is attained by the University of Melbourne (Australia).

In the list of most prolific organisations University of Utrecht (Netherlands) is at sixth place with 67 publications, followed by University College London (UK) and Maastricht University (Netherlands) with 63 publications each are ranked seventh. While the eighth place is received by the State University System of Florida (USA) with 62 records followed by the Pennsylvania Commonwealth System of Higher Education PCSHE (USA) with 59 documents and University of Queensland at the ninth and tenth place respectively.

6.1.11 Highly Preferred Journals

One of the outcomes of the study was to identify the highly preferred journals. With 87 publications Journal of Vocational Behavior published from the USA was identified to be the most preferred and productive journal at the top. Published by Germany, Zeitschrift Fur Padagogik is at the second position in the list of most preferred and productive journal. Published from the USA, Rehabilitation Counseling Bulletin with 75 records is at the third place, followed by the British Dental Journal at the with 72 records at the fourth place which is published from England, Journal of Rehabilitation at the fifth place with 70 records published from the USA.

Other titles in the list are International Journal of Educational Development with 68 records from England, Vocations and Learning with 59 records from the Netherlands, British Journal of General Practice with 52 records from England, Work-A Journal of Prevention Assessment & Rehabilitation with 47 records from Netherlands and Career Development Quarterly with 47 records published from the f USA, are among the top ten journals.

The data analysis revealed that the most preferred journals are published by the seven countries of the world. Out of these countries, England is at the top publishing 21 journals in the list of preferred journals. The USA is at the second position in the publishing of preferred journals with 17 journals. Their combined output is 38 journals. This strengthens the belief that countries having better VET infrastructure is the pioneer and doing well. Other countries among the list of bringing of preferred journals are followed by the Germany (4 Journals), Australia (3 Journals), Netherlands (3 Journals), Scotland and Spain bring 1 title each.

6.1.12 Bradford's Law

The testing of applicability of S.C. Bradford Law of scattering Journal was selected to observed its suitability in the VET domain. The calculations were made to determine the various zones of journals as described by the law. These zones can be identified when we arrange the journals in decreasing order of their productivity. These zones will have the relation 1: n: n2. The results of analysis reflected that the same has not happened in the case of journals in VET domain. The ratio between these is 81:316:1688, which does not confirm the exact applicability of latka's law in VET domain.

6.1.13 Distribution of Journals into Various Zones

Based on Bradford's law the various zones of the journals have been identified. The journals are divided into three "Zones" each almost having the equal number of journals. The distribution of journals in various zones revealed that Bradford's law does not fit exactly in the VET domain (see table 5.22). The Zone 1 consists of 81 (3.88%) journals

titles contributing 2241 (33.46%) publication, Zone 2 consists 316 journals (15.16%) contributing 2040 (30.46%)publications and the third Zone 3 covers 1688 (80.96%) contributing 2417 (36.08%) publications

6.1.14 JCR Journal Metrics for 50 Prolific Journals

The Journal impact factor (JIF) is one of important metrics to assess the quality of a journal. Therefore, the researcher has presented the JIF of the most preferred Journal in this section. The titles of fifty most prolific journals are given along with their Journal Impact Factor (JIF), Eigenfactor Score (EFC), Total Cites (TC), and World Rank (WR) in the table 5.23. it was found that 0.378 minimum and 20.785 highest is the JIF range of leading 50 journals. The highest JIF is achieved by the journal "British Medical Journal". the JIF of British Medical Journal is 20.785. in the JIF range of 3-4, there are two journals. In the JIF range of 2-3, there are nine journals, twenty-one journals are noticed in the range of 1-2. Rest of the tiles were below the citation range of 0-1. The journal "British Medical Journal" attained highest JIF. Journal of Rehabilitation was having the lowest JIF (0.378).

