RE-ENGINEERING OF COLLEGE LIBRARY SERVICES:
A STUDY OF ARTS, COMMERCE AND SCIENCE COLLEGE
LIBRARIES OF MAHARASHTRA

A Thesis

SUBMITTED TO THE

TILAK MAHARASHTRA VIDYAPEETH, PUNE

FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

In

Library and Information Science
Under the Board of Moral and Social Sciences

BY

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August 2019

CERTIFICATE

It is hereby certified that the thesis entitled "Reengineering of Library Services: A Study of Arts, Commerce and Science College Libraries of Maharashtra" being submitted by Shri. Ganesh Ramdas Sanap for admittance to the Degree of "Doctor of Philosophy" in Library and Information Science of Tilak Maharashtra Vidyapeeth has been duly completed. Entire research work has been carried out under my guidance and supervision and is original. This thesis embodies the candidate's own work and is up to the standard both in respect of its content and its literary presentation for being referred to the examiners.

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DECLARATION

I hereby declare that the thesis entitled "Re-engineering of College Library Services: A study of Arts, Commerce and Science College Libraries of Maharashtra" submitted for admittance to the degree of "Doctor of Philosophy" in the subject of Library and Information Science under the Department of Library and Information Science, Tilak Maharashtra Vidyapeeth, Pune, has been carried out by me under the guidance and supervision of Dr. Madhukar N. Shewale, Head and Librarian, Yashwantrao Chavan Maharashtra Open University, Nashik and it has not been submitted by me to any other University for the award of degree, diploma or certificate, in part or full.

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ACKNOWLEDGEMENT

Bhartiya Sanskriti Peetham, Vidyavihar, Mumbai, who helped, cooperated, and inspired me during the period of research work.

  I am indebted to the different authors on the subject whose work I have either consulted or quoted. I am also thankful to all those seen and unseen heads and hands that have been directly or indirectly helped me in completion of this research work.

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Date:

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III. LIST OF ABBREVIATIONS

Sr. No.	Abbreviation	Full Form
1	AICTE	All India Council for Technical Education
2	AISHE	All India Survey of Higher Education
3	B.A.	Bachelor of Arts
4	B.COM	Bachelor of Commerce
5	B.S.C.	Bachelor of Science
6	BPR	Business Process Reengineering
7	CCTV	Closed Circuit Television
8	DVD	Digital Versatile Disc
9	EBSCO	Elton B. Stephens Co
10	EIS	Electronic Information Sources
11	FORSA	Forum For Resource Sharing in Astronomy
12	GIS	Geographic Information Systems
13	GSDL	Greenstone Digital Library Software
14	HE	Higher Education
15	ICT	Information Communication Technology
16	IFLA	International Federation of Library Associations and Institutions
17	ILMS	Integrated Library Management Software
18	INDEST	The Indian National Digital Library in Science and Technology
19	IT	Information Technology
21	KRC	Knowledge Resource Centre
22	LC	Library of Congress
23	LIS	Library & Information Science Professionals
24	M.Phil.	Master of Philosophy
25	M-OPAC	Mobile Online Public Access Catalogue
26	MBO	Management By Objectives
27	MHRD	Ministry of Human Resource Development
28	NCRT	National Council of Educational Research and Training

29	NCTE	National Council for Teachers Education
30	NEP	National Education Policy
31	N-LIST	National Library and Information Services Infrastructure for Scholarly Content
32	NSL	National Science Library
33	OER	Open Educational Resources
34	OPAC	Online Public Access Catalogue
36	OSS	Open Source Software
37	RFID	Radio Frequency Identification
39	UGC	University of Grant Commission
40	XML	Extensible Modeling Language

CHAPTER I

INTRODUCTION

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1.1 Introduction:

The world has witnessed several information revolutions in the past and at the beginning art of writing was developed about six thousand years ago which pave the way for the development of communication through manuscripts. Further there were many languages and symbols used to write and indeed it was a great source to store and transfer the knowledge from one person to another, one society to another society and one generation to another generation using printing. The printed books were started publishing after 13th century. Latter there was a big milestone that brought out the revolution in the information and knowledge sharing activities. These developments led to the establishment of libraries to collect, store and circulate printed materials to the public. In the ancient period, libraries served to share knowledge only among the specific royal patronage but printing activities shared knowledge and became important to the educational societies, missionaries, social groups etc. This scenario was changed due to initiation of educational activities. In India, till 18th century the education was spread only among higher classes of scholars of the knowledge society. In the 19th century, education became fundamental right of every human in the country. The role of the libraries became pivotal in education as well as among the common society development through academic and public libraries. The libraries are treated as store house of the knowledge and categorized in to the three major types, viz. public, academic and special libraries. Among these, academic libraries are devoted to teaching and learning as well as academic development in Higher Education sectors.

Academic libraries are further categorized into School, College and University libraries. Among these libraries Higher Education is initiated in the colleges and Universities and role of libraries is most essential to the faculty, students and researchers. Academic libraries are dedicated to Higher Education sector in the country. The deferent revolutions made many transformations in the libraries from temple libraries to virtual libraries. The face of libraries have been changed / transformed due to revolutions like writing, printing, blue revolution and the major role played is by ICT revolution which made drastic changes in the activities of any

kind of libraries. The major technologies like computers, storage technology, scanning technology, optical technology, networking technology, internet technology, social media, web 2.0, and digital technology etc. forced librarians to reshape their existing library practices. The library profession is also witnessed constant changes from time to time and professionals have accepted the changes and tried to modernize the libraries.

In case of Higher Education Sector the role of academic libraries especially college and university libraries is very important which caters to the need of students, teachers, and researchers who needs current and retrospective information. College libraries are playing basic role of initiating Higher Education like Arts, Commerce and Science libraries. University libraries impart and provide facilities to post graduation and research workers. Both the libraries are now essential to be assessed in respect of their activities and library services available from their collection as well as from the global resources and using Information Communication Technology (ICT). Researcher being a college librarian planned to conduct a study of college libraries in imparting library services as well as activities carried out in these libraries in the era of ICT.

1.2 Growth and Development of Academic Libraries:

Academic libraries have historical development since ancient period where the universities of ancient period were having their own libraries. The ancient university libraries had information stored in the forms of palm leaves, manuscripts, clay tablets, paintings, bricks, papyrus etc. The teaching-learning process was carried out with the help of libraries, the universities like, Takshashila, Nalanda, Vikramshila, Vallabhi, Somapura, Jagaddala etc. are the examples of ancient universities famous for knowledge hubs.

The libraries of ancient period and the libraries of the 21st century have enormous differences in their aim, nature of collection, nature of services, nature of organization and management, technological changes etc. But objective is same that preservation of information resources for future generations. But in the modern period more importance have been given to library services using ICT and e-resources. Libraries have been recognized as a service oriented institution for the users. Librarians have to think about user's requirements as well as their satisfaction. Today, the users' requirements have been changed due to revolution and changing society

due to use of e-resources and advanced technology. There are several technological tools have been developed to provide modern information services to the user. Last few decades technological advancements have provided the libraries not only to meet needs but user's expectations also.

An academic library needs to change its library services and LIS Professionals have to use technological tools in their system to upgrade the library activities. Radical changes are required to reshape the faces of college libraries in ICT era. Day by day, user needs and their reading habits are changing due to use of social media, internet and other technological tools. Academic librarians have to take some initiative to avoid gap between expectations of the user and the library services.

Das and Mishra (2011) expressed their thought about challenges and opportunities to academic libraries in migrating to e-resources. According to them "The dealing of digital assets brings new challenges to the academic libraries while implementing complex hardware and software, digitization of library resources poses a great deal of challenge to the major stakeholders, that is, the library management, employees and library users. Despite everything that digitization can accomplish, there are some good reasons librarians and archivists in developing countries may regret embarking on such project. Not everything in the collection is worthy of digitizing because the idea of an entire archives or library being digitized is a long way process. Successful digital project are the result of careful planning and evaluation of collections and the digitization of only those items that will provide the greatest benefits to the users. Below are some of impediments to digitization project for librarians in the electronic environment." Further they written in the account of opportunities "Libraries shall have to continue their dual convenience of use collection development policies in hybrid statistics of use environment in which printed and electronic resources are to be integrated to meet diverse needs of communities they are expected to serve. Libraries shall have to change and adapt to the new environment keeping the future needs of users in view".

The quality of library services has to be enhanced, because quality attracts the user towards the use of library resources and services. According to Meshram (2014), "Quality services are made possible in academic libraries when quality is assured and information technology is applied to the function and services.'' Academic libraries support their institutions when staff and students can take full advantages of information resources.

In the NAAC Manual (2017 mentioned that evaluation of library based on the remote access to the knowledge for the student is necessary. The sub-criterion 4.2 of the NAAC Manual indicates that "Library as a Learning Resource, the library holdings in terms of books, journals and other learning materials and technology-aided learning mechanisms which enable students to acquire information, knowledge and skills required for their study programs. A recent development in the field due to availability of digital means, the functioning of the library has undergone a drastic change. Automation of library using the ILMS, use of e-journals and books, providing remote access to e-resources in the library have become a matter of necessity. Providing for these and such other developments as well as utilizing them well are important indicators of the quality of an academic institution".

1.3 Traditional Libraries and Modern Libraries:

With the advancement and use of ICT, the libraries have reduced their size and added the digitized collection in its holdings. In today's environment, many libraries have initiated building digital libraries. Many libraries are digitized and became smaller libraries by its size and became bigger by its access to the resources widely. The digital and electronic libraries gradually replaced the paper based information resources. The digital information system becoming more popular in these days in comparison with text based information system due to powerful search and retrieval system using ICT.

The change is the nature's characteristics and libraries have to change for surviving in competitive environment. Now days, libraries are recognized by many different terms due to use of technologies like hybrid libraries, electronic libraries, desktop libraries, online libraries, virtual libraries etc. Many authors in the published literature indicated that the libraries are categorized in to traditional library, electronic library, digital library/ virtual library. This change is due to acceptance of the trends in ICT. This is in simple words transformation due to use of ICT for providing better services to the users, using global information warehouse. The term Business Process Re-engineering (BPR) is used to develop the changes in present system. BPR involves discovering to redesign the processes to eliminate the wastage or redundant efforts and improve efficiency to implement the processes changes in order to gain competitiveness and benefit as well as economic development.

In case of libraries, this BPR concept can be easily applied to improve the efficiency and quality of library services. So that user may prefer to use library for study and research purpose. The concept of re-engineering libraries is not new but since past it is termed as modernization of libraries, redesigning of libraries, restructuring of libraries, transformation in libraries etc. Since ICT is profoundly used in almost all academic libraries (college and university libraries) there is a need to rethink for developing changes caused due to use of ICT in college libraries. At present college libraries are also initiating digital acquisitions and library services using internet. The evaluation and assessment of college libraries are essential in the changing scenario and hence the study of re-engineering libraries is considered at the proper time so as to develop new initiatives.

1.4 Thinking for 'Reengineering' of College Libraries:

The change is a continuous process where we need to change with the changing world. The libraries have undertaken many changes in their infrastructure, collection, and services. In this competitive environment for the libraries, increase the quality in services is one aspect and minimize the cost, management of available fund, minimize the efforts, increase the status is another aspect for the libraries. For this reason libraries are reengineering for fit in to present challenges. Jha, Ram and Kumar (2010) expressed their approach of reengineering libraries with digital library. As per their approach they stated that "The evolution of Library and Information Science, digitization of information, publications, research papers, manuscripts, etc. with the help of growing technology the traditional resources of a library have undergone a massive reformation with the application of universally accepted technology. With the help of these advanced technologies, the physical collection of traditional library is completely and comfortably converted into Digital Library, and further, with the help of multifaceted data and internetworking system, Digital Library is made available to researchers/users universally using Hypermedia technology." While talking on technology application to the library, Shastri (2013) has highlighted "how knowledge professionals can adopt technology such as mobile technology, GIS technology, Cloud Computing and introduce new services despite traditional library and information services in order to serve library patrons in a better way". Most of the researcher has suggested technology application while talking about reengineering of libraries.

The present needs of the users and their information seeking behavior have been changed due to the advancements in ICT. To manage the needs of users, there is a need to evaluate college libraries in the light of technologies and re-engineering to transform libraries to meet expectations of their users. Hence, there is a need to take some major initiatives towards the implementation of innovative tools and techniques in the library activities and services. The successful library services are those who fulfill the present information needs of the stakeholders. Technological developments have supported the library services to be enhanced. Therefore the trend to reengineering library activities and services is to be focused by the librarians. Reengineering libraries avoid unnecessary efforts and expenditure on the library resources as well as services. Keeping in the view of the development and changes in the profession, initiation of redesigning academic libraries concept is the need to manage 'reengineering' as suggested by Michael Hammer and Champy (1993).

In industries, the term reengineering is very popular because they are the service providers and need the changes in its products as per customer demands, since library is also a service providing sector, reengineering term can also be used in similar context more effectively. Many articles, reviews have been studied on reengineering and its application in production industries, services industries to achieve cost effectiveness, quality in service etc. Similarly the college libraries need to apply such theories/principles to change the libraries. The theory/concept of reengineering can be suitably applied in the college libraries to make drastic changes which are required today to support user needs in information explosion and ICT era.

1.5 Concept of Business Process Reengineering:

Customer satisfaction has increasingly become the basic requirement of business organization. The service institutions or any business organizations are applying marketing strategy for maximizing the facilities and generation of products for the users or customers. But, after some years, same strategy and the same slogans of marketing are not feasible and effective, hence change is the need in every discipline to support user needs. One of the reasons is that the old ways and processes have become severely inadequate and no longer acceptable. It requires changes from time to time to make a new interest in the service or production. In many cases, the present system can no longer be fixed and incremental improvements are not enough.

The reengineering suggests new processes to achieve economical products, which also suits their needs and requirements. Hence in the business sector always reengineering or BPR term is used. Though initially term BPR used for reengineering in business and marketing but later on reengineering term was also used to indicate renovation of activities using different techniques and technologies to enhance the quality of library and information services.

1.6 Definitions of Reengineering:

According to Hammer and Champy (1993) of the US, who coined the term "Reengineering". The definition of reengineering is as follows

"Reengineering is the fundamental rethinking and radical redesign of a business processes to achieve dramatic improvement in critical, contemporary measures of performance, such as cost, quality, service and speed"

With this definition of BPR, there is one another great thinker, Davenport (1993), who has given his definition on 'business process redesign'.

According to Davenport and Stoddard (1994), Business Process Redesign is "The analysis and design of workflows and processes within and between organizations. Business activities should be viewed as more than a collection of individual or even functional tasks; they should be broken down into processes that can be designed for maximum effectiveness, in both manufacturing and service environment."

From the above definition it is understood that reengineering means improvement in the performances, services to achieve cost reduction, quality improvement, services enhancement and speedy information delivery. In case of libraries reengineering deals with using ICT and different techniques to generate information products and develop new services to suit the user needs. In the process of reengineering, initially problems are isolated and they are redesigned for better utility of the user and economic collection development and library services.

The Michael Hammers definition focuses on four major key words which provide the new approach to reengineering (fundamental rethinking, radical redesign, dramatic improvement, and process).

a. Fundamental Rethinking:

The keyword described as thinking over again on the root or basic principles of the organization and thinking today's requirement for solving problems. If the root things are matched with the current environment, think where steps need to be improved. In short this is the first step of reengineering process which investigate the problems and thinking about new approach.

b. Radical Redesigning:

It means business processes need to break earlier method and redesign a new method to provide better than earlier. If present system doesn't give satisfactory output the system needs to redefine its process and plan for the new system designing.

c. Dramatic Improvement:

Reengineering process brings drastic change in the overall process of the business in order to achieve cost, quality, service and speed. This is not a little change in the system but a drastic change.

d. Process:

Reengineering is a process of dramatic change in old system for achieving better results in business processes. Reengineering is a process of dramatic improvement in the existing system/ business process/ organization etc. Hence this is the initiating process of redesigning the system.

The descriptive meaning of the reengineering is that reengineering is a process that can be applied to the organization or system, which is not effective at present due to the outdated technologies used and the low quality and time consuming processes and hence the new technologies to be introduced to develop cost effective products.

Janson (1992) also stated, every re-engineering effort involves three basic phases (rethink, redesign, and retool) similar to Michael Hammers:

1. Rethink:

This phase required investigation of the organisation's current objectives and underlying assumptions to determine how well they incorporate the renewed

commitment to customer's satisfaction. Another valuable exercise in this phase is to examine the critical success factors those areas in which the organization clearly stands apart from the competition and to check whether they contribute to the new customer satisfaction goals.

2. **Redesign:**

This phase required an analysis and redesigns the product to suit the customer's needs.

3. **Retool:**

This phase requires a thorough evaluation of the current use of advanced technologies, especially electronic data processing systems, to identify opportunities for change that can improve quality of services and customer satisfaction.

As per the above explanation on the concept of reengineering, it can be thought on the application to library and information centers to achieve the implications of five laws of library science in this digital environment and achieve the goal of academic libraries in managing cost, quality, and speed in the services provided using re-engineering concept.

College library has a crucial role to play in higher education. College libraries support the institution for achieving goals and objectives of higher education. There is a great impact of Information Communication Technology on college libraries. If libraries walk with the current development in ICT librarians are conributing to the development of society as well as nation by providing updated and valuable information services to their user's viz. students, teachers (faculty) and researchers. Therefore the researcher conducted the study for modernizing college libraries by applying the Michael Hammer's Theory of Reengineering. "Re-engineering is a new beginning which deals with application of technologies and management science to the modification of existing system, organizations, processes and products in order to make them more effective, efficient, and responsive" (Sankar 2016)

1.7 Need of the Study:

There is an impact of Information Communication Technology (ICT) on academic libraries. In the traditional library system only few options were available

for obtaining required information, but today, there are several tools and information systems established to manage high recall and precision using ICT as compared to utilization of printed resources. The tools of information sharing, distributing of information are developed with the advancement of ICT. The favorite tools are Internet, Websites, Blogs, Social Media, Audio-Video aids and other media.

Now days, traditional college libraries, providing services to users are no longer useful because of the information explosion and use of Internet and easily obtainable information which they need. Many libraries have adopted the ICT tools in the library services to manage library activities. But some of the libraries are not in the process of re-engineering due to not adopting new technologies in their library and lack of support from the management, lack of funds, lack of skills, lack of willingness etc. To cater today's techno savvy user's need; librarians have to reengineer their library services using ICT. Libraries have so far initiated activities and reengineered the card catalogue, journal subscription, printed collection, current awareness services, document delivery services, inter library loan etc. by purchasing electronic information resources, e-access to e-resources, supply documents through mail etc.

Now the problem is that majority of the college libraries have not adopted advance techniques to reengineering their library activities and library services. Though, few college libraries have initiated reengineering their libraries, therefore researcher has thought to undertake a survey of college libraries in the Maharashtra region to assess the status of college libraries which have initiated steps towards re-engineering and supporting to Higher Education efficiently. After assessing the status of college libraries in Maharashtra researcher is going to formulate a reengineering design model for college libraries to improve college libraries in their services as well as collection development.

1.8 Statement of the Research Problem:

The problem statement of the research study is **"Reengineering of Library Services: A Study of Arts, Commerce and Science College Libraries of Maharashtra".** In which researcher is planning to evaluate the concept of reengineering libraries and its need of the implementation in college libraries. Reengineering of college libraries is essential to develop economy in library activities using different technologies and fulfil the needs of users.

1.9 Aim and Purpose of the Study:

The aim of the present research study is to evaluate the present status of library and information activities and services and find out status of reengineering library service of Arts, Commerce and Science College (aided) libraries. The purpose of the present study is to reveal present situation of college library system and services and improve the activities using advanced technologies and reshaping their libraries for better utility by the stakeholders.

1.10   Significance of the Study:

All the college libraries are imparting their services to support Higher Education system by using economical methods and adapting new technologies. In majority of college libraries of Arts, Commerce and Science Colleges. There is a need to evaluate the status and support to user needs by applying technologies for better provision of services. 'Higher Education Statistics (2016)'.

Ministry of Human Resource Development (2018) published a report of All India Survey on Higher Education 2017-18. The report explored the statistics of awarded Arts, Commerce and Science graduate degrees in the year of 2017-18. As per the report "B.A. (23.89 Lakh) degree has been awarded to maximum number of students. B.Sc. (11.52 Lakh) is the second highest followed by B.Com. (9.39 Lakh)". This is the big number of learners than other fields of education.

Hence there is a need to evaluate the status of college libraries in Arts, Commerce and Science colleges and reengineer library practices using ICT in college libraries which is priority step for Higher Education support. This study will definitely be useful to reengineer Arts, Commerce and Science College libraries in Maharashtra.

1.11   Objectives of the Study:

The present study entitled "Reengineering of College Library Services: A study of Arts, Commerce and Science College Libraries of Maharashtra" has been conducted with the following objectives:

1. To understand the concept and terms of reengineering in libraries.
2. To study the present status of college libraries in relation with their collection development and library services.
3. To identify the areas which can be reengineered in college libraries.

4. To identify the college libraries those have reengineered their library and information services.

5. To study the problems faced by librarians during reengineering of college libraries.

6. To identify the status of use of ICT in college libraries.

7. To propose a model for reengineering college libraries.

1.12 Hypotheses of the Study:

The hypotheses considered for this study are:

1. Most of the college libraries provide traditional library services even though there are effective modern tools.

2. Due to financial problems, lack of trainings and lack of skills, most of the libraries in Maharashtra have not reengineered their library and information services.

3. In Arts, Commerce and Science college libraries more than 75% budget is spent on traditional resources only.

1.13 Research Methodology:

The present study is based on the descriptive survey method. This is the popular method for such type of problem solving issues. The study conducted to evaluate present library activities and services of college libraries in the Maharashtra state and investigate the status of reengineering of college libraries and their activities and services.

1.13.1 Data Collection:

Data is one of the important aspects in research work. Every researcher may have different methodology as per their field of the study but every research is based on data which is collected and analyzed and interpreted to get proper information or knowledge. There are two sources of data collection i.e. primary and secondary sources of data. The main tool in primary data collection is questionnaire, which is circulated among the librarians of colleges. Similarly secondary data is collected from the published literature to support the research observations from the survey.

1.13.2 Questionnaire Design:

The questionnaire has been designed based on the objectives fixed for the present study. The questionnaire has been designed for the librarians of Arts, Science and Commerce Colleges to obtain the data on library collection and library services, resources and facilities in both forms. The questionnaire has been designed in a four main areas, basic information, library resources, services and facilities, library budget, and reengineering of library and information services etc. In these four areas the data collected is useful for identifying the status of present library and information services and its utilization.

After design the questionnaire, some of the experienced LIS experts have been consulted to improve the questionnaire. Their suggestions have been incorporated in the questionnaire.

1.13.3 Population and Sampling:

The population of the present study is from the Arts, Commerce and Science College libraries of Maharashtra. There are about 5500 Arts, Science and Commerce Colleges in Maharashtra (as per website of higher education department of Maharashtra). It is difficult to survey all these 5500 libraries in a stipulated research time and hence researcher has concentrated aided colleges only. Out of 5500 total population 1076 colleges are aided and these are considered as population for this research study. The scope has been taken Arts, Commerce and Science College libraries of Maharashtra. There are 1076 Government Aided Arts, Commerce and Science Colleges in Maharashtra. As per the nature and scope of present study, the stratified sample has been used. There are five regions are there in the Maharashtra viz. Marathwada, Vidarbha, Khandesh and North Maharashtra, Paschim Maharashtra and Konkan. These five regions have been considered as a stratum. Thus, the stratified sampling method found suitable to the present study.

Krejcie, R. V. and Morgan (1970) Table is also used to determine the sample size. According to the Morgan table, for the known population the sample size for the 1076 is given 285 for the population of 1100. Hence researcher has considered 285 college libraries for the survey and selected randomly form the five regions of Maharashtra, i.e. Konkan Region-46, Paschim Maharashtra-69, Khandesh and Northern Region-32, Marathwada-55 and the Vidarbh 82. (The regions are identified from the website of "Government of Maharashtra") . Thus sample for this research

study is 285 Arts, Commerce and Science College libraries which are aided in nature. From the each region, random numbers of the colleges has been taken by using the MS-Excel formula of =RANDBETWEEN( ). These random numbers of the colleges have been studies. (The list of Colleges is presented in the Appendix-II)

(Konkan Region-46, Paschim Maharashtra-69, Khandesh and Northern Region-32, Marathwada-55 and the Vidarbh 82 =Total 285)

The structured questionnaire as included in annex I is circulated among the respective college librarians of Arts, Commerce and Science College libraries. Out of 285, the responses received are 206 (72.28%).

1.13.4 Data Analysis:

For the collection of data, total 285 printed questionnaires were distributed to the librarians of all the regions of Maharashtra and 206 (72.28%) questionnaires received duly filled in back from 285 college librarians of Maharashtra. The 206 questionnaires have been analyzed. The analysis has been presented in tabular and graphical form. The interpretation drown from the data is placed below the table as observation.

1.14   Scope and Limitation:

The scope of the study is limited to aided colleges in Arts, Commerce and Science in the Maharashtra state. There are 20 state universities in the Maharashtra, providing these courses and imparting education facility to all. Among these there are 11 state universities in Maharashtra providing Arts, Commerce and Science degree courses to the students as well as affiliation to the colleges to run such courses.

The researcher has considered only aided colleges for the survey because these colleges receive grants from Government and responsible for providing better services to their user, for which they have to reengineering the libraries and hence researcher conducted a survey to identify present status of college libraries in Maharashtra. The non-aided colleges since they are established in the progressive era. They are using ICT for many purposes in the library. They are also funded independent and management taking responsibility of its improvement. A separate study will be required to assess non-aided college libraries as a further research.

There are total 1076 Arts, Commerce and Science Colleges which are aided in the State of Maharashtra (As per website of Ministry of Higher and Technical

Education, 2016). The Geographical area of Maharashtra is divided into 5 main regions i.e. Konkan, Paschim Maharashtra, Khandesh and North Maharashtra, Marathwada and Vidarbh.

1.15   Benefits and Implications of the Study:

1. The present status of the college library activities and services of Maharashtra state has been presented in this study.
2. The areas identified for the reengineering activity
3. Present study revealed the need of reengineering college library services in the State of Maharashtra.
4. The solutions provided in the form of model for reengineering college libraries
5. Systematic model plan for reengineer the library and information services has been given.
6. Explored the future challenges, need of professional skills are presented in the present study.
7. Explored the future of college libraries
8. Explored the possible web based modern library services
9. Importance of college libraries at present as well as in the future is described.

These are the benefits of this study.

1.16   Organization of the Present Study:

The present study has been organized in the form of five chapters as follows:

Chapter 1: Introduction:

The present chapter covers detail introduction and background of the study, contains explanation of the concept, statement of research problem, significance of the study, objectives, hypothesis, research methodology, scope and limitations, benefits and implications of the study, organization of the study etc.

Chapter 2: Review of Related Literature:

This chapter covers review about the reengineering concept and its application to business world, application of reengineering to library and information centers, application to the library services and at the conclusion gap in the earlier study has been described.

Chapter 3: Role of Higher Education and Reengineering of College Libraries

This chapter covers the role of higher education in India, purpose of Higher Education, Objectives of Higher Education, functions of Higher Education, Higher Education in Maharashtra, college libraries of Maharashtra, objectives and function of college libraries, role of college libraries in higher education, College library services, standards for college library services etc. This chapter also covers concepts of Reengineering, Need and application of reengineering in college libraries and information centers, reengineering library services, benefits of reengineering in libraries etc.

Chapter 4: Data Analysis and Interpretation:

This chapter covers systematic data analysis and statistical presentation of data, descriptive data analysis and interpretation of collected data which has been collected through the librarians of Maharashtra.

Chapter 5: Findings, Suggestions and Conclusion:

In this chapter, the findings are presented from the observations discussed in Data analysis chapter and based on findings suitable suggestions are provided for the best practices for the reengineering college libraries. Finally the study is concluded with provision for the future studies and fulfilling and proving the objectives and hypotheses. This chapter also presents the model plan and its details explanation for re-engineering Arts, Commerce and Science College libraries of Maharashtra.

The appendices of questionnaire and selected colleges for study are attached at the end of this Thesis.

1.17   Summary:

The present chapter introduces the detail background of academic libraries development, changing scenario in the information communication and its development. As per the scenario and the changing needs of college library users, the researcher has formulated a problem statement with the help of related literature reviews. The chapter also provides the significance of the study which reveals the need to conduct present research study, and to propose the model as well as solution to problems in academic libraries. The structure of the present study has been presented in this chapter. Chapter 5th is an important chapter of this study which

presented the findings and suggestions based on analyzed data from 206 college libraries. Re-shaping of libraries is need of the time therefore the present study has focused on application of reengineering to library and information services for gain better outcomes with the solutions of present problem.

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CHAPTER II

REVIEW OF LITERATURE

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2.1 Introduction:

Literature review is an essential element for research. Without literature review the research may not be conducted properly. Literature review is beneficial to researcher in many ways. Literature reviews traces the history of present research area. The role of literature review has vital role which is described as below:

2.2 Role of Literature Review in Research:

Literature review plays an important role in conducting research, and is one of the steps in performing research steps. Literature review is nothing but gathering related published literature on the topic of research and its elements. The researcher collects literature published in different sources like books, articles, these, reports, conference proceedings, theses etc and analyses its use and sort out the related articles. The important and related literature is evaluated and used for the different purpose while writing the thesis. The literature reviews helps researcher for the following:

- Refining the problem selected
- Organizing the structure of the thesis
- Finalizing hypothesis
- Finalizing hypotheses
- Selecting research method for conducting the study
- Identifying gaps in research study based on the earlier studies
- Submitting evidences for the statements made in the chapters
- Reduces the chances of duplicating efforts in research
  Hence literature reviews helps researcher in many ways.

2.3 Importance of Literature Review:

Stating the importance of literature reviews Gall, Borg, and Gall (2007) have been stated that literature review plays a role in delimiting the research problems, seeking new lines of inquiry, avoiding fruitless approaches, gaining methodological

insights, identifying recommendations for further research and seeking support for grounded theory.

According to **Caulley (2008)** of La Trobe University, the literature review helps researcher to::

- Compare and contrast different authors' views on an issue
- Group authors who draw similar conclusions
- Criticize aspects of methodology
- Note areas in which authors are in disagreement
- Highlight exemplary studies
- Highlight gaps in research
- Show how your study relates to previous studies
- Show how your study relates to the literature in general
- Conclude by summarizing what the literature says

Finally the purposes of the review are:

- To define and limit the problem you are working on
- To place your study in an historical perspective
- To avoid unnecessary duplication
- To evaluate promising research methods
- To relate your findings to previous knowledge and suggest further research

The literature reviews are taken as per the guidelines given by Caulley.

Researcher has divided the collected literature in to facets and then analyzed as per the related facets matching to the topic of research.

2.4 Facets of Literature Review:

Following facets have been considered for Literature Review related to theme of research:

- Concept of re-engineering
- Applications of re-engineering in service sectors
- Applications of re-engineering in Libraries

The terms used for Reengineering:

The terms "Business Process Reengineering" (BPR) and "Reengineering" are used interchangeably in the present chapter. The Business Process Reengineering is

an original terms but the other terms can also be used interchangeably such as Reengineering, Restructuring, Redefining, Re-forming etc. Hence, in the literature review some authors have been used the term Business Process Reengineering and some of the used Reengineering. As per their terms used, the review has been taken and used the terms.

2.4.1 Concept of 'Re-Engineering':

Hammer and Champy (1993) are the originators and leading proponents of the concept of Business Process Reengineering. They had coined this term in the year 1993, when they wrote their book entitled "Reengineering the Corporation: A Manifesto for Business Revolution". Reengineering the corporation, describes how the radical redesign of a company's processes, organization and culture can achieve a quantum leap in performance; helping corporations to save millions more, raise their customer satisfaction still higher, and grow ever more nimble. According to authors "Reengineering is fundamental rethinking and radical redesign of business processes to achieve dramatic improvement in critical contemporary measures of performance such as cost, quality, service and speed". The purpose of writing the book was to describe a new business model that can be used by managers for the reinvention of various American companies as to face the competition. Hammer and Champy discussed on theory of division of labor and indicated that instead of tinkering with or simply computerizing an aspect of the work, the answer is to radically redesign the whole process. The book describes the guidelines for initiation, implementation and follow up of BPR exercise. They have stated that business process reengineering is not about fixing anything; it is about starting all over again in an organization i.e. about reinventing the nature of work and corporate structures from top to bottom.

The authors have studied and observed and participated in implementation BPR in several American companies e.g. Hallmark, Taco Bell, Capital Holding, and Bell Atlantic etc. and had dramatically improved their performances in one or more areas of their business by radically changing the ways in which they worked. These companies had not changed the businesses but significantly altered the processes and replaced old processes entirely. The book has explored on the reason for reengineering, its techniques, the problems, guidelines and principles for intimating, conducting and following through the reengineering process.

