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IMPORTANT FINDINGS AND SUGGESTIONS

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7.0 INTRODUCTION

The present study is the ***"Information Use Pattern by Scientists Working at Selected CSIR Laboratories Northeast and Eastern India: A Study"*** which covers 350 scientists and research scholars of seven CSIR laboratories of North East and Eastern India. It is very difficult to survey all the science and technology staff of the laboratories within a very short time. For getting a clear image of users of KRC, of all the seven laboratories the scholar personally visited all the science and technology departments and met different categories of scientists and research scholars. The data analysis and interpretation chapter of the present study has been divided into three parts: Part A- Analysis of the responses received from the librarian/ librarian in- charge, Part B- Analysis of the responses received from the scientists and Part- C: Bibliometric analysis of the Research Output of the Scientists.

In order to know the Information Use Pattern of the Scientists of the selected CSIR laboratories of Northeast and Eastern India the researcher has designed and distributed questionnaires among the Librarian/ Librarian in- charge and Scientists and Research scholars of all the seven laboratories. The research scholar received 100% responses from the Librarian/ librarian in- charge and 82.29% responses from the scientists. The research scholar has also conducted a bibliometric study of the research output of the scientists of the selected seven CSIR laboratories of North East and Eastern India by using SCOPUS Database.

After a careful analysis of the data from the questionnaires and other sources of information concerning to the present study of the KRC, the following summary and findings could be drawn upon.

7.1 IMPORTANT FINDINGS OF THE STUDY

The researcher had divided important findings of the study into three parts which are as follows:

7.1.1 Findings from the Libraries

7.1.1.1 General Information about the CSIR Laboratories and KRC's

- The present study indicates that the CSIR- CGCRI was established in the year 1950; its library is well known as Knowledge Resource Centre (KRC) and total numbers of 7 staff are working at KRC. CSIR- IICB was established in the year 1935. It is the first established laboratory among all the seven laboratories under study and it consists of 61 experienced and expert scientists. The KRC of IICB is named as Knowledge Resource Centre which consists of 7 professional and non- professional staff. The CSIR- CMERI was established in the year 1958 which comprises 121 scientists and the library is known as Knowledge Resource Centre which consists of 4 staff. The CSIR- CIMFR established in the year 1954 and the library and information division is known as Knowledge Resource Centre which comprises 7 numbers of professional and non- professional library staff. The CSIR- NEIST was established in 1961 which have 97 expert and experienced scientists working for the fulfillment of the institutions goal and the Knowledge Resource Centre comprising 5 professional and non- professional staff. The CSIR- NML was established in the year 1950 which have 138 scientists. The Information Management and Dissemination Centre (IMDC) of NML are renamed as Knowledge Resource Centre which consists of 14 staff. The last laboratory listed in the above table is CSIR- IMMT which was established in the year 1964 comprises 92 scientists. The Library and Documentation Division of IMMT is also called Knowledge Resource Center (KRC) like other CSIR laboratories which have only two staff working for the library resource management.

- From the analysis it has found that most of the KRC's have Permanent Librarian. Only two laboratories have Librarian In- charge/ Head namely NML, Jamshedpur and CMERI, Durgapur respectively. The laboratories have appointed one of the Principal Scientist/ Chief Scientist as the Librarian In-

charge/ Head of the KRC's. Except CMERI, all the laboratories KRC's have their own web address. The Libraries of CGCRI, IICB, CMERI, NEIST and NML have their E-mail address, but the libraries of CIMFR and IMMT do not have any E-mail address.

- It is found that all the KRC' are kept open in the working days and they are closed in Sunday. Out of seven (7) KRC's majority (85.71%) of the KRC's were kept close during holidays and vacations. The rest of the 14.29% KRC is open during holidays and vacations.

7.1.1.2 Library Collections, Budget and Collection Development

- The analysis shows the total number of collection in the KRC's in terms of books, current journals, back volumes, theses, reference tools, microfilm/ microfiche, CD-ROM and other resources. It gives details of the total number of library collections in the laboratories. CGCRI have total number of 49,056 books including bound volumes of periodicals. The IICB, Kolkata have 14,063 numbers of books, 32,714 numbers of back volumes, 190 numbers of current journals, Theses 242 numbers and 743 numbers of CD ROM. CMERI having 28,342 numbers of books, 18,457 numbers of back volumes, 27 numbers of current journals, 2664 numbers of CD ROM and 20,286 numbers of standards. CIMFR, Dhanbad have 13,000 books, 12,000 back volumes, 71 current journals, 50 theses, 99 CD-ROM and 500 other documents. NEIST, Jorhat have 18,568 books, 23,158 back volumes, 103 current journals 167 theses, 86 reference tools and ISI 3135. The NML, Jamshedpur has 50,000 books, 35000 back volumes, 80000 current journals, 200 theses, 5000 reference tools, 500 CD-ROM, 10000 newspaper clippings, 10000 R& D Reports, 5000 in- house publications and 5000 patents/ standards. The IMMT, Bhubaneswar has the collection of 14,023 books, 17,628 back volumes, 90 current journals and 4 microfilm/microfiche.

- The survey result that the KRC's of the laboratories namely CGCRI, IICB, CMERI, NEIST, NML and IMMT have their own collection development policy, separate library budget and selection policy. CIMFR- KRC, Dhanbad have separate budget and selection policy and they does not have collection

development policy. The survey elucidates that out of seven laboratories 85.71% laboratories have collection development policy and 14.29% laboratory do not have such policy. All the seven KRC's have their separate budget and selection policy which shows 100% responses.

- Further, the study reveals that the library budget of each laboratory from the session 2009-2010 to 2013-2014 for five years. The amount of library budget is highest that is 1 crore 35 lakhs, 1 crore 25 lakhs, 1 crore 30 lakhs in IICB, Kolkata for the sessions 2009-2010, 2010-2011, 2011-2012 and 2012-2013 respectively. For the session 2013-2014, the library budget is highest that is 1 crores in IMMT, Bhubaneswar as compared to other six laboratories.

7.1.1.3 Library Building

- From the study it has been found that all the KRC's (100%) have adequate spaces to accommodate all the library collections and provide library services. The majority (85.71%) of the KRC's has very good sitting arrangement in reading room/ periodical sections. Besides these the Results also indicates that 57.14% KRC's have special provision of research cubical/ research which is a special feature of the Scientific/ Research library.

7.1.1.4 Processing of Library Materials

- The study shows that KRC's of CGCRI, CMERI, CIMFR and NEIST have taken one week to present the books for issuing. The KRC's of NML and IMMT have taken two weeks and IICB takes one month to present the books. It was interesting to note that majority of the KRC (85.71%) were using Universal Decimal Classification (UDC) scheme and whereas very few KRC's were using Dewey Decimal Classification (DDC) and not a single KRC were using Colon Classification (CC) and other schemes. So, from the result it was clear that most of the KRC's prefer UDC for classification of reading materials.

- From the analysis it also found that 14.29% KRC's were using Classified Catalogue Code (CCC) and majority of the KRC's (85.71%) were using AACR-2 for cataloguing purpose. Use of AACR and other catalogue code is 0%.

- From the survey result it is reflected that the majority (85.71%) KRC's were using only electronic method for charging materials and 28.57% KRC's were using both electronic and traditional methods for charging of library reading materials.

7.1.1.5 Services Provided by the KRC

- The survey result shows that out of seven KRC's 71.73% have provided both documentation service and bibliographic and current content service, and 85.71% were providing active reference service.

- The 42.86% KRC's are disseminating services through document, 57.14% disseminating services through electronic form and 14.29% KRC disseminating services through other media like Social media.

- The result shows that the 57.14%, 100%, 42.86%, and 14.29% KRC's have provided current content, new arrivals, newspaper clippings and EDI services and 28.57% KRC's have provided E- SID and also alert service to its users respectively.

7.1.1.6 Library Automation Practices

- The research scholar has been prepared multiple choice questions to know the name of the library automation software and the options are Libsys, CDS/ISIS/WINISIS, SLIM++, SOUL 2.0, Koha and others. From the survey result it has been found that 57.14% KRC's are using Libsys software for library automation, 42.86% KRC's are using Koha, 14.29% KRC are using CDS/ISIS/WINISIS and SLIM++ and 28.57% KRC's are using other software's like Aurum 3.0 and Bibliosys for automating their library operations. The result shows that no KRC have using SOUL 2.0 for library automation purpose.

- From the study results it has been indicates that different areas of the KRC's were being automated. The 42.86% KRC's have been automated their acquisition section, 100% KRC's have automated the cataloguing section, 85.71% KRC's have automated circulation section, 57.14% have been automated

serial control, 71.43% automated back volume section, 42.86% KRC's have automated their text book section.

- All the seven KRC's have provided automated library catalogue service to its users. The KRC- CGCRI has provided OPAC service to its users. The IICB and NEIST have provided Web OPAC to its users. The KRC- IMMT has provided other service which was not mention in the questionnaire. The KRC of CMERI and CIMFR were providing both OPAC and Web OPAC services to its users. The result shows 14.29% KRC's have provided OPAC service, 28.57% have provided Web OPAC, and 42.86% KRC's have provided both OPAC and Web OPAC service and 14.29% have provided other online automated service.

- The result shows that all the seven (100%) KRC's have provided automated circulation services.

7.1.1.7 .ICT Infrastructure

- Regarding ICT Infrastructure of the KRC's the study reveals that the CGCRI-KRC have 15 computers, 1 scanner, 5 printers 1 photocopier, 3 telephones; IICB- KRC have 40 computers, 3 scanners, 6 printers, 1 photocopier, 5 telephones and CMERI- KRC has 9 computers, 2 scanners, 1 barcode scanner, 4 printers, 2 photocopiers, 4 telephones, 1 TV, 1 VCR. CIMFR- KRC has 10 computers, 1 scanner, 2 barcode scanner, 3 printers, 1 photocopier, 2 telephones, and 1 projector. The NEIST- KRC has 6 computers, 2 scanners, 6 printers, 2 photocopiers, 1 telephone and 1 projector. The NML- KRC have 28 computers, 4 scanners, 2 barcode scanners, 1 fax machine and 10 telephones. The IMMT-KRC has 15 computers, 2 scanners, 1 barcode scanner, 5 printers, 2 photocopiers and 2 telephones.

