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Research Papers on Leather Science: A Bibliometric Study

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Abstract: The bibliometric methods used and results given to satisfy the information needs of users form the basis of this paper. In this paper, we identify the major and emerging areas of research in leather science, core journals in specific areas, leading scientists in specific areas, and important institutions contributing to different fields. For the above we have used bibliometric techniques like trend analysis, h-index, h5-index, h-median, g-index, Eigenfactor score, Article Influence score, Thompson Impact factor and others at different times. Various sources have been used like journals – both printed and online, Web of Science, Scopus, Google Scholar etc.

Keywords: Bibliometric study, Leather science, Citation analysis, Impact factor, trend analysis

1. Introduction

Bibliometric study is useful in addressing user needs. We have taken this approach of using different relevant bibliometric methods while answering the queries of users in the library of Govt. College of Engineering & Leather Technology, Kolkata, India. This application of bibliometric methods has helped users and also shown the importance of using more than one method for the same query and this highlights the interdependence between the different methods in bibliometric analysis.

2. Objectives of the study

Objectives of the study include showing how various bibliometric methods were used to address the following needs of users (these needs are to identify various important entities in leather science and are applicable to any other field):

- Important journals
- Growth and emerging areas of research

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- Leading scientists and their institutions

3. Important journals

Periodicals are the indices of growth of knowledge. Users very often need the help of library professionals in identifying the important journals in their field of study. We have taken a holistic approach in answering this query

in the field of leather science by analyzing the following aspects of the different journals in leather science: quantity of articles in the journal over a long period using *trend analysis*; quality of articles in the journal using parameters like total references, total cites, citable documents and international collaboration; percentage of documents with more than one country; and impact of the journal using metrics like h index and Impact Factor, h5 index and 5-year Impact Factor, Immediacy Index, Eigenfactor, Article Influence, etc.

After analysing all the above aspects of about a dozen peer-reviewed academic journals in leather science (including *Leathers*, *Leather International*, *World Leather*, *Journal of Indian Leather Technologists' Association*, *Journal of the American Leather Chemists Association* (*JALCA*) and *Journal of the Society of Leather Technologists and Chemists* (*JSLTC*) we found that the two most important journals (those having greatest impact) are *JALCA* and *JLSTC*. For lack of space we give some details of the analysis results of only these two journals. *JALCA* and *JLSTC* are monthly and bi-monthlyjournals respectively. Each has been in existence for about 100 years.

SCImago Journal and Country Rank (SJR) gives the following parameters of these two journals for the period 1999-2012 (http://www.scimagojr.com): total references, total cites, citable documents and international collaboration, and percentage of documents with more than one country, given in Table 1.

Table 1. Citation Data of *JALCA* and *JSLTC*

	Total References		Total Cites		Citable Docs		International Collab.	
	JALCA	*JSLTC*	*JALCA*	*JSLTC*	*JALCA*	*JSLTC*	*JALCA*	*JSLTC*
1999	311	588	39	26	64	80	17.9	7.9
2000	355	564	41	45	67	95	14.8	28.9
2001	681	393	57	54	76	104	2.3	1.8
2002	889	385	70	41	98	111	4.5	1.2
2003	770	420	85	47	114	137	8.5	5.4

2004	1066	624	102	50	131	133	2.3	5.0
2005	915	603	82	32	132	138	17.0	4.4
2006	956	748	98	39	133	114	14.6	2.0
2007	735	593	75	44	135	124	21.2	8.0
2008	966	648	108	39	139	126	11.5	10.9
2009	1019	818	87	49	143	127	24.4	12.5
2010	877	604	71	68	140	124	13.0	12.5
2011	1020	796	91	46	136	120	18.0	13.2
2012	1043	591	85	53	134	116	6.4	4.9

For these two journals the following metrics were obtained: h index and Impact Factor, h5 index and 5-year Impact Factor, Immediacy index, Eigenfactor, Article Influence (www.researchgate.com/journal/). For instance *JALCA* had Impact factor = 0.64, 5 year impact factor = 0.57, Immediacy index = 0.07, and Article Influence = 0.12. The impact factor of *JALCA* over ten years is given in Figure 1 below.