The authors have also shared the experiences of companies like IBM Credit, Ford Motor, Kodak, Hallmark, Taco Bell, capital holding, and bell Atlantic that had used business process reengineering. The authors have written about three forces driving today's companies and those forces are Customer, Competition and Change. The authors have suggested following principles for reengineering which are as follows:

1. Several jobs are combined into one.
2. Workers make decisions.
3. Process have multiple version
4. Work is performed where it makes the most sense
5. Checks and controls are reduced
6. Reconciliation is minimized
7. A case manager provides a single point of contact.
8. Hybrid centralized/decentralized operations are prevalent

The authors have emphasized on the crucial and important role information technology which plays role in business process reengineering. They have also written about the roles of BPR leader, process owners and reengineering teams.

The present era has brought new challenges for academic library. Libraries are facing the competition due to ICT usage and the library holdings in digital resources. The same theory can be applied to the library and information services which is the most important component of LIS.

Sturdy (2010) described in his book entitled "Business Process Reengineering: strategy for occupational health and safety" that "The concept of reengineering traces its roots back to management theories developed in the early 19th century. The purpose of reengineering is to make all processes in libraries. The concept of business process improvement has encouraged businesses to consider company-wide processes, rather than focus on production processes only".

Talwar (1993) defined the reengineering term that "reengineering is the ability to rethink, restructure and streamline the business structures, process, methods of working management systems and external relationships through which helps to create and deliver value". According to him the competitive and changing environment encouraging the fundamental approach to plan and design business

activity. Further he has mentioned two main approaches to reengineering. The first is process reengineering offers the opportunity to rethink and streamline individual processes. The second is business reengineering provides an approach to rethinking and redesigning the entire process with competitive strategy.

Bhat (2010) addressed the concept and techniques of Business Process Reengineering into their book. All the chapters are related to BPR and re-engineering concepts in industries. For business process reengineering, Kaizen is the name given by Japanese, which means 'continuous incremental improvement'. 'Kai' means change and 'Zen' means good. Overall meaning of the kaizen concept is continuous improvement for the better. The author has also discussed on relationship between business process reengineering and total quality management. Author has provided detailed guidelines about the concepts and related concepts of management. The book also provides the guidelines for application of the business process reengineering to the services oriented organization. The concept discussed in the book by the author is very helpful to apply the concept of reengineering to the library and information center, as this was the core method adopted in present research work.

Summary:

It is very clear that the BPR term is initially used in management and industries as well as service providing sectors. The basic idea of this term is to develop new processes or to alter the existing processes to get maximum benefits from it. The term re-engineering is based on this principle, which can be used in libraries to modify the processes suitable for the users.

2.4.2 Application of Reengineering to Service Sector:

Tennant and Wu (2005) have conducted a research with the aim to identify the key factors for success of business process reengineering in the UK. The research has been carried out by using survey method. The questionnaire was used to gather primary research data from the UK based companies that have applied BPR to investigate the causes due to application of BPR, and identify the main barriers, and enable the authors' to propose key factors for success. Their survey found that due to BPR changes noticed in internal cost reduction, and productivity improvements. According to them, process includes the establishment of

appropriate company-wide target and measures that focuses continuous improvement for long term.

Maregwa (2003) have conducted a case study on the co-operative Bank of Kenya Ltd with the main objective to analyze effect of business process reengineering on service delivery to customers of the Co-operative Bank of Kenya Ltd. The study investigated the bank customer's satisfaction and other benefits due to application of BPR. The bank management was satisfied with the BPR but the customer's opinion is important in the service sector. So, the study was carried out to find the customers opinion as well as satisfaction with the banking services. The author has used descriptive survey method for this study. Six branches of co-operative Bank of Kenya in Nairobi were surveyed, and collected the data through questionnaire form the customers of the Bank. After the data analysis, the research has drawn a conclusion that there has been an improvement in measures of performances such as quality, services and speed of banking services. This was possible because of management has identified the appropriate areas where reengineering was necessary and beneficial.

Shuleski, Darko and Kristea (2014) presented a paper in International Management Conference on 'smart practices of business process reengineering in the public and private sector using cloud computing technologies'. In their paper they shared their opinions on effectively increase performance and competitiveness in an increasingly crowded market. They have suggested that redesigning organizational processes increases economic performance. They have mentioned three types of processes such as main process, management process and support process. The main process contains purchasing, production, product development, product care, logistics, sales, engineering, service, education, information system etc. The Management process contains document management, cords management, preventive and corrective actions, internal audit, management review etc. Lastly the supportive process contains purchasing, scheduling, accounting, finance etc. Further they have explained how to start business process reengineering, how to manage business process reengineering projects, software based plan etc. In the article, authors trying to say that change the process where change is need in the system.

Loch (1998) discussed on the operational management and reengineering. The paper provides guidelines for operational management and reengineering is related with each other. According to author the operational management is a practical thing and the reengineering is a process that has to be applied to redesign operational process for practical act. It is the operational process management where faults to be cleared to perform well, the reengineering process is needed to rethink about the operational management system.

Baker Newman Noyes (2015) published a web article that describes application of reengineering in services sector. This is an article that has explained the benefits of reengineering application in services sector as well. Author expressed his opinion that "increasing cost, strong competition and technological advances that have accompanied the rise of globalization has also been real challenges for the financial, consulting, engineering and legal industries. Service organizations should evaluate their internal process to identify the areas where restructuring could drive serious improvement". The statement is accurately matched with the current global situation.

Further the author given common objectives of BPR in service industries include:

i.   Reduced waste and increased efficiency of the service delivery process
ii.   Increased consistency of the service outcome
iii. Increased customer satisfaction
iv.   Increased throughput, more business processed using the same resources
v.   Reduced operating cost/higher profitability.

Concerning services institution/organization, the above objectives are applicable to library and information center also.

Aldakhil (2016) conducted a research by using quantitative approach to analyze the implications of BPR in a private hospital in Saudi Arabia. The main approach of his research is to reengineer the hospital system, may apply the Enterprise Resource Planning (ERP) to satisfy all stakeholders. The researcher analyzed satisfaction survey before implementation of ERP system and after implementation of ERP system. The statistics found positively that increased satisfaction level of all the stakeholders. In his study, the data have been collected from around 28 representative working in the clinic, 120 patients of the concern

hospital. According to him "The working society was moderate; patients need to hold up a great deal even they need to hold up long time at the counter in line for accepting the card number for checkup. As after the usage of ERP framework working society has turned out to be better and for the most part patients get to be fulfilled". Author focused on the changing situation of the society and their requirement about clinical services is differing from earlier. As per the need of the patient and staff of the hospital, reengineering of the hospital has been done by implementing ERP system.

Vrcek and Brumec (2009) have conducted a case study on measuring effect of BPR in public sector. In their study, the authors have provided simulation model.

They have stated that 'simulation modeling can give us deep insight in future performance of organization. Adequate use of ICT can significantly reduce resource utilization in modern public organizations and it can be proved by simulation modeling. The simulated result introduces necessary changes in the business processes and legal regulations required for efficient use of ICT'.

Hence, the study provided guidelines for the public organization to implement BPR with simulation model. Because, failure in BPR project of pubic organization is not affordable to the organizations. Therefore the author have discussed on the simulation model.

Summary:

Many research studies have been recorded on application of BPR and reengineering activities in different service sectors. Hence it can be concluded that reengineering is nothing but the innovation and change in process using modern tools and techniques for increase in user satisfaction in any information sector including LIS.

2.4.3   Application of Reengineering in Libraries:

Sylvia (1994) discussed in the article that the 2nd era of information age in which businesses and professions are experiencing a technological transformation. According to them, information to be delivered as seamless, borderless services and fast accessible to the user in this era. Further they described the three steps of BPR

and they are:

i. Developing a strategic vision,

ii. Analyzing and designing the process,

iii. Implementing a reengineering process.

Author said "It is believed that reengineering should create a bridge to the further by directly establishing links between mission-critical business or professional's needs and the processes of business". The Author mentioned the need of reengineering in library and information services in the present digital and technological era.

Bjornshauge (1999) conducted a case study on 'Reengineering of Technical Knowledge Centre and Library in Denmark'. In the study author has studied the financial problem in the traditional library system and focused on the new development in scientific publishing. Author suggested that reengineering can be done in the periodical section by acquiring electronic journals and electronic resources and develop a common interface for many resources as possible, changing internal work procedure. Using ICT infrastructure a common user interface is developed to create database and electronic full text journals, and provide training to the staff to be competence in new work procedure associated with handling e-journals. The project was undertaken to reduce expenditure by developing common user interface for e-journals and e-databases and shift the role of academic librarians to become consortia builder, system and services provider, aggregator, license administrator etc. from the traditional worker.

Ghumre (2014) mentioned in his communication the need of reengineering in college library management and services is essential. Author has given the background of reengineering theory and its application to college library. The article contains the history of reengineering and objectives, characteristics and challenges of reengineering. The author has also given a plan for reengineering college library which includes five steps namely,

i. process activities to be reengineered;

ii. Selection of reengineering team;

iii. Status of current processes in college library;

iv. Vision for the new improved process; and

v. Action needed to implement or redesign the new processes.

Further author focused on the e-collection to fulfil multidimensional need of the user and the new services in college libraries. The article gives an idea about reengineering of library services and process to start thinking about reengineering libraries and information services.

Balasubramani (2013) has undertaken a project of reengineering library and information services through web portal, special reference to 'Bharathidasan University' and 'Constituent Colleges'. Author has introduced the web based library and information services for the user in the present digital era. Author has explained that "Libraries have to design web page to provide modern library and information services to both traditional library user and new library user. Author suggested that in the digital environment there is no need for the users to come to library but libraries have to be reached to the users at their work places and overcome the distance barriers". In addition to this, librarian has to take efforts for educating or developing awareness among the user about using web based library and information services which increase the use of library services more effectively. Researcher considers that such projects need to be undertaken while re-engineering libraries using ICT and modern technologies.

Graves and Martin (1998) presented a paper in the 6th IFLA general conference at Amsterdam in 1997. The authors applied the concept of reengineering to library and information services. They have described two reengineering projects namely access to electronic reserves and access to full text journals. Also, discussed the Issues related to these projects such as staff involvement, training, equipment, user reactions and copyright. They emphasized on the use of open access journals and other electronic resources. According to them, providing access to electronic information resources instead of printed resources can be the reengineering of library resources and services. The article is based on the experience gained at Health Science Education of University of Illinois, Chicago. The authors have focused on the users need where library may provide electronic access to users. This is an attempt towards reengineering of library collection from printed to electronic access.

Pai (2015) has attempted to list out the various trends in re-engineering the libraries

which includes libraries relationship with publishers, Word of Mouth (WOM) and e-marketing medium, development of institutional repositories, links to entertainment media, open education sources, commercial document delivery service, remote access, e-books etc. according to author, success of library is increasingly dependent on its reengineering with most effective and strategic management of new technologies. The best phase through which today's libraries are moving is their transformation into the digital form. Their adoption of digital functions and providing digital services into the library learning environment shows a positive sign of reengineering of libraries.

Further the author stated that Librarian has to be pro-active and should create the environment so that when a need for information comes, librarian should be the first person to come into the mind of the information seeker. Reengineering of the libraries with the use of modern technology and providing of fast technological services can help the librarians to achieve this task. Modern users are carrying smartphone/iPods/Laptops etc. using which access to the information and approach to the librarian is very easy. This will not only increase the usage of the library but also make people realize the importance of libraries.

Lyon (2012) explored that how libraries can re-shape to better reflect the requirements and challenges of today's data-centric research landscape. According to Lyon the Informatics Transform presents five assertions as potential pathways to change, which will help libraries to re-position, re-profile, and re- structure to better address research data management challenges. The paper deconstructs the institutional research lifecycle and describes a portfolio of ten data support services which libraries can deliver to support the research lifecycle phases. Institutional roles and responsibilities for research data management are also unpacked, building on the framework from the earlier Dealing with Data Report.

He proposed some innovative steps to addressing the significant skills gaps. His study suggests that libraries have an exciting opportunity to support public engagement with science in various ways. The ways are:

- Act as a hub or one-stop shop and collate links and information about diverse citizen science activities
- Support the researcher in the production of lay summaries by advocating the

use of guidelines and templates

- Provide training for new postgraduates through Doctoral Training Centers
- Mediate public access to research datasets in institutional, disciplinary or national repositories and data centers
- Support members of the public who wish to contribute and participate in science and research projects.

Author has focused on importance of research data management for supportive services to the researchers from the library.

Francis (2008) has conducted a research study on Reengineering and Redefining University library of University libraries of Kerala. The study mainly focused on how university libraries have been reengineered by applying new technologies in collection development and library and information services. Author has used a survey method to collect data from selected seven universities of Kerala State; these are University of Kerala, Thiruvananthapuram, Mahatma Gandhi University, Kottayam, University of Calicut, Malappuram and Kannur University, Kannur. To collect the data from these universities, researcher has used questionnaire, interview and observation methods. The survey was conducted in these seven universities in Kerala in the context of modern information and communication technology.

Based on systematic analysis of collected data from these 7 universities, author has presented the findings and suggestion for re-engineering of libraries. Some of the findings are as follows:

"Digital revolution and the development of ICT have impacted changes and functioning of University libraries. Digital medium was found an effective solution to fulfill the user's needs of information. All libraries need to exploit the possibilities of modern ICTs by acquiring ICT systems in the form of hardware, software, technical and matching professional's competencies skills etc. All needs to move further in order to establish an integrated, fully computerized and automated system needs to special attention towards web OPAC, Consortia based operations for e-journals and databases, digital libraries and institutional repositories, full text databases, website and its maintenance, marketing of library and information services, web based library and information services etc. Almost all operations of libraries need to re-define. Author recommended to Government of India, Government of Kerala, UGC,

Universities in terms of developing policies, ICT infrastructure for libraries, funding, skill based manpower, support etc.

According to author the University libraries of Kerala need to reengineer to become libraries more user centric and modern. Further the author has recommended that to apply ICT tools in libraries for better results.

Brodie and Mclean (1995) have described the reengineering and its application to college library in terms of shifting to client centered resource provision. In the article, they have emphasized on the client centric approach of libraries. To satisfy users need, library needs to go through reengineering process. They elaborated the case for action such as decline, decreasing, inability, tendency etc. this need to change with the new approach. They have described the change while undertaking the reengineering process. The impact given as below:

- Steps in the process will be performed in natural order (simultaneous processing)
- Work will be performed where it makes the most sense (even if this means the client participates!)
- Work units will change—from functional departments to process teams
- Jobs will change—from simple to multidimensional—when the result to the client is always cared about
- Processes will have multiple versions for different clients (not standardization)
- Staff roles will change—from controlled to empowered to make decisions
- The focus of performance measures will shift—from activities to results
- Values will change—from protective to productive
- Managers will change—from supervisors to coaches
- Organizational structures will change—from hierarchical to flat
- Executives will change—from scorekeepers to leaders
- A hybrid centralized/decentralized structure will be possible, based on shared information systems
- A "one stop shopping" case manager, with easy access to all information systems, may be used to provide a single point of contact for users and to shield them from remaining complexities in the process
- Checks and controls will be introduced

Hence the authors have introduced the reengineered process in their article.

Desai (2015) discussed in the book chapter about reengineering strategy for college library. They stated that 'reengineering is an important tool, which helps college library to survive in this information society and to satisfy the needs of library users efficiently and effectively. Further they have discussed the detailed strategy for successful reengineering of college library. According to author the reengineering strategy is as follows:

- To understand what reengineering is? And the need for it.
- Composition of reengineering team
- Effective leadership
- Set objective for reengineering
- SWOT analysis
- Identification of process
- Understand the process
- Work the entire library system
- Involvement of all stakeholders of library
- Effective management of human resources
- Emphasis on quality
- Effective change management
- Top management sponsorship
- Use of information technology
- Pilot study
- Timeframe
- Effective communication

These are the strategies are described in their chapter for reengineering the academic library system.

Chaudhary (2015) applied the reengineering concept to college library services. He has mentioned that 'user wants information services accessible by 24hours / 7days, consequently LIS professionals must undergo to change their activities and services'. Further he has described about the process of reengineering, need, role of Information Technology in the reengineering concept, impact, users expectations, advantages,

disadvantages, changing role and its features. Author has tried to present the need of reengineering college library services as per the user's expectations.

Padmashree, S. and Sasikala (2017) conducted a case study on 're-engineering library and information services of National Ship Design and Research Centre (NSDRC) Indian Maritime University Library (IMU). They have studied in details on the transition from traditional library system to modern library system. They have expressed their opinion that library collection; services can be improved by adopting new technological tools. They have mentioned the changes in the existing library system and the performance observed after the changes. IMU Library gave access to the user from the IMU website. Thus, the costly journals utilized by the researchers properly. Hence the author has introduced the benefits of reengineering IMU Library by using ICT tools and its impact on the usage statistics and the quality of library services.

Ghosh (2005) has edited a book entitled 'reengineering library services: lessons of the past and the road ahead'. In his book, he mainly described the transformation of libraries from medieval age to present digital age. Also, he introduced current development in library and information services and applications of technology in library. Hence the author has explained the past and present situation of libraries and motivated to LIS professionals for the new development in the library and information services.

Goswami (2005) had shared the experiments of reengineering in NASSDOC information services. They introduced reengineering process undertaken in NASSDOC as below

"NASSDOC has undertaken a major project that facelift and a newly renovated state of the art library and documentation center have been developed. The newly library system offers following services and facilities to readers.

a) Study carrels with computer and communication facilities and a provision for access to a collection of CD-ROM based bibliographic as well as full text databases.

b) A core collection of books for social scientists and a representative collection of new editions of reference work in the area of social sciences particularly the

regular serial publications released by government agencies and international bodies.

c) Ph.D. theses and research reports funded by the ICSSR for in-house consultation and newspapers clipping services on certain defined areas for the use of journalists, writers and researchers.

d) An automated book issue / return system base n Radio Frequency Identification (RFID) technology.

e) A high speed internet connectivity facilitating access to online electronic databases, directories, library catalogues and other internet based sources.

The field of social science is so vast that a single library or information center cannot acquire all material required by social scientists. Perhaps the best way to serve as a national social science information center is not to function as a repository of social science literature, rather to properly assess the information needs of its users and develop a strategic plan for collection development and services management. Further the author reveals that LIS professionals working in NASSDOC are now required to redefine their role and audit their skills. Now information service is practically interplay of options i.e. print vs. electronic where intermediation has become a routine responsibility.

Hence, Goswami has explored the changes in NASSDOC services and the collection development strategy with new settings in their system.

Kalita, Mazumdar, and Deka (2010) have studied on reengineering of academic libraries of Sikkim state. Their study includes the computerization of the libraries and their library services using advance technology. Their study has found 'university libraries have better computerization whereas college libraries have not that much computerization in college libraries.

The authors had stated that as the computerization is the need of hours for reengineering of library and information services. Further they suggested that the authority of the academic libraries need to give importance to library computerization and the proper training to professional staff to handle library computerization. The qualified with skilled staff need to be appointed for the library.

Further they stated that 'this is the era of reengineering of libraries and the reengineering of libraries should start from the library computerization'.

Jha, Ram and Kumar (2010) presented an article about reengineering of libraries. According to them the present era is a digital era and the libraries need to reengineer their resources and services to survive in this era. They have explained the transformation of the libraries, the stages in transformation of libraries such as collection, reincarnation of digital libraries, multifaceted data and internetworking aspects of digital libraries, hypermedia application for digital libraries etc. According to them "the main objectives of the reengineering process was to create flexible, platforms with open interfaces within the overall organizational structure of library. The modern ICT tools changed the scenario and the work culture became more efficient".

Hence, the authors have applied the term reengineering for the changing library resources and services.

Shastri (2013) has presented an article on 'Reengineering library services with emerging technologies' The article focused on "How advanced technologies like Mobile Technology, Geographical Information System, Cloud Computing and World Wide Web plays effective role in creating, processing, storing and disseminating information in a library scenario". He described mobile library application in the library services very well. The GIS technology described for data retrieval with data display in a visual form for a particular location and further described cloud computing model in three main modules such as platform as a services, software as a services and infrastructure as a services. They have mentioned Internet based library services, databases and subject gateways. Author has also discussed on the utility value of new technology in library scenario, technological challenges, and new emerging technologies in the automated library system. He has evaluated the technological applications in library services with their advantages and disadvantages.

Jotwani (2010) has stated that 'reengineering requires radical rethinking and redesign of practices and processes to achieve dramatic improvements in performance while keeping the customer at the center of the exercise'. According to him many libraries in the developed countries have applied reengineering to face the challenges of declining library budgets, increasing cost of resources and changing demand from the users. This situation exists in all the libraries and now libraries are going through this phase.

Further author has explained the elements of reengineering as below:

- Focus on user
- Transform staff workers into case workers
- Question process
- Use information technology
- Abandon the notion that every technical process must have numerous checks and balances
- Team based work group
- Collaboration and partnership with stockholders

Author also suggested the reengineering of acquisition is as follows:

- Reengineering of acquisition policy
- Reengineering of acquisition processes
- Reengineering of library collection
- Reengineering of staff
  Etc.

Hence, the author has applied reengineering concept to acquisition process of library and further suggested to reengineer the library acquisition for the better and quality collection which easily accessible to the user.

Rajendra, Aparna and Panage (2010) have discussed on reengineering of reference service. They have stated that Emergence of new technology, it is very easy to processing, storage and dissemination of information. The WWW is a new powerful tool for reference librarians. Reference librarians are participating in the electronic publication by creating web pages and finding aids to assist their user to locate information electronically. The WWW is a challenge for librarian as well as opportunity also. Reference librarian can work smart with the ICT tools'. Further the authors have described the functions e-reference services are as follows:

- Receiving and answering queries through e-mail
- Provision of online help
- Tapping information through various OPACS
- Creating library webpage
- Constant updating of the webpage

- Putting FAQs on webpage
- Preparing of webliographies etc.

Some of the reference services are best reference services using technology. Such as Librarians Internet Index, Digital librarian, Infomine, Cybes Stacks, Refdesk.com, Virtual Reference Desk, BUBL link (Catalogue of Internet resources) etc.

Thus, this is a nice example of application of reengineering to the reference service of a library.

Kumar (2014) have conducted a study on marketing and promotion of library and information services with the approach of reengineering. author has mentioned the need of reengineering in academic library is as follow:

"Re-engineering in academic libraries is needed because:

- To improve library services, provide better library services
- To minimize the library paperwork
- To change the existing library procedure and adopt electronic environment in a traditional library structure (author has mentioned the citation as (Sawant 2009))
- Rapid development and implementation of ICT in library
- Due to the information explosion"

Further author has mentioned the output of reengineering in academic library services is as below:

- "Users expected library services
- Increase the library users and library use
- Save the time of users
- Change in traditional practices which are replaced by using technology"

Author has expressed his opinion that 'reengineering of library is the best solution for library and library professionals. Further he has mentioned that the marketing of library and information services of academic libraries is important thing. Modern ICT tools are there to help librarians for marketing library and information services.

University of California (2005) has submitted a report on 'Rethinking how we provide bibliographic service for user of University of California'. The report was

about bibliographic systems which need to change due to changing environment. The report stated that 'the continuing proliferation of formats, tools, services and technologies have upended how we arrange, retrieve and present our holdings. Our user expects simplicity and immediate reward and Amazon, Google and iTunes are the standards against which we are judged. Our current systems pale beside them'. Hence the report has recommendation that to remove old system of bibliographic services and redesign the new system with ICT tools. The major recommendations have been given as below:

- Enhancing Search and Retrieval
- Re-architecting the OPAC
- Adopting New Cataloging Practices
- Supporting Continuous Improvement

Moreover the report also highlighted user's expectations. Users want a rich pool from which to search, simplicity, and satisfaction. In order to offer the UC community the best possible services and access to the highest quality information, the UC libraries need to look closely at how we manage library collections, catalogs, and finding aids. Thus the report states the need of reengineering in bibliographic services of the library of University of California.

Das (2010) presented an article on 'reengineering of library and information services through Internet'. The author has described Internet based resources which can be used in the library and information services. Author has expressed his opinion that to cope up with the present change due to globalization, no library can go towards the proper directions to satisfy their clients without proper internet connectivity. Internet became a major part of libraries where no library can survive without internet connectivity. Most of the publishers have changed their mode of publishing from print to electronic format. Electronic format can be share very fast without any geographical barriers to share. The author has explored some web addresses where e-resources are available which explores the e-resources and services through adoption of new technological tools to facilitate academic professionals and user also.

Khan (2016) has described reengineering of libraries, issues and trends. The main objective was to emphasis library in-house operation and re-engineers the same

through innovative user centered library services. In the article author has applied term 'reengineering' to the library development. Author has focused on library automation where author suggested that housekeeping may redesign in the following manner:

- Automated acquisition system
- Automated cataloguing system
- Automated circulation system
- Automated serial control system
- Automated reporting system
- Automated stock verification system
- Automated document searching through online catalogue

The author has also described the benefits of library reengineering are as follow:

- Library provide user expected services
- Increase the user and the use of library
- Save the time of user
- Change in traditional practices
- Better library management
- Greater library cooperation
- Protection of records
- Automated reports anytime

Hence, the author has described the application of reengineering in library system by technological aspects.

Liang (1998) presented their reengineering project at Yuan Ze University Library in Taiwan which shows the significant changes due to advancement in technologies. Author has shared that the University Library has radically restructured in 1994 with the new technology and became an advanced technological University library. After the restructuring their library, the nature of library collection and services has been changed. So the benefits of restructuring have been revealed in their article. New service model and infrastructure model has been accepted by the university library to gain necessary quality in the library services.

Maharana and Panda (2001) discussed on the planning for reengineering of

academic libraries. The authors have described five steps of the BPR planning process:

- Develop business vision and process objectives
- Identify the process to be redesigned
- Understand and measure the existing processes
- Identify IT levers
- Design and build a prototype of the new process.

Further they introduce case studies of BPR in libraries, it includes,

1. Stanford University Library: The Management of SUL appointed a team in 1994 to redesigning the University Library to improve efficiency, quality, services and speed.
2. University of Illinois at Chicago Library: The technical services of University of Illinois were gone through the reengineering process which had great impact on public services.

These two major projects are described in their article to prove the success of reengineering in university library.

Ogungbeni (2018) evaluated the university libraries in Nigeria. The author has mainly discussed on personnel management of the university libraries. In the evaluation of the libraries, he found that the personnel found untrained. Author has provided guidelines for training and listed out required skills for library profession. Hence the author has applied reengineering techniques to personnel management. Author reveals that after the process of reengineering personnel staffs have been reduced and the smart workers have been appointed who trained and eligible to provide library services to their user by technological way.

Grosvenor (1997) written an article on 'reengineering library services for the digital age' in the view of Australasian public libraries. The article mainly discussed on the challenges of library professional in digital era. In their article, author has mentioned five challenges, these are as given below:

1. How to run two libraries simultaneously, one is traditional and another is digital library.
2. Who will give the fund to run both libraries?

3. Impact of digital library user on the present library system
4. Librarian should be ready all the time to provide electronic information services
5. All user have internet devices and want to find information on their device

Further he writes that 'if we have to face these challenges, we need to ready for reengineering the library system and also change in the LIS professionals in respect of technological knowledge and skills. Also, explained the concept of reengineering and its application to the library system to make drastic changes in the library resources and services.

Chaubey (2017) has expressed his opinion that "the current situation necessitates academic libraries to reengineer their traditional roles and work processes in order to make them more productive and effective. It is technique to help organizations fundamentally rethink how they do their work in order to dramatically improve customer services, cut operational cost and become best competitors". The author has applied Davenport's five steps of business process reengineering. The author has explained need of reengineering in academic libraries is as follows:

- To reduce paper work
- To improve library services
- Rapid development in ICT
- To adopt new technology
- Due to increase the size of traditional libraries
- To reduce cost and time
- To cope the challenges
- Reflects more customer-focused approach etc.

The main approach of the article is barriers in reengineering process such as conceptual barrier, organizational resistance, outsourcing, and development of human resources, technical barriers, legal & regulatory barriers etc.

Mornati (2000) explained in the article that how libraries transformed from traditional to modern or digital libraries by process of reengineering which involves staff, available tools, options to select tools, human resource etc. The author expressed the changes taken place in their library system. First of all he has reshaped and

reorganized the library collection, in results the space problem has resolved. Staffing pattern changed, skillful staff appointed for desk to solve to reference queries and low level staff has used in the stacking section. A couple of students were hired for part time collaboration to perform small task, hence low cost outsourcing achieved. All the equipments are purchased and necessary training has been given to library staff. Library has developed OPAC, online access to journal and databases. He has proposed consortia for costly journals with the universities. All the policy has been reformulated which is suitable with the present as well as future situation.

Parameswaran (2008) presented a paper that described the present situation of public libraries in India with the actual role of public libraries. But due to lack of active government support, lack of skills of librarian and lack of IT infrastructure public library not able to provide modern library services. The author explained the need of reengineering to public libraries in present day. The author has expressed his opinion that "communication services on Internet are now more accessible for public use such as Blogs, Wikis, Pod Casting, RSS feeds, Instant messaging etc. could use in the e-delivery of library and information services which change the nature of library services. Author states that "the library should avoid such situation and should reengineering their library services to meet the challenging needs that has arisen due to the tremendous change in ICT sector". The article is showing the need of reengineering in public libraries due to the advance technology and changing needs of the user.

Stachokas (2018) published a book on reengineering the library with reference to electronic resource management. Author has discussed the current issues in libraries such as interdepartmental workflows, strategies for controlling costs, license agreements to allow text and data mining, managing the transition from dedicated electronic resource management system to integration into library service platforms, new analytics and assessment techniques and operational improvements for better usability. Hence the author has explored strategies for management of electronic resources as well as library and information services.

Sherwin (2015) discussed on reengineering the corporate libraries. The article nothing but the study on skills required to library professionals in this digital era. The

author conducted a case study on corporate libraries which includes practical examples such as exposure and visible form of marketing, current awareness and research for business development, design and develop comprehensive training program, role of professionals in digital environment etc. The paper also discusses on rethinking and redesigning the library collection, role of library professionals and the space management of the library.

Office of the Independent Budget Analysis Report (2008) explained the problem perspective of their library and explored suggestions by library department steering committee to the library department for reengineering. The project has given recommendations in order to reengineer the library system for make library more effective and able to cater changing needs of the San Diego Community. The project of Business Process Reengineering generated 20 recommendations in the areas of circulation, delivery, purchasing, selection and reference. In the report the primary focus was to make better use of technology to help customer to become more self-directed. The library implemented those recommendations and for the purpose, they used following technology in the library:

- Use of email notices for reserves
- Allows for the use of debit cards for online payment
- Eliminates lost items refunds
- Eliminates printed selections lists
- Installation of self-check machines
- Standardized processing of library materials
- Providing updated library publications and increase public access to online library etc.

The report also provided statistics that shows the cost benefits and increased customer satisfaction due to the implementation of recommendation given by library steering committee under the business process reengineering project.

Parameswaran (2008) conducted a study on reengineering of library and its services of 'Tejpur University library'. Main objectives of the study were to find out the changes in the library services took place with the implementation of ICT tools and find the user perceptions and acceptance of these services and satisfaction level of the

user. For the study, author has used survey method where questionnaires were circulated to the research scholar, PG students and faculty members. While interpreting the collected data, author has found that "Tejpur University library reengineered with the ICT tools. Some of the major services developed after reengineering with the help of ICT such as automated acquisition, cataloguing, automated circulation, security system, stock verification, Web OPAC, Serial control, Communicate to patron, Institutional Repositories, digital library, create e-book server, online journals, E-CAS, Ask Librarian, Library own webpage, database, ETD lab etc. it also found that the satisfaction level of the user has been increased after reengineering library system. Among all the users, 48.91% user highly satisfied with the reengineered services and 22.44% users are satisfied with the new services.

Taviyad (2015) focused on the importance of reengineering of college library services. He has described the impact of reengineering on libraries is as follow:

- Shift from paper based resources to electronic resources

- Shift from acquisition to accessing the resources

- Media convergence in reengineering resources

- Knowledge about web page designing and e-journals are essential

- User demands for access facilities in his place, at his desktop

- Growing importance of consortia agreements for journal subscription

- Maintaining LAN, WAN and Intranet facilities with access

- Access to e-books, e-journal and other e-resources

- Use of e-mails instead of sending printed letters to supplier and reminders to patron

- Card catalogue to OPAC

  Etc.

Further author has enlisted the advantages of reengineering library services are as follow:

- The user of a reengineered library not attend library physically, there is boundary-less access to the user.

- 24 x 7 access to resources

- Same resource can be used by all users at a time

- User friendly interfaces, giving easy access to the resources
- An exact copy of the original can be made many number of times without and degradation of quality etc.

As per the above advantages of reengineered libraries, it necessitates, all libraries need to reengineer to provide boundary less access and easy access of library resources availability by 24x7.

