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Scientometric Analysis of the Literature on Textile Technology: A Global Perspective

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Abstract - **This paper attempts to highlight quantitatively and qualitatively the growth and development of world literature on Textile technology in terms of publication output and citations as per Web of Science during 1999-2012. The objective of the study was to perform scientometric analysis of Textile technology publications in the world. The parameters studied include growth of publications and citations, continent wise distribution of publications and citations, country-wise distribution of publications.**

Keywords: Textile technology, Web of Science, Publication Productivity, Scientometrics

I. Introduction

Textile Technology plays an important role in the advancement of Science and Technology and in human society. Textile products play a vital role in meeting man's basic needs. We often only consider textiles to be the clothes we wear. Obviously, clothing industry is where the majority of textiles are produced and used. However, textiles are also important in all aspects of our lives from birth to death. The use of textiles has been traced back over 8500 years. The technological advances of textiles in various industries do not always get recognized as they do in the clothing industry.

Scientometrics is the science of measuring and anlysing Science (Scientometrics 2011). In practice, scientometrics is often done using Bibliometrics, a measurement of (Scientific) publications. Modern scientometrics is mostly based on the work of Derek J. de Solla Price and Eugine Garfield. The latter founded the Institute for Scientific Information, which is heavily used for scientometric analysis. One significant finding in the field is a principle of cost escalation to the effect that achieving further findings at a given level of importance grow exponentially more costly in the expenditure of effort and resources (Scientometrics 2011).

Scientometrics is a discipline which analyses scientific publications and citations appended to the papers to gain an understanding of the structure of science, growth of science at global level, performance of a country in a particular domain, performance of institutions, departments or divisions and scientific eminence of an individual scientist. It also helps in knowing the information seeking behaviour of scientists and researchers by way of identifying where they publish and what they cite.

A. Web of Science

Web of Science provides a single destination to access the most reliable, integrated, multidisciplinary research. Quality, curetted content delivered alongside information on emerging trends, subject specific content and analysis tools make it easy for students, faculty, researchers, analysts, and program managers to pinpoint the most relevant research to inform their work.

II. Review of Literature

Kademani, B.S., *et al* (2013) analysed the attempts to highlight quantitatively and qualitatively the growth and development of world literature on materials science in terms of publication output and citations as per Web of Science (2006–2010). The objective of the study was to perform a scientometric analysis of all materials science research publications in the world.

Fei-Cheng Ma, *et al* (2013) evaluated the global progress and to assess the current quantitatively trends on translational medical research by using a scientometric approach to survey translational medicine related literatures in Science Citation Index Expanded (SCI-E), Social Science Citation Index and PubMed database from 1992 to 2012. The scientometric methods and knowledge visualization technologies were employed in this paper. The document types, languages, publication patterns, subject categories, journals, geographic and institutional distributions, top cited papers, and the distribution of keywords as well as MeSH terms were thoroughly examined. Translational medicine research has increased rapidly over past 20 years, most notably in the last 4 years. In total, there are currently 3,627 research articles in 1,062 journals listed in 91 SCI-E subject categories.

Radhamany Sooryamoorthy, (2011) studied the publication trends of South African engineering researchers for a period of 30 years since 1975. Drawing data from the ISI Web of Knowledge, this paper specifically looks at the publication patterns of engineering researchers in South Africa.

III. Objectives

The objectives of the study were perform a scientometric analysis of Textile technology and allied research publications in the world.

1. To study the growth of textile technology research literature during fourteen years between 1999 and 2012.
2. To study the characteristics of authors in terms of contributions and nationality.
3. To compare and to measure the analysis of continent-wise and country-wise output of Textile technology research literature.

IV. Method of Study

The required data were collected from Web of Science database for the period 1999–2012. It can be seen that 32815 bibliographic records were downloaded in the field of textile technology over the period of fourteen Years from the database of SCI, SSCI and A&HCI. The bibliographical fields were analysed with suitable statistical tools and applications.

