CHAPTER 7
CONCLUSIONS & IMPLICATIONS

7.1 Introduction

The present study “Mapping of CALIBER, NACLIN and IASLIC proceedings: A Scientometric study” was concerned with the content and citation analysis of the proceedings since 2003 to 2009. The conclusions of the analysis from chapter 3rd, 4th, 5th and 6th were summarized and included in this unit. The findings in relation to the objectives (1.4) and hypothesis (1.5) have been discussed.

7.2 Conclusions/Findings

The conclusions / findings have been presented under the following headings.

7.2.1 CALIBER, NACLIN & IASLIC conferences
7.2.2 Content Analysis
7.2.3 Citation analysis

7.2.1 CALIBER, NACLIN & IASLIC conferences

The conferences under study, institutions, places, states, editors are the key points on which conclusions were drawn.

7.2.1.1 The conferences

1. The parent bodies viz. INFLIBNET, DELNET and IASLIC are organizing annual CALIBER, NACLIN conventions and seminar or conference proceedings respectively.

   INFLIBNET Center has been organizing CALIBER [Convention on Automation of Libraries in Education and Research Institutions] every year in different parts of the country in collaboration with different universities, since 1993. In the beginning it was at national level, since 2003 the convention is being organized at international level, So far 16 conventions were convened up to 2010 in which 8 were national and 8 at international level.
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DELNET (Developing Library Network), New Delhi has been organizing national convention NAACLIN (National Convention on Knowledge, Library and Information Networking) every year in different parts of the country in collaboration with different universities and deemed institutions. So far 13 conventions were convened up to 2010 at different places at national level.

IASLIC conferences began since 1956 but in the years 1958 & 1959 conferences were not held. These two years and the years 1971, 1973 and 1974 the conferences were not organized. Interestingly, it can be seen that first three conferences were held in the then Calcutta only. IASLIC seminar started in the year 1960-61. The year 1962 had both seminar and conference. So far 24 seminars and 27 conferences were convened up to 2010 in different places at national level.

IASLIC seminar and conferences are the old platforms as compared to the CALIBER and NAACLIN.

2. The conferences are organized every year by the parent bodies. Present study covers the conference proceedings for the years 2003 to 2009. In all 21 proceedings of seven years were analyzed in the study. Year wise distribution shows that all three conferences were convened every year.

3. Institutions and universities have hosted these events. Colleges have not come forward to host these prestigious events. Ten universities, two IIT’s and six other institutions have organized these conferences. In all eighteen host institutions organized 21 events. Jadavpur University, Kolkata (NAACLIN & IASLIC), Jamia Millia Islamia (Central) University (CALIBER & IASLIC) and Punjab University, Chandigarh (CALIBER & NAACLIN) hosted two events each. State, central universities, traditional as well as science & technology universities and IIT’s were the host of the conferences under study.

4. As regards the place, the international & national conferences under study were organized in capital, metro and important cities. All 21 conferences were organised in 16 cities. Nine out of 16 host cities were state capitals, 6 were important
cities and one was capital of India i.e. New Delhi. New Delhi, Kolkata had organized three events each. New Delhi had organized all the three conferences i.e. CALIBER, NAACLIN & IASLIC, where as Kolkata had organized IASLIC twice being its headquarter and NAACLIN once. Chandigarh had organized CALIBER & NAACLIN.

5. As regard the state of the organising conferences during the period under study Delhi and West Bengal had organized three conferences each. North Indian states i.e. Delhi, Punjab, Uttaranchal, Jammu & Kashmir and Uttar Pradesh had organized nine conferences. East Indian states i.e. West Bengal and Orissa organized four conferences; West Indian states i.e. Maharashtra & Gujarat had organized two conferences. South Indian states i.e. Karnataka, Tamilnadu, Pondicherry and Kerala had organized in all six conferences. North Indian states had more conferences followed by South Indian states, East & West Indian states had few events.

6. Amitabha Chatterjee and H. K. Kaul have edited respectively IASLIC and NAACLIN proceedings six times during the period under study. H. K. Kaul is a director of NAACLIN and he is chief editor of every proceeding volume. IASLIC did not have chief editor however the name of Amitabha Chatterjee appears on first in every volume. INFLIBNET director at the time of the convention is the chief editor of the CALIBER proceedings. Directors are the chief editors of the CALIBER & NAACLIN proceedings where as Amitabha Chatterjee is a prime editor of IASLIC. There was no representation of female as the chief editor.

7. Arjun Dasgupta and Ramkrishna Saha occupied first position in the ranking of editors. Both of them are editors of IASLIC conference proceedings. There were 34 male and 9 female editors. Gayas Makhdumi is the only editor who had edited both CALIBER & IASLIC proceedings. CALIBER proceedings are edited by maximum 23 persons, followed by IASLIC 15 and NAACLIN minimum by 6 persons only. It can be observed that the editors are appointed from the office bearer’s of parent organization and/or the staff of the institutions where the convention was held.