Desai, Parita (2017) has conducted a research on reengineering library services in Mumbai region. The research has been carried out with the main purpose that "to assess the present status of the college libraries with respect to library collection, services, staff, library automation, ICT infrastructure and reengineering strategies adopted by the libraries in Mumbai region". Thus, the study has revealed the status of reengineering in Mumbai region and provided a model plan for reengineering college library. Researcher has used Morgan Table to determine the sample size and studied 84 aided Arts, Commerce and Science Colleges in Mumbai Region. The major findings from their research are as below:

a. Majority of college libraries opens less than 12hours.
b. 8% students and 7% staff visit to the library daily.
c. Majority of libraries having collection of books in the range 20000 to 29999 and periodicals in the range 20 to 100.
d. Very few college libraries found for the collection of non-print information resources.
e. Found 99% college libraries computerized. 92% libraries having internet connection and only one college library found where instant messaging services is used.
f. 44% college libraries having access to e-journal and e-database where majority is to N-LIST subscription.
g. Problems have been found in satisfying user needs:
    i. Lack of qualified and skilled library staff
    ii. Changing behavior and expectation
    iii. New pattern of scholarly publication/communication
h. Only 15% libraries have initiated for digitization of documents.
i. 89% college librarians have expressed his opinion that there is need of

reengineering.

j. 73% college libraries have found that there is need to reengineering human resource of library.

k. 92% libraries need to strengthen their ICT infrastructure and facilities.

Further the researcher has proposed reengineering plan for college libraries which includes 6 Phases, such as

Phase-1- Pre-reengineering,

Phase-2- Identification and selection,

Phase-3- Mapping of selection process,

Phase-4- redesign of new processes,

Phase-5- Implementation of redesigned process,

Phase-6- Evaluation of redesigned processes.

Summary of the reviews:

The above reviews have been recorded which implemented BPR concept to the library collection, services and activities. All the researchers have applied advanced technologies to reengineer the libraries. Most of the studies have been conducted on university libraries whereas only few researchers have applied the concept of BPR to college libraries. From the reviews it seems that presently the technology is the best option to reengineer the libraries for better results. Literature reviews provided the guidelines which helpful to conduct present study in a well manner such as their research methodology, objectives, hypothesis, sampling methods etc. Most of the studies have found survey and descriptive research based studies. Literature reviews have given idea to fill up the gap in the existing literature and knowledge about reengineering of college libraries.

2.5 Gaps in Research Studies and the Present Study:

Most of the researchers/ authors/ thinkers have written an article/ chapters on the concept of reengineering and its application of reengineering to the college libraries to change the traditional methods of work, processes and the nature of library and information services.

Many researchers have written on the concept of business process reengineering and its application to library and information services. In their study

many approaches have been described. Such as Sylvia has an approach to change for new era of information, Bjornshauge has an approach to reengineering for financial problem solution, Pai has an approach to application of ICT in libraries to provide timely service, Padmashree S. and Sasikala have an approach to change for provide quickly library and information services to user by applying technological tools, Lyon has an approach to provide better research information services, Sawant has an approach to reengineering the LIS Professionals by providing appropriate education to face present as well as future challenges etc. Furthermore the researchers have an approach to reengineering the libraries for increase status of college libraries, quality in library and information services, attraction of users towered library services etc.

With above approaches present researcher has kept more approaches towards the college libraries to reengineer the library and information services. Such as face the challenges of Internet world, overcome the financial barrier by applying Open Source Software and use of Open Educational Resources (OER), Management of Library and Information Services in quality approach, optimum use of ICT tools for optimum utilization of library resources and services, propose systematic ways and guidelines to reengineer libraries etc.

One of the reviews from Desai Parita, who has conducted a survey to find status of reengineering in Arts, Commerce and Science College libraries in Mumbai region. The author has been provided a statistics on each type of collection and related policies. Their study emphasized on collection development of the college libraries in terms of digital/ electronic resources availability. As far as scope is concern, the study is restricted to colleges in Mumbai region only. Another research has conducted on 'Reengineering and redefining university libraries with reference to ICT in University libraries of Kerala state. The study covered University libraries which can be extend to college level also.

The aim of the present researcher is to know the status of region wise reengineering library and information services, find out the problems in traditional library services in present era, to reveals the need of reengineering on the basis of detailed investigation and to propose model plan for reengineering library services. The present study provides the experimented model plan which was found fit to college libraries. Hence, the present study reveals the needs, problems of reengineering of library and information services and suggested the way of reengineering by conducting systematic survey of college libraries in the state of

Maharashtra.

From the published research literature, it understood that only Mumbai region has been studied in terms of college libraries as per the review of literature. Whereas, no any study or research have been conducted on the college libraries of the state of Maharashtra which could aware about the status of reengineering of college library services in the different regions of Maharashtra. Therefore the researcher formulated a problem statement entitled "Reengineering of College library services: a study of Arts, Commerce and Science College Libraries of Maharashtra State".

2.6 Summary:

The present chapter reveals the studies / researches which have been conducted in the field of academic libraries and applied reengineering techniques. The studies/ reviews helped the present researcher to find the ways to conduct complete research work. Most of the researchers have applied reengineering theory to college library. From the overall Literature Reviews it can be concluded that reengineering of college libraries is an essential activity to cater today's dynamic information needs of the researcher/students/user.

As per the categorization of the literature reviews, there are four parts which shows the reviews from originators of the concept to the application in college library services. In the college library, some of the researchers have studied in the arts commerce and science college libraries with an approach to application of ICT tools, collection development in e-format etc. There are about 48 literature reviews have been taken to clear the understanding about application of reengineering to college library. Present study expanding the above research studies with the new approach and providing the valuable suggestions and recommendations for the college libraries of Maharashtra state. As per the changing expectations of the user, LIS professionals moved towards changing the way of organizing, storing and providing information services to user. Due to the many challenges in front of LIS professionals such as internet at everyone, decreasing reading habit, decreasing use of libraries etc. libraries need to think on the solution of these challenges. Reengineering of library services is one of the solutions to face these challenges. Therefore the present research has been carried out to propose guidelines to LIS professionals about reengineering the college libraries.

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CHAPTER III

ROLE OF HIGHER EDUCATION AND REENGINEERING OF COLLEGE LIBRARIES

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ROLE OF HIGHER EDUCATION AND RE-ENGINEERING OF COLLEGE LIBRARIES

3.1 Introduction:

Education is a continuous process in human life. It is one of the largest activities in the world. The global development depends upon the quality education. Most of the research and developmental activities have been carried out in the education sector. Education guides human beings from darkness to the light of knowledge. Education is a channel to obtain knowledge of various fields. Knowledge is a power and libraries are the gateways of knowledge in Higher Education such as University libraries, College libraries, etc.

The Higher Education of India plays very important role in the development of Nation. After Independence, the first importance has been given to the education by Government of India. The University Grant Commission has started functioning in the year of 1956. The Report of 'Ministry of Human Resource Development, (1992)' key features for Higher Education:

"The report of the commission is a document of great importance as it has guided the development of the University education in India since independence. The commission made a detailed study of the problems of Higher Education in India. The Higher Education is basically the University Education. After independence, the main emphasis was on the consolidation and expansion of facilities in the existing institutions. The revised National Policy on Education (1992) in the field of Higher Education provided the following facilities"

1) Autonomous colleges
2) Redesigning the college education.
3) Planning and co-ordination.
4) Regulated admission.
5) Transformation of teaching methods.
6) Qualitative research.
7) Setting up national body.
8) Open University and Distance Learning.
9) De-linking degrees from jobs.
10) Rural University.

As mentioned above, 2nd facility 'redesigning the college education' provides the guideline for college library also. The college library is an integral part of Higher Education where knowledge spreads through book, periodicals, and references sources.

According to changing scenario in college libraries, the concept of reengineering is applicable for facing today's challenges. The researcher describes application of reengineering and its need in the present chapter.

Before reengineering of college library services, it needs to describe the detailed background of the Higher Education System in Maharashtra and the importance of college libraries in Higher Education System.

3.2 Higher Education in Maharashtra:

Maharashtra is a third largest state of India. Maharashtra state is considered as one of the most progressive states in India due to continuous efforts, promotion of knowledge in all its branches including Agriculture, Industry and Education. The first Sanskrit college was established at Pune in the year 1821, later recognized as 'Deccan College', Pune. The Mumbai University established in 1857 at Mumbai. After 1850, there were many Universities have been established in Maharashtra.

3.2.1 Purpose of Higher Education:

Higher Education helps person to develop his or her personality by the use of skills and knowledge. Education develops the thinking power, decision making skills, and nourishes thinking capacity of the learner to contribute his potential to socioeconomic development of the nation. The purposes of Higher Educations are:

1. To develop the personality as individual.
2. To provide him with the knowledge of the world in which he lives.
3. To develop skills to sustain and advance social life so that he can be creative member of society.
4. To satisfy individuals search for value.

To achieve the above result from Higher Education, there are various alternatives which help citizen to acquire and develop his or her mental and physical qualities.

3.2.2 Objectives of Higher Education:

Higher Education of India deals with the tertiary level of education. Colleges of undergraduate, postgraduate, skill based courses by the institutions etc. come under the scope of Higher Education. According to "United States-India Educational Foundation" (2017), Indian Higher Education Statistics for 2012-13 reveals that there are 700 degree granting institutions, 35500 affiliated colleges and 20 million students are enrolled in India. In the top 4 fields of the study covers 37% Arts colleges, 19% Science Colleges, 18% Commerce and Management Colleges and 16% Engineering colleges in India.

The National Assessment and Accreditation Council, (2017) gives major objectives of Higher Education as below:

1. "To train student in a wide range of academic and professional discipline to fulfill personal, social and national needs.
2. To advance knowledge through fundamental and applied research".

Those who take Higher Education, they must become the enlightened members of society and prepare to assume active and responsible citizenship of India.

3.2.3 Functions of Higher Education:

The report of the UNESCO International Commission on education in the 21st century titled "Learning: The Treasure Within" 'popularly known as Delors Commission' focused 4 pillars of education. These are 'learning to know, learning to do, learning to live together and learning to be'. The report of Delors (2013) highlights the following specific functions of Higher Education:

1. To prepare students for research and teaching
2. To provide highly specialized training courses adapted to the needs of economic and social life
3. To be open to all, so as to cater to the many aspects of lifelong education in the widest sense
4. To promote international cooperation through internationalization of research, technology, networking, and free movement of persons and scientific ideas.

3.3 Management of Higher Education of Maharashtra:

The Higher Education of Maharashtra is managed and developed by the Directorate of Higher and Technical Education. The Department of Higher & Technical Education was established in 1984 after separation from the Department of School Education. It is the apex authority responsible for steering and supporting the development and growth of quality Higher and Technical Education that meets educational and social objectives of the state. In the last few years, the state has made giant strides in the field of Higher & Technical Education. The Higher & Technical Education System in Maharashtra has grown into a fairly large-sized system, offering opportunities for education and training in a wide variety of trades and disciplines at certificate, diploma, degree, postgraduate degree and doctoral levels in institutions located throughout the state. As a result, Maharashtra is one of the top states among the country in terms of number of colleges, student enrolments and admissions in Higher & Technical education.

The organisation of the Higher and Technical Education is shown below:

Figure 3.1: Organisation of the Higher and Technical Education
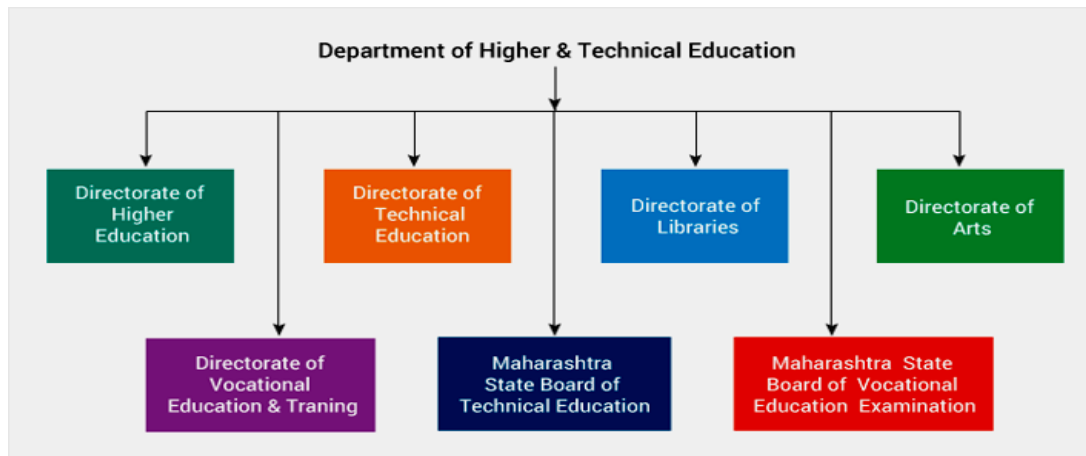
3.3.1 Directorate of Higher Education:

The Directorate of Higher Education is the nodal agency headed by the Director of Higher Education. The directorate is to play a key role among Ministry of Higher Education, Government of Maharashtra and Universities in Maharashtra, Private Colleges and Government Colleges of Maharashtra. Higher Education broadly comprises of College and University level education, which includes Degree Courses,

Post-Graduate Courses, Research Work for Doctorate, Post-Doctorate Degrees & Instructional Courses of Graduate & Post-Graduate level in different disciplines.

Key functions of The Directorate of Higher Education, Maharashtra are:

1. Controlling Government Colleges, Sanctions & Allocations of Staff and Fund Allocation.
2. Recommending Ministry for opening and closing of colleges in a particular region.
3. Recommending Ministry for College Grants, Evaluation and Management.
4. Salary distribution (UGC Sponsored), Control and Management.
5. Implementation of Educational Policies enacted by Ministry of Higher & Technical Education
6. Controlling Pre IAS (Indian Administrative Services) Training Centers.
7. Controlling Government sponsored Hostels.
8. Teacher Promotion and Motivation.

3.3.2 Divisions of the Directorate of Higher Education of Maharashtra:

There are 10 divisions of the Directorate of Higher Education in Maharashtra. The divisions are managed by the Joint Directorates. The names of the divisions throughout the Maharashtra are as follow:

Table No. 3.1: Colleges under the Divisions of Maharashtra State

Sr. No.	Division Name	Colleges Covered
1	Mumbai	83
2	Konkan Division	92
3	Pune	147
4	Kolhapur	123
5	Solapur	35
6	Jalgaon	76
7	Aurangabad	106
8	Nanded	93
9	Amaravati	145
10	Nagpur	176
Total =		**1076**

3.4 Universities in Maharashtra:

Dastane (2013) presented the position of Higher Education in Maharashtra including deemed and state Universities. There are 34 Universities established in Maharashtra, among them 20 Universities are recognized as State Universities and among these, 10 State Universities are provides Arts, Commerce and Science undergraduate and post graduate Degree to the learners. According to Dastane, the list of those 10 Universities and students' strength are given below:

Table No. 3.2: State Universities of Maharashtra and their Student's Strength

Sr. No.	Name of University	Est. Year	No. of Affiliated Colleges	No. of Students Enrolled
1	Mumbai University, Mumbai	1857	490	495000
2	Sant Gadgebaba Nagpur Amravati University, Nagpur	1923	440	425000
3	Savitribai Phule Pune University, Pune	1948	525	465000
4	S N D T Womens University, Mumbai	1949	39	81000
5	Dr. B R Ambedkar Marathwada University, Aurangabad	1958	314	395000
6	Shivaji University, Kolhapur	1983	390	375000
7	RastrasantTukdojiMaharaj University, Amaravati	1983	191	268000
8	North Maharashtra University, Jalgaon	1990	288	311000
9	Swami Ramanand Teerth Marathwada University, Nanded	1994	261	158000
10	Solapur University, Solapur	2004	111	128000

3.5 Colleges in Maharashtra:

College is an institution of higher studies where the students acquire degree of Higher Education. College is a place for attainment several kinds of knowledge which

help to develop the society as well as the national. The college plays a vital role in the University education system. During 6th five year plan, the UGC formulated policy for development of undergraduate and post-graduate education in the colleges in the view of improving the standards and quality of Higher Education.

As per the record of the Directorate of Higher Education (2016), total 2946 colleges in Maharashtra. Among them 1212 colleges are aided colleges and 1734 colleges are non-aided colleges. Among 1212 aided colleges, there are 136 aided colleges for law and B. Ed. Colleges. Remaining 1076 aided colleges provide Arts, Science and Commerce under graduate as well as post-graduate degrees to the students.

3.6 College Libraries in Maharashtra:

It is impossible to imagine college without library. College library has to be made the intellectual hub of the institution serving equally to all the students and teachers.

In India, the college library has supporting, coordinating and encouraging role in the Higher Education. It is an integral part of the college education. Moreover, it is the heart of an institution with huge storage of knowledge and its access system.

Library is a medium for exchange of information and knowledge for the educational purpose. It is a service institution and every student needs the services to learn. The college libraries have responsibility of meeting the educational information need of its users. The college libraries not only provide books related to syllabus but also provide resources and services for career guidance, holistic knowledge, and overall mental development of the individuals. Therefore, the college libraries have an importance in the Higher Education.

3.6.1   Library Finance:

The development and the quality in library services is depend on the finance. Efficient library organization and management depend upon adequate fund provision in the college budget. The college authority needs the spirit to spend money on the library resources for better services.

3.6.2 Norms for College Library Finance:

The recurring as well as non-recurring grants need adequacy for the college libraries. The recurring grant should not be on an ad-hoc basis but on capital investment at graduated rate, nature of service to be provided by the library.

"At least 6.5 percentages to 10 percentage of the total annual budget of the Institution should set apart for the management of library services. UGC should supplement the other activities like inter library loan and expenditure on cooperative acquisition out of its own resources. The funds made available towards library resources and personal determine to a large extent the quality of library services provided by it" (Anand, 1982).

The standing committee of the UGC for University and college libraries has approved the following norms for finances.

"The fund provided for the purchase of various types of library resources would in a very large measure determine the quality of the library resources. The library budget should be determined in relation to the total budget of the college. A minimum of 4% of the total revenue budget of the college including salaries should be allocated for the library for purchase of books, periodicals, and other serial publication and binding. A suitable proportion of the budget should be kept for the purchase of periodicals in the case of college offering post graduate courses. This does not include expenditure on books and journals for the institution of new courses" University Grant Commission, (1995).

The different norms laid down for allocation of funds for college libraries by commissions and committees are given below:

A. "Radhakrishnan Committee (1948) has suggested 6.5 percentage of the total budget of a University or college"(*University Grant Commission*, 1949).

B. "Kothari Commission (1964) has suggested that it should be 6.5 to 10 percent of the University and college depending on the state of development of the library. All India library conference also supported the suggested percentage" Ministry of Education, (1964).

C. "Khandala workshop of college libraries (organized by UGC 1979) recommended 4% of the total budget for books, journals, binding and other library materials. Staff salaries and capital expenditure is not a part of this ratio. The standing committee of the UGC for University and College library has approved this standard"(Nath, 2001).

D. "AIU report on National Policy on University Libraries (1986) suggested 10% of total budget of University/college for libraries"(*K. N. Raj Committee Report*, 1982).

E. "Dr. S R Ranganathan (1957) has suggested formula for financing the college libraries on the basis of number of students and teachers in in a college, i.e. Rs.30/- per student and Rs.200/- per teacher"(Ranganathan, 1965a).

Above norms are suggested for University and college libraries for the finance. Suggested norms to college libraries by various committees and commissions are different from each other. Therefore it needs to have some unique rule for Library Finance.

3.6.3   Objectives and Functions of College Libraries:

College library plays an important role in supporting for achieving the aims and objectives of Higher Education. Library holds variety of information sources which can be used by the readers easily. In the discussion of college library, it is obvious to discuss about aims and objectives of college library.

Chaudhari, (2018) has given **objectives of the college library** as follow:

i.   To provide the facilities for advanced study and research work.

ii.   To encourage the qualitative academic environment of teaching and research.

iii. To provide proper guidance and training in order to prepare the students for master and doctorate degree.

iv.   To improve the quality of education at various level.

v.   To enhance the research output by faculty through useful information resources.

vi.   To cooperate with other institutions with respect of information resources

Functions of College Library:

Md. Ashikuzzaman (2016) has stated that 'to achieve the objectives of a college library, college library performs the following functions':

1. In order to help in all educational and instructional programmes of the college it develops its collection by acquiring different documents like text books, audio-visuals etc. related to various courses offered by the college.

2. It also procures a good amount of more advanced books other than text books on different subjects to develop a habit of deep and advanced studies among college students.

3. It acquires reference books such as encyclopedias and other books on each and every aspect of different subjects to enhance the understanding of subjects among students on their own besides classroom teaching and text books.

4. To prepare the students for different professions and occupations and to develop their skills it procures self-learning materials, competitive exam books, etc. are provided by the library.

5. To procure newspapers, weekly and monthly magazines on current events, general knowledge books etc. to make aware its users about their surroundings.

6. It subscribes useful journals, research bulletins on different subjects as per the recommendations of faculty for research work and to keep the teachers abreast with the latest in their disciplines.

7. If some document is not available in the library it brings it on inter library loan on demand of its users.

8. It also provides light reading material like fiction, bibliographies, magazines, travel book guides, audio- visual etc. to give healthy leisure time to its users.

9. It procures general reference books such as dictionaries, directories, encyclopedias, yearbooks as well as some subject specific reference books.

10. To make library and its use more accessible and easy it makes proper classification, catalogue, shelf arrangement, display of new arrivals and provides services like bibliographical, indexing, abstracting, etc.

11. To provides operation training to its new users to use the library and dissemination time to time.

3.6.4 College Library Services:

Any kind of libraries are service institutions. The library to be setup to fulfill the information needs the specific user community. If we see the history of college library services, we may know the evolution of college library services.

Over a half century ago, Dr. Ranganathan (1965) describes the position of college libraries.

"College library consisted of closed cupboards. Most of them were concentrated in one or two rooms called general library. Hardly any student cared to go to the general library. A student could at best reach up to the barrier, select all by him a little from a tattered volume of printed catalogue, and drop an application form for it into a tray, one morning each week. By the evening, the available books would all stand piled up on the desk. A lucky student might find his book in the pile, but he would often feel disappointed by the book not suiting his standard or by its being something different from what he thought it to be" (Ranganathan, 1965)

This was true about academic libraries of that time. Now the situation has changed a lot. Libraries have an OPAC and immediately get confirmation about availability of books. Users have more options about to fulfill their information needs, such as e-journal, e-books, article on internet etc. Therefore, the student is not totally depended on the library, but the user may or may not know that the library is authentic source of information and the library staff assist to search the required information. This is why the libraries started applying the marketing strategy to promote the use of library services.

Today, the library services are identified as a traditional mode of library services and modern library services.

3.6.5 Traditional Library Services:

The traditional library can be defined as 'A building, room, or organization that has a collection, especially of books, for people to read or borrow, usually without payment' ("Cambridge Dictionary," 2018).

In common words the traditional library can be defined as a Library is a place where the collection of information resources in print forms that is organized and made accessible for The Teaching-Learning and research activity'. In the traditional library, books, manuscripts, maps, pictures, photographs etc. find in the library for circulate the knowledge from one generation to another generation.

In the traditional libraries, the information sources are deteriorating at a rapid rate and the access to the printed resources not easy and understandable to common and new user. After printing, books were not immediately available in the library because of the traditional tools and techniques in communication were used. There are many time consuming processes such as cataloguing, organising, indexing services etc. After all traditional library is limited with the physical boundaries.

❖ **Features of Traditional Libraries:**

All traditional libraries have some features. According to Ashikuzzaman, (2017), the features of traditional library are as follow:

1) "Generally libraries are the place to preserve and distribute the physical forms of resources, such as books and magazines, journals, periodicals.

2) To maintain these resources with cataloguing and classification.

3) Physical Searching method is using to retrieve the resources.

4) Information is stored in physical format. The users may be borrowed the resources and make use of it.

5) A traditional library consist details of available stock in books and subscription of periodicals".

Shelton (1999) has described the characteristics of traditional library as below:

- "Emphasis on storage and preservation of physical items, particularly books and periodicals.

- Cataloging at a high level rather than one of detail, e.g., author and subject indexes as opposed to full text.

- Browsing based on physical proximity of related materials, e.g., books on sociology are near one another on the shelves.

- Passivity; information is physically assembled in one place; users must travel to the library to learn what is there and make use of it."

3.6.6 Modern Library Services:

After great contribution of Father of Library Science Dr. S. R. Ranganathan in the field of Library and Information Science, the Library and Information Science started adopting new tools and techniques to provide qualitative services to the student in less time. According to Ashikuzzaman, "With the advancement of ICT, the academic libraries have been developed by adopting technologies in the library housekeeping work. As a result, today we are creating and handling digital library, virtual library, electronic library and hybrid library."

a. Automated Library:

Automated library is defined as 'when library uses machine-readable catalogue, circulation with the computer and library software, OPAC, Computer

generated reports etc. is called as an automated library. The automated library is not only saving time of the library staff but also the user's.

b. Electronic Library:

The resources of electronic libraries are in both formats i.e. print and electronic. The library is based on the internet and CD-ROM. It procures e-journals, e-databases and e-books instead of printed resources. The electronic media is used for storage, retrieval and delivery of information.

c. Digital Library:

It is later stage of electronic library which provides digitised information resources. In this type of library high speed optical fibre are used for Networking and linking with the WAN and provide a wide range of internet based library and information services such as audio, and video-conferencing, digital books, rare material in digital format etc. The majority of the holding of digital library is in the computer readable form and it acts as a point of access to other online sources.

The special characteristics of Digital Library are as below:
- "Emphasis on access to digitized materials wherever they may be located, with digitization eliminating the need to own or store a physical item
- Cataloging down to individual words or glyphs
- Browsing based on hyperlinks, keyword, or any defined measure of relatedness; materials on the same subject do not need to be near one another in any physical sense
- Broadcast technology; users need not visit a digital library except electronically; for them the library exists at any place they can access it, e.g., home, school, office, or in a car". (Shelton, 1999)

d. Virtual Library:

Kaur (2015) defines virtual library that "A Virtual Library is a collection of resources available on one or more computer systems, where a single interface or entry point to the collections is provided". All the information is presented through network at the desktop which has no physical existence of books and racks. The

concept of virtual library is that any person who has a computer and Internet connection can access virtual library.

e. Hybrid Library:

This type of library is a mixture of all the forms of resources. It allows the user access its resources and services online as well as offline. Both types of information material are available in the hybrid library i.e. print and non-print. Today, such kinds of libraries are needed.

3.7 Academic Libraries in the Future:

From the history of academic library, it is no doubt that the college libraries are transforming in the ICT based modules. Vijayakumar (2008) stated while he was discussing on the future of academic libraries, "academic libraries becoming more human necessity than past". A number of reasons are there for why academic library is becoming important such as organisation of institutional information as well as knowledge in digital form, providing the facility as an information hub for the mother Institution, providing digital literacy to the user, etc. The new opportunities are open to the academic libraries to get essential positions in the new academic environment. It includes digital skills training for the professionals, re-skilling of the staff, student's involvement in the redesigning processes, digital copyright issues, search and review process for the research and rethinking for library spaces to utilise more hands on activities.

'The libraries have to offer three C's such as Creation, Collaboration and Contemplation for all users' (Vijayakumar, 2008). Hence, the libraries are becoming more valuable for the user or the society.

How libraries are important:

Vel (2012) has described in his chapter that the following are the reasons which show how libraries are important:

1. Convenient hub

2. Socialization

3. Motivation

4. Collaboration

5. Resource rich

6. Safe

7. Relevant collections

8. Distraction free

9. Service

10. Ambiance

For the above reasons, academic libraries are still important.

3.7.1 Challenges of Academic Libraries in Future:

Now the academic libraries are facing many challenges relating to the ICT and the expectations. In future, the academic libraries will have different challenges which have to face to college libraries. Venkataramana, (2005) has defined the future challenges of academic libraries are as follow:

- ➢ "Rapid technological innovations
- ➢ Declining library budgets
- ➢ Increasing cost of publications
- ➢ Continuing emergence of new media formats.
- ➢ Explosive growth and use of web resources
- ➢ Powerful and user friendly high quality search engines
- ➢ Accelerated Learning Scenario
- ➢ Intensive use of digital resources
- ➢ Increasing competition from Internet, Online book stores, search technology and commercial publishers of information
- ➢ Changing users' information seeking behaviour and habits
- ➢ Exponential growth of open access scholarly resources on the web
- ➢ Interactive virtual learning environment"

The academic libraries have to face above complex challenges, among them some of the challenges facing today by LIS Professionals.

3.7.2 Skills Required for the Future Academic Librarianship:

For the future academic librarianship, Academic librarians will need following skills to perform their job as well.

- Extensive expertise, curiosity and capacity to collaborate:

In the future, librarians will have to have extensive expertise in digital literacy, database security and need to have collaborative skill to perform better.

- Database Management skills:

   Future librarianship will have to manage various databases as today we are managing printed resources on the shelves. So, the database managing skill will be needed to perform the job as well.

- Hardware and networking skills:

   Hardware and networking will be an integral part of the libraries where librarians need to have perfect knowledge about the hardware and networking of the library. For the collaboration and sharing the knowledge they need to have knowledge about internet protocols.

- Web technology skill:

   No doubt that the future libraries will have remote access to its resources. The web technology provides the access to the digital library resources and for the purpose librarians will have to have web technology skill to create and designing the informative web page for the library.

Some of the skills have been suggested by Venkataramana, (2005) to perform the future librarianship which are as below:

- Marketing and promotion skill:

   For the future librarianship, library professionals will have digital marketing skills and promotion skill for promoting the use of library resources. While there are competencies, there need to have this skills.

- Knowledge Management Skill:

   The institutional knowledge will have to manage by the librarians of the future. Knowledge management will be an essential task for the librarianship where the professionals need some skills about creation, organisation and share the knowledge to the user when they demand.

- Reengineering skills:

   If the library cannot have cost effective and beneficial to the institution, the librarians will have to rethink on its change management time to time. Whatever changes will be expected, it should be done therefore the reengineering skills will have needed to future library professionals.

3.8 Present Trends in HE: Distance Learning / E-Learning /Online Colleges:

In the anonymous literature, it is mentioned that in the distance education mode, the libraries have very essential role to provide learning material via mail or library website. He has stated that "Today upwards of 10 million college students in the United States take some or all of their courses online, and that number will continue to grow. In fact, the Sloan Consortium recently reported that the 21% growth rate for online enrollments far exceeds the 2 percent growth in the overall Higher Education student population and two thirds of for profit colleges say that online learning is a critical part of their long term strategy" ("Online library," 2016). With this statement we can understand that the distance education and digital common / free open educational resources are increasing day by day. In India, E-PG Pathsahala, Swayam Portal etc. are providing online free diploma & certificate courses for the youth. So, today the online courses also recognizes as an online college. Thus, library professionals have to make a provision to provide online education resources to the user.

In the sense of college libraries due to increasing use of Internet by the user for information, the use of library resources and services has put down. In the environment of information explosion, use of library and footfall of library is decreasing day by day and costly printed information resources are not in use. Reengineering is not a new concept for library and information science. Many researchers have applied reengineering approach to the library and information services. All the aspects of academic libraries have covered with the reengineering approach, such as Jotwani, (2010) applied to acquisition, Mornati, (2000) applied to user services, Francis & Kabir, (2008) applied to management of human resource, Desai, (2015) applied to strategies of college library, Taviyad, (2015) applied to college library services, Sankar, (2016) applied to traditional library services, Rajendra, Aparna and Panage, (2010) applied to reengineering reference services, Chaubey, (2017) applied to academic library system, Mole, (2017) applied to LIS Education etc.

So, according to today's situation, the researcher have applied the approach of reengineering to academic library services to solve the problems of decreasing users' interest, decreasing reading habits of the students, cost effectiveness, management of library resources and services etc. Library service is one of the main components of

library system. This research has been carried out to diagnose the problems between library services, present technological advancement and the users.

Many researchers and thinkers have already stated that 'this is internet era', 'digital era', 'information society', 'knowledge society', and so on. But in case of academic libraries, especially rural areas still suffering from financial crunch, conventional library services, negative approach of the library staff and the users also, this situations have at the level of arts commerce and science college library. Many research and development activities have been carried out at the University level and not college level. With the development of University libraries, College libraries need to develop.

If the college libraries provide fully digitized and e-information services to the student, it will be an excellent information center of a college or institute. Therefore, there is need of reengineering for library services.

3.9 Reengineering of College Library Services and Activities:

The library has a history about its development from the ancient period. In the historical study of libraries, usually the history of libraries is divided in four distinct periods such as libraries of ancient period, libraries of medieval period, libraries of modern age and the libraries of digital or internet age. The libraries of ancient period and there aim, nature of collection, functions differ from the medieval, the modern age and today's digital age.

3.9.1 Academic Libraries of Ancient Period:

In the ancient time, there were many famous education centers like Vikramshila, Trudla, Nalanda, Kashi, Vallabhi. But the libraries of these centers were special property and not to use publically. There were many limitations to the library services. "Nalanda University was the famous for his rich library in 3rd century. The administration of Nalanda University has felt that the teaching will not be completed without library. The University library setup in three buildings such as 'Ratnasagar', 'Ratnaradhi' and 'Ratnaranjak' (Jayapalan, 2005)".

The world famous Universities, such as, the Vikramsila, Vallabhi and Kanchi were coming up in other parts of the country during the period from the 5th century A.D. to the 8th century A.D. All these Universities possessed rich libraries. Nalanda and Vikramshila Universities were under the control of the king Dharmapala. The

collection of libraries includes Sanskrit literature, Religion, Hindu Shastra, Pictures of Goddess etc. The students and teachers used the library for teaching and learning.

