CHAPTER V
FINDINGS AND CONCLUSION

The present research is a study of “Research Productivity in Soft Skills: A Bibliometric Study”. The study comprised an analysis of Soft Skills literature taken from Web of Knowledge between the years 1999 and 2012. Further the study recognized the dispersion of literature in various journals published from various countries. The study satisfied the known objectives and tested the set of hypotheses formulated.

5.1 Year Wise Distribution and Authorship Pattern

The year wise distribution of research literature on Soft Skills reveals the fact that in terms of growth it has been doubled in 12 years.

The finding of relative growth rate and doubling time for research output of soft skills reveals that an additional eight year by 2020 the research productivity will have 50 per cent of growth.

Number of authors in soft skills research ranges from single author paper to maximum of 56 authors.

Collaborative authored papers is maximum (36.75%) from 1999 to 2012. Collaborative publications, i.e. research by more than two authors are on the increase. Similarly, single authored publications are (32.49%) and joint authored publications are (30.75%). Publications by two and more than two authors take a greater share of nearly 70 per cent proving the hypothesis – 1.

Single Authored Publications – Time Series Analysis it can be foreseen that single authored publications will double in 2025.

The degree of collaboration in publishing pattern of soft skills varies from 0.61 to 0.73. The collaborative research will be more in the forth coming years.
Authorship pattern in various continents of the world is Africa, Asia takes lead in single authored publications with 43.21 per cent and 38.39 per cent respectively of the total output. Collaborative research is prominent in North America and Europe forming 40.35 per cent and 37.79 per cent respectively. Joint authorship pattern is more in Oceania and South Africa. Testing of hypothesis by Chi-Square test the calculated value of $X^2$ is less than the table value. Hence the hypothesis - 2 is rejected and hence it is inferred that the authorship pattern in soft skills research various in different geographical region of the world.

The correlation coefficient of the number of publications and the number of journals contributing works out to 0.99 showing that there is positive correlation between the number of journals and the number of publications. This shows that the increase in the number of publications entails a growth in the number of contributions.

Collaboration of authors in publication is eminent in every field of research. Researcher’s collaboration leads to the development of scientific works and the achievement of more results. The importance of collaboration in writing scientific papers is especially clear in today’s complicated world in which everything is based on knowledge. The evidences show the importance of quality and even quantity of scientific productions produced in collaboration. In 1980, Lawani introduced collaboration index (CI) as the average number of authors per article. In the present study, the collaboration index ranges from 2.15 to 2.92 showing that the average number of authors per paper is 2 to 3.

Modified Collaboration Index it would be more appropriate if the papers of collaborative research alone are considered for calculating collaboration index. The modified collaboration index is given by

\[ MCI = \frac{\text{No. of Collaborative Papers}}{\text{No of collaborative Authors}} \]
In the present study, the modified collaboration index ranges from 2.16 in 1999 to 2.92 in the year 2012. This shows that the number of authors in a collaborative publication ranges from 2 to 3.


5.2 Bradford’s Law

The total journals are arranged in the order of the rank are divided into three zones, they will be in the order of 1: n: n2:… each containing the same number of publications, the number of journals in each zone are in the ratio 102:271:1403 which is not in the form 1:n:n2 deviating Bradford’s Law and thereby the hypothesis – 3 is nullified.

Correlation between journal productivity and publication productivity finding are the year-wise distribution of number of journals and the number of contributions. The correlation coefficient of the number of publications and the number of journals contributing works out to 0.98 showing that there is positive correlation between the journals and the publications, and correlation is very strong. This shows that the increase in the number of publications imply that new journals are entering into the field and hence the hypotheses – 4 is nullified.

Growth Rate of journals in Soft Skills the average growth rate is 0.05 which shows that every year the research in soft skills increases by 5 per cent which is very moderate and low.
5.3 Geographical Distribution of Authors and Publications

Research in soft skills is carried out by scholars from 103 countries around the world of which USA takes the lead (41.17%) of the total world output. The second leading country is England (9.25%) followed by Canada (4.83%). Australia is in the 4th place while Germany is in the sixth position. India has contributed 0.77 per cent with twenty second place of the total output.