7.1.1.8 Networking of the KRC

- From the study it was found that all the seven (100%) CSIR laboratories have their own websites.

- The study shows that 14.29% KRC's have independent network and 85.71% KRC's were the part of campus network.

- From the result it has been found that CGCRI has been using Enhanced CAT5 and Fiber optic cables, Manageable hub, Cisco Router and 10/100 MBPS switches for network connectivity. IICB was using Fiber optic cables, Cisco router and 10/100 MBPS switches. CMERI uses fiber optic cable and 10/100 MBPS switches. CIMFR was using CAT5 cabling, unmanageable hub, Cisco router, PCI Bridge and 10/100 MBPS switches. NEIST was using fiber optic cable, manageable hub and 10/100 MBPS switch. NML has been using fiber optic cable, Motorola router, 10/100 MBPS switches and KRC, IMMT was using fiber optic cables, manageable hub and 10/100 MBPS switches.

- From the study it was found that the campus LAN of CGCRI, CIMFR and NML were covering to all Labs/centers/units. The campus LAN of the IICB, CMERI and NEIST covered all the departments. The campus LAN of IMMT was spread to all scientists and officers residences.

- From the study it was found that Campus network and library network of all the seven (100%) laboratories were connected to internet.

- The campus network and library network of the CGCRI, IICB and NML were connected to Internet by the Internet Service Provider- NICNET. The KRC's of the CGCRI was also connected through Tata Communication and NML was also connected through BSNL. CMERI and CIMFR are connected through BSNL services. The library network of the IMMT was connected through STPI (Software Technology Park of India) and NEIST was using NKN (National Knowledge Network)/Sify services.

- From the survey result it was found that the type of internet connection was being used in the KRC (Library), departments and residences of CGCRI, IICB, CMERI and CIMFR were Leased line connectivity with <=6.0 Mbps. & above. NEIST was using Radio link connectivity with <=6.0 Mbps bandwidth. The KRC-NML was using both Leased line and Cable network connectivity with

<=2.0 to <=4.0 Mbps bandwidth of library network. The KRC of IMMT was using both Dial-up and Cable network connectivity with <=4.0 to <=6.0 Mbps bandwidth of library network.

- The study reflects that all the laboratories were the part of Library consortium but are not the member of any library network in India. All the seven laboratories (100%) namely CGCRI, IICB, NML, CIMFR, CMERI, IMMT and NEIST were the part of National Knowledge Resource Consortium (NKRC). The KRC of NEIST was also the member of DelcoN.

- All the seven KRC's have provided Internet facilities. The result shows that the KRC of CGCRI have 15 numbers of PCs connected to internet, Intel i5 core PC and per day 10 numbers of users acceding internet in the KRC. The KRC of IICB has 40 numbers of PCs connected to internet, HP computer and per day 35 numbers of users acceding internet in the KRC. The KRC of CMERI has 02 numbers of PCs connected to internet, P-IV PC and per day 8 numbers of users acceding internet in the KRC. The KRC of CIMFR has 10 numbers of PCs connected to internet and per day 10 numbers of users acceding internet in the KRC. The KRC of NEIST had 6 numbers of PCs connected to internet; NML has 15 PC, Dual core processor, 45 numbers of users accessing the internet per day and IMMT have 15 numbers of PCs connected to internet, and per day 25 numbers of users acceding internet in the KRC.

- The result shows KRC's CGCRI, IICB, CIMFR, IMMT were providing communication network services like E-mail and Telephone service. The KRC of NML is providing E-mail, Telephone, Fax service. CMERI and NEIST were providing only E-mail service in their KRC.

- All the KRC (100%) have provided personal e-mail facilities to the scientists, research scholars and technical staffs

7.1.1.9 Electronic Resources

- The study shows that CGCRI has subscribed Full- text databases like IEEE Online, Springer link, Nature, RSC and ACS. IICB, Kolkata has subscribed all the resources available through NKRC. CMERI, Durgapur has mainly subscribed IEEE Online, Springer Link, Standards (CD/Intranet) and RSC. The KRC- CIMFR subscribed E- resources like Science Direct, IEEE Online, Springer Link, ASME, ASCE, Nature, RSC and ACS. NEIST, Jorhat was subscribing Science Direct, IEEE Online, Springer Link, Nature, RSC and ACS. The KRC of the NML, Jamshedpur had subscribe Science Direct, IEEE Online, Springer Link, ASME, Nature, Standards (CD/ Intranet), RSC, ACS and other resources like Sage, Wiley, Emerald and Delphin. The IMMT, Bhubaneswar has subscribing e- resources named as Science Direct, Springer Link, ASME, Nature, RSC and ACS through the consortium.

- From the present study it has been observed that CGCRI, IICB, CIMFR, NEIST, NML and IMMT were subscribing bibliographic database Web of Science. NEIST and IMMT were also subscribing SCOPUS database and IICB is subscribing SciFinder along with Web of Science. The survey results shows that majority (85.71%) of the KRC's were subscribing bibliographic database Web of Science and 28.57% KRC's were subscribing SCOPUS database.

- The total number of e-books and e-journals subscribed by the KRC's were CGCRI subscribing 400 e-journals; IICB 2500 e-journals; CMERI 3 e-journals; CIMFR subscribing e-journals from 10 publishers; NEIST subscribing 86 e-books and 2600 e-journals and NML subscribing e-books through e-consortium and 425 e-journals. IMMT has the subscription of 500 e-books and 4500 e-journals.

- From the present study it was reflected that during the session 2013-2014, NEIST has spent 100.00 Lakhs for subscribing electronic resources which was the highest amount from 2009 to 2014. IICB did not comment regarding amount spent for e- resources subscription. CGCRI did not provide the data for the

session 2009 to 2010. CMERI, CIMFR and IMMT also have not mention the amount spent for e-resource subscription for the sessions 2009-10 to 2012-2013.

- The result shows 57.14%, 100%, 42.86%, 71.43% and 14.29% KRC's are accessing E- books, E- journals, abstracting database, Free open access journals and other sources like in- house R & D publications respectively.

7.1.1.10 Facilities Available in the KRC's

- The result shows 57.14% KRC's have provided user orientation/ education, 85.71% have provided User training, 42.86% KRC's have the provision of staff training and 14.29% KRC's have provided other professional training/ internship.

- Out of seven KRC's, 42.86% KRC's have started digitization process and rest of the 57.14% have not yet started digitization process.

- The study shows majority (71.43%) of the KRC's have their institutional repository and 28.57% KRC's have no institutional repository.

- The overall analysis reflects that 14.29% KRC have uses RFID technology and rest of the 85.71% have not using RFID technology.

- The majority (71.43%) of the KRC's was using E- print software and 14.29% was using Dspace software.

- From the analysis it is observed that CGCRI, Kolkata has been adopted RFID technology for its KRC. The other six laboratories namely IICB, CMERI, CIMFR, NEIST, NML and IMMT have not yet introduced RFID technology in their KRC's.

7.1.2 Findings from the Scientists

- The result shows that total numbers of 350 questionnaires were distributed among the scientists and out of 350 questionnaires the researcher have received

288 questionnaires and rest of 62 questionnaires were not received back. The response rate is 82.29% which reflects that majority of the population has responded the questionnaires.

- From the study it was observed that researcher has received 94% responses from the scientists of CGCRI, Kolkata, 92% responses received from the NEIST, Jorhat, 82% from IMMT, Bhubaneswar, 80% from CMERI, Durgapur, 78% from IICB, Kolkata, 76% response received from CIMFR, Dhanbad and 74% response received from the scientists of the NML, Jamshedpur. So, the majority of responses came from the scientists and research scholars of CGCRI, Kolkata.

- Analysis of visit to the library under study has been shown that the majority (95.49%) of the users have visited the KRC. The study also reveals that only 4.51% number of the respondents have not visited the Library.

- The study shows that 15.63% respondents have daily visited the library, 26.04% visited fortnightly, 18.06% once in a month, and 39.58% sometimes visited the library and only 0.69% of the respondents not at all visited the library. From the result it can be concluded that most of the Scientists and other scientific personals are found to visiting the KRC regularly. Some of the users are interested only to use library occasionally during leisure time. This situation has arises due to their limited time, lack of sufficient current literature. Frequency of KRC used by users is high due to location of current and back volume of periodicals centrally and provision of up to date information through INTERNET.

- The maximum 52.43% respondents have devoted their time for less than one hour daily to the library (KRC), 43.75% devoted their time for 1- 5 hours, 13.82% respondents devoted their time for 6- 10 hours daily to the library. From the study it is observed that scientists never get time to use the library for 11- 15 hours and over 15 hours daily.

- The majority of 72.92% respondents used to visit the KRC 'to borrow books' which is in rank one, 50.35% of respondents have visited the KRC 'for supporting research investigation' ranked as two, 44.79% respondents were

using the KRC 'to update knowledge' as rank three, 30.90% users came to the KRC 'for reading purpose' which were in rank four, 28.42% respondent were visited for 'writing an article/ paper' rank as five, 21.88% scientists visited the library for 'starting a project' ranked as six. The rest of the 14.58 %, 9.72%, 8.68%, 27.29%, 6.60% and 3.13% respondents were using the KRC for the purpose of guiding researchers, workshop/ seminar presentation, patent design, to browse internet, writing a book and others which are ranked as seven, eight, nine, ten, eleven and twelve respectively.

- From the study it has been observed that majority of the respondents (76.74%) have preferred Current information while rest of the 23.26% respondents needs information of Retrospective type. Hence, it has been found that majority of the respondents prefer Current information for their research purpose.

- The study shows that 80.90% respondent were answered that they have no departmental library while 19.10% respondents were answered that they have separate departmental library.

- The study reveals that almost 63.19% of respondents did not access the library from the department and the rest of the 36.81% respondents were access the library from their department.