Most of the University libraries of ancient period were destroyed by fire and the wars. The libraries had faced many problems during the ancient period. In the medieval and modern period, the educationist realized that the education could not be completed without the library.

3.9.2 Libraries of Medieval Age:

The academic libraries especially University library were developed in medieval age. Many books have been written in the medieval age. The Muslim rulers did patronize libraries in their own palaces. During this period, due to Muslim invasions and political troubles, the powerful empires and kingdoms of Indian rulers fell one by one. This affected Higher Education and the development of academic libraries as well.

"The period of Akbar's there was new system of education started for provide education. He has established school and colleges not only in Fatehpur Sikri in Agra but also at other places in India. It has hope that Muslim education will be improved the Islamic people and has made certain changed in the curricula of Madrasa Education"(Jayapalan, 2005). Therefore the libraries have been developed by collection and spread within the community.

3.9.3 Libraries of Modern Age:

After invention of printing technology and available the printing machines in India, the many books printed and circulated to the libraries for use. During the British rule in India, numbers of academic institutions were established by the East India Company and by the Christen missionaries. Some of the examples are Calcutta College in 1781, Banaras Sanskrit College in 1792, Fort William College, Calcutta in 1800 etc. all these colleges had their own libraries. The libraries serve the student by providing curriculum related books in the form of manuscripts, pictures, maps etc. After establishment of University Grant Commission, many Universities have been established with the library. The libraries of Universities became the research places for the researchers. Then after the importance of libraries in research and development have been increased. Then Dr. Ranganathan S.R. have made valuable contribution in developing library science in India and make the library as a service institution and

the hub of knowledge of the institutions. Raja Ram Mohan Roy Foundation has been contributed in the development of libraries and library science also.

Ranganathan Committee Report on 'University and College Library' published in 1957. In this report, the collection ratio with the student, infrastructural facilities for library, norms and rules for library have been given. Kothari Commission Report 1964-66 marked another important stage in the history of University libraries in India. The commission devoted considerable attention to the development of the University libraries and made suitable recommendations on the financial support, planning for library development, encouraging the students in the use of books, documentation services in the library, etc.

3.9.4 Academic Libraries in the Internet / Digital Era:

After the use of internet world wide, the information and the literature started production in the digital form and also converting the printed form of collection into digital form. With the advancement of ICT, the society became advanced to use of new technological tools. The technological revolution brought out the books and the other reading material in the digital form. It saved the paper, efforts, space and time. It has reduced the obstacles in library services such as time, geographical barriers, stationaries, funds etc.

The libraries from ancient period have been developing with the developing of society and technology in communication. The development of society and the development of libraries are interlinked with each other. At present, libraries are still developing but today's development of libraries is very dynamic and drastic by the ways, nature, and the form in comparison to old libraries. Therefore, the concept of reengineering has been implemented in the academic libraries.

From the history of all types of libraries, it is found that earlier nature of library services where library was store house and supply on demand for a specific user only. The services were in the form of print only. The difference between libraries of medieval period and libraries of digital age, it seems that it is dramatically change and accepted by the libraries. In the development of Information Communication Technology, libraries have adopted the changes and served as per demands. According to users' need and expectations, librarians have updated their libraries to provide modern information services. The shift from traditional libraries to

the digital is not merely a technological evolution, but requires a change in the paradigm by which people access and interact with information.

3.9.5 Concept of Reengineering:

The theory of reengineering is widely known as Business Process Reengineering (BPR) which was given by Hammer & Champy in the book as Reengineering the Corporation: A Manifesto for Business Revolution" in the year of 1993.

Bhat, (2010) had explained the BPR theory in his book named "Business Process Reengineering".

Customer satisfaction has increasingly become the cardinal principal governing any successful business. BPR has aimed that to increase customer satisfaction and achieve cost, quality, service and speed in the library services. Hammer states that "Reengineering strives to break away from the old rules about how we organize and conduct business. It involves recognizing and rejecting some of them and finding imaginative ways to accomplish work".

Hammer & Champy, (1993) have defined BPR as the "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed". According to them, the business process re-engineering is the restructure of business processes in order to vividly expand performance with respect to cost, quality, service, and speed.

Davenport, (1993) also defined term Re-engineering as - "Re-engineering is only a part of what is necessary for the radical change of processes, it refers explicitly to the design of the new process. The term process innovation encompasses the envisioning of new work strategies, the actual process design activity & the implementation of the change in its entire complex technological, human organizational dimensions".

According to Petrozoo, D. P. & Stepper, (1994) "Re-engineering is the concurrent redesign of processes, organizations, and their supporting information systems to achieve a radical improvement in time, cost, quality, and customers' regard for the company's products and services".

From the above definitions to survive in this information world, the college libraries need to focus on needs of the library users instead of the library products, services and activities to gain a competitive edge. College libraries have to focus on the process not on any particular section as in library process but all the sections are interlinked and dependent on each other. The various sections in the college library are an acquisition, technical processing, circulation, reference, human resource and IT section. Library process is a series of activities involved from procurement of resources to provision of services to its users to meet their needs. No library process is complete without the support of any of these sections. Re-engineering of college library must, therefore, focus on the overall performance of college library.

In the literature, there are several terms used for the reengineering concept. Such as Business process improvement, organizational reengineering, organizational change ecology, process innovation, business process management, transformation of library etc.

3.9.6 Why Reengineering?

"Business Process Reengineering" or "Process Reengineering" or simply "reengineering" is focused on "Breakthrough" improvement to dramatically improve the quality and speed of work and to reduce its cost by fundamentally changing the processes by which work gets done.

For organizations which want to survive in the competition, they have optionss but a compulsion. For organizations that seek to thrive, dramatic improvement is often the only key to success. Small improvements are always necessary, but sometimes quantum leaps are needed if an organization is to forge ahead. (10 percent improvement can be created by tinkering, but 50 percent improvements call for process redesign).

When an organization realizes that the old ways of doing things needs change or its customers are demanding a change or competitors are taking over its market share, many processes in the organization may need reengineering, not a minor tweak, but a major overhaul. Some of the symptoms or signals which indicate that they should start reengineering are:

  i.   It takes too long for an organization to move its products from conception to the market place as compared to its competitors.
  ii. The budgeting process may be too complex and

iii. The services provided by the organization are not compatible with its customer's needs.

Business process reengineering is a refreshed, new approach to do business. There is plenty of evidences that it works well- perhaps with performance gains of 100 to 300 percent for some recognized processes.

Success in reengineering requires fundamental understanding of processes, creative thinking to break away from old traditions and assumptions and effective use of information technology.

3.9.7 The Essence of Reengineering:

At the heart of reengineering, is the notion of discontinuous thinking of organizing and breaking away from the outdated rules and fundamental assumptions that underlie operations. Unless these rules are changed, break-through in performance is extremely difficult. Old assumptions must be challenged and the old rules that made the business under perform must be discarded. Most Contemporary businesses are run on the basis of decade old policies. These assumptions about technologies, people and organizational goals probably are outdated and no longer valid.

Quality and customer service are increasingly becoming the primary focus of any company. A large portion of the population is educated and capable of assuming responsibility and workers cherish their autonomy, expect to know how the business is run and demand quality. Consequently, the present business processes and structures are outmoded and obsolete. Work structure and processes have not kept pace with changes in technology, demographics and business objectives. Conventional process structures are fragmented, piecemeal and myopic. Consequently, employees substitute the narrow goals of their particular department for the larger goals of the process as a whole. Reengineering seeks to provide a new perspective to business operations and processes. According to Hammer and Champy, "Reengineering requires looking at the fundamental processes of the business from a cross-functional perspective."

One way to ensure that reengineering has a cross functional perspective is to assemble a team that represents the functional units involved in the process being reengineered and all the units that depend on it. Rather than looking for opportunities

to improve the current process, the team should determine which of its processes really add value and search for new ways to achieve the ends results.

In short, reengineering efforts strive for dramatic levels of improvement. They break away from conventional wisdom and the constraints of organizational boundaries and they are broad and cross-functional in scope. They use information technology not to automate an existing process but to create a new one.

3.9.8 Principles and Rules of Reengineering:

Reengineering is about achieving a significant improvement in process so that contemporary customer requirements of quality, speed, innovations, customization and service are met. This entails seven new rules of doing work proposed by Hammer, relating to who does the work, where and when it is done and information gathering and integration. These seven rules are:

Rule 1: Organize around outcomes, not tasks:

Several specialized tasks previously performed by different people should be combined into single job. The new job created should involve all the steps in processes that create a well-defined outcome. Organizing around outcomes eliminates the need for hand-offs, resulting in greater speed, productivity and customer responsiveness.

Rule 2: Have those who use the output of the process performed:

Work should be carried out where most sense to do it. This results in people closest to the process actually performing the work, which shifts work across traditional intra and inter-organizational boundaries. For instance, employees can make some of their purchases without going through the purchasing department. Customers can perform simple repairs themselves and suppliers can be asked to manage parts inventory.

Rule 3: Merge information processing work into the real work that produces the information:

This means that people who collect information should also be responsible for processing which greatly reduces errors by cutting the numbers of external contact points for a process.

Rule 4: Treat geographically dispersed resources as though they work centralized:

Centralized databases and telecommunication networks allow companies to link separate units or individual field personnel, providing them with economies of scale while maintaining their individual flexibility and responsiveness to customers.

Rule 5: Link parallel activities instead of integrating their results:

The concept of only integrating the outcome of parallel activities that must eventually come together is the primary cause of rework, high costs and delays in the outcome of the overall process. Such parallel activities should be linked continuously and coordinated during the process.

Rule 6: Put the decision point where the work is performed and build control into the process:

Decision-making should be made part of the work performed. This is possible today with more educated and knowledgeable workforce plus decision-aiding technology. Controls are now made part of the process.

Rule 7: Capture information once-at the source:

Information should be collected and captured in the company's online information system only once at the source where it is created. This approach avoids erroneous data entries and costly re-entries.

3.9.9 Application of Reengineering:

Reengineering is applied to many business processes. Hammer states that "Business Process may be defined as a set of logically related tasks to achieve a defined business outcome. A set of processes forms a business system- the way in which a business unit or a collection of units carries out its business".

Assuming that a company has decided that its processes are ineffective and inefficient, the following are the major steps the company should embark on to redesign its process. According to Hammer "Develop business vision and process objectives. This step involves prioritizing objectives and setting targets for the future. A BPR vision statement describes the ideal state of a process.

i. Identify processes to be redesigned: This involves identifying critical or bottleneck processes ad envisioning the steps to avert shortcomings in them.

ii. Understand and measure existing processes: This involves identifying current problems and setting a base line.

iii. Identify information technology levels: This involves bringing those involved in the process to a brain-storming session to identify new approaches.

iv. Design and build a prototype of the process: This includes implementing organizational and technical aspects".

Janson, (1992) states that every reengineering effort involves three basic phases:

The three 'R's of reengineering are:

1. **Rethink:** This phase requires examining the organization's current objectives and underlying assumptions to determine how well they incorporate the renewed commitment to customer satisfaction. Another valuable exercise in this phase is to examine the critical success factors and those areas in which the organization clearly stands apart from the competition and to check whether they contribute to the new customer satisfaction goals.

2. **Redesign:** This phase requires an analysis of the way the organization produces the products or services it sells - how jobs are structured, who accomplishes what tasks and the results of each procedure. Then, a determination must be made as to which elements should be redesigned to make jobs more satisfying and more customers focused.

3. **Retool:** This phase requires a thorough evaluation of the current use of advanced technologies, especially electronic data processing systems, to identify opportunities for change that can improve quality of services and customer satisfaction.

A process takes inputs and performs value-added activities on those inputs to create an output. Every business whether related to manufacturing or services has key processes that it mast absolutely perform well in order to attract and retain customers to whom to sell their products or services. Organizations have many processes that enable them to provide products and services for the customers. Some of the

processes typically found in any organizations include financial management, customer services, equipment installation and maintenance, training, performance appraisal, service design, delivery and improvement etc. If an organization's processes are not integrated properly, then the organization cannot optimize its performance. Hence, in order to be effective and to supply what the customer needs, wants and expects, an organization must focus on maintaining and improving its business processes that enable them to meet these needs, wants and expectations.

- **Types of Business Processes:**

Business processes can further be differentiated into knowledge based processes and operational processes.

i. **Knowledge based processes:** it include product development, research activity, advertisement and management consulting. These processes rely on the knowledge and creativity of the people involved. They are not dominant in business process reengineering.

ii. **Operational processes:** the processes are at the heart of most business process reengineering efforts. They are classified by their relative stability, standardization and repeatability. The examples of operational processes are customer services, procurement and manufacturing.

3.9.10 Phases of Reengineering for proper Implementation:

Now, to implement the reengineering process in the organization, the manager of reengineering or the organization should go through the following phases to implement the reengineering processes properly.

Phase 1: Planning Phase:

A close look is taken at the process to be reengineered. The requirements for the new processes are forecasted by focusing on the current and future needs of customers, analyzing what is currently accomplished by the old process, creating a vision of that is to be achieved by the reengineered process and zeroing in the difference between the two. At the end of this phase, the reengineering team should have a good grip on reality. If the planning results in a great desire to change, the reengineering team will process to the next phase.

Phase 2: Design Phase:

This phase involves designing a reengineered process which starts with actual mapping of the new process and moves to the development of a change management plan. In between these two steps, the jobs are redefined and redesigned, taking a careful look at the technology available and considering the organization's resources.

Phase 3: Implementation Phase:

The implementation of reengineering processes involves actual implementing reengineered processes. The new process is tested and its success is gauged. An atmosphere of continuous process improvement is promoted in which employees strive to make improvements that make a difference to the customer.

3.9.11 Selecting a Process Reengineering Team:

A process reengineering efforts begins with the formation of a team of people who drives the reengineering efforts. The factors to be considered when designing a team and selecting the members are:

- o Can the member manage specific responsibility?
- o Can member use the proper authority and rights?
- o Can member manage the process reengineering efforts from beginning to end?
- o Does the member do part of fulltime job?
- o Does the member have knowledge of the whole process of reengineering?
- o Does the member have interest to work as a member of reengineering team?

Hence, the above points must be considered while designing a team for implementation of reengineering processes.

3.9.12 Reengineering in the Service Industry:

In the service sector, despite speed and courtesy in addressing customers, customers' hostility persists due to the inability of the service providers to maintain consistency in delivery and service. Another frequent problem is delay, due to the inability of the service employee to make pertinent and satisfying decisions when confronted by an impatient customer. Sufficient evidence of this is found in banks and fast food restaurants. Even though some companies which start a new seem to better satisfy their customers in the beginning, after some years, they become sluggish due to growth in size and becoming increasingly intense and complex. Work habits evolve into unacceptable levels of performance which further complicate their problems. To

remain competitive today, service organizations need to focus on customer satisfaction and on real customer needs and expectations. They need to operate according to the standards of the customers.

According to Chand (2012), the concept of reengineering holds a significant promise for the service sector. The following are some of the salient features:

i.   Make the customer the starting point for change: this means identifying what the customers really want and then creating the kinds of jobs and organizational structures that can satisfy those expectations.

ii. Design work processes in light of organizational goals: companies that design work processes according to organizational goals become more focused toward the customer. Organizations that reengineer often make drastic changes in existing jobs by integrating work procedures or tasks and empowering workers with more authority and responsibility.

iii. Restructuring to support front-line performance: in a customer focused environment, every aspect of the organization strives to promote the highest level of service to its customers, especially those who come in direct contact with customers. Consequently, organizations that undertake reengineering build work teams to support their customer service representatives or create "work-station professionals" who can perform both front and back office functions.

1.9.12.1   The Impact of Reengineering on the Service Industry:

"According to Janson (1992) reengineering represents a major advance over conventional management strategies for improvement. As an integral approach, it involves three dimensions of service organizations.

i.   The Human Dimension:

To achieve a stronger customer focus, employees at all levels must readjust their thinking and recognize customer satisfaction. Some companies achieve this by rewriting their mission statement to reflect the primacy of the customer or by promoting a new vision to reinforce the central role that customer satisfaction now plays. Some other companies engage in training to help employees become better listeners, probe for customer concerns more effectively or satisfy customer needs more creatively. The motive in reengineering is to become more motivated to provide superior service and be skilled at doing it.

ii. The Work Process Dimension:

Work systems must be designed not according their internal logic or any external definition of efficiency, but according to how well they satisfy customer needs. This sometimes requires substantial structural changes in an organization changes that do more than just revamp job descriptions. It may mean setting up work teams to perform all the functions once divided among several departments of combining several individual jobs to create, one "multi-skilled customer service professional." In every case, total reevaluation of the management's role in the organization comes into play and lower level workers typically assume far greater responsibility for service quality.

iii. The Technology Dimension:

New technologies should be introduced not only because they are more advanced, but because they truly support the organization in its drive to achieve higher levels of customer satisfaction. Most importantly, technology should be used to automate secondary work functions, leaving service workers free to concentrate on more critical matters such as satisfying customer needs and solving problems (Madan, 2006).

1.9.13 Quality and Reengineering

Reengineering is not completely different from total quality principles. The issue is not Kaizen versus break-through improvement. In fact, Juran talked about breakthrough improvement long before Hammer and Champy popularize the term reengineering. Incremental and break-through improvement is complementary approaches that fall under the total quality umbrella, both are necessary to remain competitive. In fact, some people suggest that reengineering requires support of total quality management in order to be successful. If reengineering alone is driven by top management without the support and understanding of the rest of the organization, the radical innovations may end up as failures. The total quality philosophy encourages participation and systematic study, measurement and verification of results that support reengineering efforts.

1.9.14 Benefits of Reengineering:

The following are the benefits of reengineering shared by Kalpana (2014):

i. By reengineering, an organization can achieve radical changes in performance (as measured by cost, cycle time, service and quality).

ii. It boosts competitiveness in the operations network through simpler, leaner and more productive processes.

iii. Reengineering encourages organizations to abandon conventional approaches to problem solving and to "think big" (revolutionary thinking).

iv. The slow, cautious process of incremental improvements leaves many organizations unprepared to compete in today's rapidly changing market place. Reengineering helps organizations to make noticeable changes in the pace and quality of their response to customer needs changes in the pace and quality of their response to customer needs (i.e. break-through improvements)

v. Through reengineering, an organization can be transformed from a rule driven and job centered organization structure to a marketing organization structure that focusses directly on the customer.

vi. Reengineering often result in radically new organizational designs that can help companies respond better to competitive pressures, increase market share and profitability and improve cycle times, cost ratios and quality (organizational renewal).

vii. The major accomplishment of the reengineering efforts is the change that occurs in the corporate culture and the basic principles by which departments operate. Workers at all levels are encouraged to make suggestions for improvement and to believe that management will listen to what they have to say. Reengineering will eventually help the culture in the organization to evolve from an insular one to one that accepts change and knows how to deal with it.

viii. Reengineering has helped to create more challenging and more rewarding jobs with broader responsibilities for employees (job redesign).

1.9.15 Limitations of Reengineering:

a. Although business process reengineering is presented as a recipe for instant competitive advantage, it is not a panacea like any other management approach; how you apply it makes a difference.

b. It is not a simple or easily done, nor is it appropriate for all processes for all organizations. Many firms can't invest the time and resources to implement a radical, clean slate approach.

c. Moderate gains that better fit in corporate strategy and culture might give greater cumulative results though the pursuit of break-through.

d. Significant process improvements cannot be realized without use of information technology.

e. It is not enough if a firm improves its cross-functional processes but also processes within each functional area must be improved.

f. The best understanding of a process and how to improve it often lies with all people who perform the work each day, not cross-functional teams or top management (Bhat, 2010).

1.9.16 What is meant by Reengineering of College Library Services?

Reengineering is a famous concept in the business world. This concept can be applied to improve the efficiency and quality in service of academic libraries. So that user will prefer library resources and services more than other sources for their study and research purpose.

According to Kalita, Mazumdar, and Deka (2010) "The traditional libraries are changing towards digital libraries as same as the manual system of library must be reengineering with the changing scenario. Computerization of library is a primary step towards reengineering of library and information services".

The authors have stated, the library computerization and automation of manual system is a reengineering of library and information services.

According to Kumar (2014), "the application of technology and management science to the modification of existing system, organizations, processes and products in order to make them more effective, efficient, and responsive".

Here the author has stated that the reengineering is a modification of existing system to make it effective and efficient.

Maharana and Panda (2001) have been cited to 'Scepanski (1996)' suggestions about the reengineering libraries. He suggested that "libraries should consider reengineering as a way to radically adjust what they do in response to current technological and social changes. He further concludes that a radical re-examination

of librarianship may lead to the rejection of many things that librarians traditionally do".

According to Pai, Rekha D. (2015) "Reengineering of library services means reorganization of library processes for the purpose of providing updated and improved services. It also means use of computer technology and information and communication technology to provide better services to the users and better working environment for the staff". She has further mentions that "the main objective of library reengineering is to cope up with the modern time and provide its users right information at the right time by making best use of technology".

From the above opinions of the researchers, it can be stated that the libraries adjustment with present ICT tools where the library should provide modern and expected information services by their expected way. Here the ICT mostly applied to reengineer libraries because of the features of ICT. The ICT mainly developed for minimize the efforts, cost and maximize the accuracy and cost effectiveness. This is the ultimate aim of the ICT and Reengineering of libraries. Hence, college libraries need to adopt the new technology and its tools to reengineering its services and facilities.

For understand the reengineering of libraries, a table is presented as below:

Table 3.3 Reengineering Library and its Benefits

Sr. no.	Traditional form of library services	Reengineered library services	Benefits of reengineering
Library Collection		
1	Printed books, reference sources	In the form of E-books, online maps, CDs/DVDs	Save space, maintenance cost, efforts and saves the paper etc.
2	Printed Journals	E-Journals, E-Databases	
3	Inter library loan	In the form of e-consortia	Save the postage cost, efforts, time etc.
Manual process of library housekeeping operations		
4	Acquisition	Library automation with the help of library	Saves the efforts, time of the user,
5	Cataloging		

6	Circulation	software and other application software, OPAC, etc.	cost of handling, manpower etc. and improved accuracy in the work
7	Serial		
8	Reporting		
9	Stock verification	Barcoding and scanning machine	
Library and information services			
10	CAS	By using e-mails facility, messaging services, etc.	Save the time of user and printing cost etc.
11	SDI		
12	Reference Queries		
13	Question bank, syllabuses, photos, videos, college information, e-notes etc.	Digital repository	
Manuscripts preservation			
14	Preserves in the boxes/ in cloths/ on library rack	Preserve by using plastic coatings, laminations, etc.	Long time preservation
Library stack			
15	Simple rack	Rolling stack shelving	Save the space

The above table 3.3 reengineering library and its benefits, increases the understanding that what is meant by reengineering of libraries. It doesn't mean that reengineering is only just application of Information Technology. Reengineering can be done in other way which save the efforts, time, and cost and increases the quality.

In addition to ICT, best management practices are also to be adopted for different tasks of the libraries like acquisition, cataloging, classification, OPAC, collection development, services, etc. Though, ICT is major player now days in reengineering library activities but in addition to that management techniques, orientation, outreach services, and other management practices can also improve and transforming existing usage of libraries. Acquisition of e-books, networking of libraries for resource sharing, membership for associations like DELNET, usage of Internet for providing maximum access to published literature, use of Open Source Software, etc. Such implementation can also help in reengineering of college libraries.

Today, most of the areas of library services have been reengineered. Reengineering changes took place in the library by adopting new technology in the library and its services for the ease of access, increase the quality in library and information services, achieve cost effectiveness and save the efforts. Therefore the college libraries of the 19th century were on traditional mode i.e. acquisition of printed material and store and retrieve when it will be demanded by the user. There were no any computer technology used in the libraries of colleges and Universities. But with the advancement of communication technology the libraries are changed simultaneously with the development of ICT tools. It was necessary to adopt the change by replacing tools of technology in the library work. If we see the history of academic libraries development form the establishment of UGC in India, we could say that library is always reengineering its way in terms of its resources and services. Today, libraries are using modern tools and technology in the library and its services such as RFID, Web OPAC, Library Web Page, boundary less services, 24/7 availability of services etc. The traditional mode of library and the services become out dated in today's digital era. Decreasing the user of library resources and services was the major challenge in front of college libraries. But reengineering of library services are done by replacing new technology based library and information services.

Mahajan (2005) mentioned in her article that "With the advent of computers, the nature of libraries has changed dramatically. Computers are being used in libraries to process, store, retrieve and disseminate information. As a result, the traditional concept of library is being redefined from a place to access books to one which houses the most advanced media including CD-ROM, Internet, and remote access to a wide range of resources.

Traditional academic libraries transformed into hybrid libraries, digital libraries and virtual libraries. This change is not casually but dramatic change. According to the concept of business process reengineering, libraries need to reengineer its services for quality, cost effectiveness and speed.

Change in library services and adopt new technology is needed in this digital era. As Shukla & Bhardwaj (2006) said "Outreach and promotion of library resources and services is an increasing challenge in the online world since many of users do not often visit the library. This is particularly true in science and engineering libraries, where much of content have been made available online and users tend to be technology savvy". Day by day, users and their habit of reading books are decreasing

due to social media, internet and other technological tools. Academic librarian should take some initiative to consider the users expectations with the changing society. Library must be change because there should not be the gap between user expectations and the library services.

The quality of library services is essential because quality attracts the user towards the use of library resources and services. According to Meshram (2014) "Quality services are made possible in academic libraries when quality is assured and information technology is applied to the function and services.'' The aim of academic libraries will be fulfilled when their staff and students can take full advantages of information resources. Therefore library should make able to access all the resources and services as per the expected mode. Bhatnagar, Anjana stated in his article that "As more libraries move towards providing services in a digital environment, the improved access to remote library collections is making the use of electronic information resources more realistic and more attractive. Traditional online services had transformed themselves into internet-based online services using web-based technologies".

Still most of the college libraries have not adopted new changes due to lack of skills, financial crunch, management support etc. LIS professionals should keep them update by the technical knowledge and must ready to accept new technology in the library. The author has described the steps for reengineering the library services with simple way.

Many other projects have been completed or are underway. One of the things we have come to realize is that re-engineering is an ongoing process. Considering the importance of re-engineering in academic library and information services, it is necessary to rethink on this serious issue and how it will apply to the library for providing better services to fulfill multidimensional needs of the present patrons.

1.9.17 Selected Case Studies on Libraries that have undertaken reengineering:

Selected case studies are included in the present chapter that introduces the libraries which are applied the reengineering process in libraries:

1.9.17.1   Case Study: 1

Shukla and Bhardwaj (2006) have presented their reengineering process of Delhi College of Engineering:

Introduction

The Delhi college of engineering have reengineering there library and information services through web modeling. Here they have applied ICT tools to make their library services boundless. Outreach and promotion of library resources and services is an increasing challenge in the online world since many of users do not often visit the library. This is particularly true in science and engineering libraries, where much of content have been made available online and users tend to be technology savvy. Author Elaborates the process of re-engineering of automation initiatives and digital library initiatives to prepare the ground base for hybrid library. Library website is designed in such a way that helps us to re-engineering of library and information services to maximize usage and draw users back into the library, both physically and virtually.

Methodology followed for reengineering the library:

First they have reengineered their library by automation of manual housekeeping work of the library as below:

First phase:- Initial necessary hardware such as server, scanners, computer systems, CD writer, 5 in one printers, Bar-code reader its printer and internet and intranet tools were procured.

Second phase:- Readymade library management software named libsys-4 was procured and installed and further project for retrospective conversion were initiated step by step.

Step-1: Data from CDS/ISIS- The data of books available in CDS/ISIS have been imported into Libsys.

Step-2: Database for holdings and members- Without wasting time we decided to first enter all the record through the accession register by entering all the information available in the accession register. Due to the availability of limited number of library staff, the work was executed on contract basis through an outside agency. But the database for the members was created by the staff.

Step-3: Entry of class number- The library accession register does not contain class numbers. The class numbers in the computer were updated.

Step -4: OPAC- OPAC was a first computerized activity provided to the library users.

Step -5: Libsys training for library staff- An informal training programme on the use of Libsys was organized for the staff at DCE.

Step -6: Automated Circulation- After having the clear concept on the circulation activities of libsys, computerized issue / return of books had been carried out simultaneously with the manual for six months and after that it was shifted completely on automated system.

Step -7: Editing and key wording through books….The library databases is being edited and due key words is also being assigned. During this period, all the bibliographical records of books are also being updated.

Step -8: Preparation of Bar-coded library membership card- Bar-coded membership card was introduced and implemented for library facilities including circulation.

Step -9: Bar-code label printing and pasting- Library procured the barcode printer and allied stationary. Two barcode labels for each document was got printed and pasted (one on front page and another below the due date slip page) by the library staff.

Designed web page for virtual library services:

They have designed their webpage to provide following library and information services to their users.

1. Registration for membership
2. Cancellation of registration/No Dues Certificate
3. Reference service
4. E-newspaper and e-magazines
5. Journals section
6. Online database access
7. OPAC
8. Recommendation of books
9. Apply for book bank
10. RSS feed
11. Search services
12. Notice board
13. Document Delivery Services
14. Virtual tour
15. Access to Digital Repository
16. Other e-resources links etc.

These are the services offered by the Delhi College of Engineering library to their user through library webpage.

Summary:

The case study of Delhi College of Engineering presented the overall process of reengineering that shows the transformation from traditional to modern mode of library and information services. The steps are followed by the library staff are applicable to all types of libraries.

1.9.17.2   Case Study-2

Survase Dhananjay and Pasnur Prashant (2017) have presented their reengineering experience of their Deccan College Library

Introduction:

Deccan College applied reengineering technique in 2005 and today its applicability is still being in use. In Deccan College library, most of the processes and in house operations such as acquisition, cataloging, circulation, serial control, various reports etc. are being done manually. Use of information technology in library was very less. They shared that they are committed to provide an easy and ready access to the library resources for updating the knowledge for students and staff. They aimed to keep the user of the library abreast of the state of the art inputs in respect of Arts, Commerce and Science, so that they can face confidently challenges thrown open by 21st century. Hereinafter they took efforts to build the library as an excellent center for dissemination information. They made a plan for reengineering their library as per the new vision and objectives. As per the plan they reengineered their library and got better result as they shared.

Methodology followed by the Deccan college library:

To reengineered the library, they have followed following five steps

1. Processes/ activities to be reengineered
   The processes and activities have been identified to reengineer such as physical layout/facilities of the academic library, academic library collection, manual processes of library housekeeping operations etc.

2. Selection of reengineering team

   Selected a team an well as team leader for execution of the new processes and activities

3. Status of current processes in academic libraries

   Analyzed the manual process and current status to take decision what action need to be taken to increase the status of academic libraries.

4. Vision for new improved process

   The vision is developed as "we are committed to provide an easy and ready access to the library resources for updating the knowledge for students and staff, our endeavor is to keep the users of the library abreast of the state of the art inputs in respect of Arts, Commerce and Science, so that they can face confidently challenges of 21st century etc.

5. Action needed to implement

   It is necessary to redesign the new process physical layout / facilities of the library. In order to provide better services to users, the physical layout of the library may be made as follows:

   a. Separate stack room

   b. Computer laboratory with sufficient number of computers with broad band connectivity

   c. Separate reading room for students and teachers with sufficient library furniture

   d. Separate reference section

   e. Reprographic section

   f. Processing section

Reengineering of information resources:

Due to increasing cost of publication it is completely impossible for an individual or for the library to purchase each and every book of our interest. In this situation to effectively meet the individual information needs, the users are searching for e-books and easy availability with latest information attracting more and more users towards the use of e-books. Hence Deccan College started purchasing and subscribing e-books, e-journal, databases and other information in electronic form and participated in various consortiums. It was necessary that application of reengineering in the Deccan College library to fulfills multidimensional needs of the library users.

Summary:

Deccan College library has implemented the steps given in the business process reengineering given by Michel Hammer and Champy. The by changing the form of information resources and applying new technologies to fulfills present users need. It's a good experienced presented by Survase D and Panur P.

1.9.17.3 Case study- 3

Devi and Haritha (2010) presented a case study on reengineering of acquisition section

Introduction:

Library Services are essential support services in Distance Education. These learners are largely dependent in the quality and academic usefulness of services that the digital library can offer electronically. Automated Acquisition systems and on-line library catalogues are highly visible evidences of computer technology now in use in many libraries Acquisition departments are responsible for getting the materials needed by the libraries' users, in the most appropriate format and in the most efficient manner. Formats and methods change, but the responsibility and the functions of acquiring library materials remain at the core of the acquisitions department.

Devi and Haritha states that 'Re-engineering is reinventing the way one does business, by stepping back and examining values, goals, and the system processes used to meet these goals. Process redesign is often an outcome of this evaluation. The acquisition process is one prime process for re-engineering as it consists of a large number of easily identifiable routines which can be compartmentalized, and altered as required'. Further they provided a case study of Dr. B.R. Ambedkar Open University Library (DRBRAOUL) and its Acquisition Section and how to reengineer the Library Acquisitions

Methodology applied for reengineering:

To reengineer the library acquisition section author has used the option of Automated Acquisitions System through LibSys Library Automation Software. The primary motive to investigate automated acquisitions, therefore, appear to be

the hope of realizing cost containment, materials receipt monitoring, improving budget control, and expanding function systems into integrated systems. The trained personnel used to handle and manage this section. The new processes having some features and it work flow a given below.