Here it is to be noted that nearly 80 per cent of the total research output is contributed from 13 countries of the world i.e 15 per cent of the total countries involved. The Pareto 80 x 20 rule states that 80 percent of the effects in a system are generated by 20 percent of the variables in the system. This principle do not hold good in the present study since 80 per cent of the total research output in soft skills has been contributed by 15 per cent of the total countries involved in this research.

Region wise Distribution of Authors revels the continent-wise distribution of research in soft skills. North American countries take lead forming 46.43 per cent of the total output. European continent takes nearly one third of the total output while Asian continent takes one tenth of the total output. South America countries take a negligible share of 0.97 per cent since they are all under developed countries and non-English speaking countries. Asian continent is in the third place among the continents since most of them are developing countries.

In Asia there are 28 countries that have contributed for soft skills Research. Turkey occupies the first place forming 17.70 per cent of the total Asian output. The second ranked country is Israel having 12.88 per cent and the third ranked country is Taiwan with 11.60 per cent. India is in the sixth place next to Japan forming 7.48 per cent of the Asian Output. This shows that India has to concentrate more in soft skills research to compete with China.
5.4 Most Prolific Authors

In the present study it has been found that 47316 are published by 73966 numbers of authors, either single or co-authored. The total number of publications by an individual author can be calculated in three ways

1. Direct Count Method
2. Equal Share Method
3. Positional Share Method

The ranked list of authors in soft skills, first place is Lee, K from USA and Mumford, MD from USA are the most prolific authors having contributed 59 papers each. The second ranked author is Kaufman, JC from USA and the third ranked author is Sternberg, RJ from USA. There are two scholars Ferris, GR and Furnham, A who are in the fourth place. Here it is to be noted that the most prolific authors are from USA.

Equal Share Method in a collaborative publication, it can be said that all the authors have put equal effort in the research. Hence, in a three authored publication each author have one third share; in a four authored publication each have one fourth share and so on. If the authors are given weight age according to their share in their publication, there is change in the ranked list of authors. Mumford, MD who ranks first according to the total publication count is moved to the 4th place. Similarly Simonton, DK who is in the 6th rank is moved to 1st place. In this ranking, those authors with less number of publications, but having greater share in each contribution is given more weight age.

Positional Share Method according to Dr.S.R.Ranganathan in the Canon of Prepotence, the potency of an author is concentrated more on the first author who is also called prime author. Each author named in a publication is given a weight age
according to his/her position in the authors place. Therefore, more weight age of potency is accorded to the first author and then to the second, third and so on.

The findings are ranked list of authors are arranged according to their potency. Here it is interesting to note that Mumford, MD who have contributed 59 papers and ranked first in the publication count, is now in the fifth place when arranges according to the weight age. Based on author’s position Zhang, LF who was in the 15th rank according to the publication count, now comes to the 4th rank.

Anyhow Simonton, DK retains the first rank but the potency value is very less showing that in the collaborative publications his name has been placed in the later position.

Most prolific author is solo research is SIMONTON, DK with 32 papers followed by STERNBERG, RJ with 24 publications.

5.5 Lotka’s Law of Author Productivity

Lotka's Law describes the frequency of publication by authors in a given field. It states that "... the number (of authors) making \( n \) contributions is about \( 1/n^2 \) of those making one; and the proportion of all contributors, that make a single contribution, is about 60 percent" (Lotka 1926, cited in Potter 1988). This means that out of all the authors in a given field, 60 percent will have one publication, and 15 percent, two publications (\( 1/2^2 \) times .60), 7 percent of authors, three publications (\( 1/3^2 \) times .60), and so on. According to Lotka's Law of scientific productivity, only six percent of the authors in a field will produce more than 10 articles. Lotka's Law, when applied to a large body of literature over a fairly long period of time, can be accurate in general, but not statistically exact.
69.34 percentages of authors have contributed only one paper and 14.80 per cent of the authors have contributed 2 papers and hence the results matches with that of Lotka Law. Lotka’s law can also be mathematically expressed as $XnY = C$

where $X$ is the number of publications, $Y$ the relative frequency of authors with $X$ publications, and $n$ and $C$ are constants depending on the specific field ($\mathcal{N} \sim \mathcal{Z}$). The number of authors who have contributed only one paper is 69.34 per cent (Not equal to 60 percent) deviating Lotka’s law.