- From the study it has been observed that the 70.14% respondents have extensively use text books which was in rank one, 57.29% respondent were uses periodicals which ranked as two, 51.74% number of respondents were using reference books ranked as three, 49.65% research projects, 42.36% using reviews, 29.17% uses theses/ dissertations, 28.82% uses patents, 28.47% uses conference/ seminar proceedings, 27.43% uses encyclopaedias, 25% uses abstracts, 21.18% uses hand books, 16.67% uses newsletters, 13.89% uses standards, 13.54 % using bibliographies, 9.72 % uses newspaper clippings, 8.33% are using index, 7.29% uses trade literature, 3.13% uses micrographics, and others uses 0% which were falls under rank four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen and nineteen respectively. The study reveals that majority of the scientists used to search the text books as compared to the other documents. The second

number in the list is Periodicals and not a single respondent were search other documents in the KRC.

- Majority of 286 of the respondents 99.31% were accessing internet and 0.69% respondents were not searching the Internet.

- The study shows that the 70.14% respondents were mainly search internet for accessing E-books which was ranked as one and 51.74% respondents used to assess E-journals which constitute rank two, 49.65% respondents were searching internet for accessing E- these/ dissertations which ranked as three, 42.36% respondents used to access E-reports which was ranked as five, 28.82% respondents were searching E- patent, 13.54% searching E- database, 8.33% searching E- proceeding and 7.29% searching other resources in the internet which were ranked as six, seven, and eight position. The study reveals that majority of the respondents were accessing internet for searching E- books.

- The study shows majority of 29.51% respondents were accessing internet for 3-4 hours daily which is considered as the rank one. The 27.78% of respondents were accessing internet for 2- 3 hours which is in rank two, 17.71% respondents used to access internet for less than 2 hours ranked as three, 13.19% respondents have accessed internet for above 5 hours ranked as four and the 11.81% respondents were accessing internet for 4- 5 hours regularly ranked as fifth.

- The study shows that 79.17% of the respondents were searching Google for accessing E- resources which was Ranking one. The 25.69% respondents preferred Yahoo for accessing resources which ranked as two in the list, 2.43% respondents were using AltaVista for searching resources which ranked as three. The other resource like Bing was used by only 0.35% respondents ranked last in the table. Most of the respondents were preferred to search Google for its user friendly browsing and access facilities. The rest of the respondents were preferred Yahoo, Alta Vista and other source like Bing respectively for searching the e- resources.

- From the study it was found that 76.73% of the respondents were using the Internet every day which was the highest in rank among all the resources using

every day. The highest 17.01% respondents prefers to use E-journals 2- 3 times in a week; highest number of 9.38% preferred to use E- books once in week; highest number 10.07% preferred to use E- reports once in a month and 10.76% of the users never use CD-ROM which shows the highest number. The study reveals that majority of respondents were preferred to access internet resources every day and not a single respondents were use other resources.

- From the study it has been observed that 64.24% respondents have uses electronic books for academic purpose followed by e- journals 47.22% and have uses web sources 31.94% which were ranked as one, two and three. Out of 288 respondents 76.39%, 70.83% and 44.44% are using e- journals, e- books and online- database for research purpose which ranked as one, two and three respectively. The 61.46% respondent's were using e- book, 61.11% used e-journal and 34.72% used e- proceeding to update knowledge which ranked as one, two and three in the list respectively. The 21.18% respondent's were using e- patent, 15.97% full- text database and 14.24% uses e- book for patent design which ranked as one, two and three in the list respectively. The study also reveals 57.29% respondent's uses e- journal, 56.25% used e- book and 26.39% uses e- proceeding to writing article/ paper which ranked as one, two, and three in the list respectively. The 17.01% respondent's uses e- book, 10.07% open sources and 9.38% uses e- journal to writing books which ranked as one, two and three respectively. The 36.11% respondent's uses e- book, 32.29% using e-journal and 15.63% using open sources to starting project which ranked as one, two and three respectively. The other resources also used by the respondents for different purposes. The survey results that maximum number of electronic resources namely e- journals, e- books, e- proceedings, online databases, open sources and web sources for different purposes.

- The study reveals that the 98.96% respondents of the laboratories were agreed with the KRC subscribing e-journal consortium. The rest of the 1.04% respondents were not aware about the subscription of e- resources by the KRC. The survey results show that maximum number of respondents were aware about the subscription of e- resources by the KRC.

- The majority of respondents 97.92% were using consortium while 2% of the respondents were not using any consortium. The result shows that maximum number of respondents were using consortium.

- The study reveals that to update knowledge highest numbers of 72.22% respondents were using the consortium, writing article/ paper 60.42% respondents using the consortium and for research purpose 58.33% respondents were using consortium which were ranked as one, two and three. For starting a project, writing a book and patent design 35.76%, 26.39% and 19.44% respondents were using consortium which were ranked as four, five and six.

- The study shows the first ten ranks given by the respondents for the E- resources which have been published by different publishers. From the study it has been found highest number of 142 respondents have given Rank one to the publications of Elsevier Science Direct.

- The study elucidates that 82.29% respondents were agreed with getting assistance from the library personnel and 17.71% have not received any assistance from the library personnel. The result shows that maximum numbers of respondents were getting assistance from the library personnel.

- The study reveals that the majority of 90.97% of the respondents were agreed that the KRC's have provided the required document/ information to them and rest of the 9.03% respondents were not agreed with the same. Therefore it has been proved that the KRC's have providing the required documents/ information to the users.

- Satisfaction is one of the important criteria among the use of the library, which basically depend upon the materials that the library uses to possess and services rendered by the library. The analysis of the study clearly shows that 89.93% respondents were satisfied with their library activities and 10.07% were not satisfied. Thus, the maximum numbers of respondents were satisfied with the library services.

- The survey result indicates that out of 288, 65.28% respondents were answered that the E- resources available in the KRC are highly effective, 34.03% answered moderately effective and 0.69% have answered that the e- resources are not effective. Thus, from the analysis it is clear that majority of the respondents agreed that the e- resources available in the KRC are highly effective.

- The study reveals the out of 288 respondents, 54.17% respondents were rate the satisfaction level as excellent and the rest of the 45.83% respondents were rating it as good.

- Difficulties faced by the respondents while use the resources of the KRC are resulted that out of 288 respondents 36.11% respondents have lack of time to use the KRC resources, 14.93% have replied that lack of relevant information in the KRC and 10.07 % respondents have lack of knowledge about the organizing tools such as library classification, cataloguing, indexes and abstract available in the KRC. The 11.46% respondents have lack of awareness about the services rendered by the KRC, 18.75% respondents have replied that the KRC have lack of sufficient e- resources and 12.5% replied that e- resource- resource access is difficult in KRC. The result of the survey reveals that maximum numbers of users have lack of time to use the library resources.

- The study shows that the respondents of all the laboratories have suggesting for the improvement of the library facilities. Out of 288 respondents 71.18% respondent have suggesting for subscription of more e- journals and e- books which ranked as one, 68.75% suggesting for increased the current journals, 61.46% responses for increase the electronic sources such as Database, 56.25% for increase the total number of books, 50.35% for building digital library and institutional repository, 47.91% for increased the total number of reference books, 42.36% respondents have agree with increasing speed in the delivery of e- resources, 40.28% suggesting for complete automation of the Library (KRC), and 27.08% respondents have suggested for make provision of subject gateways were ranked as two, three, four, five, six, seven, eight, nine respectively.

Therefore, the study reveals that majority of the respondents have been suggested for more e- journals and e- books for the KRC.

7.1.3 Findings from the Bibliometric Analysis

7.1.3.1 Findings from the Publications of NEIST

- The analysis of the data retrieved from the SCOPUS Database shows that in North East Institute of Science and Technology (NEIST), Jorhat total number of 642 papers has been published during 2007-2016 (Up to 26-05-2016). The highest 17.75% papers has been published in the year 2015 followed by 98 15.26% and 8.46% in the years 2014 and 2013. From the analysis it is clear that the NEIST's publications increasing gradually. In the year 2010 and 2012, the trend of publications decreases as compared to the earlier years.

- The study analyzes the subject wise distribution of research publication by NEIST scientists. The highest frequency of 50.77% papers has been published in the field of Chemistry, 28.5% in Chemical engineering and 26.01% in Biochemistry, Genetics and Molecular Biology. The lowest percentage of 0.16 has been published in two subjects. Hence it is found that majority of the article/ papers have published in the field of chemical sciences.

- The study reveals that highest number of 5.45% papers has been published in Tetrahedron Letters by the NEIST scientists. In RSC Advanced and Synlett, the total numbers of 4.51% and 3.27% papers have been contributed by NEIST scientists which are ranked as one and two respectively. The rest of productive sources namely Steroids, Current Science, Molecular Diversity, Journal of Molecular Catalysis A Chemical, Catalysis Communications, Tetrahedron and Applied Catalysis A General publishes total of 3.27%, 2.49%, 2.18%, 1.71%, 1.71%, 1.24%, 1.24% and 1.09% respectively. The nine numbers of sources have 6 publications each, 12 sources have 5 publications each, 10 sources have 4 publications, 20 sources have 3 publications, 33 sources 2 publications each and 55 sources have 1 publication each.

- The study indicates that Article was the most productive Document type of publication contributing 90.49% publications to the total number of publications followed by Book chapter, Conference Paper, Article in Press, Review and Letter with 2.96%, 2.33%, 11.71%, 1.40%, 0.46% and 0.31% of publications respectively. Both Editorial and Short surveys have published the lowest 0.16% papers among all the document types.

- The study reveals that majority of 98.28% of papers has been published in India followed by France 2.49%, United States 2.02%, China 1.40%, Russian Federation and United Kingdom both have 1.24% publications each and both Australia and Brazil have 0.93% publications contributed by the NEIST scientists. The list also reflects that 3 countries have 4 publications each, 3 countries have 3 publications each, 5 countries have 2 publications and 6 countries have only one publication each. The study reveals that India, France and United States were in rank one, two and three as per distribution of publications country wise.

