Global Literature Output on Textile Research: A Bibliometric Study

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Abstract

Abstract

Global literature output on any subject normally measured using the bibliometric study. Similar approach has been adopted by the author in order to find the global literature output on textile research. Textile research data has been downloaded from 'Scopus' data base. For this study, publications commencing from 1983-2012 (30 years) has been downloaded from the database. A total of 96360 data has been identified. The collected data has been classified by using Excel and the same was loaded in to SPSS

Keywords

Global Literature, Research Output, Bibliometric Study.
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Electronic access

The journal is available at www.jalis.in

Journal of Advances in Library and Information Science
ISSN: 2277-2219 Vol. 2. No.2. 2013. pp. 94-99

Introduction

A textile is a flexible material consisting of a network of natural or artificial fibres often referred to as thread or yarn. Yarn is produced by spinning raw wool fibers, linen, cotton, or other material on a spinning wheel to produce long strands known as yarn. Textiles are formed by weaving, knitting, crocheting, knotting, or pressing fibres together.
The concept of the Indian textile technology is intricately related to both, the manufacture and decoration. This may therefore be researched in an chronological framework starting from archaeological past to the contemporary times. Regional developments have been very typical to certain styles of manufacture and decorations in textiles. There are many studies available describing the technique/design/form of textile making. Few studies also focus on the details of contemporary processes of singular decorative technique. However, no systematic study has been undertaken for presenting the growth of literatures on textiles.

Bibliometric Analysis

Bibliometric analysis is employed by researchers to study the growth of literature in given field. Pritchard (1969) defined the term Bibliometric as the application of statistical and mathematical methods to books and other communication. The bibliometrics has emerged as a thrust area of research, incorporating different branches of human knowledge. There are famous Laws of Bibliometric i.e. Lotka's law (1926) of scientific productivity, Bradford's law (1934) of scattering and Zips law (1949) on frequency of words. But the Bibliometric studies started in late sixties.

Textile Research

Output of global textile production rose over the years in comparison to the previous one due to higher output in Asia, Europe and South America while production in North America was reduced. It has to be pointed out here that Asia's production is traditional significantly higher in the second quarter compared to the first one as a result of fewer working days in China in the first quarter due to the Chinese New Year holidays. Also in comparison to last years second quarter global yarn production rose in all regions apart from North America.

Objectives of the Study

Main objectives of the study are

1. To examine the worldwide research production in textile research.
2. To identify the document type of the publications in textile research.
3. To identify the organizations conducting the research in textile research.
4. To identify the organisations providing fund for textile research.
5. To study the citation analysis on literature produced in textile research.
6. To compare and measure the growth rate of literature published.

Hypotheses

The following hypotheses will be formulated for this study based on objectives.

- There exists substantial literature on textile research.
- Growth of publications in textile research is comparatively higher in developed countries.
- There exists domination of collaborative research in textile research.
- The research productivity in textile research is dominated by English language.
- Journals are major source of publications for textile research.
- There exists steady growth in publication production in textile research.

Collection of Data

For this study, the literature on textile research data has been downloaded from 'Scopus', multidisciplinary online database, which is an international indexing and abstracting database, using the search term "textile". For this study, publications commencing from 1983-2012 (30 years) has been downloaded from the database. A total of 96360 data has been identified.

The collected data has been classified by using Excel and the same was loaded in to SPSS (statistical package for social sciences) for the purpose of analysis. Statistical tools such as frequency distribution and percentage analysis and Scientometric techniques such as Authorship pattern, Relative Growth Rate (RGR), Doubling time (dt) citation analysis etc will be used for the study.