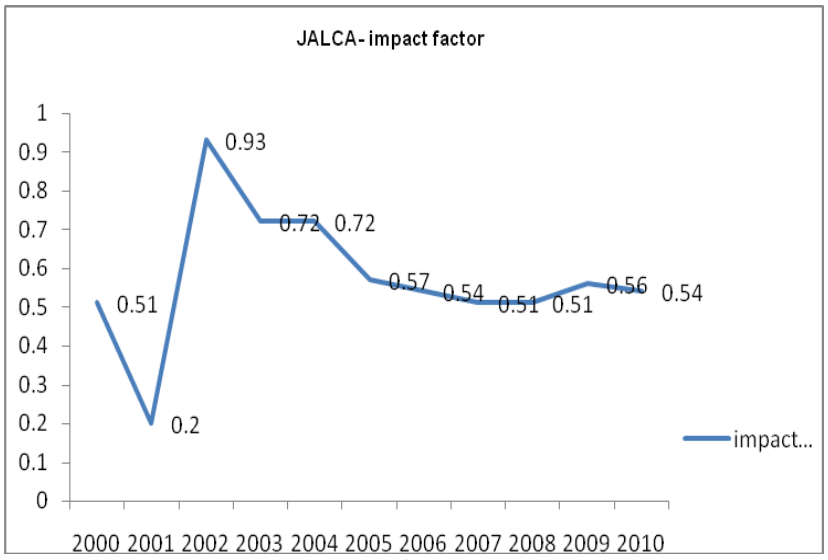

Figure 1

Again, *JSLTC* had Impact Factor = 0.6, 5-year Impact Factor= 0.46, Immediacy Index= 0.03, and Article Influence= 0.10. The impact factor of *JSLTC* over ten years is given in Figure 2.

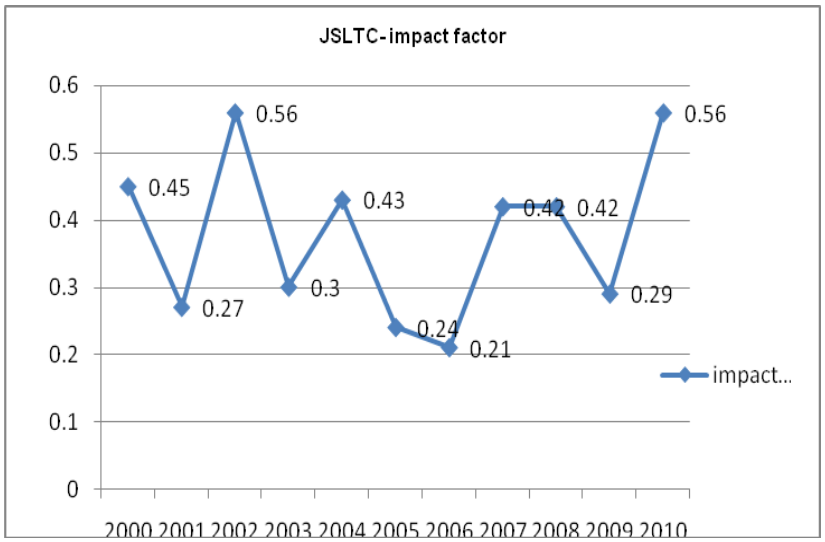

Figure 2

4. Growth and emerging areas of research

Users very often need to know the emerging areas of research in their field. We generally use the method of trend analysis to answer:

- Year-wise distribution of articles.

The year-wise distribution of articles in the journal *JALCA* from January 1980 to Dec 2010 (12 issues per year) is graphically represented in Figure 3. It shows that highest number of articles was published in the years 1999 and 2006 (38 and 54 respectively) among the total articles (993) in those aforesaid years; the minimum number of articles is 20, published in 1997. On an average, it is observed that 25-35 articles per volume and 3-4 papers per issue are published by the authors.

Same is the case of *JSLTC* (from 1980-2010) and this growth is also graphically represented with their number of papers and years. It shows that the highest number of articles was published in the years 1989, 1999, and 2006 (25, 44 and 44 respectively) among the total articles (878) in those aforesaid years. The minimum number of articles is 13, published in 1981. On an average, it is

observed that 20-30 articles per volume and 3-4 papers per issue are published by the authors.

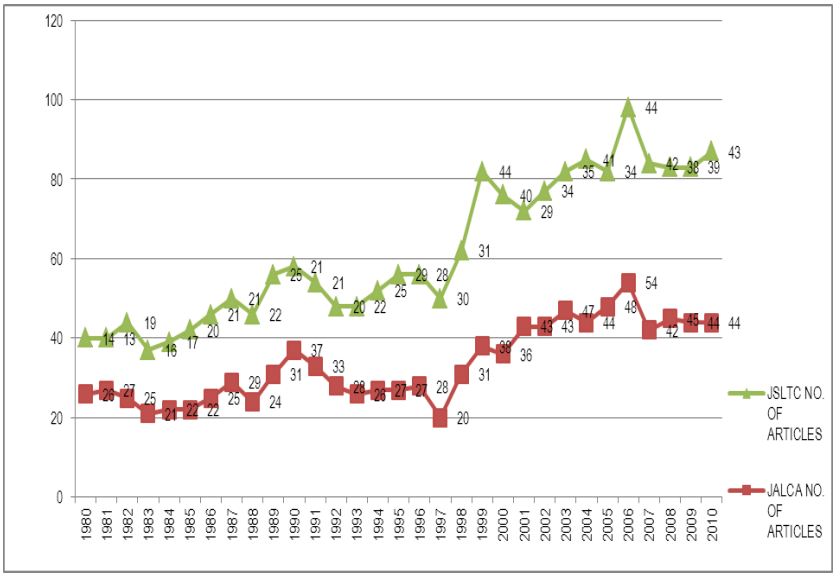

Figure 3. Yearly distribution of articles

Subject-wise pattern:

In the analysis and observation throughout the publication years of 1980-2010, it is found that the most research work is generally done on 'tanning' and different aspects of 'leather processing /manufacture'. In fact, some of the major areas as per Dewey Decimal Classification have been taken to study for the trend of emerging research areas among the aforesaid years. The critical observation found is that other areas of subject have got more or less same importance throughout the years. But the major thrust areas are – tanning and leather processing /manufacture. The graphical representation of different areas as per subject pattern (Figure 4) shows the emerging trend of research for leather science.