- From the study it has been identified that D.K. Dutta is the most productive author contributing 7.78% of research publications during 2007-2016 which holds the rank one among all the authors. The other most productive authors are M.R. Das with 7.63%, D. Prajapati 6.07%, Baruah, B.P. with 5.76%, Baruah, R.C. with 5.60%, Rao, P.G. with 5.29%, Bhuyan and P.J. with 5.14% of publications ranked as two, three, four, five, six and seven number. The authors Saikia, B.K. and Barua, N.C.with total numbers of 4.98% publications jointly holding the rank eight and Saikia, R. and Baruah, S. with 3.58% papers jointly holds the rank nine. The author Borah, B.J. has published total of 3.42% publications which ranked in the tenth position.

- The study results that NEIST itself published 46.41% publications which ranked as one followed by Council of Scientific and Industrial Research with 9.34% and Medical Chemistry division and Dibrugarh University both with 3.73% publications collaborating with NEIST ranked as two and three respectively. The other institutions namely Gauhati University, Tezpur University, Analytical Chemistry Division, Synthetic Organic Chemistry Division, CSIR-North East Institute of Science and Technology and National Institute for Interdisciplinary

Science and Technology have published 3.58%, 12.49%, 2.33%, 2.18%, 2.02% and 1.86% papers collaborating with NEIST respectively. The lowest number of publications was found in case of 57 institutions which have published only 0.15% papers each and ranked as twenty in the list.

- The study indicates that the highly cited authors were Pal D., Dasgupta S., Kundu R., Maitra S., Das G., Mukhopadhyay S., Ray S., Majumdar S.S., Bhattacharya S. with citation 192 followed by Das Sharma S., Hazarika P., Konwar Dreceived 162 citations and Das M.R., Sarma R.K., Saikia R., Kale V.S., Shelke M.V., Sengupta P. with 154 citations have received one, two and three in the study. The other highly cited authors were Das M.R., Sarma R.K., Saikia R., Kale V.S., Shelke M.V., Sengupta P. with 154 citations; Chaturvedi D., Goswami A., Pratim Saikia P., Barua N.C., Rao P.G. with 101 citations; Chutia M., Deka Bhuyan P., Pathak M.G., Sarma T.C., Boruah P. with 71citations; Sharma P., Das M.R. with 69 citations; Kaminska I., Das M.R., Coffinier Y., Niedziolka-Jonsson J., Sobczak J., Woisel P., Lyskawa J., Opallo M., Boukherroub R., Szunerits S. with 68 citation; Thakur D., Yadav A., Gogoi B.K., Bora T.C. with 62; Baruah B., Bhuyan P.J. with 56 citations; Hazarika L.K., Bhuyan M., Hazarika B.N. with 56 citations and Khan R., Dhayal M. with 55 citations.

- The study reveals that average number of was 0.97 and the range for degree of collaboration of the NEIST's authors started from 0.97 to 1.00. Maximum number of Degree of Collaboration occurred in 2007, 2015 and 2016 with 1.00 and lowest in 2008 and 2011 with 0.91.

7.1.3.2 Findings from the Publications of CGCRI

- The study elucidates that total number of 1484 papers has been published from Central Glass and Ceramic Research Institute (CGCRI), Kolkata since 2007 to 2016. The highest number of 14.95% papers was published in the year 2014 followed by 12.19% in the year 2013 and 11.79% paper published in the year 2015.

- From the study it is found that CGCRI individually published 1129 number of papers which is 76.07% of the total publications that holding rank one. CSIR publishes 21.83% papers collaborating with CGCRI followed by Jadavpur University with 8.42% and University of Malaya with 3.70% publications which were ranked as two, three and four number. The collaborating institutions have less numbers of publication as compared to the above four institutions.

- The study shows that the subject Material science shows highest number of 62.93% publications followed by Physics and Astronomy 46.97% and engineering 34.37% publications which were ranked as one, two and three respectively.

- The study examined that Article was the most favored document type of publication in where 82.95% publications have been contributed by the scientists of CGCRI followed by Conference Paper and Review with 38.83% and 2.39% respectively. The lowest frequency 0.13% papers have been published both in the Letters and Books.

- From the study it has been found that the majority of 99.12% paper has been published in India by scientists of CGCRI. Malaysia was in second number with 3.91% and United Kingdom was in third number with 3.01% publications.

- From the study it has been found that the most productive sources of publication of CGCRI was Ceramic International with 5.80% publication followed by RSC Advance 2.49% and Journals of Alloy and Compounds with 2.22% publications.

- The study reveals that Bhadra, S.K. was the most productive author during the period of 2007 to May 2016 with 8.96% publications in his credit. The other highest productive authors were Pal, M. with 8.55% publications, Paul, M.C. with 6.67% and Karmakar, B. with 6.40% publications over the period and ranked as two, three and four number in the list.

- The highly cited authors of the CGCRI as per the analysis were Majumder M., Gangopadhyay T.K., Chakraborty A.K., Dasgupta K., Bhattacharya D.K. with 308 citations, followed by Das S., Mukhopadhyay A.K., Datta S., Basu D. with

161 citations and Mazumder R., Sujatha Devi P., Bhattacharya D., Choudhury P., Sen A., Raja M. received 146 citations.

- The highest degree of collaboration of CGCRI was 0.99 which has been show in the year 2009, 2010, 2012, 2013, and 2014 and lowest degree of collaboration 0.93 which was shown in the year 2008.

7.1.3.3 Findings from the Publications of CIMFR

- The study reveals that total number of 478 papers has been published from CIMFR during the period from 2007 to May 2016. The majority of 13.59% papers have been published in the year 2013.

- From the study it has been found that Earth and Planetary Sciences have the 50.28% publications from the total number of publications of CIMFR. The other subject areas are Energy with 30.75% publications, Environmental science with 23.22% publications.

- From the study it has been observed that in the Journal of Mines Metals and Fuels the scientists of CIMFR have published highest number of 13.17% papers followed by Indian Journal of Environmental protection 4.18% and Indian Journal of Rock Mechanics and Mining Sciences 2.92% of publications.

- The study shows that majority of 80.75% documents of CIMFR has been published as article in journal followed by 12.55% published as conference paper, 3.13% as review, article in press 1.25%, Letter 1.25%, Book chapter 0.83% and 0.20% book has been published by the CIMFR scientists.

- From the study it has been observed that majority of 99.16% papers of CIMFR has been published in India which was ranked as one, in United Kingdom 1.25%, in Australia 1.04%, Japan 1.04%, Nigeria 1.04%, Canada 0.83%, Germany 0.83%, Sweden 0.62%, United States 0.62%, Italy 0.41%, Spain 0.41% and 11 countries 1 publication each having 0.20% publications collaborating with CIMFR.

- The study reveals that the most productive author of CIMFR was Sinha, A. with 8.99% publications out of 478 publications which was ranked as one. The rest of the productive authors were Ram, L.C. with 8.78% publications, Masto, R.E. with 7.53% publications, etc. which were ranked as two and three respectively.

- From the study it has been observed that CIMFR individually published 442 numbers of papers which is 92.46% of the total publications securing rank one. Indian School of Mines University has been published 19.45% papers collaborating with CIMFR which was ranked as two followed by CSIR with 3.97%, Jadavpur University with 2.92% papers and with Bhabha Atomic Research Center the CIMFR have publishes 2.30% publications which were ranked as three, four and five respectively.

- From the study it has been found that James O.O., Maity S., Usman L.A., Ajanaku K.O., Ajani O.O., was the most cited author of CIMFR with 96 citations. The other highly cited authors are Chaubey R., Sahu S., James O.O., Maity S. with 91 citations holding the rank two and Ram L.C., Masto R.E. with 60 citations holdings the rank three.

- The study indicates that average number of degree of collaboration of CIMFR was 0.94 and the range for degree of collaboration started from 0.86 to 1.00. Maximum number of Degree of Collaboration occurred in 2007 with 1.00 and lowest in 2009 with 0.86.

7.1.3.4 Findings from the Publications of CMERI

- The study shows the year wise distribution of the publication. In CMERI, Durgapur total of 682 papers has been published during 2007-2016 (Up to 23-05-2016). The highest of 16.86% papers has been published in the year 2014 followed by 15.84% in 2015 and 14.51% in 2013. From the analysis it has been found that the CMERI's publications increasing gradually. In the year 2010 and 2012, the trend of publications decreases as compared to the earlier years and in 2015 also the number of publications decreases than the year 2014.

- From the study**,** it reveals that Engineering has the highest number of 46.48% publications from the total number of publications. The rest of the subject areas

are Material Science with 28.59% publications, Physics and Astronomy with 25.51% publications which holds the rank one, two and three in the list.

- From the analysis it has been observed that the highest 2.93% papers have been published in Numerical Heat Transfer Part A Applications which was in rank one. The rest of the sources were RSC Advances and Dalton Transactions with 2.34% publications were jointly holding the rank two and International Journal of Heat and Mass Transfer with 1.61% securing the rank three.

- From the study it has been reflected that out of 682 publications 72.14% publications of CMERI were published as Article, 22.72% as Conference papers, 3.07% as Review, 1.17% as Article in Press, 0.87% in Book Chapter and 0.14% published as Erratum.

- The scientists of CMERI has been published 99.12% papers in India followed by 4.98% papers in South Korea, 3.65% papers in South Korea, 3.07% papers in United States which were holding the rank one, two, three and four in the list.

- From the study it has been found that since 2007 to May, 2016 the most productive author of CMERI was Chatterjee, D. with 8.06% publications secured the rank one. The other authors are Chatterjee, D. with 7.18% publications and Kuila, T. with 5.42% publications which were ranked as two and three respectively.

- From the study it has been found that CMERI individually published 659 numbers of papers which was 96.62% of the total publications which was ranked as one. National Institute of Technology, Durgapur publishes 20.08% papers collaborating with CMERI followed by IIT, Kharagpur with 7.77%, Jadavpur University with 6.01% and IIT, Kanpur with 5.42% publications which were ranked as two, three, four and five.