IASLIC editors are from the state of West Bengal where as NAACLIN appoints editor from the institute where the conference is held. Gayas Makhdumi is the only editor who had edited both CALIBER & IASLIC conference proceedings.
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8. The themes of conferences were on Information technology including digitization, open source, networking, e-contents, etc focused towards service profession & knowledge management. Hence, “The themes of the conventions are related to recent concepts“ (Hypothesis No. 1) is valid.

9. Of the total 1706 papers published in all 21 conference proceedings CALIBER had covered more than 48.48% contribution of papers followed by IASLIC 35.99%. NACLIN had only 15.53% share in the database. NACLIN did not publish any paper in abstract form. There was growing trend in publication of papers. There was growth in both full papers as well as abstracts. There were maximum 16.76% papers in the year 2009 where as 11.43% papers in the year 2004.

7.2.2 Content analysis of conference proceedings

To analyse content of the proceedings under study, following parameters were taken into consideration viz. Author productivity, authorship pattern, citation metrics of key authors, communication channels are the parameters analyzed in chapter 5, and major conclusions are enumerated in this section.

7.2.2.1 Author productivity

There were 1706 papers were written by 1698 authors. The average numbers of authors per paper were 0.995.

There were 827, 265 and 614 papers written by 1081, 330 and 649 authors resulted on an average number of authors per paper were 1.3, 1.2 and 1.5 in CALIBER, NACLIN and IASLIC conference proceedings respectively.

In overall data Dr. Ibohal Singh Charoibam, Lecturer in Department of Library and Information Science, Manipur University, Imphal was found most prolific author with 17 papers contributed to proceedings under study.

Dr. T. A. V. Murthy, the then Director of INFLIBNET and Editor-in-chief of CALIBER since 2003 to 2006, was found most prolific author with 16 papers in overall as well as CALIBER proceedings.
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Dr. H. K. Kaul, the Director of DELNET and Editor-in-chief of NACLIN, was found most prolific author with 8 papers contributed to NACLIN proceedings, hence “Chief Editors of the proceedings have maximum contribution /citations” (Hypothesis No. 2) is valid.

Dr. Ibohal Singh Charoibam, Lecturer in Department of Library and Information Science, Manipur University, Imphal was found most prolific author with 11 papers contributed to IASLIC proceedings.

There were 1706, 827, 265 and 614 papers written by 1040, 620, 199 and 408 first authors resulted in an average number of authors per paper were 1.64, 1.33, 1.33 and 1.5 in overall, CALIBER, NACLIN and IASLIC conference proceedings respectively. Dr. Ibohal Singh Charoibam, Lecturer in Department of Library and Information Science, Manipur University, Imphal was found most prolific first author with 12 papers contributed to proceedings under study.

In CALIBER Two authors Manoj Kumar Sinha, Assistant Librarian, Assam University and Umesha Naik Lecturer, Mangalore University wrote six papers each and ranked first. In NACLIN Two authors Dr. H K Kaul, Director, DELNET and Dr. Sangeeta Kaul, Network Manager, DELNET, New Delhi and editors of NACLIN proceedings wrote seven papers each and ranked first. In IASLIC, Atanu Kumar Sinha of Viswa Bharati, Shantiniketan wrote eight papers and ranked first.

Total number of 1706 publications of overall proceedings were divided into 3 equal zones, while numbers of authors writing similar number of papers in each zone were in the ratio of 123: 347: 570. The total number of 827 papers in CALIBER were divided into 3 equal zones, while number of authors writing similar number of papers in each zone is in the ratio of 107: 237: 276. The total number of 265 papers in NACLIN were divided into 3 equal zones, while number of authors writing similar number of papers in each zone is in the ratio of 30: 80: 89 and the total number of 614 papers in IASLIC were divided into 3 equal zones, while number of authors writing similar number of papers in each zone is in the ratio of 49: 154: 205. Bradford’s law of scattering verbally as well as graphically fits in to the set of data for overall as well as CALIBER, NACLIN and IASLIC proceedings, while mathematically it does not fit in to Bradford’s law scattering.
The productivity distribution does not fit Lotka’s inverse square law applied to it, in overall as well as individual data sets of CALIBER, NACLIN & IASLIC. However the Lotka’s law fits in to set of data by applying K-S test. Productivity Trend with proportion of authors for overall proceedings where only first authors were considered with exponent value of $\alpha = 2.15, 2.77, 2.42$ and $2.48$ for overall, CALIBER, NACLIN and IASLIC proceedings respectively.

The analysis of the data revealed that the maximum difference (Dmax) in observed and estimated cumulative proportions is less than the K-S. static (Critical Value) at 0.01 level of significance for all sets of data as well as CALIBER, NACLIN and IASLIC data. Therefore present set of data fits in to generalized form of Lotka’s law.

Percentage of papers published in proportions to the square root of total authors ranges from 11.48 to 17.1 which is much below 50% as predicted by De Solla Price.

Similarly it was observed that 20% of the authors contributed maximum of only 44.78% of the total papers. This is much below the 80% as predicted by 80/20 rule. In overall as well as CALIBER, NACLIN and IASLIC set of data 80% of papers were contributed by the authors in the range of 49.75% to 73.3%.

Hence neither Price square root law nor does 80/20 rule fit in to the present set of data.

