CHAPTER I

INTRODUCTION

1.1 Textile Industry

Indian has been the traditional home of cotton and cotton textiles. The domestication of the cotton plant for commercial cultivation for clothing as well as for other forms of human utilization is considered to have begun from the times of Harappa civilization in this sub-continent using diploid or Asiatic cotton (Gossypium herbaceum and G.arboreum). Indian economy has been consistently influenced and boosted by cotton through its production and processing sectors and by generating direct and indirect employment to more than 8 million people and by annual addition to national wealth through export earning of over Rs 4500 crores (Kairon et al., 1998). Cotton is the most vital crop of commerce, popularly known as the ‘White Gold’. In India, all the four cultivated cotton species, viz G. arboreum, G. herbaceus, G. hirsutism and G. barba dense are grown commercially. The diploid cotton (G. arboreum and G. herbaceus) are mainly cultivated in dryland tracts, though Bengal desi is grown under irrigated conditions in the northern states. G. hirsutism is known as the American cotton and the most popular varities and hybrids now under cultivation belong to this group. G. barba dense is popularly known as the Egyptian cotton and is grown in small area in India. The textile industry is based on these different varieties of cotton.

The textile industry occupies a place of eminence in all developing economics. The case is no different for India. The textile industry in India is one of the oldest and
biggest industries in India catering to essential demands of the people. Next to food, clothing is the most necessary requirement of humankind. Being a consumer good, it meets the needs of all the sections of the society belonging to all age groups, sexes, religions, social customs and civilization and has a place of pride in Indian economy.

The textile industry of India has a significant presence in the Indian economy as well as international textile industry. This industry over the years has contributed significantly to our national income employment and exports.

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The Indian industry contributes 20% to the total industrial production and 7.2% to the GDP. It provides direct employment to 35 million people and indirectly to many. More important is its 1/3 rd share in the total foreign exchange earnings of the country. Thus it earns about 35% of the country’s foreign exchange while adds up only 1% to 1.5% to the gross import bills showing a favourable balance of trade picture.

1.2 Categorization of Textile Industry

The textile industry is segmented into three large groups: Apparel, the textile used in clothing; home furnishings, the textile used for home including furniture, bath, kitchen and bed and Industrial textiles which is used for miscellaneous items such as luggage, flags, boat, sails, bandages, dust filters, and so on.
India is one of the top producers in the world for the production of yarns and fabrics. The textile industry is an independent and self-reliant industry with great versatility and diversification.

According to a study by (Simpson, 2001), India is a large scale producer of fibre, and third among the leading producers of cotton in the world. Indian shares 15% of total world production of the cotton crop. The Indian textile industry produces different varieties of the cotton crop. This provides flexibility in operational work for domestic textile producers.

The industry is highly localized in Bombay, Ahmedabad Coimbatore, Kanpur, Sholapur, Kolkata and Indore.

1.3 Need of the Study

The accessibility of the Web of Science, SCOPUS and Google Scholar has directed to an increase in the number of bibliometrics/scientometrics analysis. There is a continuous generation of information in the field of textile research, it is found essential to study quantitatively the output of literature by applying bibliometrics/scientometrics tools/indicators. The study of this nature would benefit to identify the major areas of research in the field of ‘Textile Research’ and to assess the extent of research carried out by scientists of different nations. It is proposed to study quantitatively the literature published on the textile by using the bibliographic database namely SCOPUS, an online International database.

This study aims to measure the research productivity of textile among India and G7 countries. The concept of India and G7 countries itself happens to be a growing
phenomena. India has been making strides in various fields of research and textile research is not an exception. This study further identifies India’s contribution in the field of textile research among G7 countries.