- The highly cited author of CMERI was Singh, S. with 207 citations, Gopalsamy B.M., Mondal B., Ghosh S. with 74 citations secured the rank two, Das S., Saha S., Das S., Gupta A. with 63 citations in rank three, Choudhury B., Saha B.B., Chatterjee P.K., Sarkar J.P. with 55 citations in rank four, etc.

- The study indicates that average degree of collaboration of CMERI was 0.95 and the range for degree of collaboration started from 0.82 to 1.00. Maximum number of Degree of Collaboration occurred in 2016 with 1.00 and lowest in 2008 and 2007 with 0.82.

7.1.3.5 Findings from the Publications of IICB

- The study shows that from IICB, Kolkata total number of 1769 papers has been published during 2007-2016 (Up to 23-05-2016). Out of 1769, the 14.42% papers has been published in the year 2014 followed by 12.55% and 12.09% in the years 2013 and 2012 respectively.

- From the study it has been found that 52.74 % papers of IICB have been published in the area of Biochemistry, Genetics and Molecular Biology which was in rank one. The rest of the subject areas were Medicine with 36.61% publications and Chemistry with 24.92% publications which are holding rank two and three.

- The result shown that the 3.61% papers from IICB are published in Plos ranked as one, 2.48% papers has been published in Tetrahedron Letters and RSC Advance with rank two, 1.63% papers has been published in Journal of Biological Chemistry holds the rank three and 1.18% published in Biochimica Et Biophysica Acta General Subjects which was ranked as four.

- The study shows that the majority of the scientists of IICB have published their documents as article which was 88.29% from the total publication and it was in rank one. Review has been received the rank two with 5.59%, Conference paper was in rank three with 2.14%, Article in press was in rank four with 1.13% from the total publications.

- The survey results shows that majority of the documents of IICB has been published in India with 97.85% publications ranking as one followed by United States 10.62% and United Kingdom 2.54% which were in rank two and three.

- The most renowned author of IICB, Kolkata was Kumar, G.S with 4.97% publications of the total publications 1769, Chaudhuri, K. with 3.95%

publications, Mondal, N.B. with 3.67% publications and Suresh Kumar G. and Roychoudhury, S. with 3.44% publications receiving the rank one, two, three and four.

- From the study it has been found that IICB individually published 1747 numbers of papers which was 98.75% of the total publications. Jadavpur University publishes 8.37% papers collaborating with IICB and University of Calcutta with 7.80% of publications.

- From the analysis, it has been found that the most cited authors from the IICB, Kolkata were Brahmachari S.K., Majumder P.P., Mukerji M., Habib S., Dash D., Ray K., Bahl S., Singh L. with 182 citations ranked as one. Maiti, M. Kumar, G.S. received 127 citations with rank two and De R., Kundu P., Swarnakar S., Ramamurthy T., Chowdhury A., Nair G.B., Mukhopadhyay A.K. received 119 citations with rank three.

- The study indicates that average number of degree of collaboration of IICB was 0.99 and the range for degree of collaboration started from 0.98 to 1.00. Maximum number of Degree of Collaboration occurred in 2009, 2011 and 2016 with 1.00 and lowest in 2015 with 0.98.

7.1.3.6 Findings from the Publications IMMT

- The study reveals that **t**otal number of 1120 papers has been published during the period from 2007 to May 2016. The study reveals that in the year 2014 16.07% paper has been published from IMMT which holds the rank one followed by 14.55% papers published in 2012, 14.11% in 2013, 12.32% in 2015 and 11.70% papers has been published in 2011 which were ranked as two, three, four and five respectively.

- The study indicated that the 37.59% papers has been published in the area of Material Science, followed by Engineering with 29.55% publications, Chemistry with 29.11%, Chemical engineering 25.80%, and Physics and Astronomy 20.80% publications which were ranked as one, two, three, four and five.

- From the study it has been analyzed that 2.5% papers has been published in Hydrometallurgy, in RSC Advances 1.88%have been published and in Transactions of the Indian Institute of Metals 1.79% papers from IMMT have been published which were ranked as one, two and three.

  The rest of the papers has been published in Powder Technology 1.61%, Journal of Hazardous Materials 1.52%, 3 sources 15 publications each 1.34%, Industrial and Engineering Chemistry Research 1.25%, 2 sources publications each having 1.16%, International Journal of Mineral Processing (1.07%), 2 sources 11 publications each having 0.98%, Journal of the Geological Society of India 0.89%, 3 sources 9 publications each having 0.80%, 11 sources 8 publications each having 0.71%, 10 sources 7 publications each having 0.62%, 14 sources 6 publications each having 0.54%, 16 sources 5 publications each having 0.45%, 15 sources 4 publications each having 0.36%, 29 sources 3 publications each having 0.27% a and 41 sources 2 publications each having 0.1%. So, from the analysis it was found that highest number of papers has been published in Hydrometallurgy.

- The study shows that the majority of 85.90% documents have been published in the journal as articles. The rest of the documents were published in Conference paper 8.75%, Article in press 2.23%, review 1.52%, Book chapter 0.98%, Erratum 0.36% and book, editorial and letter 0.089%.

- The study shows that majority of 98.48% documents has been published in India followed by 2.86% in South Korea, 2.59% in Australia and 2.14% papers has been published from United States which were ranked as one, two, three and four in the list. The rest of the countries are South Africa with 2.05% publications, Germany with 1.61% publications, Japan 0.98%, Nigeria and United Kingdom had 0.89% publications each, Taiwan with 0.71%, Canada 0.62% and Sweden with 0.54% publications ranking as six, seven, eight, nine, ten and eleven.

- The study reveals that the most productive author was Parida, K.M. with 12.5% publications, follwed by Mishra, B.K. 11.52%, Mishra, B.K. 5.63% and Anand,

S. with 4.73% publications ranking as one, two, three and four. The other productive authors were Sukla, L.B. with 4.38% publications, Singh, S.K. with 4.29%, Mohapatra, M. with 4.11%, Pradhan, N. 3.75%, Mishra, D.K. 3.48%, Mohapatra, B.K. with 3.48% publications and Das, B. with 3.30% publications.

- From the analysis it is found that IMMT individually published 1056 numbers of papers which was 94.29% of the total publications and ranking as one in the list. IIT, Bhubaneswar publishes 4.39% papers collaborating with IICB ranking as two followed by CSIR with 3.75% of publications and it was ranking as three.

  The other high rank affiliated institutions in terms of publication were Siksha O Anusandhan University with 3.30% publications, Utkal University with 2.77%, Institute of Physics Bhubaneswar with 2.5%, National Institute of Technology Rourkela with 2.41%, Kalinga Institute of Industrial Technology, Bhubaneswar with 2.32%, Indian Institute of Technology, Kharagpur with 2.14% and Korea Institute of Geoscience and Mineral Resources with 2.05% publications.

- The study identified the most cited authors of IMMT were Mohapatra M., Anand S., Mishra B.K., Giles D.E., Singh P. with 232 citations ranking as one, followed by Sundaray S.K., Nayak B.B., Lin S., Bhatta D. with 146 citation ranking as two, Parida K.M., Sahu N. with 144 citations, Pradhan N., Nathsarma K.C., Srinivasa Rao K., Sukla L.B., Mishra B.K. with 135 citations, Giles D.E., Mohapatra M., Issa T.B., Anand S., Singh P. 99 citations, Baral S.S., Das N., Ramulu T.S., Sahoo S.K., Das S.N., Chaudhury G.R. 97 citations, Naik B., Parida K.M., Gopinath C.S. 90 citations, Parida K.M., Reddy K.H., Martha S., Das D.P., Biswal N. with 88 citations, Parida K.M., Sahu N., Biswal N.R., Naik B., Pradhan A.C. 84 citations and Pradhan G.K., Parida K.M. with 83 citations. Hence the most cited authors of IMMT were Mohapatra M., Anand S., Mishra B.K., Giles D.E., Singh P.

- The study indicates that average number of degree of collaboration was 0.98 and the range for degree of collaboration started from 0.93 to 0.99. Maximum

number of Degree of Collaboration occurred in 2011 and 2012 with 0.99 and lowest in 2007 and 2008 with 0.91.

7.1.3.7 Findings from the Publications of NML

- The study shows yearly distribution of publication from NML, Jamshedpur since 2007 to 23rd May, 2016. Total number of 1109 papers has been published from NML during the period. The 13.17% papers has been published in the year 2013 followed by 12.35% in 2014, 11.09% in 2007, 11% in 2010 and 2012, 107 9.65% in 2008, and 2009, 9.38% in 2011, 8.66% in 2015 and 4.06% publications in 2016.

- From the study it has been found that 64.47% documents of NML has been published in Material science which was ranked as one, followed by 48.42% paper published in Engineering, 31.65% papers has been published in Physics and Astronomy, Chemistry 14.25%, Chemical Engineering 11.72%, Earth and Planetary Sciences 9.74%, Environmental Science 5.14%, Energy 3.61%, Computer Science 2.80%, Biochemistry, Genetics and Molecular Biology with 2.61% publications which were ranked as two, three, four, five, six, seven, eight, nine and ten in the list.

- The other subjects like Mathematics have 1.98%, Pharmacology, Toxicology and Pharmaceutics with 1.44%, Medicine with 1.35%, Business, Management and Accounting with 1.08%, Social Sciences 0.54%, Multidisciplinary 0.36%, Economics, Econometrics and Finance 0.27%, 3 subjects 2 publications each having 0.18% and Decision Sciences have 0.09% publication.

- From the study it has been found that in the journal Materials Science and Engineering A 8.21% paper has been published which was ranked as one. In Hydrometallurgy and Metallurgical and Materials Transactions A Physical Metallurgy and Materials Science 3.52% paper has been published which was ranked as two. The other sources like Transactions of the Indian Institute of Metals have 2.71% publications ranked as three and Journal of Magnetism and Magnetic Materials with 1.89% publications have securing the rank four. So, from the above study it has been indicated that the maximum number of

publications of NML were published in the journal Material Science and Engineering.