Data Analysis

The year wise distribution of a total 96360 records were shown in table 1

Table 1: Year wise distribution

Sl.No.	Year	TP	%	Cumula-tive	Cum. %
1	1983	2009	2.08	2009	2.08
2	1984	2389	2.48	4398	4.56
3	1985	2119	2.20	6517	6.76
4	1986	1927	2.00	8444	8.76
5	1987	1947	2.02	10391	10.78
6	1988	1925	2.00	12316	12.78
7	1989	1658	1.72	13974	14.5
8	1990	1609	1.67	15583	16.17
9	1991	1545	1.60	17128	17.77
10	1992	1471	1.53	18599	19.3
11	1993	1574	1.63	20173	20.93
12	1994	2020	2.10	22193	23.03
13	1995	1970	2.04	24163	25.07
14	1996	2532	2.63	26695	27.7
15	1997	2506	2.60	29201	30.3
16	1998	2809	2.92	32010	33.22
17	1999	3203	3.32	35213	36.54
18	2000	3424	3.55	38637	40.09
19	2001	3995	4.15	42632	44.24
20	2002	4144	4.30	46776	48.54
21	2003	4613	4.79	51389	53.33
22	2004	5065	5.26	56454	58.59
23	2005	4890	5.07	61344	63.66
24	2006	5375	5.58	66719	69.24
25	2007	5348	5.55	72067	74.79
26	2008	5355	5.56	77422	80.35
27	2009	5071	5.26	82493	85.61
28	2010	4548	4.72	87041	90.33
29	2011	5080	5.27	92121	95.6
30	2012	4239	4.40	96360	100
	Total	**96360**	**100**		

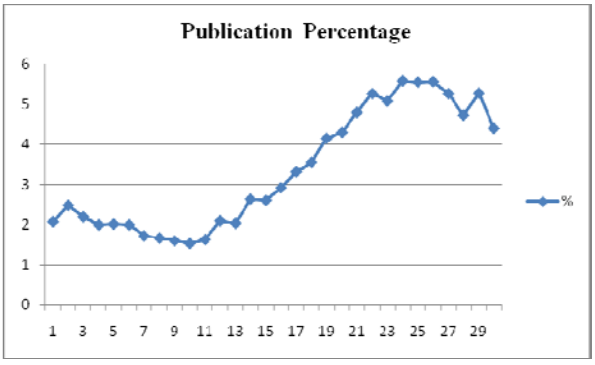

Fig 1. Publication Trend(Yearwise %)

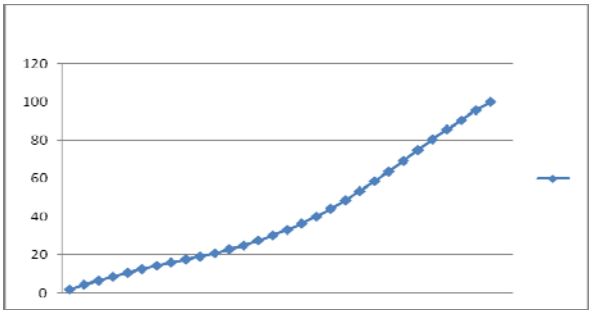

Fig2. Publication Trend (Cumulative %)

It can be seen from the table 1 that the publication of textile research seems to be in linear trend. During the last ten years there is a substantial increase in the publications. This indicates that the awareness and importance of textile has been in increasing trend. To identify the growth trend, the 30 years period has been divided in to five block years. Each block year comprises of six years.

The block year wise distribution is shown in table 2.

Table 2: Block year wise distribution

S.No	Block Year	No. of publications	%	Ratio of growth
1	1983-1988	12316	12.78	1.00
2	1989-1994	9877	10.25	0.80
3	1995-2000	16444	17.07	1.34
4	2001-2006	28082	29.14	2.28
5	2007-2012	29641	30.76	2.41
	Total	**96360**	**100.00**	

Table 2 indicates during the block year of 2007 to 2012, the growth has attained 30.76%. Even during the block year of 2001 to 2006 the growth rate is 29.14%. Nearly 59.90% of output on the growth of Textile research has been witnessed during the period of 2001 to 2012.

The bibliographc form of the literature growth of textile has also been identified and the same is shown in Table-3.

Table 3: Bibliographic Form

Sl.No.	Type of Document	TP	%
1	Article	78288	81.25
2	Conference Paper	9659	10.02
3	Review	3083	3.20
4	Undefined	1792	1.86
5	Book	888	0.92
6	Short Survey	859	0.89
7	Note	820	0.85
8	Editorial	283	0.29
9	Conference Review	258	0.27
10	Letter	125	0.13
11	Article in Press	95	0.10
12	Patent	87	0.09
13	Erratum	55	0.06
14	Business Article	46	0.05
15	Report	22	0.02
	Total	**96360**	**100**

Table 3shows the output can be seen in fifteen different bibliographic formats. Nearly 81.25% of publications are published has journal articles. It is followed by Conference proceedings (10.02%). There exist patent literature in textile and it is account to 0.1%.