1.4 Statement of problem

The literature available on textile studies is widely scattered in India and globally. Efforts are needed to gather those literature and apply bibliometric indicators to know the growth of literature, productivity, and citation analysis in textile research. There is a need to study the trends of research in India, the area of textile research and compare it with the industrially developed countries such as G7. The literature review conducted does not provide any evidence of such research, except few study on individual journals analyzing publication trends. No comprehensive study involving India has been carried out. It is with the objective of meeting this shortcoming and to enable researchers to consult the available literature on Textile Studies systematically, effectively and efficiently that brings the researcher to conduct the present study entitled ‘Textile Research in India and G7 Countries: A Bibliometric Study’ has been proposed.

1.5 Scope of the study

This study is confined to the literature published during 2000 to 2015. The study is restricted to published items, classified as journal articles, books, book chapters, reviews, case studies and any other form. Further, the literature published from India and G7 Countries (Canada, France, Germany, Italy, Japan, the United Kingdom and
the United States). Citation count will be considered as a number of citations accumulated by the articles till December 2015.

1.6 Objective of the study

This study examines each citation of the articles published in twenty-one textile research journals during the period of sixteen years. A set of objectives is employed for this study. These objectives are given below:

1. To identify and analyze the growth in textile research in India and G7 Countries during 2000 to 2015. (To examine the growth of literature output of textile research during 2000 to 2015);

2. To gather information on availability and usage of India and G7 countries.
   (A) Author (To analyze the India research output, status, publication of textile research with G7 country):
   (B) Country (To identify the contribution of countries in India and G7 Countries);
   (C) Journal (To study the contribution of journals in India and G7 Countries);
   (D) Institutional (To develop attractive profiles of the identified nations and institutions of textile research, based on the output in bibliometric study);

3. To determine the collaboration pattern of Indian Textile research in India and G7 Countries.
   (A) G7 Countries (To model the growth trends of Indian and G7 countries research output);
   (B) Institutions (To study the contribution of Indian Institutions and their international collaboration, and impact using various scientific measures);
(C) Authors (To study the authorship and collaboration pattern for different nations of textile research and technology in general and India in particular);

4. To study the citation patterns followed in the textile research institutes.

(A) Highly cited articles (To assess the impact of the output using absolute citations and to identify highly cited articles);

(B) Highly cited authors (To identify prolific authors and the choice of journals of the researchers for publication of their research findings);

(C) Highly cited institutions (To identify most prolific institutions and their impact as seen by Relative Citations Impact (RCI) and Citations Per Paper (CPP));

(D) h-Index (To study the pattern of author collaboration and the impact of using various scientific measure such as h-Index).

1.7 Hypotheses

The pattern of reference determines the significance of literature. For the purpose of the present investigation, the following hypothesis has been formulated:

(H1) There is no significant difference between India and G7 country in terms of textile research output.

(H2) The contribution of Indian authors has an impact on global textile research.

(H3) There is a progressive research trend in textile research globally.

(H4) The G7 countries have direct impact on Indian textile research.
1.8 Methodology

The methodology for the purpose of the study consists of:-

(A) Identification of the institution from the cumulative corporate index of the textile journals from SCOPUS database during the period 2000 to 2015.

(B) The collaboration between countries, institutions and authors will be determined in case of publication with joint authorship.

(C) Examination of citations of all the identified authors for the succeeding four years period after the publication of the paper.

(D) The different bibliometric techniques and laws will be applied for achieving the objectives.

(E) Processing of the entire data set for developing bibliometric/scientometrics indicators has been described in chapter five.

(F) The result will be presented in table and charts.

1.9 Significance of the study

The vast amount of literature generated in the field of textile studies at a considerable cost, time and energy are lying scattered. This literature is extremely significant for determining the contribution of growth and development. Thus, the computerized database of literature published on textile studies will assist the researchers in accessing the desired literature on the subject. Further, bibliometric techniques will
help in the determination of various types of indicators in the textile studies, such as growth of the subject, authorship pattern, highly productive authors, content analysis and citation pattern.

1.10 Data Analysis

The data extracted from the database has been processed and analyzed using Microsoft Excel and SPSS (Statistical Package for Social Scientists) software. The extracted data was administrated to the scientometrics tools and techniques to ascertain the fulfilment of stated objectives and the hypotheses. The classification of data has been carried out and analyzed by using scientometrics indicators. In addition to the frequency distribution and percentage analysis, some statistical tools and scientometrics indicators also have been employed in the process of analysis and interpretation of data.