- From the study it has been found that majority of 78.54% documents has been published as journal article from NML, Jamshedpur followed by 5.96% published as Conference paper, 2.25% published as review, 1.71% as Article in press, 0.72% is published in book chapters, 0.45% as erratum, 0.18% as editorial, 0.09% published as book and note.

- The study shows that the scientists of NML have publishes majority of 98.65% documents in India followed by United States 6.04%, South Korea 5.59%, Germany 5.04% of publications, United Kingdom 1.71%, Russian Federation 1.26%, Finland 0.72%, 2 countries 7 publications each with 0.63%, 2 countries 6 publications each with 0.54%, 4 countries 5 publications each with 0.45%, 3 countries 4 publications each with 0.36%, 2 countries 3 publications each with 0.27%, 6 countries 2 publications each with 0.18% and 16 countries 1 publication each 0.09% which were ranked as one, two, three, four, five, six, seven, eight, nine, eleven, twelve, thirteen and fourteen .

- The most renowned authors from NML were Tarafder, S. 6.76% publications, Pandey, B.D. with 6.04%, Sivaprasad, S. with 5.86%, Mitra, A. with 5.50% publications, Panda, A.K. with 5.41% publications, Ghosh, M. with 5.23%, Mishra, S.K. 3.61%, Das, G. 3.52%, Ghosh, R.N. 3.34%, Jha, M.K. 3.34%, Das, S.K. 3.34% and Roy, R.K. with 3.25% publications have secured the rank one, two, three, four, five, six, seven, eight, nine and ten. Hence the most productive author from NML, Jamshedpur was Tarafder, S.

- From the study it has been observed that NML individually published 1041 numbers of papers which was 99.55% of the total publications and rank in one position followed by IIT, Kharagpur publishes 7.39% papers collaborating with IICB, CSIR and Jadavpur University with 6.49% publications were ranked as two and three.

- The highly cited authors of NML were Mohanty A., Garg N., and Jin R. with 151 citations. Balaz P., Achimovicova M., Balaz M., Billik P., Cherkezova-Zheleva Z., Criado J.M., Delogu F., Dutkova E., Gaffet E., Gotor F.J., Kumar R., Mitov I., Rojac T., Senna M., Streletskii A., Wieczorek-Ciurowa K. have received 144 citations and Singh R., Dahotre N.B. has received 106 number of citations have secured the rank one, two and three.

  The other highly cited authors were Kumar S., Kumar R., Mehrotra S.P. with 90 citations, Dhal B., Thatoi H.N., Das N.N., Pandey B.D. with 85 citations, Kumar R., Kumar S., Mehrotra S.P. with 80, Tran N., Mir A., Mallik D., Sinha A., Nayar S., Webster T.J. with 78 citations, Kumar S., Kumar R., Bandopadhyay A., Alex T.C., Ravi Kumar B., Das S.K., Mehrotra S.P. with 75 citations, Chakravarty S., Mohanty A., Sudha T.N., Upadhyay A.K., Konar J., Sircar J.K., Madhukar A., Gupta K.K. with 74 citations and Lee J.-C., Pandey B.D. with 73 citations securing the rank four, five, six, seven, eight, nine and ten.

- The analysis Indicates that average number of degree of collaboration of NML was 0.96 and the range for degree of collaboration started from 0.92 to 1.00. Maximum number of Degree of Collaboration occurred in 2007with 1.00 and lowest in 2011 with 0.92.

7.1.3.8 Findings from overall publications of the CSIR Laboratories of Northeast and Eastern India

- From the overall bibliometric analysis of the CSIR Laboratories of Northeast and Eastern India reveals that altogether the selected seven CSIR laboratories of Northeast and Eastern India have 7,284 publications from 2007 to 23rd May, 2016. Out of 7,284 publications 14.61% papers has been published in 2014 followed by 13.06% in 2013, 12.52% in 2015, 12.11%, 10.69% in 2011, 9.58% in 2010, 8.92% in 2009, 7.24% in 2008, 5.67% in 2016 and 5.6% papers has been published in 2007. Hence, from the study it has been observed that

maximum numbers of papers of selected laboratories of CSIR were published in the year 2014.

- From the study it has been observed that the scientists of CSIR laboratories of Northeast and Eastern India were largely published their documents in Article form with 83.51% publications followed by 9.98% in Conference paper, 2.88% in Review, 1.07% in Book chapter, 0.38% in Erratum and Letter, 0.22% in Editorial and 0.09% documents were published as a book ranking as one, two, three, four, five, six and seven.

- The study indicates that average number of degree of collaboration was 0.97 and the range for degree of collaboration of the CSIR laboratories of North East and Eastern India started from 0.95 to 0.98. Maximum number of Degree of Collaboration occurred in 2007with 0.98 and lowest in 2011 with 0.95.

- The study shows that among all the authors from CSIR Laboratories of Northeast and Eastern India Parida, K.M. was the most productive author with 1.92% publications secured the rank one. The other productive authors were Bhadra, S.K. with 1.83%, Mishra, B.K. with 1.77%, Pal, M with 1.74%, Paul, M.C. with 1.36%, Karmakar, B. with 1.30%, Kumar, G.S. with 1.21%, Basu, D. with 1.10%, Tarafder, S. with 1.03% and Mukhopadhyay, A.K. with 1.02% publications have secured two, three, four, five, six, seven, eight, nine and ten in the list.

7.2 REALIZATION OF THE OBJECTIVES OF THE STUDY

The objective wise findings of the study have been discusses below:

- ***Objective one:*** *It has been designed to determine the information use patterns of the scientists of CSIR Laboratories of Northeast and Eastern India*

To create information and to promote use of information, it is necessary to know the needs and use pattern of users. Research and development institution, are the place where knowledge is being generated as a result of research activities undertaken by

them. Creating and using scientific knowledge are imperative components of the activities of scientists.

Information use pattern of the scientists is the path pursued by them in order to resolve a need. From the study it has been observed that the 70.14% respondents have extensively use text books for gaining information, 57.29% respondent were consult periodicals, 51.74% of respondents were using reference books, 49.65% respondents consult research projects, 42.36% respondents using reviews, 29.17% respondents consult theses/ dissertations, 28.82% respondents consult uses patents, 28.47% respondents uses conference/ seminar proceedings, 27.43% respondents uses encyclopaedias, 25% respondents uses abstracts, 21.18% respondents uses hand books, 16.67% respondents uses newsletters, 13.89% respondents uses standards, 13.54 % respondents consult bibliographies, 9.72 % respondents uses newspaper clippings, 8.33% respondents were using index, 7.29% respondents uses trade literature and 3.13% respondents were consulted micrographics. So the users were mainly preferred to use text book and periodical both printed as well electronic form. The Electronic resources they used to consult were Publications of Elsevier- Science Direct, American Chemical Society (ACS), American Institute of Physics (APS), Derwent Innovation Index, Emerald, IEEE, Nature, Royal Society of Chemistry (RSC), Cambridge University Press (CUP), Taylor & Francis, Web of Science, Wiley Annual Reviews, ACM Digital library SCOPUS database and Sage Journals online. These are the path pursued or pattern use by the respondents in order to satisfy their information needs.

- ***Objective 2:*** *It has been designed to study the trend of information use by the scientists of individual laboratories on the basis of their publications and citations given by them in journals.*

Scientific organization's success/achievement is measured number of patents it filled/ commercialized, number of paper published and Impact factor earn by the scientists. Progressing trend of achievement of a scientific work is directly related to the availability of latest information to its Science &Technology workers. To fulfill this objective the research scholar has been conduct bibliometric analysis of the productivity of the individual laboratories as well as overall publication trends by the scientific

community working at selected CSIR laboratories of Northeast and Eastern India with the help of SCOPUS Database.

From the overall bibliometric analysis of the CSIR Laboratories of Northeast and Eastern India it has been reflected that altogether the selected seven CSIR laboratories of Northeast and Eastern India have 7,284 publications from 2007 to 23rd May, 2016. Out of 7,284 publications 14.61% papers has been published in 2014 followed by 13.06% in 2013, 12.52% in 2015, 12.11%, 10.69% in 2011, 9.58% in 2010, 8.92% in 2009, 7.24% in 2008, 5.67% in 2016 and 5.6% papers has been published in 2007. Hence, from the study it has been observed that maximum numbers of papers of selected laboratories of CSIR were published in the year 2014.

From the analysis of the publications of individual CSIR Laboratories it has been found that out of 7284 publications 24.29% papers has been published from IICB, 20.37% was published from CGCRI, 15.38% from IMMT, 15.23% from NML, 9.36% from CMERI, 8.81% from NEIST and 6.56% papers has been published from NML. The success of any R & D institutions had mainly dependents on the research scientific productivities and the research output has been published in the journals.

From the study it has also been observed that the scientists of CSIR laboratories of Northeast and Eastern India were largely published their documents as Article in journals with 83.51% publications followed by 9.98% in Conference paper, 2.88% in Review, 1.07% in Book chapter, 0.38% in Erratum and Letter, 0.22% in Editorial and 0.09% documents were published as a book ranking as one, two, three, four, five, six and seven. Therefore from the study it has been reflected that majority of scientists have published their documents as journal article.

The study found that the most cited authors of NEIST were Pal, D., Dasgupta, S., Kundu R., Maitra S. and Das, G. with 192 citations. The most cited authors of IMMT were Mohapatra M., Anand S., Mishra B.K., Giles D.E., Singh P. with 232 citations. The highly cited authors of NML were Mohanty A., Garg N., and Jin R. with 151 citations. The highly cited author of CMERI was Singh, S. with 207 citations. The most cited authors of CGCRI were Majumder, M., Gangopadhyay, T. K., Chakraborty, A. K., Dasgupta, K. and Bhattacharya, D.K. with 308 citation. The highly cited authors from IICB were Brahmachari S.K., Majumder P.P., Mukerji M., Habib S., Dash D., Ray K., Bahl S., Singh L., 182. Singh S. and the most cited authors of CIMFR were James

O.O., Maity S., Usman L.A., Ajanaku K.O., Ajani O.O., Siyanbola T.O., Sahu S., Chaubey R. with 96 citations. From the study it has been observed that 22.87% journal citations have been used by the scientists of IICB, 19.19% citations used by the scientists of CGCRI, IMMT used 14.48% citations, NML used 14.34% citations, CMERI used 11.02% citations, NEIST used 10.38% citations and the authors of CIMFR have used 7.73% citations. Citations received by the authors and used by the authors have reflected the use of information by the scientists of the selected CSIR Laboratories.