V. Analysis and Discussions

Table I Geographical Distribution of Authors

S.No.	Country	Publication Count	Percent
1.	USA	5156	15.71
2.	CHINA	2598	7.92
3.	JAPAN	1678	5.11
4.	INDIA	1497	4.56
5.	ENGLAND	1475	4.49
6.	GERMANY	1258	3.83
7.	TURKEY	1189	3.62
8.	FRANCE	1006	3.07
9.	SOUTH KOREA	968	2.95
10.	AUSTRALIA	774	2.36
11.	CANADA	733	2.23
12.	ITALY	699	2.13
13.	POLAND	658	2.01
14.	IRAN	610	1.86
15.	SPAIN	552	1.68
16.	TAIWAN	540	1.65
17.	RUSSIA	442	1.35
18.	BRAZIL	382	1.16
19.	EGYPT	376	1.15
20.	HONG KONG	368	1.12
21.	BELGIUM	254	0.77
22.	SWITZERLAND	254	0.77
23.	NETHERLANDS	239	0.73
24.	OMAN	234	0.71
25.	NEW ZEALAND	231	0.70
26.	SWEDEN	212	0.65
27.	PORTUGAL	203	0.62
28.	CROTIA	194	0.59
29.	SLOVENIA	190	0.58
30.	LITHUANIA	188	0.57
31.	THAILAND	172	0.52
32.	CZECH REPUBLIC	163	0.50
33.	SCOTLAND	151	0.46
34.	SINGAPORE	149	0.45
35.	GREECE	144	0.44
36.	ISRAEL	141	0.43
37.	AUSTRIA	127	0.39
38.	DENMARK	127	0.39
39.	PAKISTAN	118	0.36
40.	TUNISIA	106	0.32

S.No.	Country	Publication Count	Percent
41.	SERBIA	102	0.31
42.	WALES	100	0.30
43.	FINLAND	97	0.30
44.	SOUTH AFRICA	89	0.27
45.	MEXICO	89	0.27
46.	MALASIA	86	0.26
47.	HUNGARY	62	0.19
48.	BANGLADESH	62	0.19
49.	ARGENTINA	60	0.18
50.	NORTH IRELAND	58	0.18
51.	IRELAND	54	0.16
52.	NORWAY	52	0.16
53.	SLOVAKIA	48	0.15
54.	LATVIA	38	0.12
55.	JORDAN	35	0.11
56.	SAUDI ARABIA	32	0.10
57.	UKRAINE	31	0.09
58.	BULGARIA	31	0.09
59.	NIGERIA	31	0.09
60.	BYELARUS	28	0.09
61.	PERU	21	0.06
62.	ALGERIA	21	0.06
63.	MOROCCO	19	0.06
64.	YUGOSLAVIA	17	0.05
65.	UZBEKISTAN	16	0.05
66.	URUGUAY	16	0.05
67.	CHILE	15	0.05
68.	COLOMBIA	13	0.04
69.	INDONESIA	9	0.03
70.	SRI LANKA	9	0.03
71.	LEBANON	9	0.03
72.	ESTONIA	7	0.02
73.	KENYA	7	0.02
74.	COSTA RICA	7	0.02
75.	CUBA	6	0.02
76.	ETHIOPIA	6	0.02
77.	KUWAIT	6	0.02
78.	MACEDONIA	6	0.02
79.	PHILIPPINES	5	0.02
80.	MAURITIUS	4	0.01
81.	ICELAND	4	0.01
82.	TOGO	4	0.01
83.	ARMENIA	4	0.01
84.	LUXEMBOURG	3	0.01
85.	GHANA	3	0.01
86.	VENEZUELA	3	0.01
87.	ZIMBABWE	3	0.01
88.	VIETNAM	3	0.01
89.	JAMAICA	3	0.01
90.	IRAQ	3	0.01
91.	CAMEROON	2	0.01
92.	BOSNIA	2	0.01
93.	U ARAB EMIRATES	2	0.01
94.	BENIN	2	0.01
95.	BOLVIA	2	0.01
96.	UAE	2	0.01
97.	TANZANIA	2	0.01
98.	SYRIA	2	0.01
99.	SUDAN	2	0.01
100.	PANAMA	2	0.01
101.	CYPRUS	2	0.01
102.	BOTSWANA	1	0.00
103.	BURKINA FASO	1	0.00
104.	NEPAL	1	0.00
105.	MONACO	1	0.00
106.	MALAWI	1	0.00
107.	ECUADOR	1	0.00
108.	QATAR	1	0.00
109.	NA	4793	14.61
Total		32815	100.00