6.1.15 SCImago and CWTS Journal Metrics for 50 Prolific Journals

The journal metrics provided by the SCImago Metrics for 50 Prolific Journals (see table 5.24) were retrieved by the researcher to complement the JCR metrics. These metrics give a different view of the prolific journals. The study identified that the highest global ranked was attained by The British Medical Journal with Journal-World rank (JWR): 853). The second position with JWR:1014, is occupied by the Journal of Education Policy. Third highest ranked (JWR: 1305) journal is European Sociological Review. Medical Education at the fourth position (JWR: 1501). The fifth place is attained by Teaching and Teacher Education (with JWR: 1625). In the list of highly ranked journals which are under the range of 2000 are as follows: Journal of Vocational Behavior (JWR: 1772), Higher Education (JWR: 1814), The fiftieth most preferred journal "The Australian Journal of Adult Learning" received the rank of 17993).

0.159 lowest to 2.567 highest is the SCImago journal rank range. The lowest SJR is attained by The Australian Journal of Adult Learning and the highest SJR was received

by the British Medical Journal, between the range of (0.159 to 2.567 respectively). There were seventeen journals below the SJR of <0.5, In the SJR range between <0.5 to >1 seventeen journals were observed. 13 titles were in the SJR range of < 1to 2> and remaining three titles were observed in the range of <2 to 3>.

British Medical Journal (337) has the highest h-Index, followed by the Archives of Physical Medicine and Rehabilitation (143), Psychiatric Services (111), Medical Journal of Australia (105) and Journal of Vocational Behavior (101). All the journals named above were having the h-index more than hundred. International Journal of Training Research obtained the lowest h-Index of 3, in VET.

CWTS Journal Metrics 2016 for 50 Prolific Journals are presented in the table 5.25. It was observed that the highest number of Impact Per Publication of 50.8, was received by the British Dental Journal. While the Australian Journal of Adult Learning was having the lowest IPP of 0.23. The SNIP range of most prolific 50 journals was between the range of <0.42 to > 40.75. British Dental Journal attained highest (40.75) rate of SNIP among all the journals. While the lowest SNIP was obtained by the journal Psychological Reports (0.42).

The Self-citation range for these prolific 50 journals is between >1.7% to <42.6%. There are seventeen journals in the range of >1.7% to <10%. In the range of >10% to <20% there are Twenty-eight journals, and in the range of >20% to <30%., there are eight journals. While four journals were in the range of >30% to <43%. The highest percentage of self-cited article 42.6% is received by the Die Rehabilitation received. Least self-citation 1.7% was attained by the British Medical Journal received.

6.1.16 Citation Range of Highly Cited Publication in VET

Various citation range were formed to identify the number of documents in respective citation range. 6719 records were than categorised according the range (see table 5.27). it was observed that out of the 6719 publications 1991 publications remained uncited. The maximum share of documents receiving the citations was in the range of 1-150. This consists of 70% share of the total output of the global knowledge. Remaining 28 records

are observed to have the 8466 citations. These 28 documents have achieved citation between 151 to 1500 citations.

6.1.17 Highly Cited Articles in VET

According to the Eugene Garfield's explanation, the highly cited document having 400 and above citations are identified as citation classics. To study the classics in the VET, the researcher has determined that documents having more than the 100 citations are term as citation classics in VET domain. based on the citation received by the individual publication list of 56 documents are presented in the table 5.28. The most highly cited five articles are as follows:

a) Lent, Robert W., Steven D. Brown, and Gail Hackett. 1994. "Toward a Unifying Social Cognitive Theory of Career and Academic Interest, Choice, and Performance." Journal of Vocational Behavior 45 (1): 79–122., with 1448 citation followed by the;
b) Mannuzza, S., R. G. Klein, A. Bessler, P. Malloy, and M. LaPadula. 1993. "Adult Outcome of Hyperactive Boys. Educational Achievement, Occupational Rank, and Psychiatric Status." Archives of General Psychiatry 50 (7): 565–76, with 799 citations;
c) Green, Michael F., Robert S. Kern, and Robert K. Heaton. 2004. "Longitudinal Studies of Cognition and Functional Outcome in Schizophrenia: Implications for MATRICS." Schizophrenia Research 72 (1): 41–51, with 659 citations;
d) Wykes, Til, Vyv Huddy, Caroline Cellard, Susan R. McGurk, and Pál Czobor. 2011. "A Meta-Analysis of Cognitive Remediation for Schizophrenia: Methodology and Effect Sizes." The American Journal of Psychiatry 168 (5): 472–85, with 453 citations and
e) Ferreira, I., K. van der Horst, W. Wendel-Vos, S. Kremers, F. J. van Lenthe, and J. Brug. 2007. "Environmental Correlates of Physical Activity in Youth - a Review and Update." Obesity Reviews: An Official Journal of the International Association for the Study of Obesity 8 (2): 129–54, with 391 citations.

6.1.18 h-Index and g-Index for Top Ten Countries

One of the objectives of the study was to identify the h-index and g-Index of the prolific countries. The researcher observed that the most prolific ten countries have brought out

89.31% of the total publications and 94.77% of the global share of citations. The highest h-index and g-Index was attained by the USA (72 h-index and 120 g-index), England was having the h-index of 57 and g-index of 79, Germany has h-index of 16 and g-index of 24, Netherlands has the h-index of 25 and g-index 46, h-index 15 and g-index 23 was attained by the Australia, in line Spain was having 4 h-index and 6 g-index, France has 7 h-index and 11 g-index, Turkey has 6 h-index and 11 g-index, Switzerland, attained 14 h-index and 22 g-index and Brazil attained 3 h-index and 5 g-index were having the h-index and g-Index less than 25.

6.1.19 Subject Research Domains in VET

The Vocational Education and Training is regarded as an integral part of the general education system. The 6719 publications were consisting of 122 subject categories. The result the findings of the study revealed that Education subject was the highest researched domain in connection to VET publications. A total of 1985 records were consisting the term “Education Educational Research” which comprised of 29.543% of the total share which was researched under this subject domain. The second most popular research category of VET was “Psychology” with 1049 publications (15.612% share). As the VET consists training competent the concept of Rehabilitation was the third most preferred domain of research contributing 700 documents (10.418% share).

Being a multidisciplinary domain knowledge domain, the VET was comprising of multidisciplinary subject categories, specifically from the Social Sciences and Medical Sciences. It includes “Business Economics” at the fourth place with 470 (6.995% share), followed by the “Public Environmental Occupational Health” at fifth position with 441records (6.563% share), at the sixth place Psychiatry with 407 publications (6.057% share), General “Internal Medicine” at seventh place with 332 (4.941% share), “Sociology” at eighth position with 297 (4.420% share), “Neurosciences Neurology” at the ninth place with 233 (3.468% share), and at the tenth position “Social Sciences Other Topics” with 230 (3.423% share).

6.1.20 Web of Science Subject Categories

VET consists of two components, namely education and training. Both components are high concern for the society. Therefore, the major WoS subject categories in VET are from the disciplines of Social Sciences. WoS database used to index the document under particular category. For this purpose, various subject categories are identified in WoS database

180 subject categories are found in the VET domain under as per WoS Subject categories. Among all the subjects once again “Education Educational Research” was the hihghest researched category. 1675 records out of the 6719 documents (24.929% of the total output) were attributed under this category. The Rehabilitation with 700 records (10.418%) was at the second position, third place was occupied by the “Public Environmental Occupational Health” with 441publications (6.563%). The Psychology Applied contributed 413 items (6.147%), was at the fourth place, Psychiatry appeared in 407 publications (6.057%) was at fifth place. Further, followed by the term Medicine General Internal with 321documents (4.777%), Sociology with 297 documents (4.420%), Economics contributing 251documents (3.736%), Education Scientific Disciplines with 189 publications (2.813%) and Clinical Neurology with 185 items (2.753%), are among the top ten subject categories.