The countrywise distribution has identified and top 50 countries contribution were shown in Table -4

Table 4: Country wise distribution

Sl.No.	Country	TP	%	Ratio of contribution with USA
1	United States	8610	8.94	1.00
2	China	5296	5.50	0.62
3	Germany	5186	5.38	0.60
4	India	5006	5.20	0.58
5	United Kingdom	3534	3.67	0.41
6	Japan	1844	1.91	0.21
7	France	1653	1.72	0.19
8	Italy	1357	1.41	0.16
9	Turkey	1283	1.33	0.15
10	Spain	999	1.04	0.12
11	Poland	984	1.02	0.11
12	Canada	907	0.94	0.11
13	Switzerland	870	0.90	0.10
14	South Korea	835	0.87	0.10
15	Australia	832	0.86	0.10
16	Russian Federation	810	0.84	0.09
17	Belgium	794	0.82	0.09
18	Hong Kong	697	0.72	0.08
19	Taiwan	691	0.72	0.08
20	Iran	683	0.71	0.08
21	Brazil	619	0.64	0.07
22	Portugal	557	0.58	0.06
23	Egypt	553	0.57	0.06

24	Netherlands	542	0.56	0.06
25	Romania	534	0.55	0.06
26	Sweden	460	0.48	0.05
27	Slovenia	455	0.47	0.05
28	Czech Republic	455	0.47	0.05
29	Austria	436	0.45	0.05
30	Croatia	408	0.42	0.05
31	Finland	314	0.33	0.04
32	Pakistan	285	0.30	0.03
33	Greece	259	0.27	0.03
34	Tunisia	243	0.25	0.03
35	New Zealand	221	0.23	0.03
36	Denmark	215	0.22	0.02
37	Malaysia	215	0.22	0.02
38	Thailand	207	0.21	0.02
39	Mexico	187	0.19	0.02
40	Singapore	171	0.18	0.02
41	Israel	169	0.18	0.02
42	South Africa	149	0.15	0.02
43	Lithuania	149	0.15	0.02
44	Bulgaria	144	0.15	0.02
45	Hungary	125	0.13	0.01
46	Slovakia	113	0.12	0.01
47	Nigeria	112	0.12	0.01
48	Serbia	100	0.10	0.01
49	Norway	99	0.10	0.01
50	Ireland	99	0.10	0.01
51	Others	44894	46.59	5.21

Nearly 25% of the outputs were provided by four countries such as USA, China, German and India. The top 50 countries provide nearly 53.41% of the total contribution in textile Research. USA contributes nearly 8.94%. It is followed by china (5.50%) and German (5.38%). India stands fourth place with the contribution of 5.20%. The contributions were compared with USA has base country and the ratio is also shown in Table 4. It can be seen that nearly 15 countries are providing nearly 10% contribution equivalent to USA. India contributes 41% of USA contributions.

The relative growth rate (RGR) and doubling time (Dt) shows in table 5.

Table 5: The relative growth rate (RGR) and doubling time (Dt)