The important features are as below:

(I) Selection

- Completion of bibliographic information;
- Duplicate verification.

(II) Purchasing

- Discount patterns;
- Vendor assignment;
- Order Placement;
- Status of order, i.e., whether the materials have been received or not;
- Notices for claims;
- Cancellation of orders.

(III) Accessioning

- Matching of received materials with order file;
- Budget control;
- Payment status, i.e., whether the payments have been related or not.

(IV) Gifts and Exchange

- Information like addresses of the Exchange Partners.
- Whether the material is being received and sent or not
- Notices.

(V) Statistics and Report Compilation:

The acquisition module may have several sub modules like the modules for ordering, budget control, gifts, exchange, etc., to perform difficult function. These modules can be stand alone or integrated in such a manner that the user can access any of them without exiting the system.

After reengineering the acquisition system, Dr. B. R Ambedkar Open University consists of following procedure under the acquisition section:

- Receiving recommended books from the vendors and duplicate checking;
- Entering into the system for LibSys Software;
- Main Screen ;
- Data Entry;
- Check for duplicates;
- Bibliographic details;
- LibSys – Acquisition;
- Creation of Control Numbers;
- Developing Order;
- Accessioning;
- Notices text;
- Generating Order;
- View of file contents;
- Receiving bills from vendors;
- Processing of bills;
- Accessioning & Receiving in the System;
- Bill Invoicing;
- Title in Process;
- Cataloguing of (English, Telugu, Hindi and Urdu Books);
- Multiple copies;
- Adding Volumes;
- Update.

Summary:

Acquisition section is one of the important component of library system. Devi and Haritha applied the concept of reengineering to Acquisition section of Dr. B.R. Ambedkar Open University Library. With the help of present information technology the library implement the automation software for acquisition section and redefined the process as presented above.

1.9.17.4   Case study- 4

The researcher has conducted a pilot study on two college libraries in the Raigad district of Maharashtra. The study of both libraries described as below:

Introduction:

The researcher has selected following libraries to apply reengineering their library and information services:

a. The library of Doshi Vakil Arts College and G.C.U.B. Science and Commerce College

b. The library of Anandibai Pradhan Scince College

Above libraries have selected to reengineer their library and information services for better results in respect of resources utilization and cater the need of present users. Generally the undergraduate students are using library for newspaper reading, borrowing textbooks, and writing the notes for exam point of view. By observation, it is found that most of the students and teachers are getting information from the mobile internet and from the computers of college computer lab. Excluding textbooks, the use of library resources and services found very less as on the use study on both libraries. The librarians of both colleges decided to apply concept of reengineering to redesign our library system as per the expectations of the user. Most of the users' expectations were information need in digital form or library resources and services should have online access. Hence, the researcher has taken initiative to develop a plan to apply in the libraries to reengineer the library and information services.

Methodology applied for reengineering the library:

The researcher has developed a systematic plan or steps to apply reengineering. The plan is described as below:

I.   Develop vision and objectives

II.   Understand existing services and processes

III.   Identify new services and ways

IV.   Reengineering plan with involving team

V.   Implement the new processes

VI.   Make new services and processes operational

VII.   Evaluate the services and processes

VIII.   Ongoing continuous improvement

(The above stapes have been explained in section 3.9.18 as a guideline for libraries)

Reengineering of libraries has done by applying above steps. Most of the reengineering of library services and resources has been done by applying ICT tools. Booth libraries have purchased computers for library as well as user. Installed SOUL 2.0 in the libraries and made all the library housekeeping operations automated. E-resource collections have been increased in the libraries. Subscribed N-LIST Database and provided access to the user. All the modern library and information services provided to the users by libraries. Library web pages have been designed and the page has been shared through social media. Many of the services provided to the user through library web page.

Summary:

Before reengineering the plan was made by the researcher that succeeds the reengineering of libraries. As on above way, libraries have been made impressive and provided awareness among the users about availability of new services in the libraries in a new form. As a result use of library has been increased as well as the status of libraries. The model plan is developed throughout the process is added in the present study in a suggestion part to apply for other libraries.

1.9.18 How the College library Services to be Reengineered: Guidelines

Now days, college libraries have not been restricted to only acquisition of printed books, store and disseminate it but the role of college libraries and the nature of library services have been changed. It became necessity to apply ICT tools in the library to serve the user electronically. Because, the students use smartphones, laptops, tablet PCs, Internet etc. Students give first preference for searching study material to the internet and then the library. So, the users of libraries decreasing day by day if the library not applied modern library services.

To study the guidelines suggested by other researcher, noted following scholars who have reported reengineering practices as given below:

1) Hammer & Champy (1993) practiced reengineering as per following way:

i. Introduction into business reengineering

ii. Identification of business processes

iii. Selection of business processes:

iv. Understanding the selected business processes

v. Redesign of the selected business processes

vi. Implementation of redesigned business processes

2) Davenport & Stoddard (1994) practiced reengineering as per following way:

i. Visioning and goal setting

ii. Identification of business processes

iii. Understand and measure

iv. Information technology

v. Process prototype.

vi. Implementation

To cope with the present challenges of library and library professionals, the library and its services must be reengineered. The researcher has proposed model plan as on above methodologies:

Reengineering plan for library services can be made as follow:

1) Develop vision and objectives

2) Understand existing services and processes

3) Identify new services and ways

4) Make reengineering plan with involving team

5) Implement the new processes.

6) Make new processes and services operational

7) Evaluate the services and processes

8) On-going continuous improvement

1) Develop Vision and Objectives:

While implementing reengineering to library services, a library need to develop vision and objectives of library. The model vision and objectives for college library are as given below:

- **Vision:**

To explore and implement modern and innovative tools and services for deliver information and scholarly resources with ease of access in the whole campus. Also, provide facility where students can pursue learning independently beyond the classroom.

- **Objectives:**
  - Make library able for support to achieve the objectives of mother institution
  - Design library system as per the user centric approach
  - Make available electronic resources related to curriculum and provide its access offline as well as online
  - Provide 24/7 access to the library resources and services
  - Make available all the modern library and information services
  - Provide assistance to the user about information searching and download
  - To organise extension programmes to attract the user towards library services and resources.
  - Digitise the reference material which is frequently asked by the user
  - Create digital repository of all the institution information and make it accessible over intranet and internet.
  - Conduct student satisfaction survey periodically and apply changes as on student feedback

2) **Understand Existing Services and Processes:**

The present services and processes can be analysed by conducting use and user studies. From the feedback, the SWOT analysis of the library needs to be done. As per the lacunas and problems relating to the usage of library services, it will be needed to rethink about the service system. New services and processes are to be analysed and adopted for the libraries. Keeping systematic technological based approach in the mind, find out the modern library and information services which are really wanted by the user regarding information resources. The feedback will explore the expectations of the user. The model plan has been made as per the new and technological based services.

3) **Identify New Services and Ways:**

As per the present demand and expectations, the libraries need to introduce new library and information services, its tools in terms of timely services with quality.

As per the 4th law of library science, to save the user time, we need to provide maximum services online as well as digitised. ICT tools to be used as a new way for providing timely based services.

4) Make Reengineering Plan with Involving Team:

Figure 3.2: Model Plan for Reengineering of College Library Services

As per the above model plan for reengineering of college library services, it can be applied to provide those modern services to the user.

5) Implement the New Processes:

Adopt the new processes as per the reengineering plan for library services. It needs to purchase computers, IT Equipment and library automation and digitisation software to implement new processes. The e-resources must be purchased and provide

link to the institutional as well as library website with its usage guidelines. You may create digital repository with its access to educational information resources.

6) **Make New Services and Processes Operational:**

While completing the new processes and if the new system is ready to provide modern library and information services to the user, the library professionals need to provide awareness about reengineered library services to the users. The awareness can be given through library website, social media, conducting orientation programme, guide boards in library etc. After the awareness programme you may start providing new services.

7) **Evaluate the Services and Processes:**

From the feedback, Librarians become aware about users' expectations. Periodically evaluation of library and information system is needed for improvement the services and its quality. From the evaluation of library and information services, you may know the set objectives are achieved or not. If the objectives are not proved, you may rethink about your system. If most of the objectives are achieved, you may consider that the reengineering of library and information services has been successful.

8) **Ongoing Continuous Improvement:**

With the development of ICT tools, the nature of users' demand will be differ. Therefore, wherever changes are needed, the changes need be done in the existing processes. On-going continuous improvement may be done using users' satisfaction survey.

3.9.18 Benefits of Reengineering of Library Services and Processes:

The Benefits of reengineering of library and information services are given below:

    i.   The status of library services to be increased

    ii.   The quality in library and information services to be increased

    iii.   The cost effectiveness to be achieved

    iv.   Utilisation of library resources to be achieved

    v.   Borderless services to be provided

    vi.   Overall usages of library and information resources to be increased

vii. With the automation, perfection and the speed of work to be achieved

viii. Help to achieve five laws of library science given by Dr. S. R. Ranganathan etc.

Taviyad, R. H. gives the benefits of reengineering of library and information services as follow:

i. The user of a reengineering library need not to go to the library physically, people from all over the world can gain access to the same information.

ii. The major advantage of reengineering is that people can gain access 24/7.

iii. Same resource can be used by multiple users at a time.

iv. Reengineering libraries can provide very user-friendly interfaces giving clickable access to the resources.

v. An exact copy of the original can be made many times with original quality.

Hence, the reengineering of library services may help to improve the quality and the speed of services.

3.9.19 Strategy of Reengineering Library and Information Services:

Desai, Parita and Patil, Vinay (2015) have described the reengineering strategy for college library in there chapter of a book. The strategy is as given below:

- To understand what reengineering is? and the need for it:
- Composition of reengineering team:
- Effective leadership
- Set objective for reengineering:
- SWOT Analysis:
- Identification of process:
- Understand the process: (mapping library work process)
- Work the Entire Library System:
- Involvement of all stakeholders:
- Effective management of human resource:
- Emphasis on quality:
- Effective change management:
- Top Management Sponsorship:
- Use of Information Technology:
- Pilot study:

- Timeframe:
- Effective Communication:

The above strategy is one of the review presented by the researcher on reengineering strategy for college libraries. The strategy may or may not be common to all. In fact, after proper understanding of the reengineering of libraries, the librarian can develop their own strategy for whole reengineering process of their library. The researcher has studied and have experience of reengineering process in libraries. Thus, the researcher has proposed the common strategy for reengineering college library activities and services which is suitable to all libraries explained as under.

1) Remake clear vision and objectives
2) Investigate existing process and think for more effective
3) Study the users need & expectations and rethink for the services
4) Discuss and make the team positive for reengineering the existing services
5) Implement the redesigned processes and make user aware about new processes
6) Start to provide redesigned services to the user
7) Periodically evaluation of the redesigned process
8) Keep update the system as well as staff's skills with the development.

This is the common strategy which can be applied in libraries. The strategy is based on the model plan proposed by the researcher. The plan and its explanation is given on section number 5.5.3 in chapter 5th of the present study. Today, Reengineering of library and information services is very easy using modern IT tools. Because there are many software and tools are open source or available freely on the internet.

3.9   Summary:

In the present chapter, the researcher has described Higher Education system in India. Importance of libraries in Higher Education is also described. The status of Higher Education of Maharashtra is explained. The data and information of Higher Education of Maharashtra is taken from the website of Ministry of Higher Education of Maharashtra State. The Higher Education System of Maharashtra is managed

through the divisional directors and the joint directors of Maharashtra state. As per the intension of the study, more focus is kept on the aided college libraries, norms of college libraries and their development. This chapter has provided the descriptive guideline to the reader about Higher Education system especially of Maharashtra and the role of libraries with the development from traditional to digital library.

The essence of this chapter is to make library professional able to understand the process of reengineering with the help of given pointes such as the concept of reengineering, principles of reengineering, application of reengineering, essence of reengineering, impact of reengineering, benefits to reengineering, etc. In the case of college libraries, the researcher has described the planning for reengineering. The steps have been explained. Hence it will help to LIS Professionals to apply the reengineering processes to their libraries. Selected case studies have been presented in the present chapters that are undertaken reengineering process.

The reengineering is a systematic efforts or planning based process. Today, it is challenging era for the library and library professionals, because of the new technological gadgets. Thus, the library professionals can understand the theory of reengineering and its process to apply their library to reengineer the library services. Reengineering of library services will change the status of library, library professionals and increase the use of library services so that the cost effectiveness is to be achieved.

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CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

CHAPTER IV
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction:

The higher education and the academic libraries are having core relation. The academic library is a support to achieve the aim and objectives of higher education. It stores, processes and disseminate the knowledge resources in the community. This hub of knowledge should be updated with the development in ICT.

The present study is conducted with the aim to assess the status of college libraries in digital era and efforts made towards re-engineering libraries including better services in terms of quality, speed and as per expectation of user. College libraries have to cater users need by using ICT tools with considering five laws of library science. Therefore this study has been conducted and collected data from 206 librarians of aided Arts, Commerce and Science college libraries of Maharashtra.

To collect the data, structured questionnaire was designed for the librarians. The questionnaire contains 4 sections such as basic information of library, library resources and facilities, library budget and reengineering of library and information services.

In the basic part, the questions have been asked about the college name, address, contact details, affiliated university, establishment, librarian's name, library staff, college as well as library website etc. In the second section, the questions have been asked on available library resources and facilities. Such as number of library resources with last three years collection added, seating capacity, about internet, available equipment, available modern facilities for user, various sections of library, various use ratios etc. In third section of questionnaire, the questions have asked on library budget and its allocation. It includes the questions on sources of library fund, annual library budget for last three years, the budget enough or not, options for cater user needs, expenditure on printed as well as e-journal etc. In the last section questions have been asked on reengineering of library and information services. It includes uses of traditional library services in present era, statements about traditional library services, RFID technology, library automation, its year and the areas of library automation, reasons if library not automated yet, details about circulation services, e-journal and e-database subscriptions, available modern library and information

services and its uses in present era, digital repository, digitization of rare books, marketing strategies used for library resources utilization, statements about how we can achieve user satisfaction, opinions about library reengineering etc. Stratified sampling method has been used for the study and sample size determined by using Krejcie and Morgan Table. The sample size has been determined and it has divided in the five regions as described below:

Total Aided Arts, Commerce and Science Colleges in Maharashtra=1076
Sample size determined with the help of Krejcie and Morgan's Table is = 285

Region wise aided Arts, Commerce and Science College Libraries in percentage:

$$= \frac{\textbf{Colleges in region}}{\textbf{Total population}} \times \textbf{100}$$

Regionwise sample size

$$= \frac{\textbf{Total population from the region}}{\textbf{100}}$$

$$\times \textit{regionwise colleges in percentage}$$

Marathwada	= 55
Vidarbha	= 82
Khandesh and Northern Maharashtra	= 32
Paschim Maharashtra	= 70
Konkan	= 46
Total	**=285**

Thus 285 questionnaires have been distributed in all five regions according to their percentage and received 206 duly filled questionnaires from all five regions. The data analysis and interpretation of 206 questionnaires as follow:

4.2 Data Analysis:

1. Response rate:

Region-wise Responses to the Questionnaires are as follow:

Table 4.1: Region-wise Response to the Questionnaire

Sr. No.	Name of the Region	Questionnaire Distributed	Questionnaire Received	Percentage
1	Marathwada Region	55	34	61.81%
2	Vidarbha Region	82	54	65.85%
3	Khandesh and North Maharashtra	32	27	84.37%
4	Paschim Maharashtra	70	52	74.28%
5	Konkan Region	46	39	84.78%
	Total	**285**	**206**	**72.28**%

Figure 4.1: Region-wise Response to the Questionnaire
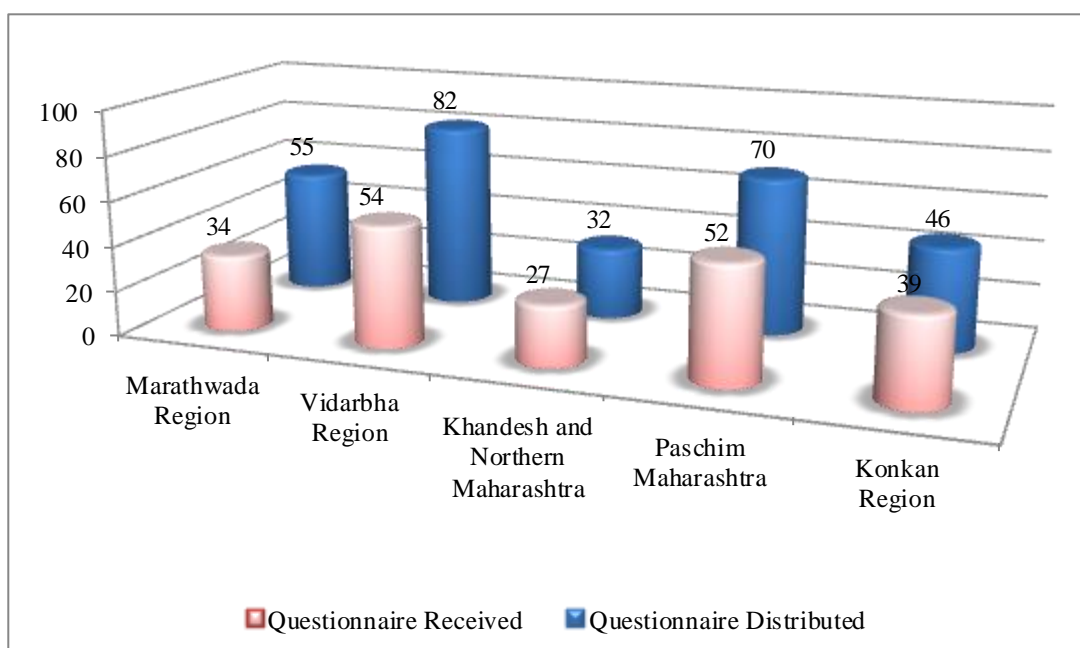
As on table no. 4.1, among the 285 circulated questionnaires 206 librarians have responded to the questionnaire / survey. The response is almost 72.28%. For the data analysis 206 questionnaire's data is considered for the present study.

A. College Libraries in Maharashtra:

2. Qualification of Librarians:

Table 4.2: Qualification of Librarians

Sr. No.	Qualification	Number	Percentage
1	Only having Bachelor/ Master in Library Science	28	13.59%
2	M.Lib.I.Sc. and M.Phil.	46	22.33%
3	M.Lib.I.Sc., SET/NET	105	50.97%
4	M.Lib.I.Sc., M.Phil., Ph.D	19	9.22%
5	M.Lib.I.Sc. SET/NET, M.Phil, Ph.D.	8	3.88%
Total		**206**	**100.00%**

Figure 4.2: Librarian's Qualification
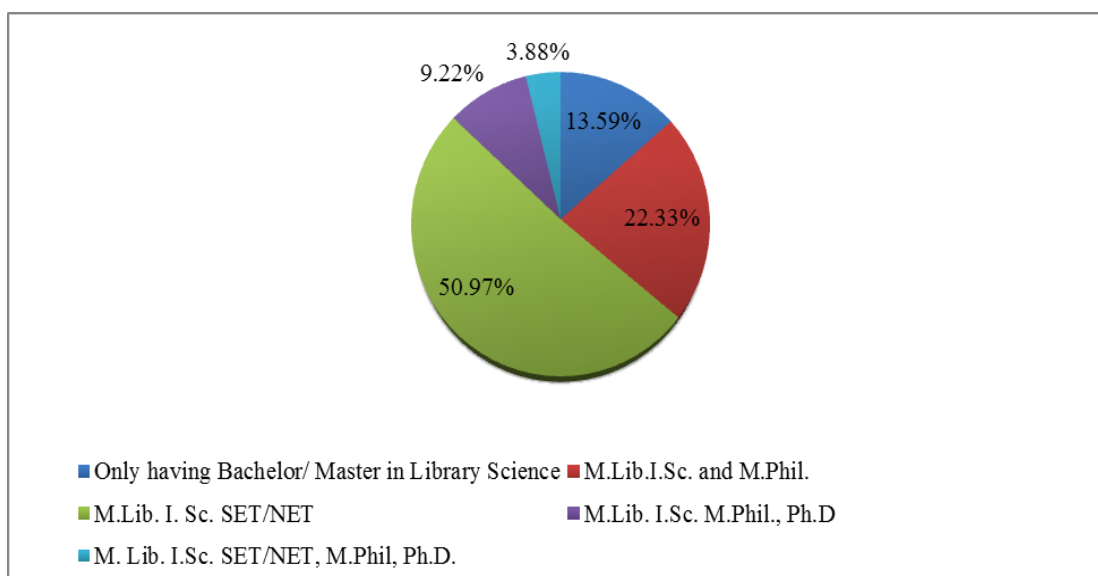
Observation:

As per the table 4.2, most of the colleges in Arts, Science and Commerce have well established libraries and qualified librarians (87%) to take care of library activities.

3. Establishment Year:

Table 4.3: Phases of Colleges Establishment

Regions	Before 1900	1900-1930	1931-1960	1961-1990	1990-2018
Marathwada	--	--	5	18	11
	--	--	14.70%	52.94%	32.35%
Vidarbha	--	--	9	29	16
	--	--	16.66%	53.70%	29.62%
Khandesh & North Maharashtra	--	--	2	18	7
	--	--	7.40%	66.66%	25.92%
Paschim Maharashtra	--	2	6	30	14
	--	3.84%	11.53%	57.69%	26.92%
Konkan	1	1	5	21	11
	2.56%	2.56%	12.82%	53.84%	28.20%
Total	1	3	27	116	59
	0.48%	1.45%	13.10%	56.31%	28.64%

Figure 4.3: Phases of Colleges Establishment
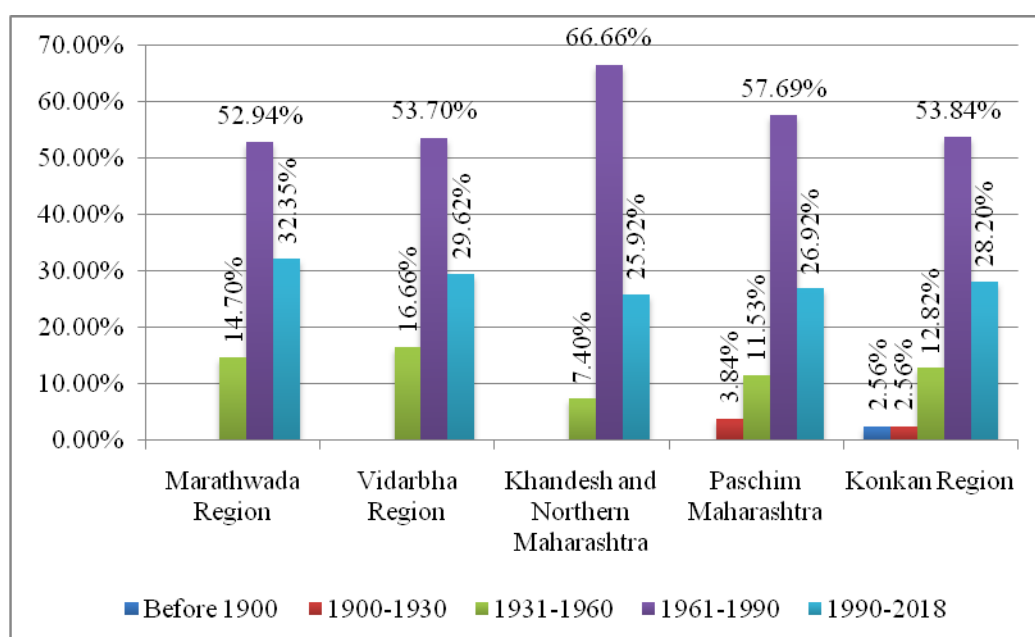
Observation:

As per the data presented in table 4.3, among the surveyed college libraries and responses received, Collages in Maharashtra initiated prior to 1900 (0.48%). The maximum growth of colleges took place during the period 1961-1990 (56.31%) Following to this during 1990-2018 28.64% colleges have been established.

4. Library Website:

Table 4.4: Independent Library Website

Sr. No.	Options	Libraries having Independent Library Websites	
		Response	**Percentage**
1	Marathwada	3	8.82%
2	Vidarbha	4	7.40%
3	Khandesh & North Maharashtra	3	11.11%
4	Paschim Maharashtra	8	15.38%
5	Konkan	7	17.94%
6	No website	181	87.86%

Figure 4.4: Having Independent Library Website
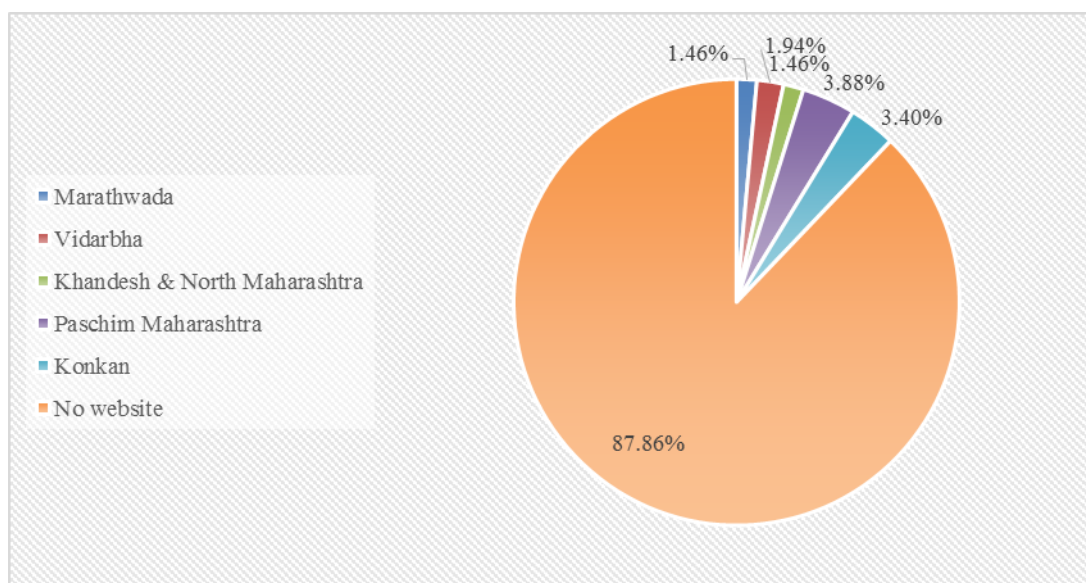
Observation:

As per table 4.4, almost 87.86 % college libraries do not have independent library websites.

5. Library Staff:

Table 4.5: Number of Library Staff

Sr. No.	Regions	Single Staff	2 to 5 Staff	6 to 10 Staff	11 to 15 Staff	16 to 20 Staff	21 to 25 Staff
1	Marathwada	4	19	6	4	1	0
		11.76%	55.88%	17.64%	11.76%	2.94%	0.00%
2	Vidarbha	2	38	10	4	0	0
		3.70%	70.37%	18.51%	7.40%	0.00%	0.00%
3	Khandesh & North Maharashtra	3	15	7	2	0	0
		11.11%	55.55%	25.92%	7.40%	0.00%	0.00%
4	Paschim Maharashtra	0	30	12	7	1	2
		0.00%	57.69%	23.07%	13.46%	1.92%	3.84%
5	Konkan	2	23	12	1	0	1
		5.12%	58.97%	30.76%	1.56%	0.00%	2.56%
	Overall	11	125	47	18	2	3
		5.33%	60.67%	22.81%	8.73%	0.97%	1.45%

Figure 4.5: Number of Library Staff
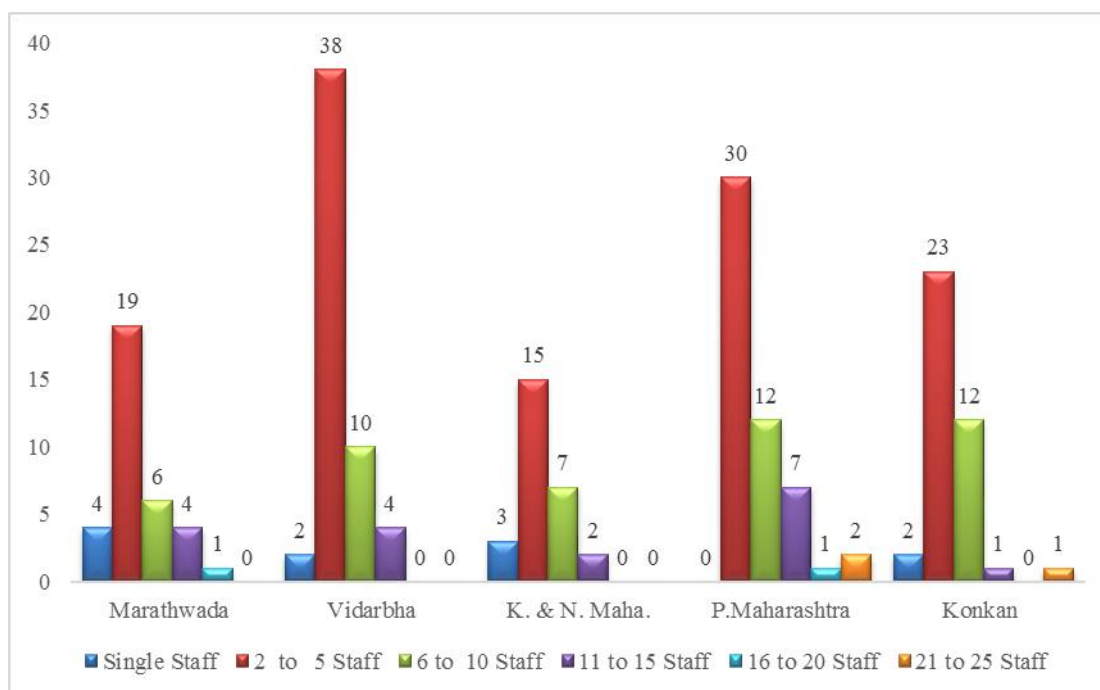
Observation:

From the table 4.5, only 1.45 % libraries have more than 21 library staff, but majority of college libraries (60.67%) have only 2-4 staff members in the library.

B. Library Resources and Facilities:

6. Collection of libraries (Books):

Table 4.6: Total Collection of Books

Sr. No.	Books	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	1000-10000	10	10	6	16	11	53
		29.49%	18.51%	22.22%	30.76%	28.20%	25.72%
2	10001-20000	6	5	9	7	5	32
		17.64%	9.25%	33.33%	13.46%	12.82%	15.53%
3	20001-30000	7	9	4	5	8	33
		20.58%	16.66%	14.81%	9.61%	20.51%	16.01%
4	30001-40000	2	6	4	4	2	18
		5.88%	11.11%	14.81%	7.69%	5.12%	8.73%
5	40001-50000	1	6	0	4	2	13
		2.94%	11.11%	0.00%	7.69%	5.12%	6.31%
6	50001-60000	0	3	3	7	3	16
		0.00%	5.55%	11.11%	13.46%	7.69%	7.76%
7	60001 & More	8	15	1	9	8	41
		23.52%	27.77%	3.70%	17.30%	20.51%	19.90%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.6: Total Collection of Books
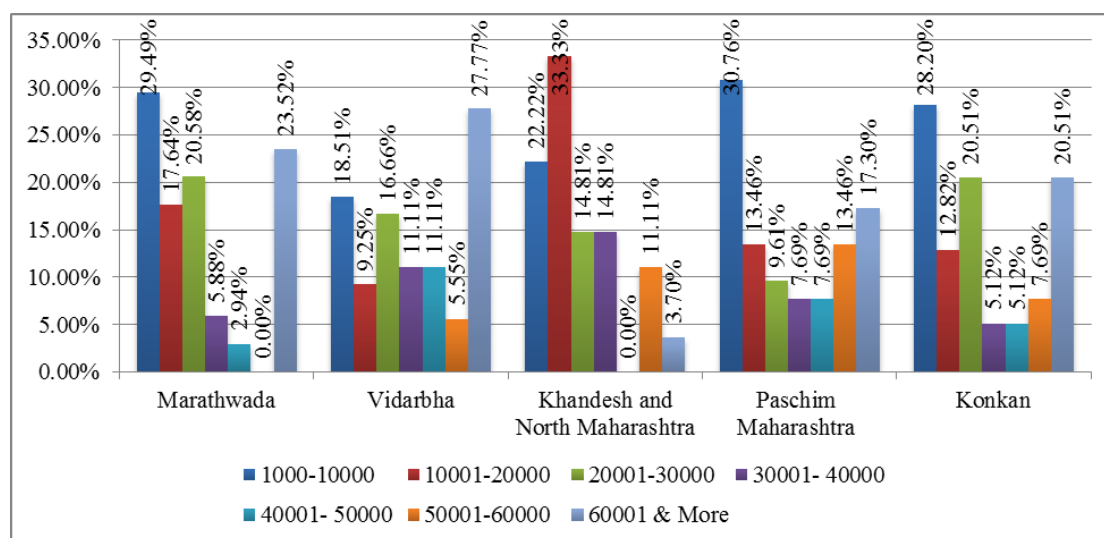
Observation:

      The table 4.6 reveals that only 19.19% libraries have collection more than 60,000 and have better print resources also.41.25% libraries have collection in between 1thousand to 20 thousand. 38.81% libraries have collection in between 20,000 to 60,000.