6.1.21 Language wise Analysis

The top five languages in which the Global Knowledge is diffused are European Languages. English language being a global communication language is the topmost preferred language among all the 30 languages. Total 5768 documents are published in the English language. These documents received highest average citations per paper (10.80), after the English language, German Language is the most preferred by the knowledge diffusers. 419 documents are published in German, which received 3.13 average citations per paper, followed by the Spanish language at third position with 175

documents, French at the fourth place with 110 records and the Portuguese at the fifth position with 65 records.

6.1.22 Document wise distribution of Knowledge

As per the analysis based on the 6719 documents, various categories of documents were identified to know that in which form the diffusion of the knowledge is preferred by the diffusers in the domain of VET. The result revealed that for the diffusion of knowledge article is the most sought by the diffusers. 5931 documents are diffused in the form of articles. Proceedings paper was found to be the second choice of knowledge diffusion (228 publications) followed by the Review (209), Editorial Material (113), Books Reviews (112) and others forms of documents (126).

6.1.23 Testing of Hypothesis

This section reports the results of the statistical testing of the hypothesis:

6.1.23.1 Hypothesis I

The hypothesis "Journals are the preferred source of knowledge diffusion than other sources" was statistically tested. It was assumed that the 90% of the total knowledge is diffused in the journal publications. However, it was observed that the mammoth share 99.69% of the total knowledge in VET is diffused in the form of journal. To statistically prove this hypothesis significant t-test was used. The t-test value was positive (t - 0.5), hence, the hypothesis (Journals are the preferred source of knowledge diffusion than other sources) has been proved positive.

6.1.23.2 Hypothesis II

To test the hypothesis "Is there any direct or indirect relation between country's GDP and its publication productivity", the Pearson Correlation Coefficient has been measured and presented to validate the relationship of publication productivity and the GDP of most prolific 25 countries for the year 2015. The result of analysis revealed the degree of relationship (r-value) 0.974222 (positive), which means that there is a positive relationship between a number of publications and the GDP of the country. Therefore, it

can be concluded that the countries are having higher income can spend more on the education, research, teaching, learning, training and skills. Thus, the knowledge output of the specific country is directly related to the GDP of the particular country.

6.2 Suggestions

The researcher has sustained the following impact measures to improve the research in VET on the findings of the present study:

- Based on the findings, scientists should focus on the neglected areas by being hopeful to carry out more research actions in those areas of VET research as per the emerging needs of skills and demands.
- From the conclusion of the present study, the degree of collaboration of the authors could be recognized. Therefore, the individual scientist may be stimulated to distribute a greater number of contributions to enhance the single author contributions.
- The atmosphere and infrastructure are also very effective for the entire development of research in VET areas which requires the financial investment.
- It should necessitate, stimulate and encourage researchers and scientists in this field of VET to carry out research to recognise the impact of research output.
- The study emphasise that the research support should be extended to the developing countries, especially Asian and African nations for their sustainability and development. It is suggested to engage prolific research institutions to support research in VET in the developing countries.
- The Universities and research institutions are to be provided with more financial assistance in the form of research grants to increase the quality of research.
- The output of the study may serve the stakeholders involved in planning, imparting training, teaching and learning of VET in the country. The funding and regulating bodies working for VET in India i.e. UGC, AICTE, National Skill Development Authority (NSDA), NSDC, Government may use the findings for framing policies, to focus more on neglected areas. Further, research based on social network analysis in VET may be focused.

6.3 Demographic Dividend

The study is an insight into getting the demographic dividend. According to the UN Report, the world's population numbered nearly 7.6 billion as of mid-2017, the major population of the world reside in Asia is sixty percent (4.5 billion). China (1.4 billion) and India (1.3 billion) are most populous countries in the world. Presently there is almost equal number of men and women in world. Presently ¼ children in the world are below the age of 15 years and, about ½ (61 percent) population is between 15 to 59 years at an average of 30 years.

it is expected that half of the world's population growth from 2017 to 2050, will be concentrated in just nine countries: India, Nigeria, the Democratic Republic of the Congo, Pakistan, Ethiopia, the United Republic of Tanzania, the United States of America, Uganda and Indonesia. It is estimated that India will surpass the China very soon. Thereafter, Indian population is projected to grow in future1.5 billion (2030) to 1.66 billion (2050).