On an average more than 195 papers were published each year in overall proceedings. The most productive years were 2009 for overall and CALIBER, 2007 for NACLIN and year 2008 for IASLIC. There are ups and downs in growth rate while during the year 2004, 2006 and year 2008 there is negative growth i.e. decline in the number of papers, for overall set of data. The average growth rate works out to 5.667 papers per year for overall set of data, 12.33 for CALIBER, -3.5 for NACLIN and – 3.167 for IASLIC proceedings.

There is imbalance in the publications of papers by authors. For one conference they wrote few papers while for other they do not write a single paper. Singh, Ibohal key author in overall set of data continuously contributed from 2004 to
2008 to the proceedings under study. Dr. T A V Murthy authored his 16 papers just in four years that too in CALIBER only. Dr. T A V Murthy has credit of contributing maximum seven papers in a year 2005. H K Kaul has contributed his paper every year in NACLIN proceedings. Ibohal Singh again key author in IASLIC proceedings wrote 11 papers to IASLIC since 2004 to 2008.

The male authors have published 69.05% to 73.28% papers where as female authors have published 26.72% to 30.95% papers in overall, CALIBER, NACLIN and IASLIC proceedings. The average ratio of female to male authors was 1: 2.62. The average numbers of papers per male author were 1.64 papers where as in female author it was 1.63, this clearly indicates that though female authors were less in number, average number of papers produced by female authors were equal to the average number of papers produced by male authors.

Further Chi square test was applied to overall as well as CALIBER, NACLIN and IASLIC set of data it proved that though the number of female authors were less in number they have produced equal number of papers in proportion

Though there is general assumption that there is significant association between gender of authors and productivity, for the present set of data for overall proceedings, CALIBER, NACLIN and IASLIC, this difference is considered to be not statistically significant, hence it clearly indicates that “Male and female authors produce equal number of publications” (Hypothesis No. 3 ) is valid.

In the overall data set, the subjects Information technology: Data communication, interoperability, Open source software, retro conversion top the list with 273 (16%) papers. In the CALIBER set of data, the subjects Information technology top the list with 184 (22.25%) papers. In the NACLIN set of data the subjects Information sources, supports and channels top the list with 50 (18.87%) papers. In the IASLIC set of data the subjects Sociology of information: Scholarly communication, bibliometrics, pricing, digital divide etc top the list with 140 (22.80%) papers. Hence, “The themes of the conventions are recent concepts“ (Hypothesis No. 1) is valid.
The digital library was the most favorite subject on which 119 (6.98\%) were published. Knowledge Management 80 (4.69\%), consortia 54 (3.17\%), etc are the areas of work on which more papers are published. In CALIBER and NACLIN too the digital library was the most favorite subject on which 85 (10.28\%) and 16 (6.037\%) papers were published respectively. In IASLIC proceedings Knowledge Management was the most favorite subject on which 33 (5.375\%) were published.

### 7.2.2.2 Authorship pattern

An analysis of authorship pattern based on overall set of data indicates that of the 1706 papers single authors contributed 732 (42.91\%) papers, 649 (38.04\%) papers were jointly written by two authors. In CALIBER, of the 827 papers, single authors contributed 301 (36.39\%) papers, 326 (39.42\%) papers were jointly written by two authors. In NACLIN, out of the 265 papers single authors contributed 137 (51.7\%) papers, 90 (33.96\%) papers were jointly written by two authors. In IASLIC, out of the 614 papers, single authors contributed 294 (47.88\%) papers, 233 (37.95\%) papers were jointly written by two authors.

Maximum collaboration of authors for single publication was six. Multi-authored papers were more as compared to single authored papers except NACLIN set of data. It indicates that research is shifting from solo to team hence; “Research is shifting from solo to team” (Hypothesis No. 6) is valid.

Maximum collaboration coefficient was 0.636 in CALIBER papers, followed by overall set of data with 0.571 and 0.521 for IASLIC. The degree of collaboration in NACLIN was below 0.5 i.e. 0.483 only.

In the year wise authorship pattern the highest number of single authored publications i.e. 135 were observed in the year 2003 and highest numbers of multi-authored publications i.e. 172 were in the year 2009. In CALIBER, the highest number of single authored publications i.e. 69 and highest numbers of multi-authored publications i.e. 110 were in the year 2009. In NACLIN, of single authored publications i.e. 32 in the year 2003 and highest numbers of multi-authored publications i.e. 25 were in the year 2007. In IASLIC proceedings the highest number
of single authored publications i.e. 68 and highest numbers of multi-authored publications i.e. 59 were in the year 2008.

The data sets of CALIBER, NACLIN as well as IASLIC are clearly indicating that year by year research is shifting from solo to team hence, "Research is shifting from solo to team" (Hypothesis No. 6) is valid.

In overall data, Dr. Ibohal Singh is the key author with 17 papers. From the 17 research papers he had 2 single authored papers. He was first authoring 12 times and second author for five times. Among multi-authored papers he had two authored (2), three authored (12), and four authored (1) paper. He had a cluster of 17 collaborators in his group. The most prolific authors in his cluster are Madhuri Devi Thodingjam (7), R. R. Lahiri (4), Shyam Singh (4) etc. His collaborative index is 1.41. Equivalence index of Dr. Madhuri Devi and Dr. Ibohal Singh is 0.4117 and Salton index is 0.642. The collaboration coefficient of Dr.Ibohal singh is 0.8823.