7. **Year wise Collection Development of Books: (Last Three Years)**

Table 4.7: Year wise Collection Development of Books

Sr. No.	Year	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	2015-16	383	338	420	398	344	371
2	2016-17	411	334	413	459	500	420
3	2017-18	394	328	398	466	461	408
	Average	396	334	410	441	435	400

$$\left(\textbf{Average no. of books} = \frac{Total\ books\ purchase\ in\ all\ colleges}{Number\ of\ colleges}\right)$$

Figure 4.7: Year wise Collection Development of Books

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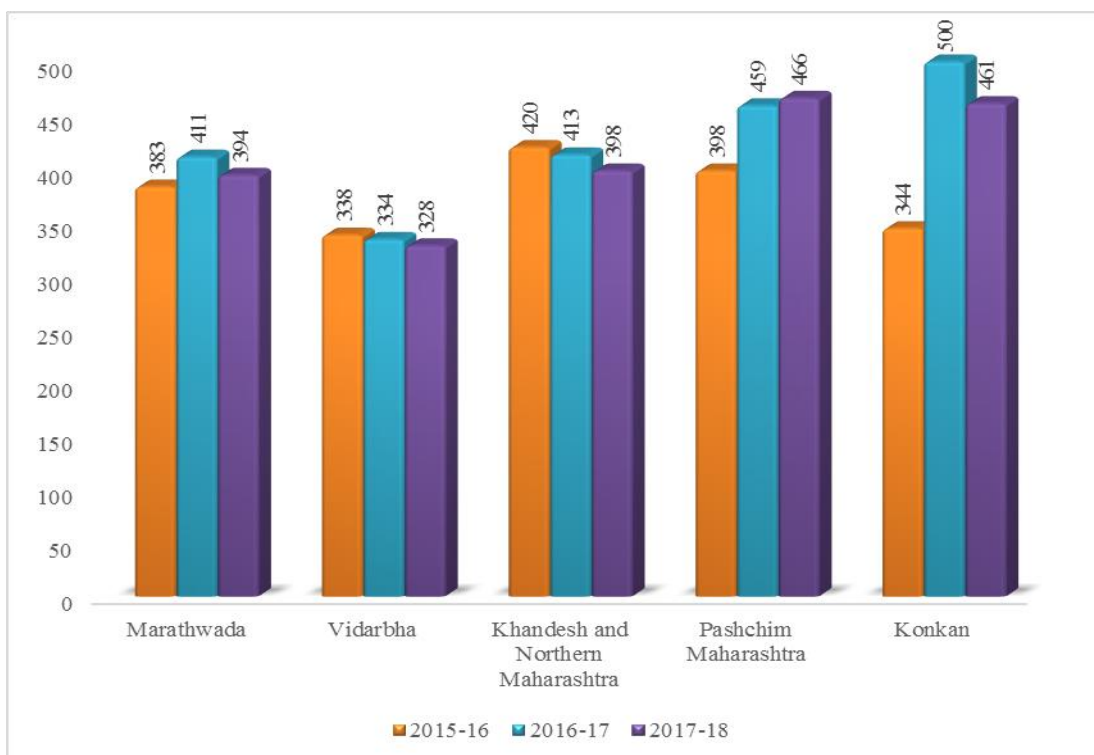
Observation:

As on table 4.7, average 400 books purchased every year in the college libraries of Maharashtra. Among the five regions of Maharashtra, in the region Paschim Maharashtra purchased maximum titles (441) followed by Konkan region and less titles (334) purchased in the Vidarbha Region.

8. Collection of Periodicals:

Table 4.8: Collection of Periodicals

Sr. No.	No. of Periodicals	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	1-10	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	11-20	1	8	2	9	6	26
		2.94%	14.81%	7.40%	17.64%	15.38%	12.62%
3	21-30	5	6	5	8	10	34
		14.70%	11.11%	18.51%	15.38%	25.64%	16.50%
4	31- 40	4	6	4	10	4	28
		11.76%	11.11%	14.81%	19.23%	10.25%	13.59%
5	41- 50	6	6	3	3	1	19
		17.64%	11.11%	11.11%	5.76%	2.56%	9.22%
6	51-60	11	8	5	6	10	40
		32.35%	14.81%	18.51%	11.53%	25.64%	19.41%
7	61 & More	7	20	8	16	8	59
		20.58%	37.03%	29.62%	30.76%	20.51%	28.64%
	Total	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.8: Collection of Periodicals

Legend: ■ 1-10 ■ 11-20 ■ 21-30 ■ 31- 40 ■ 41- 50 ■ 51-60 ■ 61 & More
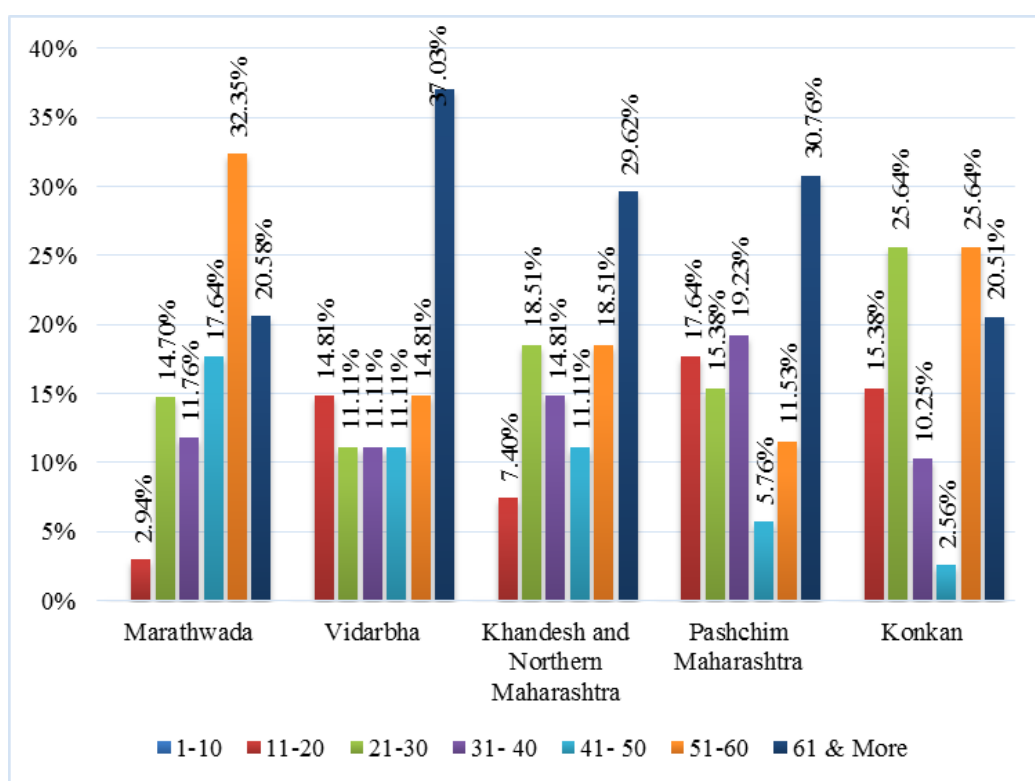
Observation:

Above table presents that 48.05% libraries have periodicals more than 51 and have better titles also. 51.95% libraries have collection up to 50 periodicals.

9. Year wise Collection Development of Periodicals: (last three years)

Table 4.9: Collection Development of Periodicals

Sr. No.	Periodicals	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	2015-16	Total	1762	3116	1321	2404	1740	10343
		Average	52	58	49	47	45	50
2	2016-17	Total	1760	3116	1342	2382	1732	10332
		Average	52	58	50	46	44	50
3	2017-18	Total	1781	3114	1340	2392	1734	10361
		Average	52	58	50	46	44	50

Figure 4.9: Collection Development of Periodicals
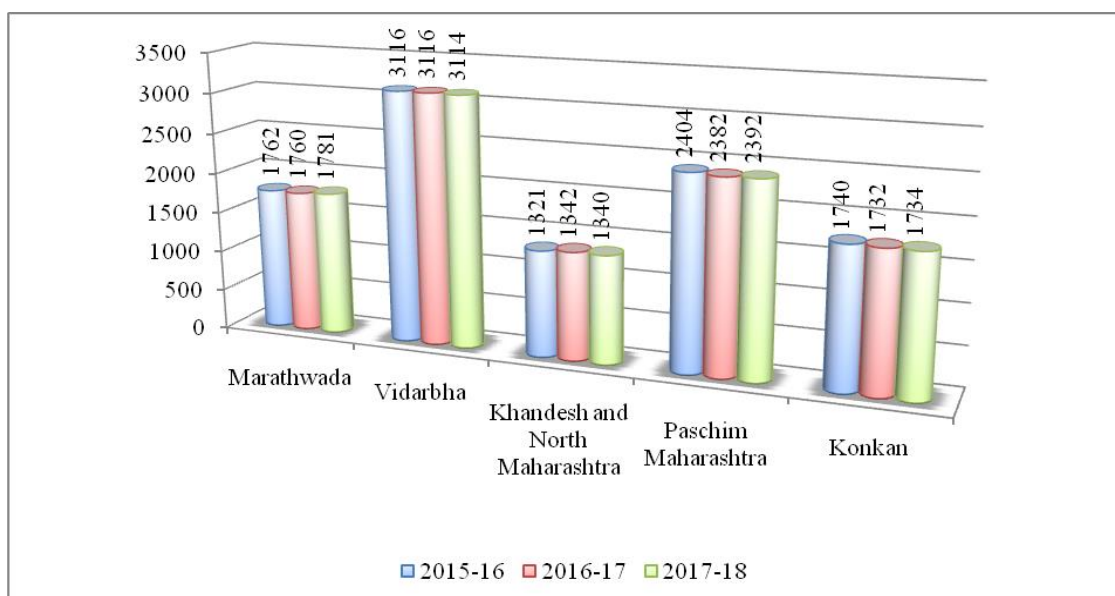
Observation:

According to table 4.9, among the five regions, Paschim Maharashtra region has more number of Periodicals than other regions. In the last three years no any change in the subscription of printed journal. It is observed that the trend of subscription to printed journals has not changed.

10. Collection of Other Printed Information Resources:

The question about other printed resources is analyzed by Ghumre (2012) in his Thesis. According to their method, the following table 4.10 has been analyzed.

Table 4.10: Printed Collection of Libraries

Sr. No.	Other Printed Resources	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Bound Volumes	33	49	26	47	38	193
		97.06%	90.74%	96.3%	90.38%	90.38%	93.68%
2	Theses/ Dissertations / Projects	7	12	8	13	9	49
		20.59%	22.22%	29.63%	25.00%	23.07%	23.78%
3	Reports	9	27	13	12	14	75
		26.47%	50.00%	48.15%	23.08%	23.08%	36.40%

4	Manuscripts	7	12	5	8	6	38
		20.59%	22.22%	18.52%	15.38%	15.38%	18.44%
5	Newspapers	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6	Maps	8	29	15	18	13	83
		23.53%	53.7%	55.56%	34.62%	34.62%	40.29%

Figure 4.10: Printed Collection of Libraries
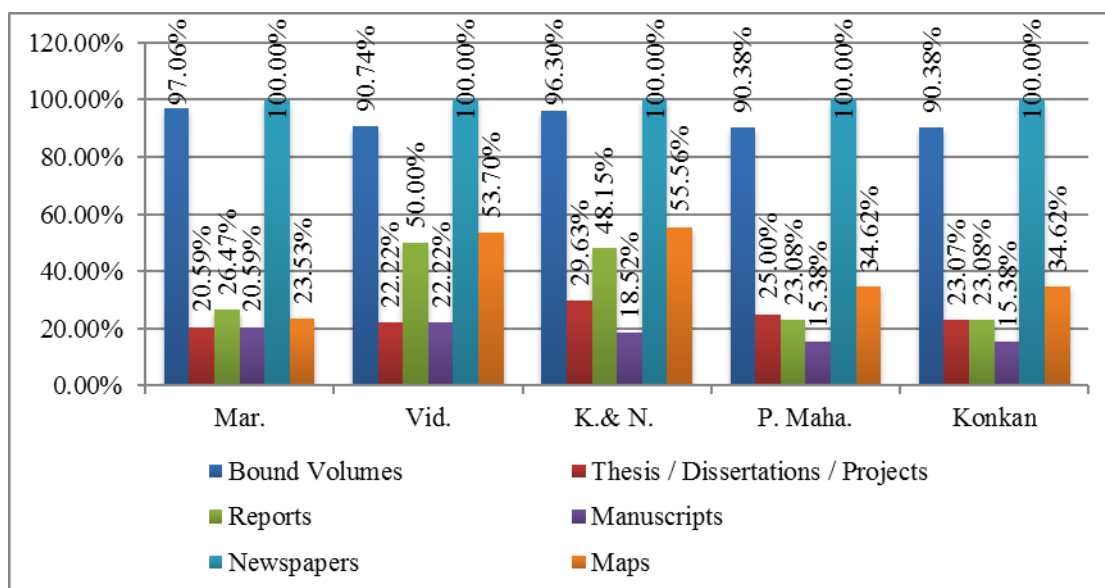
Observation:

From the table 4.10, in other printed information resources, 100% libraries have subscription to daily newspapers followed by collection of bound volumes (93.68%). Maps, manuscripts, reports, theses / dissertations / projects have been found in few college libraries.

The printed collection other than books has been analyzed separately by Regions:

10.1 Marathwada Region:

Table 4.11: Printed Resources of Marathwada

Range (50)	Bound Vol.	Theses /Dissertations /Projects	Reports	Manu-scripts	News-papers	Maps
1-50	0	4	7	4	34	8
	0.00%	11.76%	20.59%	11.76%	100.00%	23.53%

51-100	1	1	1	2	0	0
	2.94%	2.94%	2.94%	5.88%	0.00%	0.00%
101-150	3	0	1	0	0	0
	8.82%	0.00%	2.94%	0.00%	0.00%	0.00%
151-200	6	0	0	0	0	0
	17.65%	0.00%	0.00%	0.00%	0.00%	0.00%
201-250	5	0	0	0	0	0
	14.71%	0.00%	0.00%	0.00%	0.00%	0.00%
251-300	5	1	0	1	0	0
	14.71%	2.94%	0.00%	2.94%	0.00%	0.00%
301 & More	13	1	0	0	0	0
	38.24%	2.94%	0.00%	0.00%	0.00%	0.00%
No Availability	1	27	25	27	0	26
	2.94%	79.41%	73.53%	79.41%	0.00%	76.47%
Total	34	34	34	34	34	34
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.11: Printed Resources of Marathwada
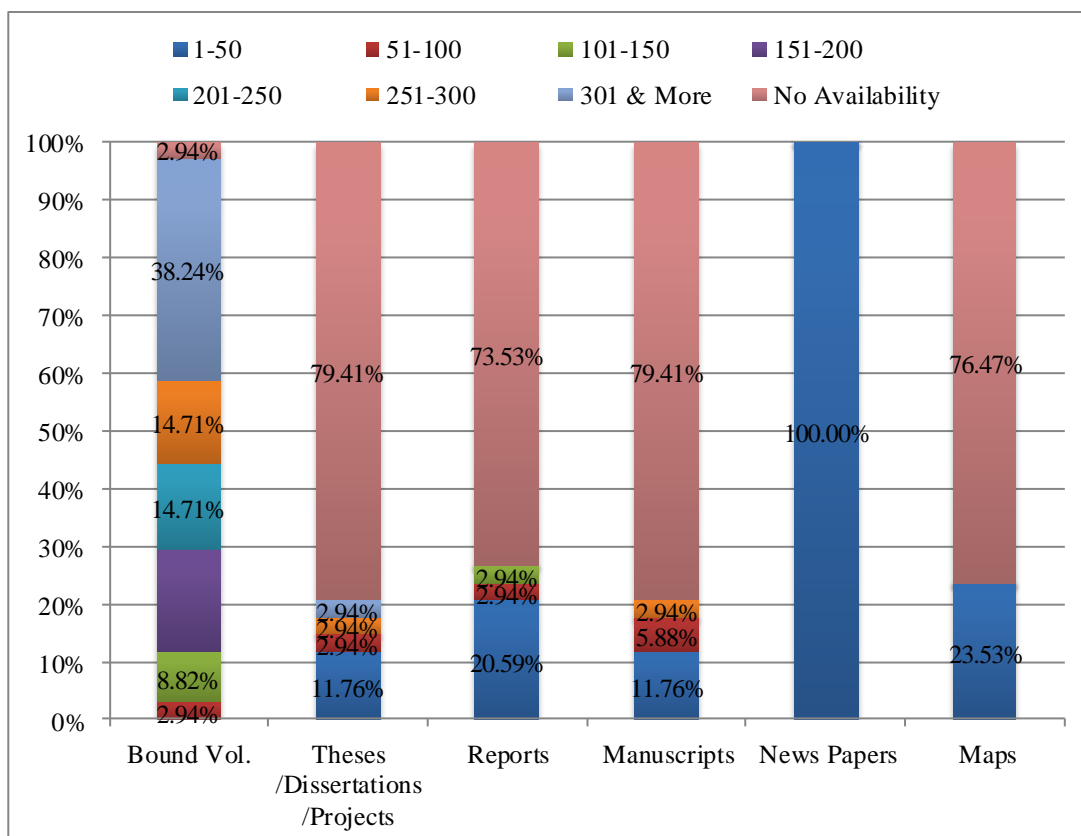
Observation:

As per table 4.11 in Marathwada, it found that 100% libraries have subscription to daily newspapers followed by collection of bound volumes (97.05%). All libraries have newspapers less than 50 and most of the bound volumes (66.67%) are more than 300. Availability of Maps, Manuscripts, Reports, Theses / Dissertations / Projects has found in few college libraries.

10.2   Vidarbha Region:

Table 4.12: Printed Resources of Vidarbh Region

Range (50)	Bound Vol.	Theses /Dissertations /Projects	Reports	Manu-scripts	News-papers	Maps
1-50	0	5	14	6	54	25
	0.00%	9.26%	25.93%	11.11%	100.00%	46.30%
51-100	2	3	11	3	0	4
	3.70%	5.56%	20.37%	5.56%	0.00%	7.41%
101-150	1	2	0	2	0	0
	1.85%	3.70%	0.00%	3.70%	0.00%	0.00%
151-200	5	0	0	0	0	0
	9.26%	0.00%	0.00%	0.00%	0.00%	0.00%
201-250	4	1	1	1	0	0
	7.41%	1.85%	1.85%	1.85%	0.00%	0.00%
251-300	1	1	0	0	0	0
	1.85%	1.85%	0.00%	0.00%	0.00%	0.00%
301 & More	36	0	1	0	0	0
	66.67%	0.00%	1.85%	0.00%	0.00%	0.00%
No Availability	5	42	27	42	0	25
	9.26%	77.78%	50.00%	77.78%	0.00%	46.30%
Total	54	54	54	54	54	54
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.12: Printed Resources of Vidarbh Region
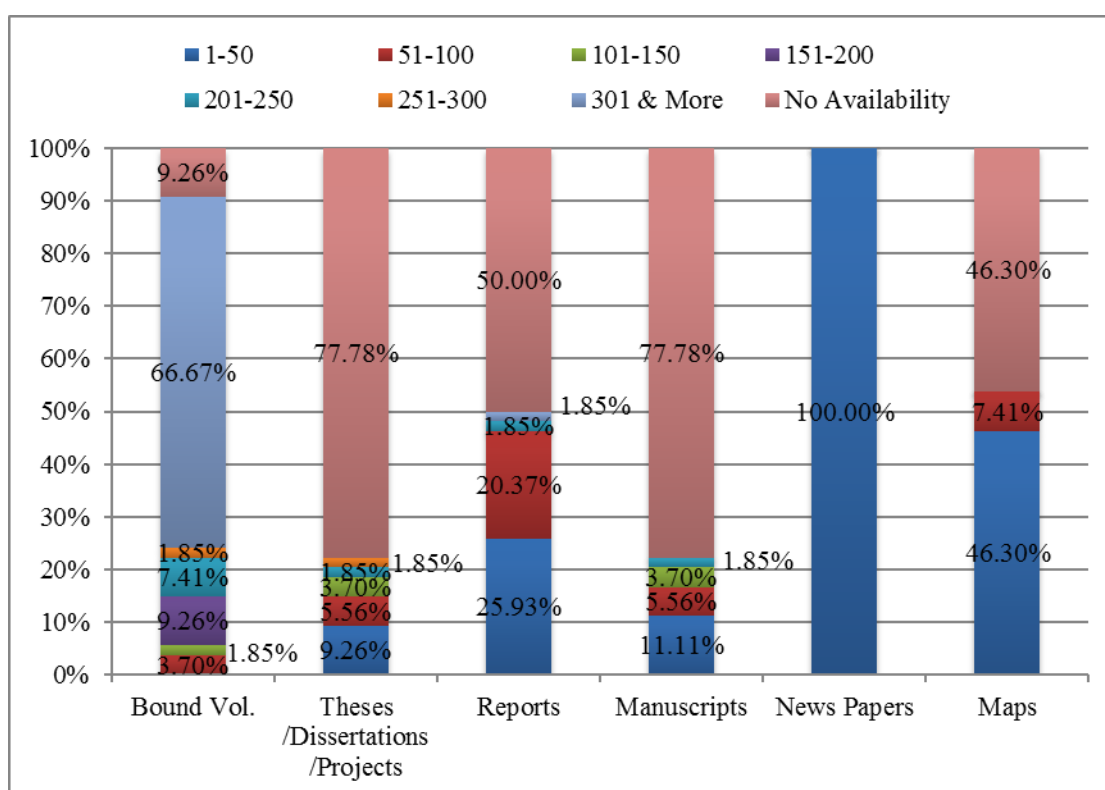
Observation:

In Vidarbha, it found that 100% libraries have subscription to daily newspapers followed by collection of bound volumes (90.74%). All libraries have newspapers less than 50 and bound volumes (66.67%) are more than 300. Availability of Maps, Manuscripts, Reports, Theses / Dissertations / Projects has found in few college libraries.

10.3   Khandesh and Northern Maharashtra Region:

Table 4.13: Printed Resources of Khandesh and Northern Maharashtra

Range (50)	Bound Vol.	Theses /Dissertations /Projects	Reports	Manu-scripts	News-papers	Maps
1-50	0	9	9	4	27	15
	0.00%	33.33%	33.33%	14.81%	100.00%	55.56%
51-100	0	5	1	0	0	0
	0.00%	18.52%	3.70%	0.00%	0.00%	0.00%
101-150	1	1	2	0	0	0
	3.70%	3.70%	7.41%	0.00%	0.00%	0.00%

151-200	2	1	1	0	0	0
	7.41%	3.70%	3.70%	0.00%	0.00%	0.00%
201-250	1	1	0	1	0	0
	3.70%	3.70%	0.00%	3.70%	0.00%	0.00%
251-300	2	1	0	0	0	0
	7.41%	3.70%	0.00%	0.00%	0.00%	0.00%
301 & More	20	0	0	0	0	0
	74.07%	0.00%	0.00%	0.00%	0.00%	0.00%
No Availability	1	19	14	22	0	12
	3.70%	70.37%	51.85%	81.48%	0.00%	44.44%
Total	27	27	27	27	27	27
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.13: Printed Resources of Khandesh and Northern Maharashtra
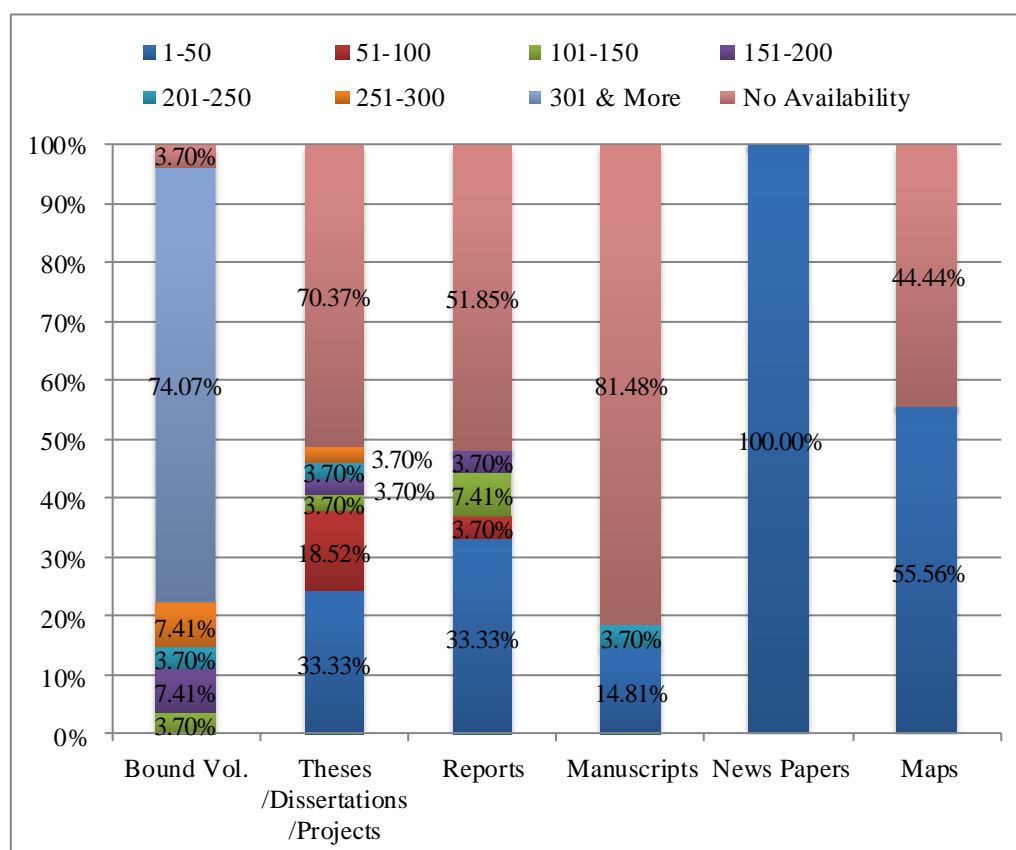
Observation:

Table 4.13 presents that in Khandesh and North Maharashtra, it is found that 100% libraries have subscription to daily newspapers followed by collection of bound

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volumes (96.29%). All libraries have newspapers less than 50 and most bound volumes (74.07%) are more than 300. Availability of Maps, Manuscripts, Reports, Theses / Dissertations / Projects has found in few college libraries.

Total collection of other printed materials:

10.4   Paschim Maharashtra:

Table 4.14: Printed Resources of Paschim Maharashtra Region

Range (50)	Bound Vol.	Theses /Dissertations /Projects	Reports	Manu-scripts	News-papers	Maps
1-50	0	7	10	5	52	18
	0.00%	13.46%	19.23%	9.62%	100.00%	34.62%
51-100	1	2	2	2	0	0
	1.92%	3.85%	3.85%	3.85%	0.00%	0.00%
101-150	3	3	0	0	0	0
	5.77%	5.77%	0.00%	0.00%	0.00%	0.00%
151-200	4	0	0	1	0	0
	7.69%	0.00%	0.00%	1.92%	0.00%	0.00%
201-250	15	0	0	0	0	0
	28.85%	0.00%	0.00%	0.00%	0.00%	0.00%
251-300	0	1	0	0	0	0
	0.00%	1.92%	0.00%	0.00%	0.00%	0.00%
301 & More	24	0	0	0	0	0
	46.15%	0.00%	0.00%	0.00%	0.00%	0.00%
No Availability	5	39	40	44	0	34
	9.62%	75.00%	76.92%	84.62%	0.00%	65.38%
Total	52	52	52	52	52	52
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.14: Printed Resources of Paschim Maharashtra Region
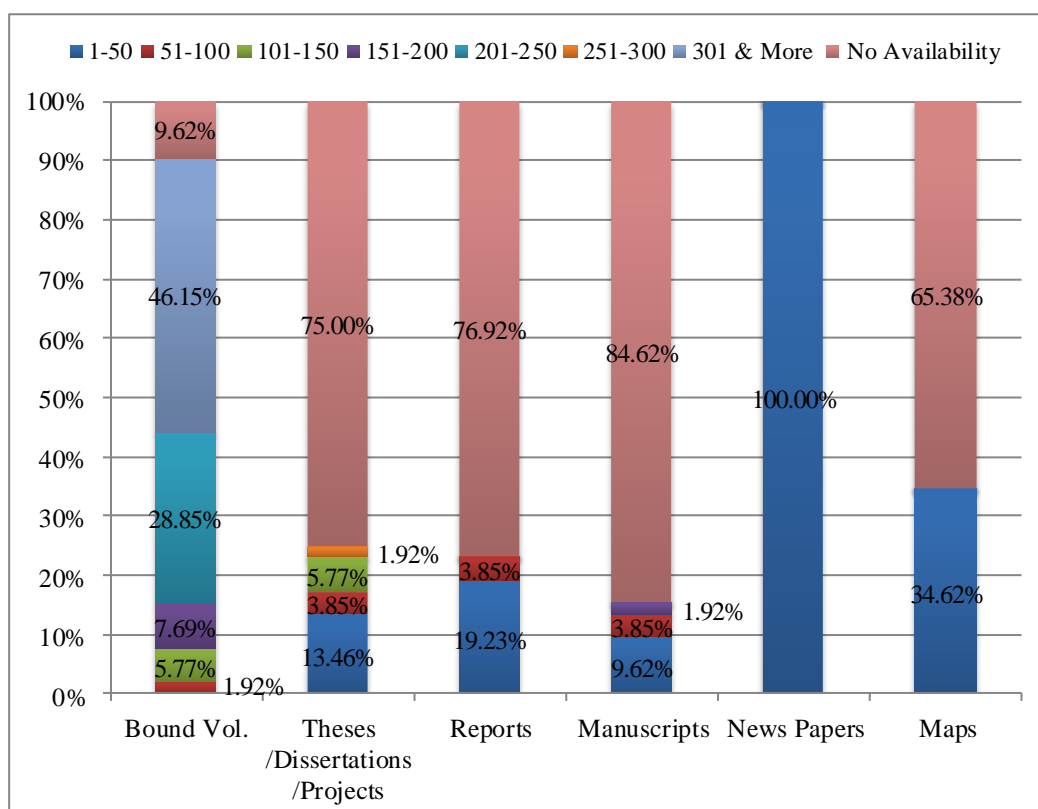
Observation:

As on table 4.14 in Paschim Maharashtra, it found that 100% libraries have subscription to daily newspapers followed by collection of bound volumes (90.38%). All libraries have newspapers less than 50 and most bound volumes (46.15%) are more than 300. Availability of Maps, Manuscripts, Reports, Theses / Dissertations / Projects has found in few college libraries.

10.5   Konkan Region:

Table 4.15: Printed Resources of Konkan Region

Range (50)	Bound Vol.	Theses /Dissertations /Projects	Reports	Manu-scripts	News-papers	Maps
1-50	0	8	9	5	39	13
	0.00%	20.51%	23.08%	12.82%	100.00%	33.33%
51-100	1	0	5	1	0	0
	2.56%	0.00%	12.82%	2.56%	0.00%	0.00%

101-150	5	0	0	0	0	0
	12.82%	0.00%	0.00%	0.00%	0.00%	0.00%
151-200	0	0	0	0	0	0
	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
201-250	4	0	0	0	0	0
	10.26%	0.00%	0.00%	0.00%	0.00%	0.00%
251-300	0	1	0	0	0	0
	0.00%	2.56%	0.00%	0.00%	0.00%	0.00%
301 & More	28	0	0	0	0	0
	71.79%	0.00%	0.00%	0.00%	0.00%	0.00%
No Availability	1	30	25	33	0	26
	2.56%	76.92%	64.10%	84.62%	0.00%	66.67%
Total	39	39	39	39	39	39
	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.15: Printed Resources of Konkan Region

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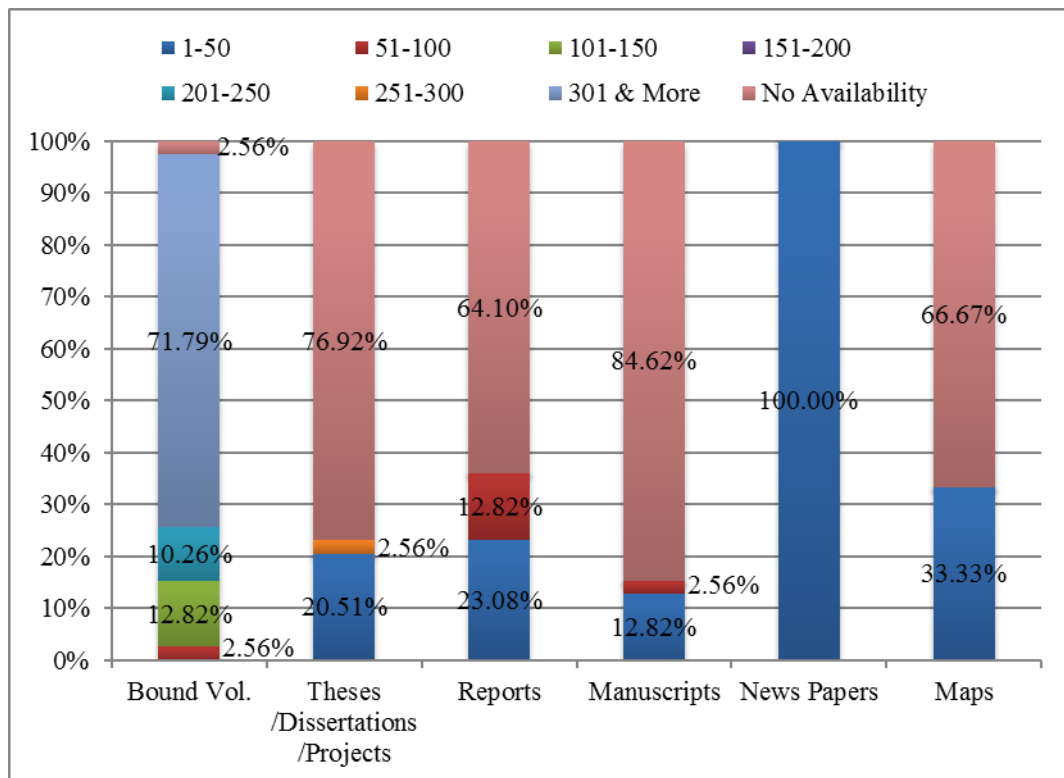
Observation:

According to table 4.15, in Konkan region, it found that 100% libraries have subscription to daily newspapers followed by collection of bound volumes (97.43%). All libraries have newspapers less than 50 and most bound volumes (71.79%) are more than 300. Availability of Maps, Manuscripts, Reports, Theses / Dissertations / Projects has found in few college libraries.