6.4 International Migrants Workforce

The economic and social developments are offering the rebalance in the labour markets. International migration of the workers is one of the important processes for the progress of the world economy. In return, it promotes the return investment and higher standards of living in the parent countries through facilitating the remittances of money. During 1950 to 2015, the Europe, Northern America and Oceania were the receivers of international migrants, while Africa, Asia and Latin America and the Caribbean were the suppliers; this phenomenon is increasing over the time. There is a progressive increase of global migration till 2010. Europe, Northern America and Oceania collectively attracted 3.1 million per annum migrants during 2000 to 2010. United States of America, Germany, Canada, the United Kingdom, Australia and the Russian Federation are expected to be the highest recipient from 2015 to 2050. India, Bangladesh, China, Pakistan, and Indonesia are projected to be the supplier of migrants (above 100,000 annually) could be benefitted from the "demographic dividend". **(United Nations, 2017).**

6.5 Financing VET

As the imparting of Vocational Education is a costly affair, the question 'Is it worthwhile to invest in VET' remains important. VET is costly compared to general education. However, blue-collar workers (i.e. VET graduates) are still needed in today's economies. Thus, the next immediate question comes to the mind is "how can the provision of VET be made most cost-effective" (**Kathrin, Hoeckel, 2008**). As we see the overall costs of education are on the increase day by day. The developing countries are particularly hard hit due to the economic crisis in their state. Thus, the budget allocations for education are getting tighter and squeezing on the availability of funds for Vocational Education and Training (VET), as VET is publicly funded. Since the VET essentially requires imparting of skill training for job the cost of VET is higher 2 to 3 times as compared to the general education. The access cost may be spent on equipment, infrastructure, consumables/ materials, tutorials etc. Thus, the alternatives of financing VET need to find out to achieve cost effectiveness (**UNESCO-UNEVOC, 1996**). This study could be used as input to draw a policy for achieving cost effectiveness in imparting VET, especially in developing nations by refereeing best practices of prolific nations imparting cost effective VET.

6.6 Summing up

The data analysis revealed that total 6719 records, attained a sum of 64065 citations. The overall average citations per paper were 9.53 and h-Index was 86. The average number of publications per year was 268.76 for the period of study. The highest number of publications 805 papers was diffused in 2016. It was found the year 2004 is the highly cited year. The whole study period records the mean relative growth rate of 0.35. The European continent is the highly productive region with 3827 records, resulting 56.96% of the global output, followed by North America with 2332 records, sharing 34.71% global output. Total 68 countries across the globe had diffused 6719 records. Among the global share of knowledge diffusion and dissemination in the VET domain, United States of America is the leading knowledge diffuser and disseminator in VET with 2249 records, which contributes more than ¼ of the global share (33.472%). Norway has the highest Publication Efficiency Index (158.515%). Among the countries, Denmark has the

highest Relative Citation Index (2.15). The major share 26 publications (0.3870%) of prolific authors are contributed by the Chan, F. and Anonymous authors/bodies. Murray, T.S. is ranked second with 16 publications (0.2381%), Benbow, C.P. is at the third place with 15 publications (0.2232%). University of London (UK) has contributed the highest number of publications 149. Journal of Vocational Behavior, published from the USA is the highly productive and preferred journal with 87 records. The journal "*British Medical Journal*" is having the highest impact factor. Out of the total output of 6719 records, 1991 publications did not receive a single citation whereas 69.96% of the total knowledge diffused received citations in the range of 1-150, which is the highest cited range. The USA had the highest h-Index (72) and g-index (120). Being a global communication language English language is the most preferred language. The highest amount of knowledge was diffused in the form of articles.

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