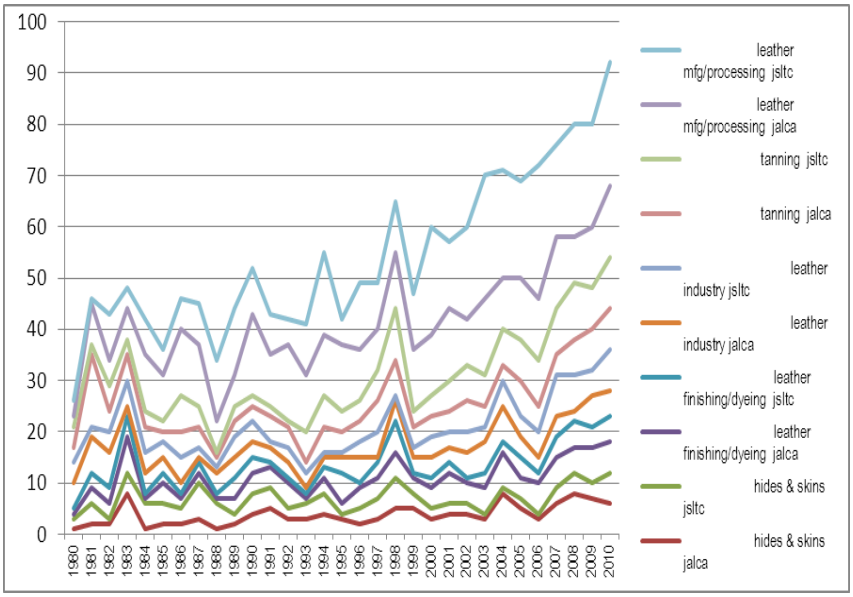

Figure 4 Emerging research trends

5. Leading Scientists and their Institutions

It is critically observed by going through the journals (print and online version) that many of the scientists have a large number of contributions through the years 1980-2010. They are leading in frequency of contributions in those journals.

- Authorship Pattern

Here the authorship pattern has been analyzed to find out the pattern of authorship – single, double and multiple (3 or more) authors. We found over the period 1980 – 2010 that in the last decade multiple author papers have grown sharply and form the most dominating category. Therefore, here the emerging trend of group research work is found in more recent stages. Some of these are given in Figure 5.

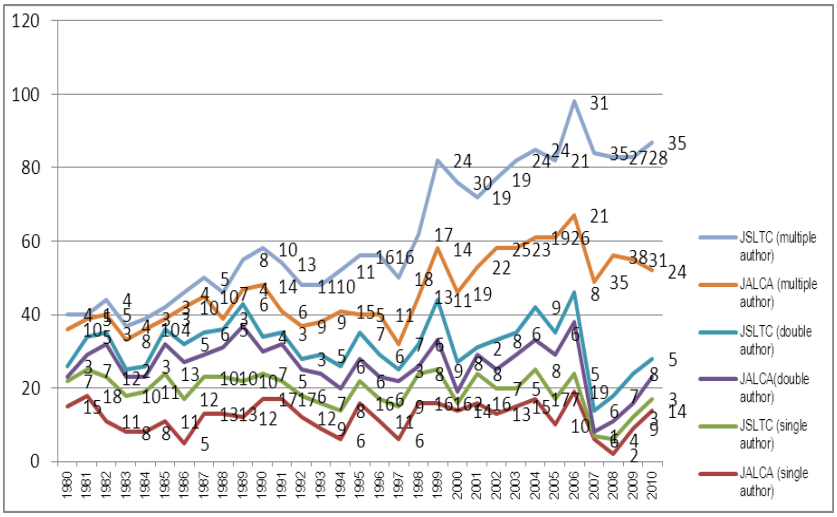

Figure 5. Authorship pattern

Using productivity of scientists, their authorship pattern and metrics like h index and g index we give in Table 7 the leading five (for lack of space) scientists and their institutions. Although there are no Indian scientists in the top ten, there are six Indian scientists in the top twenty.

Table 2. Indian scientists in top twenty

Name of the author	Institutions
A Wyler	Jerusalem college of technology, Portugal
Z Korenek	Department of Leather technology, Czechoslovakia
A E Russell	LIRI, South Africa
Z Vinklarek	Department of Leather technology, Czechoslovakia
K T Alexander	British Leather Confederation, U K

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6. Conclusion:

This analytical study is giving us a deep insight into the use of theoretical methods and results of bibliometrics in the practical field of answering the queries and needs of users of the library. There is scope for further research on these lines by extending the bibliometric methods used, nature of queries answered, and covering users from more disciplines. Although we have covered

the field of leather science we feel the methods described are applicable to other fields also.

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