It is found that 100% colleges among five regions of Maharashtra have availability of newspaper and followed by bound volumes which are more than 300.

11. Availability of E-Information Resources in the Libraries:

Table 4.16: Availability of E-Information Resources

Sr. No.	E-Resources	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	E-Books	17	39	18	43	24	141
		50.00%	72.22%	66.67%	82.69%	61.54%	68.45%
2	E-Journals	15	40	11	35	22	123
		44.12%	74.07%	40.74%	67.31%	56.41%	59.71%
3	Database	15	37	11	34	22	119
		44.12%	68.52%	40.74%	65.38%	56.41%	57.77%
4	CDs/DVDs	28	39	20	45	35	167
		82.35%	72.22%	74.07%	86.54%	89.74%	81.06%

Figure 4.16: Availability of Non-Print Information Resources
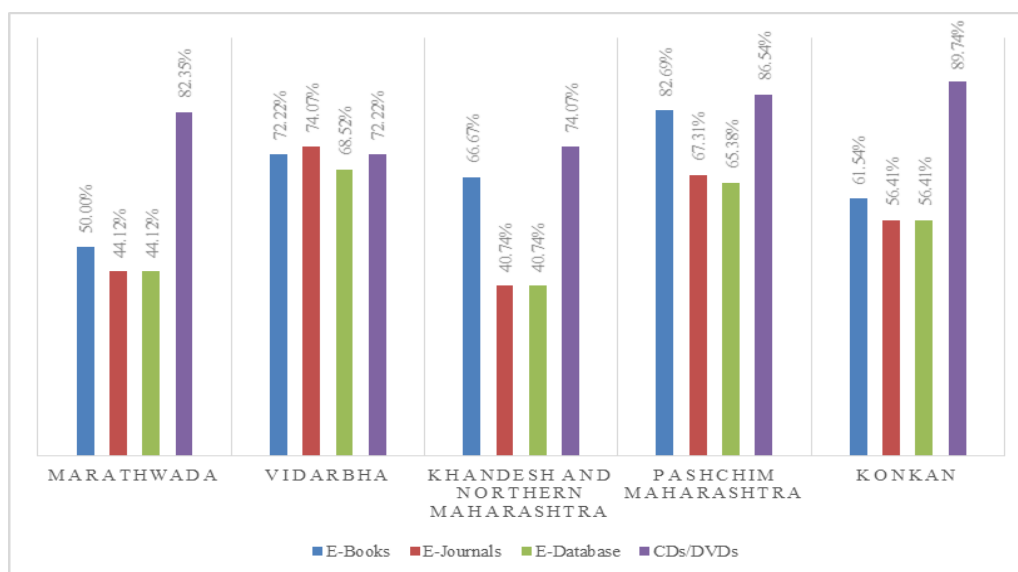
Observation:

Information given in table 4.16 reviewls that among the five regions of Maharashtra, Paschim Maharashtra has more availability of e-books (82.69%) follwed by Vidarbha region (72.22%) libraries. in case of e-journal and databases, more availability is found in the region of Vidarbha. Collection of CDs/DVDs is availabile in the libraries more than other e-information resources.

12. Internet Connection in the Libraries:

Table 4.17: Internet Connections in the Libraries

Sr. No.	Regions	Yes		No		Total	
		No.	%age	No.	%age	No.	%age
1	Marathwada Region	31	91.18%	3	8.82%	34	100.00%
2	Vidarbha Region	52	96.30%	2	3.70%	54	100.00%
3	Khandesh & North Maharashtra	25	92.59%	2	7.41%	27	100.00%
4	Paschim Maharashtra	52	100.00%	0	0.00%	52	100.00%
5	Konkan Region	38	97.44%	1	2.56%	39	100.00%
	Total	198	96.12%	8	3.88%	206	100.00%

Figure 4.17: Internet Connections in the Libraries

	Marathwada	Vidarbha	Khandesh & North Maharashtra	Paschim Maharashtra	Konkan
No	8.82%	3.70%	7.41%	0.00%	2.56%
Yes	91.18%	96.30%	92.59%	100.00%	97.44%
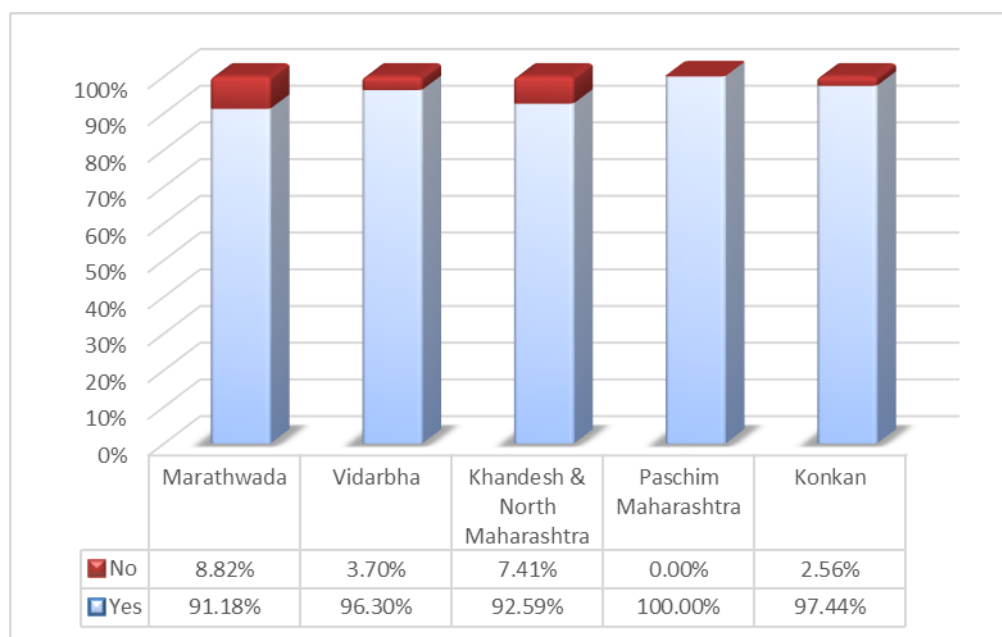
Observation:

Table 4.17 presented most of the college libraries (96.12%) having Internet connection but still few libraries (3.88%) do not have internet connection.

13. Speed of Internet:

Table 4.18: Speed of Internet

Sr. No.	Regions	1Mbps	2 Mbps	4 Mbps	More than 4 Mbps
1	Marathwada	0	5	3	26
		0.00%	14.71%	8.82%	76.47%
2	Vidarbha	1	2	5	46
		1.85%	3.70%	9.26%	85.18%
3	Khandesh and North Maharashtra	1	1	5	20
		3.70%	3.70%	18.52%	74.07%
4	Paschim Maharashtra	2	7	9	34
		3.85%	13.46%	17.31%	65.38%
5	Konkan	0	2	4	33
		0.00%	5.13%	10.26%	84.61%
	Total	4	17	26	159
		1.94%	8.25%	12.62%	77.18%

Figure 4.18: Speed of Internet
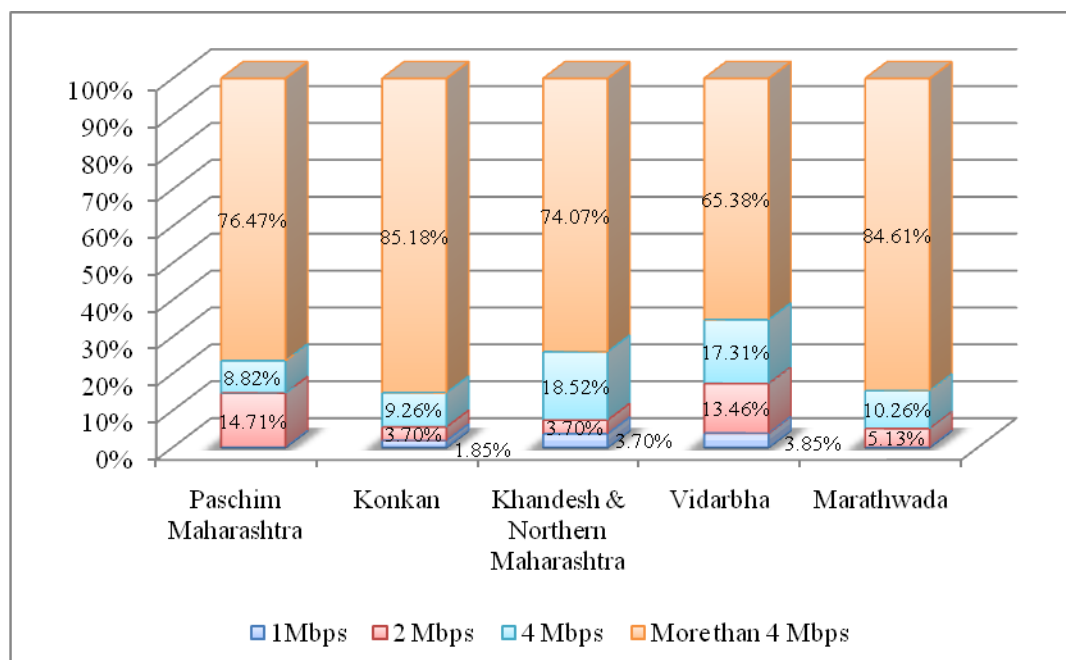
In table 4.18, most of the college libraries (77.18%) having speed of Internet connectivity more than 4mbps whereas 22.82% libraries having speed of internet connectivity less than 4mbps.

14. Availability of Equipments

Table 4.19: Equipments Available in the Libraries

Sr. No.	Equipment	Marathwada Region		Vidarbha Region		Khandesh & North Maharashtra		Paschim Maharashtra		Konkan Region		Total	
1	Barcode Reader	26	76.47%	40	74.07%	16	59.26%	40	76.92%	19	48.72%	141	68.45%
2	Barcode Printer	17	50.00%	35	64.81%	11	40.74%	26	50.00%	17	43.59%	106	51.46%
3	Inkjet Printer	2	5.88%	3	5.56%	3	11.11%	3	5.77%	6	15.38%	17	8.25%
4	Dot Matrix Printer	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
5	Laser Jet Printer	34	100.00%	51	94.44%	24	88.89%	49	94.23%	35	89.74%	193	93.69%
6	Server	30	88.23%	49	90.74%	23	85.19%	45	86.54%	31	79.49%	178	86.40%
7	Digital Scanner	30	88.24%	44	81.48%	19	70.37%	40	76.92%	29	74.36%	162	78.64%
8	Photocopy Machine	25	73.53%	40	74.07%	16	59.26%	40	76.92%	19	48.72%	140	67.96%
9	LCD Projector	6	17.65%	5	9.26%	3	11.11%	7	13.46%	9	23.08%	30	14.56%
10	Web Camera	6	17.65%	4	7.41%	2	7.41%	6	11.54%	5	12.82%	23	11.17%
11	UPS	27	79.41%	46	85.19%	19	70.37%	45	86.54%	26	66.67%	163	79.12%
12	Wi-Fi Router	25	73.53%	40	74.07%	16	59.26%	40	76.92%	31	79.49%	152	73.79%

Observation:

In table 4.19, most of the equipemnts have found in the libraries viz. barcode reader, barcode printer, laser jet printer, server, scannar, UPS, photocopy machine, wifi router etc. But few equiepmnets found in the libraries viz. inkjet printer, dot matrics printer, LCD projector and web camera. Inkjet printer and dot matrics printer are not used in libraries now days.

15. Availability of Modern Facilities:

Table 4.20: Available Modern Facilities

Sr. No.	Sections of libraries	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Photocopy	25	40	16	40	19	140
		73.53%	74.07%	59.26%	76.92%	48.72%	67.96%
2	Internet	31	52	25	52	38	198
		91.18%	96.30%	92.59%	100.00%	97.44%	96.12%
3	Laptop	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	Tablet Pcs/e-book reader	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	Ear phones for audio book reader	18	21	10	27	30	106
		52.94%	38.89%	37.04%	51.92%	76.92%	51.46%
6	Wi-Fi facility	16	31	17	33	31	128
		47.06%	57.41%	62.96%	63.46%	79.49%	62.14%
7	Discussion Cafe	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00

Figure 4.19: Available Modern Facilities for the User
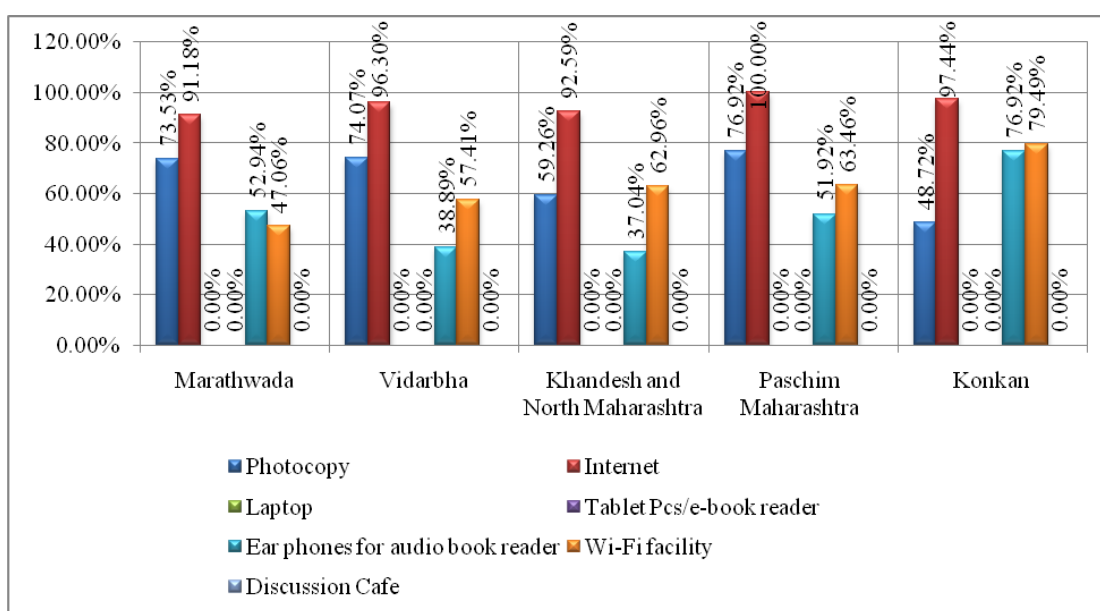
Observation:

From table 4.20, the modern facilites are available in the libraries viz. photocopy (67.96%), Internet (96.12%), Ear phones for audio book reader (51.46%) and Wi-Fi facility (62.14%). Few facilities are new and not implemented in libraries viz. Laptop (0.00%), Tablet Pcs/e-book reader (0.00%), Discussion Café (0.00%).

16. Various Sections of Libraries:

Table 4.21: Various Sections of Libraries

Sr. No.	Sections of libraries	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Acquisition	25	28	21	47	32	153
		73.53%	51.85%	77.78%	90.38%	82.05%	74.27%
2	Circulation	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
3	Periodical	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	Reference	29	44	25	50	35	183
		85.29%	81.48%	92.59%	96.15%	89.74%	88.83%
5	Technical Processing	25	28	21	47	32	153
		73.53%	51.85%	77.78%	90.38%	82.05%	74.27%
6	E-Library	22	23	16	31	24	116
		64.71%	42.59%	59.25%	65.38%	61.53%	56.31%

7	Reprography	25	31	19	44	31	150
		73.53%	57.41%	70.37%	84.62%	79.49%	72.82%
8	Rare Book / Manuscript	14	19	9	18	12	72
		41.17%	35.18%	33.33%	34.61%	30.76%	34.95%
9	Stack Section	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.20: Various Sections of Libraries
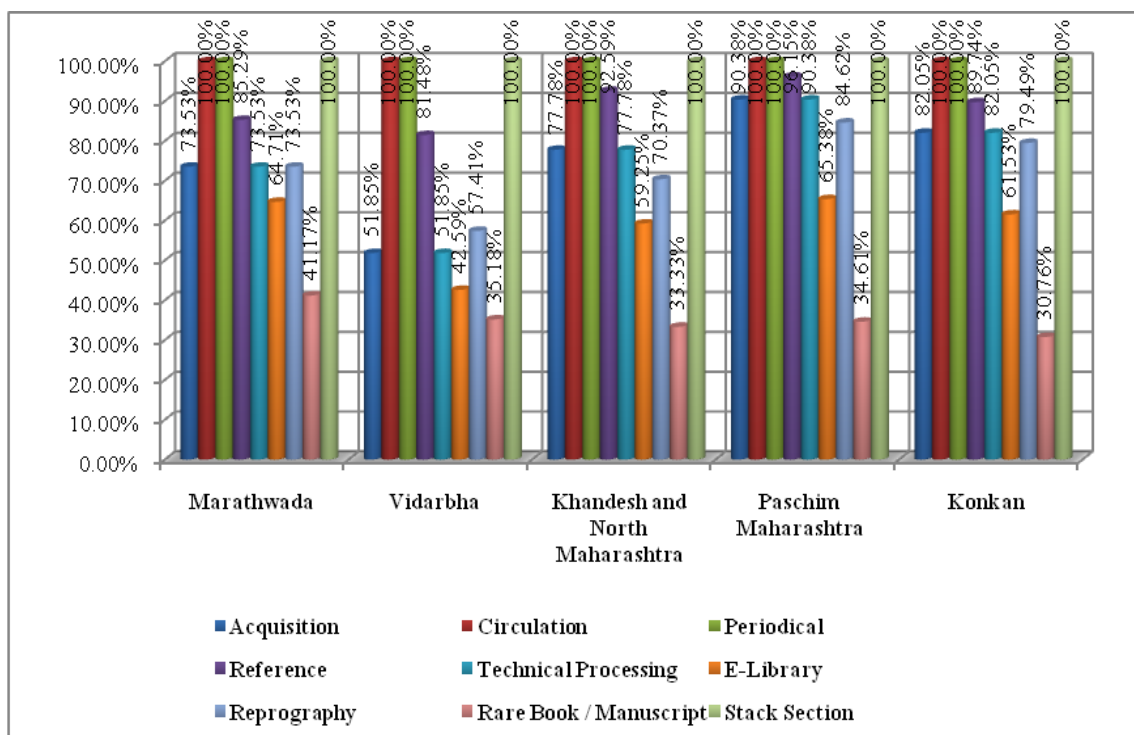
Observation:

As on table 4.21, circulation, periodical and stack section have found 100.00% availability in all libraries of Maharashtra. It is found that e-library section and rare and manuscripts section are found in a few college libraries of Maharashtra.

17. Student Strength of the Colleges:

Table 4.22: Student Strength of Colleges

Sr. No.	Regions	100-500	501-1000	1001-1500	1501-2000	More than 2001	Total
1	Marathwada	9	12	7	0	6	34
		26.47%	35.29%	20.58%	0.00%	17.64%	100.00%
2	Vidarbha	6	19	8	7	14	54
		11.11%	35.18%	14.81%	12.96%	25.92%	100.00%
3	Khandesh and North Maharashtra	5	11	3	2	6	27
		18.51%	40.74%	11.11%	7.40%	22.22%	100.00%
4	Paschim Maharashtra	13	24	6	0	9	52
		25.00%	46.15%	11.53%	0.00%	17.30%	100.00%
5	Konkan	9	14	4	6	6	39
		23.07%	35.89%	10.25%	15.38%	15.38%	100.00%
	Total	42	80	28	15	41	206
		20.38%	38.83%	13.59%	7.28%	19.90%	100.00%

Figure 4.21: Student Strength of Colleges
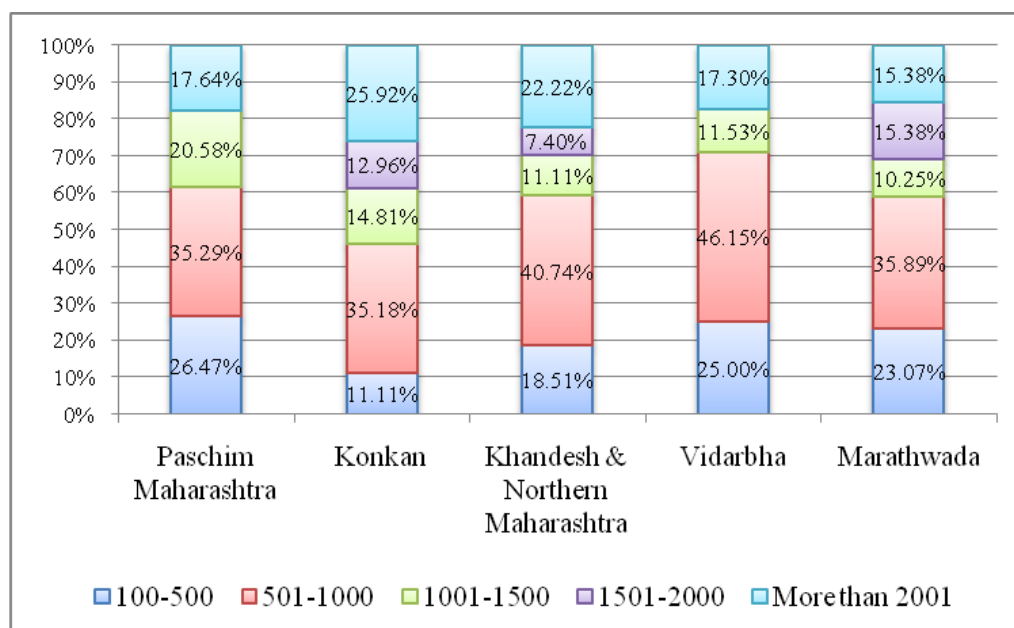
Observation:

From the table 4.22, it is observed that most number of colleges (38.83%) have students strength in between 500 to 1000 and followed by the strength (20.38%) in between 100 to 1000. It is also observed that 19.90% colleges have student strength more than 2000.

18. Average Number of User Visits to the Library:

Table 4.23: Average Number of User Visits to the Library (Per Day)

Sr. No.	User's Range (50)	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	01 to 50	3	5	1	3	4	16
		8.82%	9.26%	3.70%	5.77%	10.26%	7.77%
2	51 to 100	14	20	4	5	10	53
		41.18%	37.04%	14.81%	9.62%	25.64%	25.73%
3	101 to 150	4	15	8	23	9	59
		11.76%	27.78%	29.63%	44.23%	23.08%	28.64%
4	151 to 200	7	5	6	5	9	32
		20.59%	9.26%	22.22%	9.62%	23.08%	15.53%
5	More than 200	6	9	8	16	7	46
		17.65%	16.67%	29.63%	30.77%	17.95%	22.33%
	Total	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.22: Average Number of User Visits to the Library (per day)
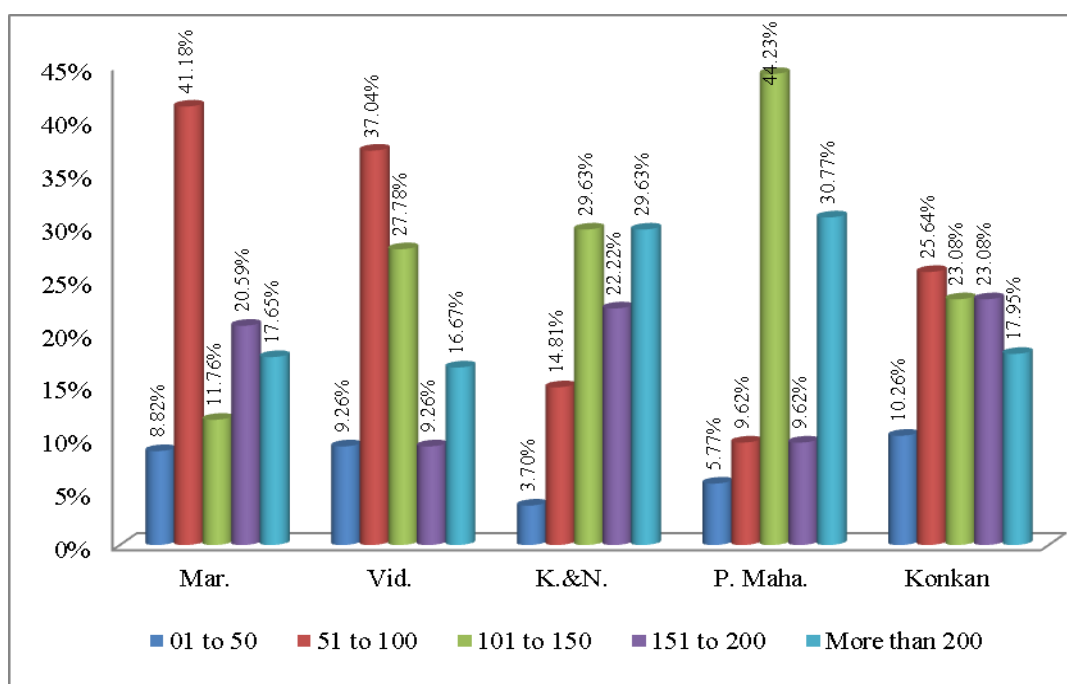
Observation:

From table 4.23 it is observed that most of the libraries (62.14%) have user visits up to 150 whereas few libraries (37.36%) have user visits more than 150 per day.

19. Purposes of Library Visits:

Table 4.24: Purposes of Library Visits

Sr. No	Purpose	Mar.	Vid.	K.&N.	P. Maha.	Konkan	Total
1	For Circulation	67	84	56	90	77	75
2	For use of Internet facility	29	41	38	44	42	39
3	Visits to the periodical section	18	15	19	24	18	19
4	Visits to the E-Journal/e-books	15	18	21	20	16	18
5	Visits for study purpose	82	84	61	83	96	82
6	Visits to the library for reference sources	10	14	11	9	12	12
7	Visits to the library for research work	9	13	17	21	18	16
8	Visits for reading Newspaper	41	60	55	61	57	55
9	Visits to the library for other purposes	7	4	4	7	3	5

Figure 4.23: Purposes of Library Visit
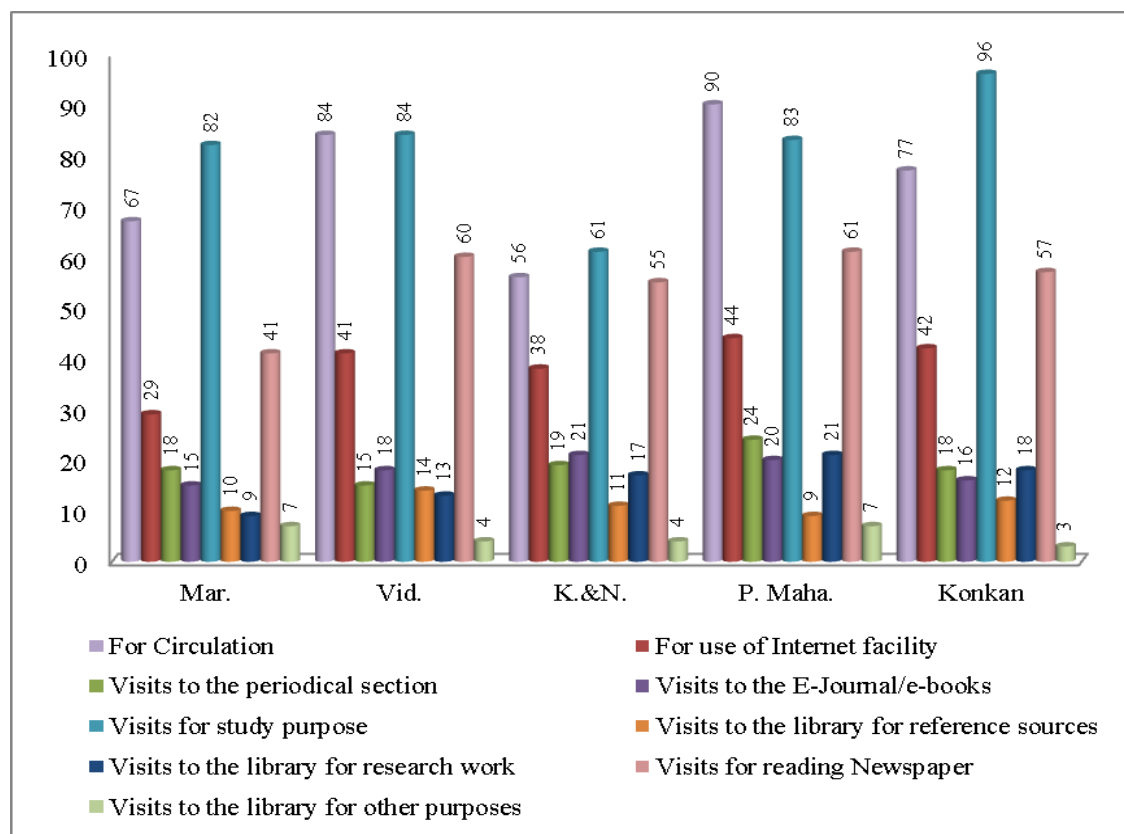
Observation:

From the table 4.24, Most number of user visits to library for study(82) and follwed by circulation purpose (75). Excluding visits for other purposes, less number of user (16) vistis to the library for refere reference sources of libraies.

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C. Library Budget:

20. Sources of Library Fund: (Multiple choice's question)

Table 4.25: Sources of Library Fund

Sr. No.	Sources	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	UGC	21	44	22	43	25	155
		61.76%	81.48%	81.48%	82.69%	64.10%	75.24%
2	Library Fees	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
3	Grant form State Govt.	2	5	1	5	4	17
		5.88%	9.26%	3.70%	9.62%	10.26%	8.25%
4	From Management	8	10	4	9	9	40
		23.53%	18.52%	14.81%	17.31%	23.08%	19.42%
5	Donation	2	10	6	10	5	33
		5.88%	18.52%	22.22%	19.23%	12.82%	16.02%
6	Other	2	5	1	3	4	15
		5.88%	9.26%	3.70%	12.00%	10.26%	7.28%

Figure 4.24: Sources of Library Fund
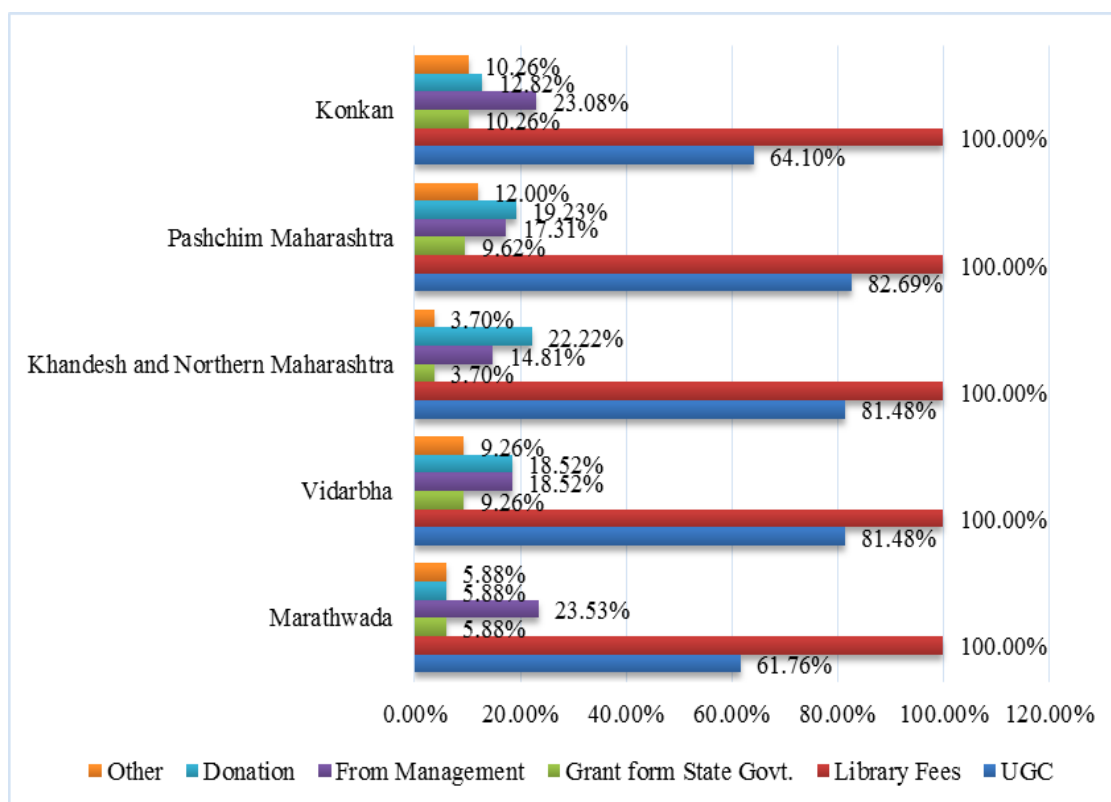
Observation:

Table 4.25 reveals all the sources of library funds, funds form library fees (100.00%) and the funds from UGC (75.24%) found as main sources for the library funds.