- ***Objective 3:*** *It has been designed to know the purpose of use of information, nature and type of information required by the scientists*

The majority of 72.92% respondents used information of books available in the KRC's, 50.35% of respondents have used information from the KRC's for supporting research investigation, 44.79% respondents were using the information available in the KRC 'to update knowledge', 30.90% respondents consult different sources in the KRC 'for reading purpose' only, 28.42% respondent were consult various sources of information to 'writing an article/ paper', 21.88% scientists used information of KRC's for 'starting a project' ranked as six. The rest of the 14.58 %, 9.72%, 8.68%, 27.29%, 6.60% and 3.13% respondents were using the information available in the KRC's for the purpose of guiding researchers, workshop/ seminar presentation, patent design, to browse internet, writing a book and other purposes.

Regarding type and nature of information needed by the scientists the reveals that 76.74% respondents prefer Current information while rest of the 23.26% respondents needs information of Retrospective type. Hence, it has been found that majority of the respondents prefer Current information for their research purpose.

- ***Objective 4:*** *It has been designed to investigate the various channels for information.*

The various channels are the sources of information that have been searched by the scientists, like different printed documents, internet/ electronic resources, consortium channel, etc. The type of documents that have search by the scientists of the

laboratories under study were mainly text books, reference books, patents, reviews, index, bibliographies, research project, trade literature, encyclopedia, periodicals, conference/ seminar proceedings, standards, newsletters, abstracts, micrographics, theses/ dissertations, hand books, newspaper clippings and others. From the study it has been revealed that the 70.14% respondents have extensively use text books, 57.29% respondent were uses periodicals, 51.74% respondents were using, 49.65% research projects, 42.36% using reviews, 29.17% uses theses/ dissertations, 28.82% uses patents, 28.47% uses conference/ seminar proceedings, 27.43% uses encyclopaedias, 25% uses abstracts, 21.18% uses hand books, 16.67% uses newsletters, 13.89% uses standards, 13.54 % using bibliographies, 9.72 % uses newspaper clippings, 8.33% are using index, 7.29% uses trade literature and 3.13% uses micrographics.

Regarding the Internet Resources accessed by the respondents the study reveals that 70.14% respondents were search internet for accessing E-books, 51.74 respondents used to assess E-journals 49.65% respondents were searching 28.82% respondents were searching E- patent, 13.54% searching E- database, 8.33% searching E- proceeding and 7.29% searching other resources in the internet.

The majority of 97.92% respondents were using consortium while 2% of the respondents were not using any consortium channels. The result shows that maximum number of respondents were using consortium channel for information access.

The study shows that 79.17% of the respondents were searching Google for accessing E- resources, 25.69% respondents preferred Yahoo for accessing resources, and 2.43% respondents were using AltaVista for searching resources, the other resources like Bing was used by only 0.35% numbers of respondents ranked last in the table. The analyses mentioned above have given a clear picture of realization of the objective four.

- ***Objective 5****: It has been designed to find out the extent of Internet and E-resources use by the scientists*

Searching Internet and electronic- resources is a viable platform for developing research activities. From the present it has observed that majority of 99.31% of the

respondents were accessing internet and 0.69% respondents were not searching the Internet. Therefore, majority of the respondents have access the internet. The main reason for using Internet is that the scientists significantly depend on communication with the fellow scientists and also search frequently current information in their concerned field to keep up to date their knowledge. This helps scientists in their further study, starting a new project, inventions and innovations. Internet is the only way for keeps up to date information and because of that the science and technology people more frequently access Internet. The rest of the small group of respondents has not willing to access internet may be due to the age factor.

The study reveals that 70.14% respondents were searching internet for accessing E-books 51.745 respondents used to assess E-journals, 49.65% respondents were searching internet for accessing E- these/ dissertations, 42.36% respondents used to access E-reports, 28.82% respondents were searching E- patent, 13.54% respondents have searching E- database, 8.33% searching E- proceeding and 7.29% searching other resources in the internet. The study reveals that majority of the respondents were accessing internet for searching E- books.

Regarding the extent of internet used by the respondents it has been revealed that the 29.51% respondents were accessing internet for 3- 4 hours daily, 27.78% numbers of respondents were accessing internet for 2- 3 hours, 17.71% respondents used to access internet for less than 2 hours, 13.19% respondents have accessed internet for above 5 hours 11.81% respondents were accessing internet for 4- 5 hours regularly.

The study also reveals that 64.24% respondents have uses electronic books for academic purpose followed by e- journals 47.22% and web sources 31.94%. The study shows that out of 288 respondents 76.39%, 70.83% and 44.44% were using e- journals, e- books and online- database for research 61.46% respondent's uses e- book, 61.11% e-journal and 34.72% uses e- proceeding to update knowledge. The 21.18% respondent's uses e- patent, 15.97% full- text database and 14.24% uses e- book for patent design 57.29% respondent's uses e- journal, 56.25% e- book and 26.39% uses e- proceeding to writing article/ paper. The study reveals that the 17.01% respondent's uses e- book, 10.07% open sources and 9.38% uses e- journal to writing, 36.11% respondent's uses e-book, 32.29% e- journal and 15.63% uses open sources to starting project.

The majority of 97.92% respondents were using consortium while 2% of the respondents were not using any consortium. The result shows that majority of the respondents were using consortium.

- ***Objective 6:*** *It has been designed to identify the type of documents mostly used.*

The type of documents that have searched and used by the respondents of the selected CSIR Laboratories were text books, reference books, patents, reviews, index, bibliographies, research project, trade literature, encyclopedia, periodicals, conference/ seminar proceedings, standards, newsletters, abstracts, micrographics, theses/ dissertations, hand books and newspaper clippings.

The study shows the types of document used by the users of KRC's of all the seven CSIR Laboratories. From the study it has been revealed that the 70.14% respondents have extensively use text books, 57.29% respondent were uses periodicals, 51.74% of respondents were using reference books, 49.65% uses research projects, 42.36% uses reviews, 29.17% uses theses/ dissertations, 28.82% uses patents, 28.47% uses conference/ seminar proceedings, 27.43% uses encyclopaedias, 25% uses abstracts, 21.18% uses hand books, 16.67% uses newsletters, 13.89% uses standards, 13.54 % using bibliographies, 9.72 % uses newspaper clippings, 8.33% are using index, 7.29% uses trade literature and 3.13% uses micrographics. The study reveals that majority of the scientists used to search the text books as compared to the other documents.

- ***Objective 7:*** *The study has been conducted to find out the extent of current information needs.*

The study reveals that majority of 76.74% of the respondents were using Current information and 23.26% respondents needs information of Retrospective type. Hence, it has been found that majority of the respondents preferred to using Current information for their research purpose. The scientists were access these Current information from various sources it may be printed documents or electronic sources like e- journals, e-books, e- proceedings, e- patents, e- databases, e- theses/ dissertations, e- standards, web resources, etc.

7.3 EVALUATION OF THE HYPOTHESES

This part mainly deals with the evaluation of the hypotheses that has been formulated in the early stage of the present study. Following are the evaluation of the hypotheses:

7.3.1 Evaluation of Hypothesis 1

Null Hypothesis= **H01:** The adequate library resources may not be available in CSIR KRC for the scientists.

Alternative Hypothesis**= H11:** The adequate library resources are available in CSIR KRC for the scientists.

The evaluation of the hypothesis 1 has been done by using MS- Excel through ANOVA test.

Table- 7.1: Availability of Adequate Library Resources in the CSIR KRC

ANOVAs: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
CGCRI	47	157	3.340426	0.620722
IICB	39	125	3.205128	0.746289
CMERI	40	141	3.525	0.307051
CIMFR	38	125	3.289474	0.859886
NEIST	46	161	3.5	0.522222
NML	37	124	3.351351	0.28979
IMMT	41	136	3.317073	0.571951

The above **Table- 7.1** calculated the laboratory wise variance of availability of Library resources in the CSIR KRC. The table shows the Variance of availability of Library Resources for CGCRI with variance 0.620722, IICB had variance of 0.746289, CMERI has variance of 0.307051, CIMFR has variance of 0.859886, NEIST had variance of variance of 0.522222, NML has 0.28979 and the IMMT has variance of 0.571951.

Table- 7.2: ANOVA Test for F- value and P-value

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Labs	3.205313	6	0.534219	0.953033	0.457513
Error	157.5134	281	0.560546		
Total	160.7188	287			

Analysis of Variance (ANOVA)

From the ANOVA Table-7.1 and 7.2, it has been observed that the p-value corresponding to F value is 0.457 which is greater than 0.05. Therefore, we can say that there is no significant difference among the labs in CSIR KRC for the scientists in terms of adequate library resources. It means that Library resources are equally available in CSIR KRC for the scientists.

Hypothesis Evaluation

Therefore, the Null Hypothesis (H01) = "the adequate library resources may not be available in CSIR KRC for the scientists" has been rejected.

The Alternative Hypothesis (H11) = "the adequate library resources are available in CSIR KRC for the scientists" has been accepted.

7.3.1 Evaluation of Hypothesis 2

Null Hypothesis **(H02)**: The research output may not be declined on account of limited library budget.

Alternative Hypothesis **(H12)**: The research output may be declined on account of limited library budget.

The evaluation of the hypothesis 2 has been done by comparing Year Wise Allocation of Library Budget and Year wise Publications of CSIR Laboratories of Northeast and Eastern India from 2009-10 to 2013-14 for five years. From Table- 6.5 and Table- 6.127 it has been reflected that in 2009-10 the total budget of KRC's were 5 crore39 lakhs and the number of publications of the CSIR Laboratories of Northeast and Eastern India for 2009 was 650 (8.92%) from the total publication 7284. In 2010, number of publication was 698 (9.58%) and the library budget for 2010- 2011 was 5

crore 76.8 lakhs. In 2011, the number of publication was 779 (10.69%) and Library budget for 2011- 12 was 6 crore 15.41. In 2012- 13 the library budget was 5 crore 59.75 lakhs and the publication in 2012 was 882 (12.11%). In 2013- 14, the library budget was 6 crore 33.92 Lakhs and the number of publications in 2013 were 951(13.03%).