The key author of CALIBER Dr. T.A.V. Murthy had no single authored papers in present set of data. Among multi authored papers he had two authored 7 papers, 8 three authored and 1 four authored. He had a cluster of 20 collaborators in his group. In which four collaborators are female and remaining 15 are male. The most prolific authors were Cholin, V S and Dube Sonia. His collaborative index is 1.25. Equivalence index of Dr. T A V Murthy and V S Cholin is 0.25 and salton index is 0.5. By giving one credit to each author, the total authorship comes to 42. It can be noted that Dr. T A V Murthy had collaborated with Professor, Information resource officer, IIT Librarian, University Assistant librarian, Scientist, Technical officer, programmer, Head informatics etc. The collaboration coefficient is 1.

In NACLIN proceedings Dr. H. K. Kaul was the key author. Authorship pattern of Dr. H. K. Kaul was observed and it was found that all his papers were written by him alone. There was no collaboration; hence the collaboration coefficient of H. K. Kaul is zero.

Dr. Ibohal Singh had 12 research papers in IASLIC proceedings. He had two single authored papers. He was first authoring 7 times and second author 4 times. Among multi-authored papers he had two authored (2), three authored (6), and four
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authored (1) paper. He had a cluster of 9 collaborators in his group. The most prolific authors are Madhuri Devi Thoidingjam (4), R. R. Lahiri (4). The collaboration coefficient is 0.8182. His collaborative index is 1.22. Equivalence index of Dr. Ibohal Singh and Madhuri Devi is 0.3636 and Salton index is 0.631662.

25 Teachers, academic library staff and researchers were maximum contributors to the proceedings. University library staff includes University Librarian, Deputy Librarian, Assistant Librarian, Professional Assistants etc were maximum 318 (18.72%) contributor in the proceedings under study followed by College library staff which includes Librarian, Assistant Librarian and Library Assistants were 265 (15.6%). The teachers which includes Professor, Associate Professor (Reader) and Assistant Professors (Lecturer/Faculty) from the department of Library and Information Science were 264 (15.54%) contributors.

College librarians contributed maximum in all conference proceedings. University library staff has considerable contributions in all conference proceedings. Teachers in Library and Information also have significant contribution. The researchers and institution librarians also wrote for the conference proceedings.

26 Maximum 26 (1.53%) authors were from the Burdwan and Gulbarga University each followed by Bharathidasan university 25 (1.47%) authors. It can also be noted that the more number of authors were from the universities. There were 1698 authors from different 763 institutions. While determining the institutional affiliation of contributors in proceedings that university teachers and academic library professionals contributed 86.1% in overall proceedings, 85.95 in CALIBER, 75.45 in NALCIN and 86.9 in IASLIC proceedings hence, "Information professionals from academic institutions (libraries) contribute maximum research papers" (Hypothesis No. 4) is valid.

27 Delhi ranked first with 115 (6.77%) authors followed by Kolkata with 109 (6.42%) authors and Mumbai with 67 (3.957%) authors. Delhi, Mumbai, Kolkata, Bangalore Chennai etc are the prime cities from which maximum number of authors wrote for proceedings. More number of authors were from the state capitals and metro cities.
The authors of the proceedings under study were from 28 Indian states and 7 union territories. The state of Karnataka had occupied first rank with 249 (15.16%) authors followed by West Bengal 219 (13.33%) and Tamilnadu 174 (10.59%) authors. The state of Karnataka topped in contributions of overall and CALIBER proceedings where as it had been on second in IASLIC and third in NAACLIN. The state West Bengal topped in IASLIC where it was in top five for other proceedings. The state of Maharashtra topped contributions in NAACLIN proceedings and was in top four states in other proceedings.

The South Indian states have maximum 587 (35.73%) contributors followed by North India with 454 (27.63%) contributors and East with 319 (19.42%) contributors. As the 35.73% authors were from the South Indian states it indicates that the "South Indian states dominate the scenario" (Hypothesis No. 5) is valid.

In Overall and CALIBER proceedings, South Indian states dominated the scenario where as for NAACLIN and IASLIC north and East Indian states dominated the scenario. Hence it can be said that the more number of authors contribute for the proceedings from the zone in which the organizer is located, except the CALIBER.

Maximum 2002 (97.18%) authors were from India. The percentage of Indian authors ranged from 95.74 minimum in CALIBER to 99.69% in IASLIC. There were 58 (2.82%) authors from 21 foreign countries from North America, Australia, Europe, Africa and Asian continent. The CALIBER is an international convention still there is representation of only 46 (4.26%) of foreign authors. Though the NAACLIN and IASLIC are national conventions there was representation of foreign authors 10 (3.03%) and 2 (0.308%) respectively.

### 7.2.2.2 Citation Metrics of Key authors

The key author of CALIBER was Dr. T A V Murthy. His impact factor was 2.3125. The key author of NAACLIN was Dr. H. K. Kaul, his impact factor was found 3 and in IASLIC key author was Dr. Ibohal Singh with impact factor zero.