Textile technology research literature are published from authors from 108 countries of the world of which USA stands first forming 15.71 % of the total output. The second ranked country is China (7.92 %), the third ranked country is Japan (5.11%) and India is in the 4th place. Of the total 108 countries, there are 86 countries that have a negligible per cent of publications. Hence it can be understood that authors are emanating more from developed countries proving the hypothesis.

Table II Region-Wise Distribution of Authors

Sl.No.	Continent	Publication Count	Percent
1	Europe	10468	31.90
2	Asia	9360	28.52
3	North America	5978	18.22
4	Australia	1005	3.06
5	Africa	680	2.07
6	South America	513	1.56
7	Central America	18	0.05
8	NA	4793	14.61
Total		32815	100.00

Table III Distribution of Authors in Various Regions – Africa

Sl.No.	**Country**	**Publication Count**	**Percent**
1	Egypt	376	55.29
2	Tunisia	106	15.59
3	South Africa	89	13.09
4	Nigeria	31	4.56
5	Algeria	21	3.09
6	Morocco	19	2.79
7	Kenya	7	1.03
8	Ethiopia	6	0.88
9	Mauritius	4	0.59
10	Togo	4	0.59
11	Zimbabwe	3	0.44
12	Ghana	3	0.44
13	Sudan	2	0.29
14	Tanzania	2	0.29
15	Cameroon	2	0.29
16	Benin	2	0.29
17	Burkina Faso	1	0.15
18	Botswana	1	0.15
19	Malawi	1	0.15
Total		680	100.00

Table III shows the distribution authors in various regions of African countries in Textile technology research. Egypt is leading among the African countries forming 55.29% of the total output. Second ranked country is Tunisia with 15.59% and this is followed by South Africa having 13.09%. There are few African countries like Ethiopia, Mauritius, etc. which have very negligible per cent of publications in Textile technology research.

Table IV Distribution of Authors in Various Regions - ASIA

Sl.No.	Country	Publication Count	Percent
1	China	2598	27.76
2	JAPAN	1678	17.93
3	INDIA	1497	15.99
4	SOUTH KOREA	968	10.34
5	IRAN	610	6.52
6	TAIWAN	540	5.77
7	HONG KONG	368	3.93
8	OMAN	234	2.50
9	THAILAND	172	1.84
10	SINGAPORE	149	1.59
11	ISRAEL	141	1.51
12	PAKISTAN	118	1.26
13	MALAYSIA	86	0.92
14	BANGLADESH	62	0.66
15	JORDAN	35	0.37
16	SAUDI ARABIA	32	0.34
17	UZBEKISTAN	16	0.17
18	INDONESIA	9	0.10
19	SRI LANKA	9	0.10
20	LEBANON	9	0.10
21	KUWAIT	6	0.06
22	PHILIPPINES	5	0.05
23	ARMENIA	4	0.04
24	VIETNAM	3	0.03
25	IRAQ	3	0.03
26	SYRIA	2	0.02
27	U ARAB EMIRATES	2	0.02
28	UAE	2	0.02
29	NEPAL	1	0.01
30	QATAR	1	0.01
Total		9360	100.00

In Asia there are 4 countries that have contributed for Textile technology research. China occupies the first place forming 27.76 % of the total Asian output and second ranked country is Japan having 17.93 %. India is in the third place forming 15.99 % of the Asian Output. There are few Asian countries like UAE, Nepal etc. which have very negligible per cent of publications in Textile technology research.