Sl. No.	Year	TP	%	w1	w2	RGR	Dt
1	1983	2009	2.08	0	7.605392	7.61	0.09
2	1984	2389	2.48	7.605392	7.77863	0.17	4.00
3	1985	2119	2.2	7.77863	7.6587	-0.12	-5.78
4	1986	1927	2	7.6587	7.56372	-0.09	-7.30
5	1987	1947	2.02	7.56372	7.574045	0.01	67.12
6	1988	1925	2	7.574045	7.562681	-0.01	-60.98
7	1989	1658	1.72	7.562681	7.413367	-0.15	-4.64
8	1990	1609	1.67	7.413367	7.383368	-0.03	-23.10
9	1991	1545	1.6	7.383368	7.342779	-0.04	-17.07
10	1992	1471	1.53	7.342779	7.293698	-0.05	-14.12
11	1993	1574	1.63	7.293698	7.361375	0.07	10.24
12	1994	2020	2.1	7.361375	7.610853	0.25	2.78
13	1995	1970	2.04	7.610853	7.585789	-0.03	-27.65
14	1996	2532	2.63	7.585789	7.836765	0.25	2.76
15	1997	2506	2.6	7.836765	7.826443	-0.01	-67.14
16	1998	2809	2.92	7.826443	7.940584	0.11	6.07
17	1999	3203	3.32	7.940584	8.071843	0.13	5.28
18	2000	3424	3.55	8.071843	8.138565	0.07	10.39
19	2001	3995	4.15	8.138565	8.292799	0.15	4.49
20	2002	4144	4.3	8.292799	8.329417	0.04	18.93
21	2003	4613	4.79	8.329417	8.436634	0.11	6.46
22	2004	5065	5.26	8.436634	8.530109	0.09	7.41
23	2005	4890	5.07	8.530109	8.494948	-0.04	-19.71
24	2006	5375	5.58	8.494948	8.589514	0.09	7.33
25	2007	5348	5.55	8.589514	8.584478	-0.01	-137.61
26	2008	5355	5.56	8.584478	8.585786	0.00	529.80
27	2009	5071	5.26	8.585786	8.531293	-0.05	-12.72
28	2010	4548	4.72	8.531293	8.422443	-0.11	-6.37
29	2011	5080	5.27	8.422443	8.533067	0.11	6.26
30	2012	4239	4.4	8.533067	8.352083	-0.18	-3.83
		96360	100				

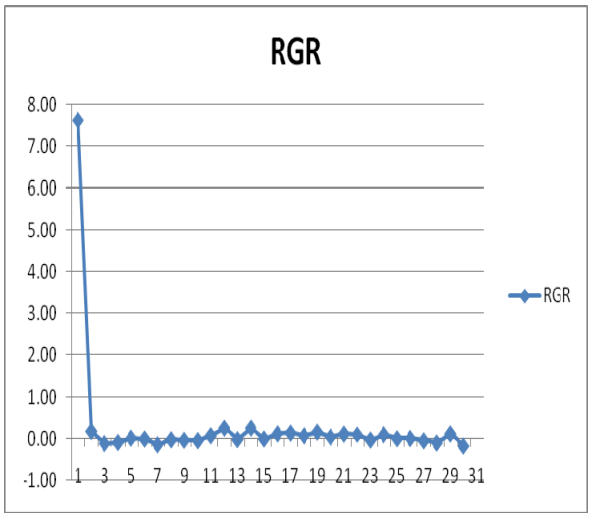

Fig. 3 Relative Growth Rate

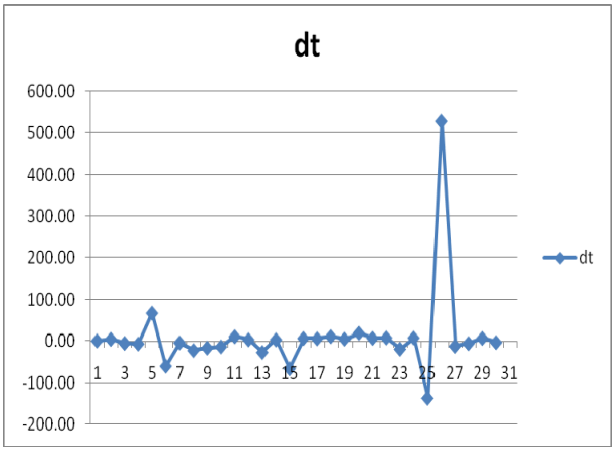

Fig. 4 Doubling Time

The graph shows the relative growth rate is linear in nature. Their exist negative growth. Similarly the doubling time also shows linear trend and few exceptions.

The top 20 journals were identified in regard to textile research and the same is shown in table -6.