Researcher has attempted to calculate h-index with the help of Google scholar and it was found that h-index of Dr. Ibohal Singh, Dr. T.A.V. Murthy Dr. H. K. Kaul and it was zero, 5 and 108 respectively.
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33 g-index of key author in the present data set was calculated with the help of google scholar and it was zero for Dr. Ibohal Singh; 5 for Dr. T A V Murthy and 46.85 for Dr. H. K Kaul. Dr. T A V Murthy published 72 and received 72 citations for these papers. He had collaboration with maximum five authors. Dr. H. K. Kaul published 59 papers and received 177 citations for these papers. He had collaboration with maximum five authors.

7.2.2.4 Communication Channels

34 Maximum publication density was 0.0264 for NACLIN proceedings followed by 0.0123 for Overall proceedings. Minimum publication density was found for CALIBER i.e. 0.0085. The publication density of IASLIC was 0.0114.

35 The publication concentration for overall proceedings was 0.381% of the papers i.e. 853 accounted by 8 communication channels. In CALIBER 50% of the papers i.e. 413.5 accounted by 4 communication channels. Hence the publication concentration for CALIBER was 0.57143. In NACLIN, 50% of the papers i.e. 132.5 accounted by 4 communication channels. Hence the publication concentration for NACLIN was 0.57143. In IASLIC, 50% of the papers i.e. 307 accounted by 4 communication channels. Hence the publication concentration for IASLIC was 0.57143

7.2.3 Citation analysis of conference proceedings

The chief conclusions from chapter 6th based on analysis of citation distribution, authorship pattern, cited authors, channels of communications, bibliographic coupling, co-citations and self citations are specified in this section.

7.2.3.1 Citation distribution

36 Highest number of citations were 2121 (16.91%) in the year 2007, followed by 2032 (16.2%) and 1946 (15.51%) in the year 2008 and 2006 respectively. The lowest number of citations were 1456 (11.61%) in the year 2004.

There was growth in the citations during 2003-2007 then it was decreased during 2008-2009. NACLIN 2008 and IASLIC 2009 had sudden decrease in the citations which have resulted in the decrease of citations in overall set of data in the years 2008 and 2009.
In the case of overall proceedings there were 9.49 average citations per paper and 597.43 average citations per proceedings. There were maximum 11.1 average citations per paper in the year 2009 and minimum 8.17 average citations per paper in the year 2005. It can also be noted that as number of papers increases, number of citations also increases. It can be said that number of citations are directly proportional to the number of papers. There were maximum 100 citations for a paper; whereas 178 papers have no citation.

Website of wikipedia cited maximum 55 times followed by American Library Associations website 28 times. A reference book India: Reference annual was on 7th position with 13 citations. It was found that when authors are citing website they are not giving bibliographical details, it becomes difficult for the researcher to analyze such citations.

Maximum 99.79% citations were in English only 0.21 % citations were in other languages viz Bengali (0.12%), Hindi (0.047%), and Marathi (0.039%). Maximum citations were in English. Citations in other than English language were less than one percent. The language of conferences and the papers was English hence it was but natural that citations were in English mostly.

The subjects Information technology: Data communication, interoperability, open source software, retro conversion topped the list with 2252 (21.8%) citations, followed by Information treatment for services: Content analysis & management, Knowledge management, watermarking data-mining, data-warehouse etc 1536 (14.9%) citations. The themes of the CALIBER and NA CLIN are mostly on the application of information technology, internet and networking; maximum citations were on these subjects whereas IASLIC citations were mostly on library and information sources and services.

The subjects of source papers which were highest those subjects were highest in citation also. Citations on traditional topics in library and information science were decreasing as more and more citations cited related to the information and communication technology.

7.2.3.2 Authorship pattern
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There were three types of authorship viz. personal, website and corporate. Citations by personal authors were maximum 8442 (67.29%) in number followed by citations of websites 2946 (23.48%). Corporate authors were 1158 (9.23%). The corporate authors included publications authored by the government, institutes and associations.

Citations by personal authors cited more i.e. from 63% to 70 % followed by websites from 20.1% to 28%, corporate authors were 8.23 to 9.58% It indicates that personal authored documents were referred more. However the percentage of citing websites increased tremendously in recent past.

The highest 5757 (68.19%) number of citations observed with single authorship followed by 1813 (21.48%) citations with two authors and 481 (5.69%) by three authors. Multiple authorship citations were 2685 (31.8%) to the total personal authored citations. It may be inferred that single authored citations were predominant in overall proceedings. Single authored citations were 66.79% to 69.34% followed by two authored citations were from 21.07 to 21.81% and three authored citations were from 4.62% to 6.9%.

About 70% citations were single authored, 20% citations were two authored and 5% citations were three authored remaining 5% citations were of more than three authors.

Maximum 73.9% of single authorship found in the year 2003 followed by 68.76% in the year 2004. Minimum 62.2% of single authored citations were recognized in 2005. Single authored citations were maximum 5757 (68.19%) followed by two authored citations were 1813 (21.48%). The single authored citations were ranging from 62.2% in the year 2005 to 73.9% in the year 2003. It seems that there is trend of writing papers for conference proceedings by single author only.