### 5.6 Price’s Fundamental Law of Science

It is seen that the values in the last column are not constant deviating Lotka’s Law and hence nullifed hypotheses – 5.

### 5.7 Distribution of Publications by Type

In type of publications, Article publication is the highest at 91.5%. It discloses that of most of the publications nearly ninety per cent is in the type of articles. Second type of publication is placed as Review having 5.42%. Least publication types are Bibliography, Editorial Material; Book Chapter and Art Exhibit Review.

### 5.8 Distribution of Publication by Language

In Distribution of publication by language, English language has first place with 93.29 per cent. Spanish and German place second and third place of 1.88 and 1.71 respectively. Other languages are very lest occurrence of publication. It shows English is highly preferred language in the world of publication in soft skills.
5.9 Distribution of Publications by Number of References

According to Dr.S.R.Ranganathan, any research starts with a bibliography and ends with a bibliography. Scholarly communication is well performed by referring to publications of previous research. The more the number of references, the more the quality of the reference paper. Research papers with 31 to 40 references is maximum. There are references ranging from single reference to as many as more than 200 references. As the range of references increase from 1-10 to 31-40 the number of publications also increases. When the number of references increases above 40 the number of publications decreases. Hence it can be inferred that the optimum number of references in a research publication in the subject soft skills is 31 to 40.

5.10 Distribution of Publication by Number of Citations

In the present research, there are many papers that do not have any citation (26.66%) Research papers with 1 to 10 citations is maximum (48.61%) As the range of citations increase above 11-20, the number of publications also increases.

5.11 Referencing Pattern

5.11.1 Age of the References

The age of the references appended at the end of each research paper. The age of references ranges from as early as before 1500 to as latest as 2012. References belonging to the period after the millennium is more. The maximum number of references belongs to the year 2001 - 2012. In every decade the number of reference is in increasing range. Hence it can be understood that the optimum age of references in a research paper with respect to the subject soft skills is 30 years.
5.11.2 Highly referred authors

In the ranked list of referred authors Mumford MD is 19th rank. Hence it can be said Mumford MD who has the first highest contributions is not referred frequently since he is in the 19th place in the list of highly referred authors. From this it can inferred that more productivity do not guarantee more references and the hypothesis – 6 has been rejected.

5.11.3 Highly referred Journals

The most frequently referred journal is J PERS SOC PSYCHOL. Similarly CHILD DEV which is in the second rank. This shows that scholars in soft skills research prefer to refer journals that are core in nature.

5.12 Activity Index of Various Countries

The study reveals that the countries that are active in soft skills research in the order of activity are England (4.2), Netherland (2.94) and USA (1.6). Those countries that are less activity are Italy (0.03), Denmark (0.09), India (0.03) and China (0.0).

5.13 Correlation between soft skills research and GDP

The study implies that as the GDP of the country grows the research productivity of that country will also grow in general as well as specific (soft skills) by providing the hypothesis – 7.
5.14 Suggestions

The researcher has made the following suggestions;

The research productivity in soft skills publication count is very low. USA has more number of publications to measure up with other countries. This is due to unavailability of intellectual resources and lack of research in soft skills, especially in developing countries.

To include the soft skills subject in their academic syllabus, invariable of all academic levels to improve the soft skills productivity. Today without soft skills one who is difficult to fit in their field. So it is necessary to have a training programme in short and long term scheme.

Incentives and grant’s that are provided in academic sector also shell increase the research publications in soft skills.

5.15 Areas of Further Research

The present study was carried out only in Web of Knowledge database. It is suggested that this type of study may be regional wise, national wise and institutional level to find out the specific solution by collecting data from other databases besides web of knowledge.

5.16 Conclusion

All most all the countries to pay more attention to soft skills research and literature output as they have providing valuable guidance for development of their own countries. In developing countries research output are poor and it is required to fill up the research gap in soft skills.
The growth of nation depends on the research and development. It is necessary to give preference to develop the research productivity in soft skills. Moreover in library professionals should improve soft skills to satisfy the user community.

The analysis of the present study further reveals the applications of statistical techniques and tools and the generation of number of formulae and equations that facilitate future researchers to test.