Table 6: Top 20 Journals

Sl.No.	Journal	TP	%	Cum %
1	Textile Research Journal	1738	1.8	1.8
2	Textile Asia	1466	1.52	3.32
3	Melliand Textilberichte	1391	1.44	4.76
4	Journal of the Textile Institute	1226	1.27	6.03
5	Colourage	1131	1.17	7.2
6	Advanced Materials Research	1013	1.05	8.25
7	Textile Month	1008	1.05	9.3
8	Medical Textiles	868	0.9	10.2
9	Asian Textile Journal	849	0.88	11.08
10	Textile World	836	0.87	11.95
11	Fibre Chemistry	794	0.82	12.77
12	Wool Record	699	0.73	13.5
13	Proceedings of SPIE the International Society for Optical Engineering	665	0.69	14.19
14	Textile Magazine	663	0.69	14.88
15	Technical Textiles International	660	0.68	15.56
16	International Dyer	659	0.68	16.24
17	Tinctoria	651	0.68	16.92
18	Journal of Applied Polymer Science	613	0.64	17.56
19	Pakistan Textile Journal	558	0.58	18.14
20	American Dyestuff Reporter	557	0.58	18.72
	Total	18045		

Nearly 18.72% of articles are published in top 20 journals. Similarly top 20 institutions were identified and the same is shown in Table 7.

Table 7 : Top 20 institutions in Textile Research contribution

Sl.No.	Institution/R&D/University	TP	%
1	Donghua University	926	0.96
2	North Carolina State University	660	0.68
3	Hong Kong Polytechnic University	622	0.65
4	Rheinisch-Westfälische Technische Hochschule Aachen	522	0.54
5	Technische Universität Dresden	457	0.47
6	Politechnika Lódzka	388	0.40
7	Indian Institute of	383	0.40

	Technology, Delhi		
8	University of Manchester	382	0.40
9	Tianjin Polytechnic University	359	0.37
10	University of Leeds	331	0.34
11	National Research Center, Cairo	300	0.31
12	University of Zagreb, Faculty of Textile Technology	267	0.28
13	Universidade do Minho	252	0.26
14	Technická Univerzita v Liberci	248	0.26
15	Univerza v Mariboru	243	0.25
16	Universitat Politécnica de Catalunya	233	0.24
17	Georgia Institute of Technology	230	0.24
18	PSG College of Technology	226	0.23
19	Istanbul Teknik Üniversitesi	225	0.23
20	Zhejiang University	219	0.23
	Total	7473	7.74

7.74% of the contributions were published by 20 institutions. Among the top 20 Donghua University top the list. IIT Delhi ranks seventh and PSG college of Technology ranks 18.

Major Findings

Some of the major findings of the study are

- There exist 96360 publications during the period of 1983-2012.
- During the block year of 2007 to 2012, the growth has attained 30.76%. Even during the block year of 2001 to 2006 the growth rate is 29.14%. Nearly 59.90% of output on the growth of Textile research has been witnessed during the period of 2001 to 2012.
- It can be seen from the table that the publication of textile research seems to be in linear trend. During the last ten years there is a substantial increase in the publications.
- Nearly 25% of the outputs were provided by four countries such as USA, China, German and India. The top 50 countries provide nearly 53.41% of the total contribution in textile Research
- United States of America has contributed highest number of articles (8.94%) in textile research.
- India has contributed 5.2% of total world output and ranked in 4th position.
- Nearly 81.25% of publications are published has journal articles. It is followed by Conference proceedings (10.02%). There exist patent literature in textile and it is account to 0.1%.
- Nearly 18.72% of articles are published in top 20 journals.
- 7.74% of the contributions were published by 20 institutions. Among the top 20 Donghua University top the list. IIT Delhi ranks seventh and PSG college of Technology ranks 18.

Conclusion

In this densely populated world, food, shelter and cloths are very essential one. Textile research is a mixed field of many subjects viz Agriculture and Engineering. Textile research gave us a remarkable improvement in cloth production. There necessaciates extensive research in this area. It seems little contributions can be seen in textile research comparing to newer subjects such as nano technology, smart materials etc. The funding agencies must come forward for developing the research aspects in textile. In India, the Ministry of Human Resources is concentrating on textile and started implementing the textile park in various places especially in Tamil Nadu.

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