1.10.1 Subject and place

The title of this research highlights that the bibliometric tools used for the articles be published in textile research journals. All the journals have been selected from this subject area. The detailed steps of the journal selection procedures is given in data collection section.

1.10.2 Period Coverage

The articles published in the twenty-one journals during the period of sixteen years i.e. from 2000 to 2015 have been considered for this study. All of those citations are
excluded from this study. Therefore, the present study covers a period of sixteen years ranging from 2000 to 2015.

1.10.3 Journal Coverage

A list of journals in textile research is available on SCOPUS database website. All the journals are arranged according to SJR (Scimago Journal and Country Rank). Twenty-one top ranking journals have been taken for this study. The detailed descriptions of the journals are given below:

Table 1.1: List of Journal Coverage

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<tr>
<th>S. No.</th>
<th>Title</th>
<th>Field code</th>
<th>ISSN</th>
<th>Impact Factor</th>
<th>h-Index</th>
<th>Country</th>
<th>Publisher</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>Chemical Fibers International</td>
<td>CFI</td>
<td>1434-3584</td>
<td>0.5</td>
<td>15</td>
<td>Germany</td>
<td>Deutscher Fachverlag GmbH</td>
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<td>2</td>
<td>Clothing and Textile Research Journal</td>
<td>CTRJ</td>
<td>0887-302X</td>
<td>1.5</td>
<td>26</td>
<td>United States</td>
<td>Sage Publications</td>
</tr>
<tr>
<td>3</td>
<td>Fiber and Integrated optics</td>
<td>FIO</td>
<td>1096-4681</td>
<td>0.8</td>
<td>22</td>
<td>United Kingdom</td>
<td>Taylor &amp; Francis</td>
</tr>
<tr>
<td>4</td>
<td>Fibers and Polymers</td>
<td>FP</td>
<td>1229-9197</td>
<td>1.8</td>
<td>34</td>
<td>South Korea</td>
<td>Korean fiber Society</td>
</tr>
<tr>
<td>5</td>
<td>Fibers and Textiles in Eastern Europe</td>
<td>FTEE</td>
<td>1230-3666</td>
<td>0.9</td>
<td>28</td>
<td>Poland</td>
<td>Institute of Chemical Fibres</td>
</tr>
<tr>
<td>6</td>
<td>Geotextiles and Geomembranes</td>
<td>GG</td>
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<td>4.6</td>
<td>58</td>
<td>Netherlands</td>
<td>Elsevier BV</td>
</tr>
<tr>
<td>7</td>
<td>International Journal of Clothing Science and Technology</td>
<td>IJCST</td>
<td>0955-6222</td>
<td>1.15</td>
<td>27</td>
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<td>Emerald Group Publishing Ltd.</td>
</tr>
<tr>
<td>8</td>
<td>Indian Journal of Fibre &amp; Textile Research</td>
<td>IJFTR</td>
<td>0971-0426</td>
<td>1.4</td>
<td>28</td>
<td>India</td>
<td>Scientific Publishers</td>
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<tr>
<td>S. No.</td>
<td>Title</td>
<td>Field code</td>
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<td>Impact Factor</td>
<td>h-Index</td>
<td>Country</td>
<td>Publisher</td>
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<tr>
<td>9</td>
<td>Journal of Fashion Marketing and Management</td>
<td>JFMM</td>
<td>1361-2026</td>
<td>1.8</td>
<td>33</td>
<td>United Kingdom</td>
<td>Emerald Group Publishing Ltd.</td>
</tr>
<tr>
<td>10</td>
<td>Journal of Industrial Textiles</td>
<td>JIT</td>
<td>1530-8057</td>
<td>1.7</td>
<td>26</td>
<td>United States</td>
<td>Sage Publications</td>
</tr>
<tr>
<td>11</td>
<td>Journal of the Japan Research Association for Textile End-uses</td>
<td>JJRATEU</td>
<td>0037-2072</td>
<td>0.13</td>
<td>5</td>
<td>Japan</td>
<td>Japan Research Association for Textile End-User</td>
</tr>
<tr>
<td>12</td>
<td>Journal of the Textile Association</td>
<td>JTA</td>
<td>0368-4636</td>
<td>0.18</td>
<td>7</td>
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<td>Textile Association (India)</td>
</tr>
<tr>
<td>13</td>
<td>Journal of Textile Engineering</td>
<td>JTE</td>
<td>1346-8235</td>
<td>0.4</td>
<td>11</td>
<td>Japan</td>
<td>Textile Machinery Society of Japan</td>
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<tr>
<td>14</td>
<td>Journal of the Textile Institute</td>
<td>JTI</td>
<td>0040-5000</td>
<td>1.2</td>
<td>30</td>
<td>United Kingdom</td>
<td>Taylor &amp; Francis</td>
</tr>
<tr>
<td>15</td>
<td>Optical Fiber Technology</td>
<td>OFT</td>
<td>1068-5200</td>
<td>2.7</td>
<td>47</td>
<td>United States</td>
<td>Elsevier BV</td>
</tr>
<tr>
<td>16</td>
<td>Textile Asia</td>
<td>TA</td>
<td>0049-3554</td>
<td>0.1</td>
<td>12</td>
<td>Hong Kong</td>
<td>Business Press Ltd.</td>
</tr>
<tr>
<td>17</td>
<td>Textile History</td>
<td>TH</td>
<td>0040-4969</td>
<td>0.44</td>
<td>8</td>
<td>United Kingdom</td>
<td>Maney Publishing</td>
</tr>
<tr>
<td>18</td>
<td>Textile Outlook International</td>
<td>TOI</td>
<td>0268-4764</td>
<td>0.14</td>
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<td>United Kingdom</td>
<td>Textile Intelligence Ltd.</td>
</tr>
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<td>19</td>
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<td>TRJ</td>
<td>0040-5175</td>
<td>2.4</td>
<td>65</td>
<td>United States</td>
<td>Sage Publications</td>
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<td>20</td>
<td>Textile Trends</td>
<td>TT</td>
<td>0040-5205</td>
<td>0.07</td>
<td>3</td>
<td>India</td>
<td>Eastland Publications (Pvt.) Ltd.</td>
</tr>
<tr>
<td>21</td>
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<td>TTI</td>
<td>0964-5993</td>
<td>0.14</td>
<td>9</td>
<td>United Kingdom</td>
<td>International Newsletters</td>
</tr>
</tbody>
</table>
**1.10.4 Article Coverage**