The degree of collaboration in the citations in the proceedings varies from 0.306 to 0.332. The degree of collaboration for overall proceedings was 0.318. The degree of collaboration in the proceedings varies from 0.26145 to 0.3775 during the year 2003 to 2009. The degree of collaboration was maximum in the year 2005 (0.3775) and minimum in the year 2003 (0.26145).
When the value of C increases it means that the level of collaboration is increasing and vice-versa. The degree of collaboration shows that citations in the proceedings were predominantly single authored citations. There was no fixed trend in the level of collaboration, it was neither increasing nor decreasing.

7.2.3.3 Cited authors

C. A. Lynch was on rank first with 39 citations, followed by F.W. Lancaster with 36 citations. The first two authors were foreigners. Authors on third rank with 35 citations were Dr. Jagdish Arora and M. K. Sinha. The father of library science Dr. S. R. Rangathan was on 6th rank with 28 citations. The existing director of INFLIBNET Dr. Jagdish Arora ranked first with 20 citations in CALIBER. Hence, “Chief Editors of the proceedings have maximum contribution/citations” (Hypothesis No. 2) is valid. In NACLIN V.N. Patkar ranked first with 20 citations where as director of DELNET Dr. H. K. Kaul ranked second with 13 citations. Hence, “Chief Editors of the proceedings have maximum contribution/citations” (Hypothesis No. 2) is valid. In IASLIC, Dr. S.R. Rangnathan and K. A. Raju ranked first with 15 citations where as F. W. Lancaster and C.A. Lynch ranked second with 14 citations each.

Maximum cited authors in the CALIBER and NACLIN were authors of the source documents. The topics discussed in these two conferences were on latest themes and there is no sufficient print literature available on these current topics might be the reason that author cites the authors from the previous literature from the proceedings and by the authors.

The productivity distribution does not fit Lotka’s inverse square law applied to it, in overall as well as individual data sets of CALIBER, NACLIN & IASLIC, hence a different procedure was adopted.

However the Lotka’s law fit in to set of data by applying K-S test. Productivity Trend with proportion of authors for overall as well as CALIBER, NACLIN and IASLIC proceedings where only first authors were considered with exponent value of $\alpha=2.53$, 2.51, 1.54 and 2.71 respectively.
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The analysis of the data revealed that the maximum difference (Dmax) in observed and estimated cumulative proportions is less than in overall and IASLIC data where as the K-S static (Critical Value) at 0.01 level of significance for all sets of data. In CALIBER the difference is insignificant. Therefore present set of data fits in to generalized form of Lotka’s law except NAACLIN set of data.

7.2.3.4 Channels of communications

There were total 12546 citations cited in 21 conference proceedings under study. Maximum 4306 (34.32%) citations were of websites followed by 3839 (30.6%) citations of periodicals and 2687 (21.42%) citations of books.

It was clear that the websites were most used bibliographic form followed by periodicals, books, conference proceedings, reports and theses. Researchers are citing more and more websites in technological papers as the sources from websites are easily available and it covers the latest information. Hence, “Citation trend is shifting from traditional sources to internet sources” (Hypothesis No. 7) is valid.

The periodicals have also its own importance in scholarly communication.

7.2.3.4.1 Books

Encyclopedia of Library and Information science cited maximum 27 times followed by India Reference annual cited 20 times. Annual review of Information science & technology ranked third with 16 citations. It was surprising to note that even in the age of Information technology the book Five laws of library science by Dr. S. R. Ranganathan is still referred by the researchers. Reference and recent technology books are cited more times. There were 2107 books and 2687 book citations in overall proceedings. Reference books had maximum citations. The two books viz. Reference service and Five laws of library science by Dr. S.R. Ranganathan were referred still though those were written long back.

Ess Ess publications acquired first rank with 79 citations followed by Library Association publishing ranked second with 60 citations in overall proceedings. There was good combination of Indian and foreign publisher in first ten ranked publishers.
Library Association in CALIBER, Prentice Hall of India in NACLIN and Library Association publishing in IASLIC obtained first rank in rank list of publisher.

In overall as well as CALIBER, NACLIN and IASLIC proceedings there was sudden growth in the number of citations in last ten years. The half-life of the literature was found ten years i.e. fifty percent citations were from last ten years only. The unidentified citations with missing year figured 284 (10.57%) for overall, 118 (11.38%) for CALIBER, 41 (7.02%) for NACLIN and 125 (11.73%) for IASLIC. The first citation identified from the year for 1373 Overall and CALIBER proceeding, 1893 for NACLIN and 1911 for IASLIC. It can be said that authors cited latest publications in their research papers.

The capital city of India New Delhi topped first with 576 citations of the books published from the city followed by London with 302 cited publications. Six out of ten cities are from other countries and only four cities from India can obtain place in the top ten rank list. This indicates that researchers refer national and international publication for writing paper in proceedings. New Delhi ranked first in overall as well as CALIBER, NACLIN and IASLIC proceedings.

Books published from Indian metro cities like New Delhi, Kolkata, Mumbai, Bangalore were cited more in the conference proceedings under study. Publications from international places like London, New York, Chicago, Washington, Cambridge, Boston, Oxford, Berlin, Medford etc. were also cited in the conferences under study.