Table V Distribution of Authors in Various Regions – Australia

Sl.No.	Country	Publication Count	Percent
1	Australia	774	77.01
2	New Zealand	231	22.99
Total		1005	100.00

Table V shows Research literature in Textile technology is shared by two Oceanic countries namely Australia (77.01%) and New Zealand (22.99%).

Table VI Distribution of Authors in Various Regions – South America

Sl.No.	Country	Publication Count	Percent
1	BRAZIL	382	74.46
2	ARGENTINA	60	11.70
3	PERU	21	4.09
4	URUGUAY	16	3.12
5	CHILE	15	2.92
6	COLOMBIA	13	2.53
7	VENEZUELA	3	0.58
8	BOLIVIA	2	0.39
9	ECUADOR	1	0.19
Total		513	100.00

Table VI shows among the countries from South American Continent, Brazil ranks first forming 74.46 % of the total output. The second ranked nation is Argentina having 11.70 % and this is followed by Peru having 4.09 %.

Table VII Distribution of Authors In Various Regions – North America

Sl.No.	Country	Publication Count	Percent
1	USA	5156	86.25
2	CANADA	733	12.26
3	MEXICO	89	1.49
Total		5978	100.00

Table VII shows the distribution of authors in various regions of North America. USA is the leading country among the North American countries forming 86.25 % of the total output. The second ranked country is Canada with 12.26 % and this is followed by Mexico with least publication of 1.49% of the total research output in Textile technology.

Table VIII Distribution of Authors in Various Regions – Europe

Sl.No.	Country	Publication Count	Percent
1	ENGLAND	1475	14.09
2	GERMANY	1258	12.02
3	TURKEY	1189	11.36
4	FRANCE	1006	9.61
5	ITALY	699	6.68
6	POLAND	658	6.29
7	SPAIN	552	5.27
8	RUSSIA	442	4.22
9	BELGIUM	254	2.43
10	SWITZERLAND	254	2.43
11	NETHERLANDS	239	2.28
12	SWEDEN	212	2.03
13	PORTUGAL	203	1.94
14	CROTIA	194	1.85
15	SLOVENIA	190	1.82
16	LITHUANIA	188	1.80
17	CZECH REPUBLIC	163	1.56
18	SCOTLAND	151	1.44
19	GREECE	144	1.38
20	DENMARK	127	1.21
21	AUSTRIA	127	1.21
22	SERBIA	102	0.97
23	WALES	100	0.96
24	FINLAND	97	0.93
24	HUNGARY	62	0.59
25	NORTH IRELAND	58	0.55
26	IRELAND	54	0.52
27	NORWAY	52	0.50
28	SLOVAKIA	48	0.46
29	LATVIA	38	0.36
30	BULGARIA	31	0.30
31	UKRAINE	31	0.30
32	BYELARUS	28	0.27
33	YUGOSLAVIA	17	0.16
34	ESTONIA	7	0.07
35	MACEDONIA	6	0.06
36	ICELAND	4	0.04
37	LUXEMBOURG	3	0.03
38	CYPRUS	2	0.02
39	BOSNIA	2	0.02
40	MONACO	1	0.01
Total		10468	100.00

Table VIII shows the distribution of Textile technology research by scholars from European countries. England ranks first among the European Countries forming 14.09% of the total output from the region. The second ranked country is Germany (12.02%) and the third ranked country is Turkey (11.36%). There are few European countries like Estonia, Macedonia, Iceland, etc. which have very negligible per cent of publications in Textile technology.

VI. Conclusion

Textile technology research literature are published from authors from 108 countries of the world of which USA stands first forming 15.71 % of the total output. Hence it can be understood that authors are emanating more from developed countries. Though USA is the leading country in publication productivity, Europe has the highest publication count which is nearly one third of the total world productivity. Asia ranks second with 28.52 % and North America ranks third. These kinds of studies would not only be useful for scientists and science policy makers but also to information professionals concerned with collection management in textile technology and allied research.

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