A total of 9000 articles published during the period of sixteen years are taken from twenty-one journals. The numbers of articles in CFI, CTRJ, FIO, FP, FTEE, GG, IJCST, IJFTR, JFMM, JIT, JJRATEU, JTA, JTE, JTI, OFT, TA, TH, TOI, TRJ, TT and TTI are 754, 356, 199, 578, 343, 471, 212, 728, 397, 281, 119, 448, 199, 889, 480, 170, 151, 248, 1736, 119 and 122 respectively. Year wise collected articles are tabulated below:

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<td>517</td>
<td>529</td>
<td>502</td>
<td>491</td>
<td>523</td>
<td>506</td>
<td>465</td>
<td>516</td>
<td>684</td>
<td>675</td>
<td>683</td>
<td>682</td>
<td>588</td>
<td>458</td>
<td>9000</td>
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</tbody>
</table>

**1.10.5 Citation Coverage**

All the citations are collected from the above mentioned twenty-one journals, however, a total of 95,505 citations have been considered for this study. A small number of citations having no attributes for calculations are excluded from this study. The detailed descriptions are given in data collection section. The numbers of articles in CFI, CTRJ, FIO, FP, FTEE, GG, IJCST, IJFTR, JFMM, JIT, JJRATEU, JTA, JTE, JTI, OFT, TA, TH, TOI, TRJ, TT and TTI are 2412, 4214, 3290, 7482, 5282, 4571, 2341, 3549, 8421, 5725, 989, 4588, 2799, 9875, 8565, 1670, 7908, 791, 9412, 856 and 837 respectively. The following table shows year wise collected citations from the above mentioned twenty-one journals:
Table 1.3: Statement showing year wise collected Citations