Maximum 887 (33.01%) books were from India followed by USA and UK with 518 (19.28%) and 490 (18.24%) citations respectively. These three countries contributed 70% cited books. Citations with untraced country of publication were 641 (23.85%).

Authors cited books from 14 plus countries around the globe. Maximum 70% of citations were published from three countries i.e. India, UK and USA. Publications from the countries of Europe, North America, Africa and Asian continents were cited in the proceedings.

7.2.3.4.2 Periodicals (Journals)
In overall periodicals, D-lib magazine ranked first with 97 citations followed by IASLIC Bulletin with 96 citations and University News with 36 citations. Library and Information Science Journals were more than the general and other subject journals. D-lib magazine ranked first in CALIBER and NAACLIN where as IASLIC Bulletin ranked first in IASLIC proceedings. Maximum Library & Information science journals found place in rank list. There was good combination of Indian and foreign journals in citations.

By dividing total number of cited journals into 3 equal zones, the relationship between the zones is 21:96:450 which is 1:4.57:21.43. The square of n i.e. \((4.53)^2\) is 20.88, which is nearer to 21.43. Hence the relation \(1:n:n^2\) proved in CALIBER. In NAACLIN relationship between the zones is 21:62:229 which is 1:2.96:10.9. The square of n i.e. \((2.95)^2\) is 8.76, which is nearer to 10.9. Hence the relation \(1:n:n^2\) proved in NAACLIN.

In IASLIC and overall set of data the relation \(1:n:n^2\) is not proved exactly however it proves general statement that the when journals grouped into a number of zones each producing a similar number of relevant articles, number of journals in each zone will be increasing rapidly.

The journals from 83 years were cited in the proceedings. Maximum 166 (10.2%) citations were from the year 2002. There were more than 100 citations per year from the year 1999 to 2006. The decade 2000 to 2009 covered 1060 (65.23%) citations. The unidentified citations with missing year figured 25 (1.72%).

The half life of journal literature was 8 to 9 years for the set of data under study. This indicates that the documents referred by the authors of papers published in proceedings were latest and half of the literature is within ten years span.

Maximum 1127 citations from 267 journals were cited from the periodicals published in USA followed by 976 citations from 154 journals originated from India. The UK had also large contribution of 886 citations from 137 journals. These three countries had share of 77.87% in overall proceedings. Over all 3838 citations were cited from 950 journals published from 35 plus countries.
In LIS journal D-lib Magazine tops the list of core journals in Library Information science with 97 citations followed by IASLIC Bulletin with 96 citations and Journal of Documentation with 77 citations. D-LIB Magazine, IASLIC Bulletin, Journal of documentation, ILA Bulletin etc were few from the highly cited core journals in the conference proceedings under study.

IASLIC bulletin had maximum 96 citations followed by University News 83 citations and ILA bulletin 71 citations. Two non-LIS journals were there in the top ten Indian Journals. Library and information Science professional journals as well as journals from other subjects were cited from the Indian journals. IASLIC Bulletin, University News, ILA Bulletin, DESIDOC Bulletin of LIS and IT were amongst the highly cited Indian journals.

**7.2.3.4.3 Websites**

The website, en.Wikipedia.com had maximum 91 citations followed by ala.org and ifla.org with 63 and 38 citations respectively. It can be stated that from the above discussion researchers are referring more and more websites for their research publications. Hence, “Citation trend is shifting from traditional sources to internet sources” (Hypothesis No. 7) is valid.

Websites of Wikipedia, American Library Association, International Federation of Library Association are referred maximum times.

Extension .org websites were cited maximum 1350 times followed by .com 1293 and .edu 474 times. These three extensions were on same rank in overall, CALIBER, NACLIN and IASLIC proceedings.

Indian websites were cited maximum 569 times followed by .uk 309 times and .ca 84 times. Websites of Indian, United Kingdom, Canada, Australia are referred more by the researcher for writing papers in the conference proceedings under study.

**7.2.3.4.4 Conference proceedings**

ICDL International conference on digital libraries proceedings had maximum 39 citations followed by CALIBER proceedings of 2006, with 27 citations, 2004 with 24 citations. In top five four conferences were held by INFLIBNET. International
conference on digital libraries was cited maximum times by the authors of the papers contributed in the conference proceedings under study. It can be said that the author of the conference papers refer previous proceedings of the conferences on similar themes.

64 CALIBER organized by INFLIBNET cited maximum 183 times in the proceedings under study. IASLIC seminar and conferences were cited 125 times where as NAACLIN was cited 69 times. The proceedings under study were ranked on top three positions. CALIBER, NAACLIN, ICDL, IFLA, ILA, SIS, PLANNER were prominent conferences held at national and international level.

65 INFLIBNET had acquired first rank with 235 citations to its conference publications followed by IASLIC ranked second with 125 citations in overall proceedings. Authors of papers have cited national and international conferences held in India and abroad. Conference proceedings published by INFLIBNET i.e. CALIBER and PLANNER are popular in the authors of the papers writing for conference proceedings. Authors refer national and international conferences published by national and international organization. INFLIBNET, IASLIC, DELNET, IFLA, ILA etc are the successful publishers of the conference proceedings.