So from the above discussion it was reflected that the number of publications have been increases with the increases of the library budget. And in the year 2012 the library budget was decreases but it does not affect the publications. The number of publications in 2012 has been increased as compared to the previous year.

Hypothesis Evaluation

Therefore, Null Hypothesis **(H02)** = "the research output may not be declined on account of limited library budget" has been accepted.

The Alternative Hypothesis **(H12)** = "The research output may be declined on account of limited library budget" has been rejected.

7.3.3 Evaluation of Hypothesis 3

Null Hypothesis (H03) = the scientists may not be comfortable using E-resources.

Alternative Hypothesis (H13) = the scientists are feeling comfortable while using E-resources.

Table- 7.3: ANOVA for Scientists Feel Comfortable while Using E- resources

ANOVA: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
CGCRI	46	66	1.434783	0.251208
IICB	37	51	1.378378	0.241742
CMERI	40	54	1.35	0.233333
CIMFR	37	55	1.486486	0.312312
NEIST	46	62	1.347826	0.231884
NML	36	49	1.361111	0.237302
IMMT	39	50	1.282051	0.207827

The above **Table- 7.3** calculated the laboratory wise variance of scientist's comfortable feelings by using E- resources in the CSIR KRC. The table shows the

comfortable feelings of the scientists of CGCRI with variance 0.251208, IICB had variance of 0.241742, CMERI has variance of 0.233333, CIMFR has variance of 0.312312, NEIST had variance of variance of 0.231884, NML has 0.237302 and the IMMT has variance of 0.207827.

Table- 7.4: Measuring F- value and P- value

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*
Labs	1.026167	6	0.171028	0.699552	0.650201
Error	66.98807	274	0.244482		
Total	68.01423	280			

Analysis of Variance (ANOVA)

From the ANOVA **Table- 7.4** above, it has been observed that the p-value corresponding to F value is 0.6502 which is greater than 0.05. Therefore, we can say that there is no significant difference among the labs using E-resources by the scientist. It means that scientists in different labs are comfortable while using E-resources.

Hypothesis Evaluation

Therefore, the Null Hypothesis (H03): "The scientists may not be comfortable using E-resources" has been rejected.

The Alternative Hypothesis (H13): "The scientists are feeling comfortable while using E-resources" has been accepted.

7.4 SUGGESTIONS AND RECOMMENDATIONS

Information use pattern is that seeking behaviour that leads to the use of information in order to meet the individual needs. To create information and to promote the need for information it is essential to identify the information needs of the users. Research and Development institutions are the place where knowledge are generated as a result of research undertaken by science and technology personnel's. The Knowledge Resource Centers (KRC's) of CSIR Laboratories of Northeast and Eastern India are considered as one of the biggest special library which continued to provide library and information

services to R & D and industrial institutions. But, from the study it has been clear that the users of KRC are not fully satisfied with the library services provided to them. In order to make them satisfied with the Library services and to meet the varying information needs of the scientists and other science and technology personals, therefore, certain possible suggestions are made to improve the KRC's.

Thus following suggestions and recommendations have been made for improving the services of the KRC's of selected CSIR Laboratories of Northeast and Eastern India.

1. The printed documents are equally important for collection development of any R & D institution's library. So, the KRC's of Selected CSIR Laboratories should enrich their collections in terms of purchasing text books, reference books, subscribing printed journals and other documentary resources.

2. All the CSIR Laboratories under study should have Collection Development Policy, Selection Policy and Separate Library Budget.

3. As people become more enthusiastic to buy and read books from book fair although the same books are already available in the library, which may due to the environment created by large number of books at a same place, so survey among the users about their recent needs and of course feedback evaluation will be helpful for smoothly conducting the library.

4. Most of the Laboratories have sufficient fund for developing their KRC's. But in case of some of the Laboratories the budget has found to be decreases which affect the KRC's during purchasing of costly Electronic Resources. Therefore, CSIR should maintain equality while distributing fund to their Laboratories/ Institution of Northeast and Eastern India.

5. Some of the KRC's does not have adequate numbers of seats and Research Cubical/ Carrel to their Scientists/ Users. Therefore the KRC should provide sufficient space, adequate seats and Research Cubical/ Carrels to its users.

6. For developing any R & D institutions libraries the sufficient number of staff is very much important. The numbers of library professionals in most of the KRC's

are very less and they should increase their Library staff for improving library services.

7. Some of the library staffs were not expertise in latest technologies. It is essential that the library staff should be well trained in order to give proper services to the user, so that users are satisfied. Professionally qualified Librarian and other staffs should be appointed to improve the services of the KRC and satisfy the user's actual needs.

8. The Staff of the KRC should be trained on Computer handling and they should have knowledge about the latest technology.

9. Extending Library hours as per the demand of the users. The KRC should be kept open for maximum possible time in a day and also open during Saturday and Sunday to make a library workhouse of intellectuals in the real sense of the term.

10. Inadequacy of collection in the library should be avoided through exploration of financial and resource sharing.

11. The majority of users need current periodicals and which must be continued. But due to the escalation price of the periodicals primarily of the foreign periodicals due to the general economic recession all around the world, it is not possible for any library to have all the periodicals subscribed. Under such circumstances resource sharing/inter library loan system has became indispensable and which should be implemented.

12. In case of S& T libraries users the current information is most essential to improve their products or to help their discoveries. Journal in foreign languages other than English is very less. So, to meet this need and to promote maximum utilization of KRC, facilities of translation service to the scholars should be provided with the help of NISCAIR.

13. The provision of documentation service is very much needed by the scientists along with the provision of Selective Dissemination of Information (SDI) and Current Awareness Service (CAS) to keep the scholars abreast of recent developments.

14. Internet service and accessibility should be improved. Internet facility for accessing e-journals, e-books will be strengthened in order to accommodate more people at a time. There should be provision to access library service from any computer.

15. To satisfy the varying need of scientists it should be necessary for KRC to provide web-based electronic resources to this special kind of users.

16. Most of the KRC's did not have any network system of its own. It uses institutions LAN, server, etc. To increase the speed of network connectivity inside the KRC, separate network connectivity is needed. A high speed Broad band Internet connection should be installed in the KRC's.

17. Each and every library resources should be digitized. Some of the KRC were using E-print and Dspace for building institutional repository and digital library. So, all the KRC's should build their institutional repository and should be developing Digital Library.

18. The Library Automation Software should be installed in all the KRC's of the selected CSIR Laboratories and the KRC should be fully automated so that the users will accessed their required documents at right time. All the sections of the KRC's should be completely automated and KRC should also provide OPAC and Web OPAC services to the users.

19. The KRC's needs to procure CDROM of various national and international databases and sufficient number of e-books, e-databases, e-theses and dissertations, etc.

20. The KRC's need to be extended internet services to various departments within the laboratories.

21. The number of Xerox machine should be increased and independent Xerox facility should be there. The authorized users should be issued certain Smart Cards for using Xerox facility against payment of nominal charges for a definite period. On expiry of the period, new card should be issued.

22. The young and bright should regular visit the library for generating more innovative ideas and increase their knowledge. They should be library centric and for that library should be well equipped.

23. The searching of information from book/journal should be accessed from onboard computer in the KRC's and also there should be provision to access through intranet.

24. Wider accessibility to various journals through electronic medium should be added.

25. The KRC staff should always be honest, friendly and ready to help at any time.

26. The KRC's should have provision of Subject Gateways.

27. Users Education Programs should be conducted from time to time regular basis on use of library and latest ICT applications implemented in the KRC's.

28. The KRC should conduct regular training programs to the staff of the KRC on latest technologies.

29. The KRC should subscribe sufficient number of Electronic Resources.

30. All the KRC's should subscribe Full text Electronic Databases like SCOPUS, Web of Science, etc. and also should be the part of National Knowledge Resource Consortium (NKRC)

31. The ICT infrastructure should be developed in all the KRC's of the selected CSIR Laboratories of Northeast and Eastern India.

32. Radio Frequency Identification (RFID) technology should be implemented in all the KRC's of the selected CSIR Laboratories.

7.5 SUGGESTION FOR FURTHER STUDY

The present study focused on the "***Information Use Pattern by Scientists Working at Selected CSIR Laboratories of Northeast and Eastern India***". The study is limited to the Scientists working at seven CSIR Laboratories of Northeast and Eastern India.

- Similar studies can be conducted among other CSIR Laboratories/ Institutions of India which have not included in the present study;

- The Comparative study and case study of Information Use Pattern of the Scientists of North East and Eastern India can be conducted;

- The Bibliometric Study of the scientific productivity of the CSIR Laboratories of North East and Eastern India and also productivity of all the CSIR Laboratories can be conducted to ascertain the publication trend of the Scientists.

- The present study had been covered the scientists and few research scholars. Similar studies can also conducted by covering other Scientific and technical staff also.

- It is equally important to study the Information needs and expectation of the Users and to make sure about the KRC's have provide the required information to the users or not

Hope that the present study have given a clear picture on the information use pattern by the Scientists, The present status of the Knowledge Resource Centers of the CSIR Laboratories of Northeast and Eastern India. It will also help the research scholar to undertake any kind of research activities on CSIR Laboratories of North East, Eastern India and the activities and the services provided by their KRC's and also reflects the publication trends of the Scientists working at the CSIR Laboratories of these two regions.

7.6 CONCLUSION

The present chapter identified some of the important findings and on the basis of these findings the research scholar has tried to give some suggestions and recommendations to the improvement of the services and facilities of the KRC's. The research scholar has also suggested for conducting further studies on the five related areas. The Conclusion chapter of the study is presented in the next **Chapter- 8**.