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<tbody>
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<td>54</td>
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<td>81</td>
<td>79</td>
<td>74</td>
<td>98</td>
<td>95505</td>
</tr>
</tbody>
</table>

1.10.6 Data Collection

Data collection is the most significant part of this study. Several steps have been followed for collecting bibliographic and citation data. These steps are discussed below:

1.10.7 Selection of Database

These databases are SCOPUS, Textile Technology Complete, CAB and AGRIS. For citation analysis, SCOPUS offers about 20% more coverage than Textile Technology, CAB and AGRIS because of inconsistent accuracy. Only SCOPUS covers a wider journal range, of help both in keyword searching and citation analysis” (Falagas et al., 2008). SCOPUS is easy to navigate and has the ability to search both forward and backward from a particular citation. Therefore, the SCOPUS database has been selected for collecting data.

1.10.8 Selection of Journals

A list of journals of textile research is available in the SCOPUS database for the year from 2000-2015. All the journals in this list are ranked by the SCOPUS and h-Index. The ranking parameters of this list are as follows:
• Subject Area: Textile Technology, Fashion Technology, Garment and Fabrics
• Subject Category: Textile Research
• Country: India and G7 Country
• Year: 2000-2015

1.10.9 Selection of Articles

All the articles published in the above selected twenty-one journals during the period of sixteen years (2000 – 2015) are included in this study primarily. Some articles have been rejected for incomplete information in SCOPUS database. A few of the articles are excluded from the study on the following grounds:

• Articles on conference proceeding, review, editorial, letter, notes, short survey and erratum;

• Articles having incomplete reference information in SCOPUS database.

1.10.10 Parameters of Data

Each article is scanned and collected from the journals. An article contains bibliographic and citation information. Almost all of the parameters of each individual article have been examined. Within the range of parameters, the following bibliographical and citation information have been collected from each individual article:

(i) Name of the Journal;

(ii) Author(s) of the article;

(iv) Page number;

(v) Year of article published;
(vi) Article impact (Number of times cited by other articles);

(Vii) Document type

(Viii) Name of country

(ix) Name of institution/s

(x) All the information in references

1.10.11 Notes on Citation Information

Some citations are excluded from this study for the following reasons:

- The citations having no publishing date (for both print and web information);
- Incomplete citations in SCOPUS database;
- Citation information is available but not adequate for analysis and;
- Repetition of citations i.e. same document with the same year but in the different location. So, there is a small difference between the collected citations and the total number of citations contained in an article.

1.11 Reference Style

Citation styles are standardized systems for crediting and citing sources of documents used in the study. The American Psychological Association (APA) citation style is one of many different citation styles. In the main entry, a tiny modification has been done for data representation conveniently. Publication years and journal names are abbreviated in all entries of the main entry section.
1.12 Limitations of the study

The selected twenty-one textile journals for the study covers a period of sixteen years from 2000 and 2015. Records for the analysis in this investigation have been downloaded from SCOPUS database. Though there are many textile journals available in the database, the study is limited to only twenty-one journals as the other journals do not meet the requirements. The findings of this study apply mainly to the fields covered in the SCOPUS database and the subject headings. The journal articles alone were taken into account for analysis leaving notes, editorial and book reviews, etc.

The study covers a period of ‘sixteen years’ between 2000 and 2015 (both years inclusive). Records during the period of study have been downloaded exclusively from SCOPUS online database. Generalizations are based on the downloaded data pertaining to the sixteen years period. Nations that fall under ‘G7 countries’ during the period of coverage of this study have alone been taken into purview as the standard geographical entity for the purposes of this research investigation.