66 In overall as well as CALIBER, NAACLIN and IASLIC proceedings there was sudden growth in the number of citations in last eight years. The half-life of the literature was found eight years i.e. fifty percent citations were from last eight years only.

The unidentified citations with missing year figured 28 (1.934%) for overall, 15 (2.19%) for CALIBER, 7 (2.44%) for NAACLIN and 6 (1.25%) for IASLIC. The first citation identified from the year for 1897 Overall and 1948 for CALIBER proceeding, 1897 for NAACLIN and 1963 for IASLIC. It can be said that authors cited latest publications in their research papers.

67 The city Ahmedabad ranks first in the rank list of cited conference proceedings with 238 citations followed by Delhi with 228 citations. First seven top cities were Indian the two cities were from abroad. Ahmedabad is headquarter of INFLIBNET. INFLIBNET organizes two events annually i.e. CALIBER and
PLANNER. The place from which the conference proceedings published ranked first in general.

Maximum 878 (60.63%) of citations were from Indian publications followed by USA with 69 (4.76%). There were 1448 citations of conference proceedings of publications from 36 countries in overall dataset. Maximum citations of conference proceedings were from Indian publications. Authors of the papers published in the conference proceedings under study referred documents around the globe.

### 7.2.3.5 Bibliographic coupling

There were 895 bibliographical couplings. The maximum strength of bibliographic coupling was 6 in one couple of papers. Two couples of papers were with common five citations. The bibliographic coupling of CALIBER papers with IASLIC papers was maximum 109 followed by 58 in CALIBER & NACLIN and 30 in IASLIC & NACLIN. The maximum strength of bibliographic coupling was 6 in one couple of papers by Rao, P. Venkata and Vishala in 2007 CALIBER proceeding.

### 7.2.3.6 Co-citations

Co-citations identified in 5 cases when Jagdish Arora was cited T.A.V. Murthy was also cited because both are related to CALIBER as present and past Director of INFLIBNET respectively. There were 433 bibliographic couples with 912 citations.

In CALIBER, too Jagdish Arora was cited when T.A.V. Murthy was also cited in four cases. There were 148 bibliographic couples with 304 citations.

In NACLIN, in 4 cases when H. K. Kaul was cited V. N. Patkar was also cited because both are related to NACLIN as Kaul as Director of DELNET and Patkar as the leading author in NACLIN proceedings. There were 46 bibliographic couples with 94 citations.

In IASLIC, in 4 cases when Ingwersen, P was cited Bjorneborn, L was also cited. There were 176 bibliographic couples with 362 citations.
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7.2.3.7 Self-citations

Amongst the total 412 self citation cases maximum 151 (36.65%) self-citations appeared in the IASLIC followed by 165 (40.05%) in CALIBER and 96 (23.3%) in NAACLIN proceedings. Average rate of self-citation was ranging from 0.039 maximum in IASLIC to 0.027 minimum in CALIBER. Percentage of self-citation was maximum 3.943 in IASLIC and minimum 2.725 in CALIBER. Manoj Kumar Sinha has maximum 23 self citations.

7.3 Implications of Results

Based on experience, problem faced by the researcher in data collection, data analysis and results of the present study following implications have been suggested to Library and Information Science Professionals, organizers, editors of the proceedings and the authors of the papers.

7.3.1 For Library and Information Science Professionals

There is an urgent need to create a database of conference papers or conference paper index. This will help as a bibliographic control tool as well as it will also help in control of duplication of papers by same title and some times republication of same paper in different conference and journals.

7.3.2 For Organizers

The seminar themes are on latest trends and more stress has been given to the information technology. There is need again to discuss basic subjects in the light of new technology.

The seminars are organized in few states & cities only. Every state should get privilege to organize such important events. So that the professionals from that state get benefit on large scale.

The CALIBER is an international convention and participants around the globe join it. However the events are organized in India only. Organizers should try to organize it in abroad.

Due representation should given to the female professionals in editorial processes such as Chief Editor or the Editor.
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7.3.3 For Editors of the proceedings

The editors of the proceedings needs to be more careful in selecting, editing the papers. Even there are many print mistakes in the proceedings that need to take due care in the editing. It is necessary to give clear guidelines and be adhering to it. They should give proper guidelines for citation of website.

7.3.4 For the authors

The authors must take care of quality of paper, its content, structure and references etc. language of the paper must be of high quality, research oriented case studies should be more than that of the theoretical papers. Author should follow guidelines given by the editorial board. Republication of paper as it is or with minor changes in other proceedings or journals should be avoided. Citations of website should be standard and uniform covering all bibliographical details and date of access of website by the researcher.

7.4 By-Product of the Study

Researcher has developed a cumulative database of conference proceedings under study (Appendix - A) which is new contribution to the knowledge in general and to the Library and Information Science subject in particular.

7.5 Areas for Further Study

The further study can be carried out on the topics; viz.

i) Scientometric study of other type of conference proceedings like ILA, SIS etc.
ii) Obsoloence studies of the journal literature etc can be undertaken.