21. Sanctioned Library Budget:

Table 4.26: Library Budget

Sr. No.	Budget (Range: 100000) in Rupees	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Below 100000	9	3	2	0	5	19
		26.47%	5.56%	7.41%	0.00%	12.82%	9.22%
2	100001 to 200000	11	26	13	20	17	87
		32.35%	48.15%	48.15%	38.46%	43.59%	42.23%
3	200001 to 300000	2	23	10	24	3	62
		5.88%	42.59%	37.04%	46.15%	7.69%	30.10%
4	300001 to 400000	10	2	2	3	9	26
		29.41%	3.70%	7.41%	5.77%	23.08%	12.62%
5	400001 to 500000	2	0	0	3	3	8
		5.88%	0.00%	0.00%	5.77%	7.69%	3.88%
6	More than 500001	0	0	0	2	2	4
		0.00%	0.00%	0.00%	3.85%	5.13%	1.94%
	Total	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.25: Library Budget
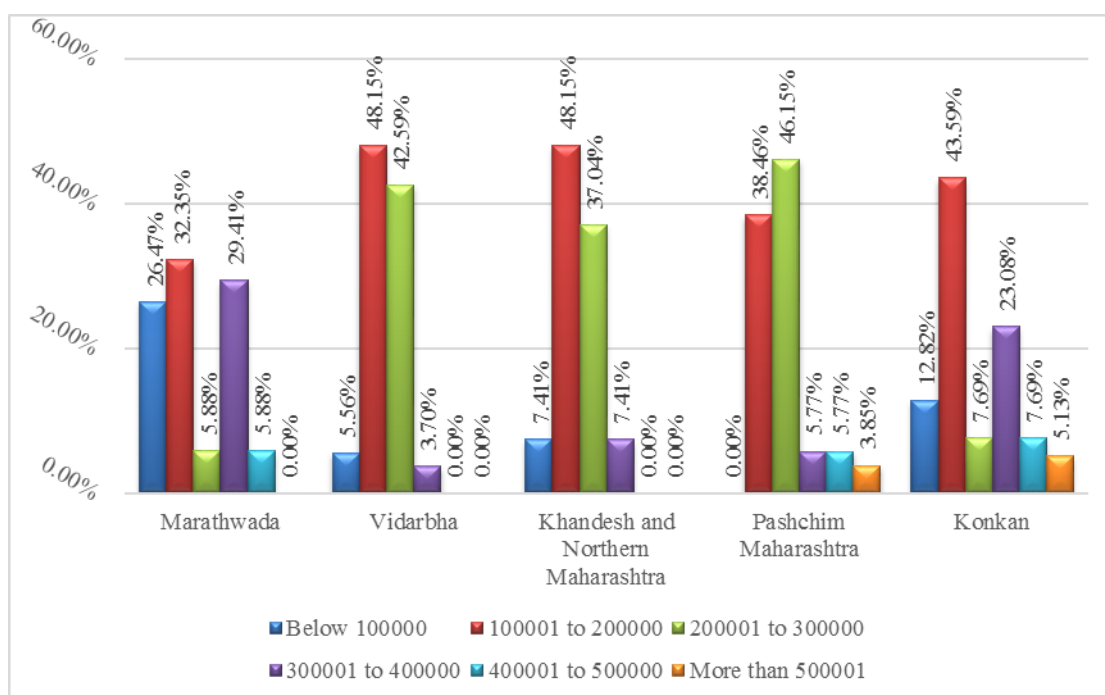
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It is observed that 98.05% libraries of all the regions of Maharashtra have annual library budget less than 5 lakh.

22. Details of Library Budget Expenditure for Previous Three Years:

Table 4.27: Details of Library Budget Expenditure

Sr. No.	Collection and Year	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Printed Books						
	2015-16	57.73%	50.34%	57.89%	55.16%	56.16%	55.46%
	2016-17	56.69%	52.23%	57.15%	56.34%	56.98%	55.88%
	2017-18	55.96%	50.75%	59.04%	55.61%	54.50%	55.17%
2	Printed Periodical						
	2015-16	19.42%	20.61%	16.67%	20.09%	21.94%	19.75%
	2016-17	19.33%	21.41%	16.84%	19.57%	23.15%	20.06%
	2017-18	18.61%	21.12%	16.73%	19.14%	22.60%	19.64%
3	E-Journals, E-Books, E-Databases, CDs/DVDs Etc.						
	2015-16	3.62%	5.63%	6.44%	4.50%	4.94%	5.03%
	2016-17	4.10%	5.49%	6.56%	4.84%	3.16%	4.83%
	2017-18	6.80%	5.76%	6.69%	5.07%	6.61%	6.19%
4	Library Resource Maintenance						
	2015-16	13.58%	14.48%	9.94%	12.48%	10.65%	12.23%
	2016-17	13.49%	12.75%	10.36%	11.98%	10.42%	11.80%
	2017-18	12.90%	13.50%	8.56%	11.73%	9.88%	11.31%
5	Other expenditure						
	2015-16	5.62%	8.91%	9.03%	7.74%	6.29%	7.52%
	2016-17	6.37%	8.09%	9.07%	7.24%	6.27%	7.41%
	2017-18	5.70%	8.85%	8.96%	8.82%	6.03%	7.59%

Figure 4.26: Details of Library Budget Expenditure

Legend:
- Konkan
- P. Maha.
- K. & N.
- Vid.
- Mar.

Other Expenditure

2017-18
- 6.03%
- 8.82%
- 8.96%
- 8.85%
- 5.70%

2016-17
- 6.27%
- 7.24%
- 9.07%
- 8.09%
- 6.37%

2015-16
- 6.29%
- 7.74%
- 9.03%
- 8.91%
- 5.62%

Library Resource Maintenance

2017-18
- 9.88%
- 11.73%
- 18.56%
- 13.50%
- 12.90%

2016-17
- 10.42%
- 11.98%
- 10.36%
- 12.75%
- 13.49%

2015-16
- 10.65%
- 12.48%
- 9.94%
- 14.48%
- 13.58%

E-Journals, E-Books, E-Databases, CDs/DVDs Etc.

2017-18
- 6.61%
- 5.07%
- 6.69%
- 5.76%
- 6.80%

2016-17
- 3.16%
- 4.84%
- 6.56%
- 5.49%
- 4.10%

2015-16
- 4.94%
- 4.50%
- 6.44%
- 5.65%
- 3.62%

Printed Periodical

2017-18
- 22.60%
- 19.14%
- 16.73%
- 21.12%
- 18.61%

2016-17
- 23.15%
- 19.57%
- 16.84%
- 21.41%
- 19.33%

2015-16
- 21.94%
- 20.09%
- 16.67%
- 20.61%
- 19.42%

Printed Books

2017-18
- 54.50%
- 55.61%
- 59.04%
- 50.75%
- 55.96%

2016-17
- 56.98%
- 56.34%
- 57.15%
- 52.23%
- 56.69%

2015-16
- 56.16%
- 55.16%
- 57.89%
- 50.34%
- 57.73%

Observation:

As on table 4.27, It is observed that within three years, no considerable changes have been found in the expenditure. Most of the percentage of library budget (55.50%) is spent on printed books and followed by periodicals expenditure (19.81%). For the e-information resources, only 5.35% of the total budget is spent.

23. About Sanctioned Budget Adequacy:

Table 4.28: Budget Adequacy for Libraries

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	6	4	0	5	1	16
		17.65%	7.41%	0.00%	9.62%	2.56%	7.77%
2	No	28	50	27	47	38	190
		82.35%	92.59%	100.00%	90.38%	97.44%	92.23%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.27: Budget Adequacies for Libraries
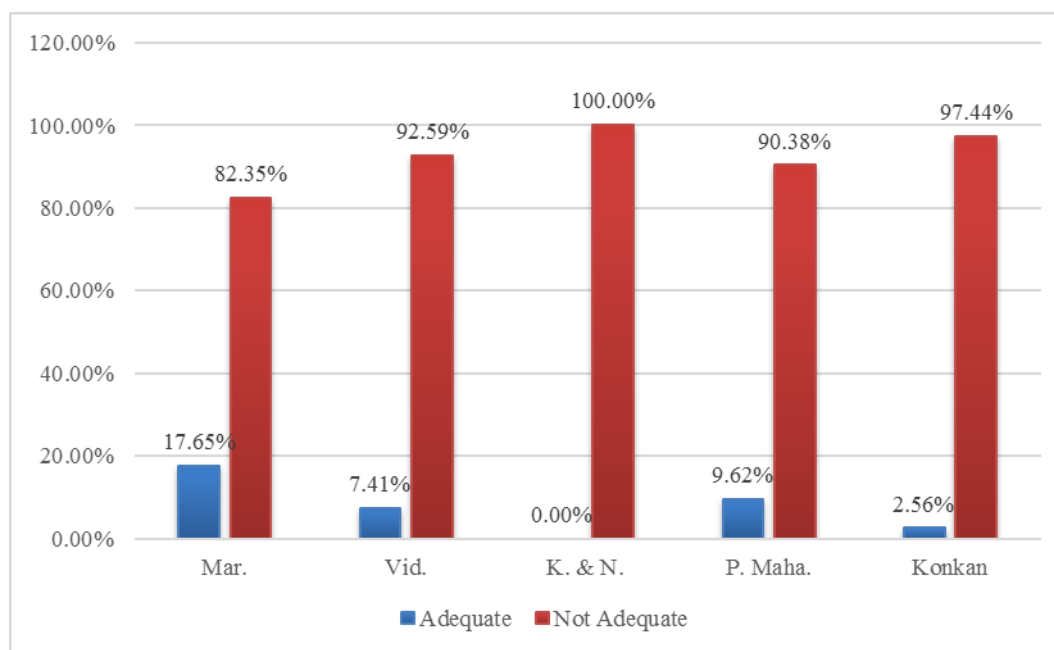
Observation:

From table 4.28, most of the libraries (92.23%) have not satisfactory annual library budget. Few libraries (7.77%) have satisfactory budget provision.

24. Reasons behind Satisfactory Budget:

Table 4.29: Reasons for Adequacy of Library Budget

Sr. No.	Reason	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Required funds becomes available when needed	1	1	0	1	1	4
		16.16%	25.00%	0.00%	20.00%	100.00%	25.00%
2	Less requirement form the user	1	0	0	2	0	3
		16.16%	0.00%	0.00%	40.00%	0.00%	18.75%
3	OER	3	2	0	2	0	7
		50.00%	50.00%	0.00%	40.00%	0.00%	43.75%
4	Enough resources available	1	1	0	0	0	2
		16.16%	25.00%	0.00%	0.00%	0.00%	12.50%

Figure 4.28: Reasons for Adequacy of Library Budget
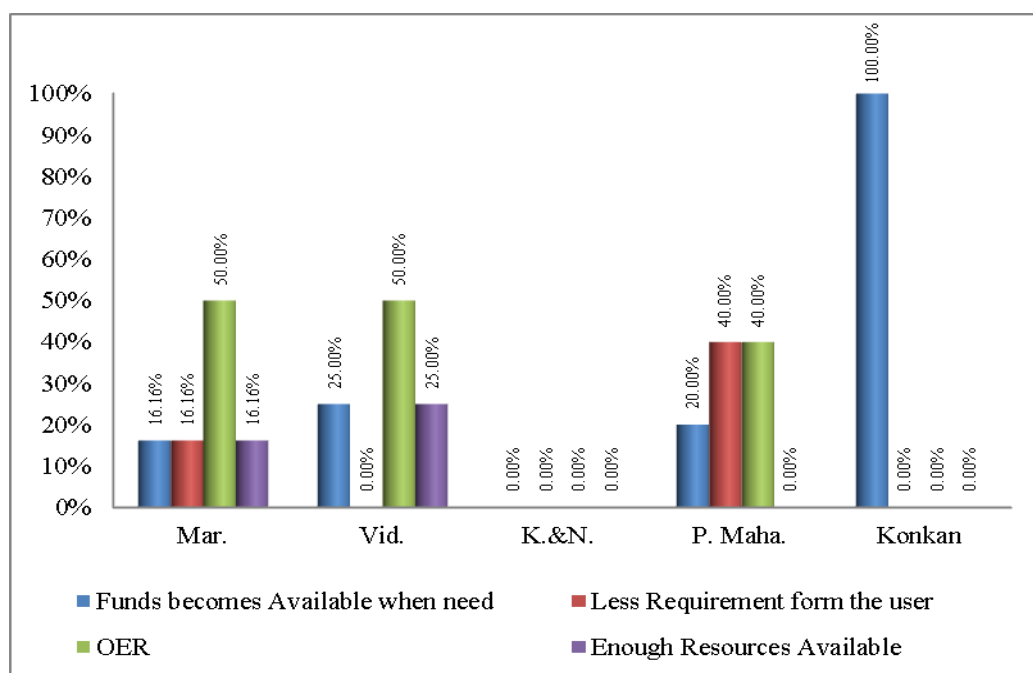
Observation:

As per table 4.29, the reasons for budget adequacy are funds supportive management to the library, less requirement form the user, use of OER and few mentioned, enough information resources is available.

25. Options Used to Cater the Users Need While Insufficient Budget: (Multiple choice's question)

Table 4.30: Catering User Needs While Insufficient Budget

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Inter Library Loan	10	16	14	18	15	73
		29.41%	29.63%	51.85%	34.62%	38.46%	35.44%
2	Ignore User's Requirements	5	2	1	3	3	14
		14.71%	3.70%	3.70%	5.77%	7.69%	6.80%
3	Provide OER	25	40	22	40	25	152
		73.53%	74.07%	81.48%	76.92%	64.10%	73.79%
4	Provide Internet Facility	20	42	21	43	31	157
		58.82%	77.78%	77.78%	82.69%	79.49%	76.21%

Figure 4.29: Catering User Needs in Budget Insufficiency
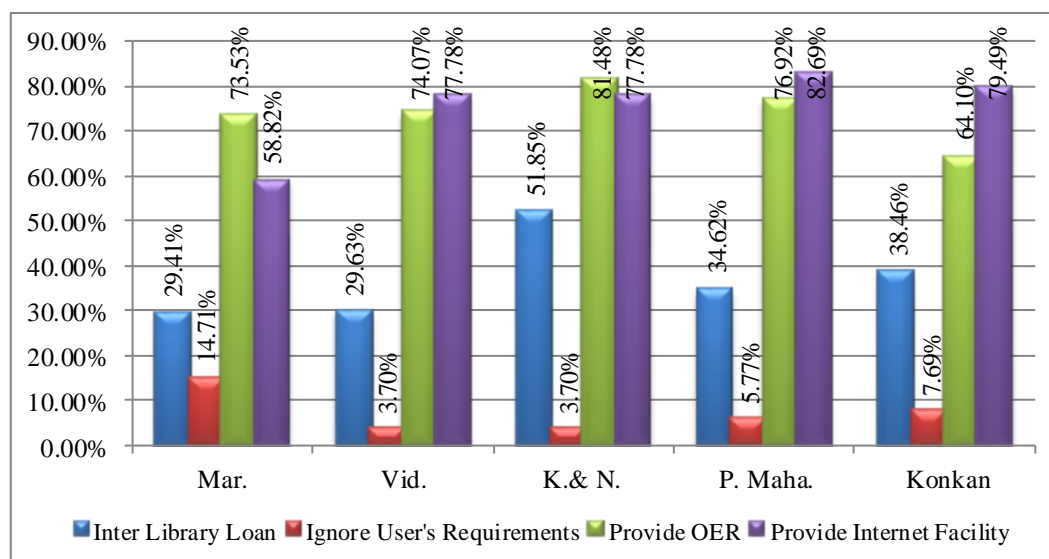
Observation:

Table 4.30 presents that while facing financial crunch, the most libraries (76.21%) used the option of Internet facility and followed by OER (73.79%).

D. Reengineering of Library and Information Services:

It is a fourth section of the questionnaire, which includes the questions regarding the problems in Traditional library services and available modern library services and facilities to the user.

26. Uses of Traditional Library Services in Present Era:

Table 4.31: Use of Traditional Library Services in Present Era

Sr. No.	Traditional Library Services	Availability and its usage	Marathwada Re	Marathwada %	Vidarbha Re	Vidarbha %	Khandesh and North Maharashtra Re	Khandesh and North Maharashtra %	Paschim Maharashtra Re	Paschim Maharashtra %	Konkan Re	Konkan %	Total Re	Total %
1	Circulation (by card or register)	Availability	7	20.59%	9	16.67%	5	18.52%	7	13.46%	10	25.64%	38	18.45%
		Max. usage	7	20.59%	9	16.67%	5	18.52%	7	13.46%	10	25.64%	38	18.45%
		Average usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Less usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
2	Reference service (as on printed reference sources)	Availability	7	20.59%	10	18.52%	11	40.74%	14	26.92%	9	23.08%	51	24.76%
		Max. usage	3	8.82%	2	3.70%	4	14.81%	6	11.54%	4	10.26%	19	9.22%
		Average usage	2	5.88%	5	9.26%	3	11.11%	5	9.62%	2	5.13%	17	8.25%
		Less usage	2	5.88%	3	5.56%	4	14.81%	3	5.77%	3	7.69%	15	7.28%
		Not use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
3	Referral Services (as on available knowledge)	Availability	25	73.53%	12	22.22%	14	51.85%	19	36.54%	13	33.33%	83	40.29%
		Max. usage	0	0.00%	3	5.56%	0	0.00%	5	9.62%	4	10.26%	12	5.83%
		Average usage	15	44.12%	7	12.96%	11	40.74%	9	17.31%	7	17.95%	49	23.79%
		Less usage	9	26.47%	2	3.70%	3	11.11%	3	5.77%	2	5.13%	19	9.22%
		Not use	1	2.94%	0	0.00%	0	0.00%	2	3.85%	0	0.00%	3	1.46%
4	Current Awareness Service (display on board/ circulating list)	Availability	33	97.06%	41	75.93%	25	92.59%	46	88.46%	32	82.05%	177	85.92%
		Max. usage	14	41.18%	23	42.59%	11	40.74%	19	36.54%	22	56.41%	89	43.20%
		Average usage	8	23.53%	12	22.22%	7	25.93%	16	30.77%	8	20.51%	51	24.76%
		Less usage	10	29.41%	6	11.11%	5	18.52%	7	13.46%	2	5.13%	30	14.56%
		Not use	1	2.94%	0	0.00%	2	7.41%	3	5.77%	0	0.00%	6	2.91%
5	Selective Dissemination of Information (Sending specific info. By hand/post)	Availability	21	61.76%	27	50.00%	16	59.26%	29	55.77%	21	53.85%	114	55.34%
		Max. usage	0	0.00%	3	5.56%	1	3.70%	4	7.69%	3	7.69%	11	5.34%
		Average usage	12	35.29%	4	7.41%	11	40.74%	13	25.00%	9	23.08%	49	23.79%
		Less usage	8	23.53%	11	20.37%	3	11.11%	9	17.31%	5	12.82%	36	17.48%
		Not use	1	2.94%	9	16.67%	1	3.70%	3	5.77%	4	10.26%	18	8.74%

No.	Service	Response		%		%		%		%		%		%
6	Cataloging (Card Catalogue System)	Availability	1	2.94%	0	0.00%	0	0.00%	2	3.85%	1	2.56%	4	1.94%
		Max. usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Average usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Less usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not use	1	2.94%	0	0.00%	0	0.00%	2	3.85%	1	2.56%	4	1.94%
7	Inter Library Loan (get issue printed material from other library)	Availability	4	11.76%	10	18.52%	2	7.41%	15	28.85%	8	20.51%	39	18.93%
		Max. usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Average usage	1	2.94%	0	0.00%	0	0.00%	2	3.85%	3	7.69%	6	2.91%
		Less usage	0	0.00%	4	7.41%	0	0.00%	5	9.62%	1	2.56%	10	4.85%
		Not use	3	8.82%	6	11.11%	2	7.41%	8	15.38%	4	10.26%	23	11.17%
8	Indexing (prepare manual indexing of periodical articles)	Availability	2	5.88%	9	16.67%	5	18.52%	11	21.15%	8	20.51%	35	16.99%
		Max. usage	0	0.00%	0	0.00%	1	3.70%	0	0.00%	0	0.00%	1	0.49%
		Average usage	0	0.00%	1	1.85%	4	14.81%	0	0.00%	2	5.13%	7	3.40%
		Less usage	2	5.88%	5	9.26%	0	0.00%	9	17.31%	6	15.38%	22	10.68%
		Not use	0	0.00%	3	5.56%	0	0.00%	2	3.85%	0	0.00%	5	2.43%
9	Abstracting (circulating abstracts of books, articles etc.)	Availability	2	5.88%	4	7.41%	5	18.52%	3	5.77%	5	12.82%	19	9.22%
		Max. usage	0	0.00%	0	0.00%	1	3.70%	0	0.00%	0	0.00%	1	0.49%
		Average usage	0	0.00%	0	0.00%	4	14.81%	0	0.00%	1	2.56%	5	2.43%
		Less usage	2	5.88%	4	7.41%	0	0.00%	2	3.85%	1	2.56%	9	4.37%
		Not use	0	0.00%	0	0.00%	0	0.00%	1	1.92%	3	7.69%	4	1.94%
10	Newspaper clipping (newspaper cuttings, display and preserve in file)	Availability	33	97.06%	38	70.37%	24	88.89%	46	88.46%	34	87.18%	175	84.95%
		Max. usage	8	23.53%	18	33.33%	5	18.52%	19	36.54%	17	43.59%	67	32.52%
		Average usage	8	23.53%	14	25.93%	16	59.26%	16	30.77%	8	20.51%	62	30.10%
		Less usage	10	29.41%	6	11.11%	2	7.41%	7	13.46%	6	15.38%	31	15.05%
		Not use	7	20.59%	0	0.00%	2	7.41%	3	5.77%	3	7.69%	15	7.28%
11	New Arrival Displayed at library (display new books on rack or circulation list of new books)	Availability	21	61.76%	27	50.00%	16	59.26%	29	55.77%	21	53.85%	114	55.34%
		Max. usage	0	0.00%	3	5.56%	1	3.70%	4	7.69%	3	7.69%	11	5.34%
		Average usage	12	35.29%	4	7.41%	11	40.74%	13	25.00%	9	23.08%	49	23.79%
		Less usage	8	23.53%	11	20.37%	3	11.11%	9	17.31%	5	12.82%	36	17.48%
		Not use	1	2.94%	9	16.67%	1	3.70%	3	5.77%	4	10.26%	18	8.74%
12	Other Services (other traditional library services more than above)	Availability	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Max. usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Average usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Less usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

27. Availability and Use of Modern Library and Information Services:

Table 4.32: Availability and Use of Modern Library and Information Services

Sr. No.	Modern Library and Information Services	Availability and its Usage	Marathwada		Vidarbha		Khandesh and North Maharashtra		Paschim Maharashtra		Konkan		Total	
			Re	%	Re	%	Re	%	Re	%	Re	%	Re	%
1	Automated Circulation	Availability	27	79.41%	45	83.33%	22	81.48%	45	86.54%	29	74.36%	168	81.55%
		Maximum Usage	27	79.41%	44	81.48%	23	85.19%	45	86.54%	29	74.36%	168	81.55
		Average Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
2	Online Reservation/ Renewal	Availability	4	11.76%	7	12.96%	4	14.81%	10	19.23%	8	20.51%	33	16.02%
		Maximum Usage	1	2.94%	3	5.56%	0	0.00%	3	5.77%	0	0.00%	7	3.40%
		Average Usage	3	8.82%	4	7.41%	4	14.81%	5	9.62%	7	17.95%	23	11.17%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	2	3.85%	1	2.56%	3	1.46%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
3	Web-OPAC	Availability	9	26.47%	15	27.78%	8	29.63%	15	28.85%	8	20.51%	55	26.70%
		Maximum Usage	3	8.82%	4	7.41%	2	7.41%	6	11.54%	1	2.56%	16	7.77%
		Average Usage	5	14.71%	9	16.67%	3	11.11%	9	17.31%	5	12.82%	31	15.05%
		Less Usage	1	2.94%	2	3.70%	3	11.11%	0	0.00%	2	5.13%	8	3.88%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
4	Mobile OPAC	Availability	2	5.88%	4	7.41%	1	3.70%	6	11.54%	2	5.13%	15	7.28%
		Maximum Usage	1	2.94%	2	3.70%	1	3.70%	4	7.69%	2	5.13%	10	4.85%
		Average Usage	1	2.94%	1	1.85%	0	0.00%	2	3.85%	0	0.00%	4	1.94%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

No	Service	Measure													
5	Current Awareness Service through web/e-mail	Availability	23	67.65%	38	70.37%	23	85.19%	44	84.62%	29	74.36%	157	76.21%
		Maximum Usage	10	29.41%	22	40.74%	11	40.74%	16	30.77%	9	23.08%	68	33.01%
		Average Usage	13	38.24%	14	25.93%	6	22.22%	19	36.54%	12	30.77%	64	31.07%
		Less Usage	0	0.00%	1	1.85%	6	22.22%	7	13.46%	5	12.82%	19	9.22%
		Not Use	0	0.00%	1	1.85%	0	0.00%	2	3.85%	3	7.69%	6	2.91%
6	E-Journal Access	Availability	15	44.12%	40	74.07%	11	40.74%	35	67.31%	22	56.41%	123	59.71%
		Maximum Usage	4	11.76%	8	14.81%	3	11.11%	12	23.08%	7	17.95%	34	16.50%
		Average Usage	6	17.65%	13	24.07%	5	18.52%	17	32.69%	10	25.64%	51	24.76%
		Less Usage	4	11.76%	14	25.93%	0	0.00%	3	5.77%	4	10.26%	25	12.14%
		Not Use	1	2.94%	5	9.26%	3	11.11%	3	5.77%	1	2.56%	13	6.31%
7	Databases Access	Availability	15	44.12%	37	68.52%	11	40.74%	34	65.38%	22	56.41%	119	57.77%
		Maximum Usage	4	11.76%	5	9.26%	3	11.11%	12	23.08%	7	17.95%	31	15.05%
		Average Usage	6	17.65%	13	24.07%	5	18.52%	17	32.69%	10	25.64%	51	24.76%
		Less Usage	4	11.76%	14	25.93%	0	0.00%	3	5.77%	4	10.26%	25	12.14%
		Not Use	1	2.94%	5	9.26%	3	11.11%	2	3.85%	1	2.56%	12	5.83%
8	E-Books Access	Availability	17	50.00%	39	72.22%	18	66.67%	43	82.69%	24	61.54%	141	68.45%
		Maximum Usage	4	11.76%	11	20.37%	9	33.33%	16	30.77%	8	20.51%	48	23.30%
		Average Usage	13	38.24%	18	33.33%	4	14.81%	25	48.08%	6	15.38%	66	32.04%
		Less Usage	0	0.00%	8	14.81%	4	14.81%	0	0.00%	5	12.82%	17	8.25%
		Not Use	0	0.00%	2	3.70%	1	3.70%	2	3.85%	2	5.13%	7	3.40%
9	Library Web Page	Availability	3	8.82%	4	7.41%	3	11.11%	8	15.38%	7	17.95%	25	12.14%
		Maximum Usage	2	5.88%	1	1.85%	0	0.00%	3	5.77%	2	5.13%	8	3.88%
		Average Usage	1	2.94%	2	0.00%	3	11.11%	5	9.62%	2	5.13%	13	6.31%
		Less Usage	0	0.00%	1	1.85%	0	0.00%	0	0.00%	3	7.69%	4	1.94%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
10	Ask Librarian	Availability	3	8.82%	4	7.41%	4	14.81%	10	19.23%	7	17.95%	28	13.59%
		Maximum Usage	0	0.00%	0	0.00%	1	3.70%	4	7.69%	2	5.13%	7	3.40%
		Average Usage	3	8.82%	3	5.56%	3	11.11%	0	0.00%	4	10.26%	13	6.31%
		Less Usage	0	0.00%	1	1.85%	0	0.00%	6	11.54%	1	2.56%	8	3.88%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

No	Service	Measure	n	%	n	%	n	%	n	%	n	%	n	%
11	Virtual Reference Desk	Availability	6	17.65%	5	9.26%	7	25.93%	9	17.31%	6	15.38%	33	16.02%
		Maximum Usage	2	5.88%	3	5.56%	1	3.70%	5	9.62%	1	2.56%	12	5.83%
		Average Usage	2	5.88%	1	1.85%	3	11.11%	1	1.92%	1	2.56%	8	3.88%
		Less Usage	2	5.88%	1	1.85%	2	7.41%	3	5.77%	4	10.26%	12	5.83%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
12	E-Document Delivery Service	Availability	26	76.47%	42	77.78%	21	77.78%	43	82.69%	27	69.23%	159	77.18%
		Maximum Usage	21	61.76%	14	25.93%	18	66.67%	26	50.00%	14	35.90%	93	45.15%
		Average Usage	2	5.88%	16	29.63%	3	11.11%	8	15.38%	11	28.21%	40	19.42%
		Less Usage	3	8.82%	10	18.52%	0	0.00%	9	17.31%	2	5.13%	24	11.65%
		Not Use	0	0.00%	2	3.70%	0	0.00%	0	0.00%	0	0.00%	2	0.97%
13	Webinars / Video Lectures	Availability	0	0.00%	2	3.70%	3	11.11%	5	9.62%	1	2.56%	11	5.34%
		Maximum Usage	0	0.00%	1	1.85%	1	3.70%	0	0.00%	0	0.00%	2	0.97%
		Average Usage	0	0.00%	1	1.85%	2	7.41%	0	0.00%	1	2.56%	4	1.94%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
14	E-Notes on topic	Availability	0	0.00%	0	0.00%	1	3.70%	2	3.85%	1	2.56%	4	1.94%
		Maximum Usage	0	0.00%	0	0.00%	1	3.70%	2	3.85%	1	2.56%	4	1.94%
		Average Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
15	Translation service tools	Availability	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	1	0.49%
		Maximum Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Average Usage	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	1	0.49%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
16	Downloading services	Availability	3	8.82%	4	7.41%	3	11.11%	8	15.38%	7	17.95%	25	12.14%
		Maximum Usage	1	2.94%	0	0.00%	1	3.70%	2	3.85%	5	12.82%	9	4.37%
		Average Usage	2	5.88%	4	7.41%	2	7.41%	4	7.69%	1	2.56%	13	6.31%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	1	1.92%	1	2.56%	2	0.97%
		Not Use	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	1	0.49%

No	Service		15	44.12%	26	48.15%	18	66.67%	19	36.54%	12	30.77%	90	43.69%
17	Online search service/ federated search	Availability	15	44.12%	26	48.15%	18	66.67%	19	36.54%	12	30.77%	90	43.69%
		Maximum Usage	11	32.35%	14	25.93%	7	25.93%	10	19.23%	9	23.08%	51	24.76%
		Average Usage	3	8.82%	12	22.22%	8	29.63%	7	13.46%	3	7.69%	33	16.02%
		Less Usage	1	2.94%	0	0.00%	3	11.11%	2	3.85%	0	0.00%	6	2.91%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
18	E-Mail Alert	Availability	7	20.59%	3	5.56%	5	18.52%	4	7.69%	3	7.69%	22	10.68%
		Maximum Usage	6	17.65%	3	5.56%	5	18.52%	4	7.69%	3	7.69%	21	10.19%
		Average Usage	1	2.94%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.49%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
19	Online User Education	Availability	8	23.53%	5	9.26%	7	25.93%	12	23.08%	4	10.26%	36	17.48%
		Maximum Usage	2	5.88%	4	7.41%	3	11.11%	4	7.69%	2	5.13%	15	7.28%
		Average Usage	4	11.76%	1	1.85%	4	14.81%	5	9.62%	2	5.13%	16	7.77%
		Less Usage	2	5.88%	0	0.00%	0	0.00%	3	5.77%	0	0.00%	5	2.43%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
20	Instant Messaging Services	Availability	5	14.71%	4	7.41%	4	14.81%	6	11.54%	2	5.13%	21	10.19%
		Maximum Usage	5	14.71%	3	5.56%	4	14.81%	6	11.54%	2	5.13%	20	9.71%
		Average Usage	0	0.00%	1	1.85%	0	0.00%	0	0.00%	0	0.00%	1	0.49%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
21	Frequently Asked Questions (FAQ)	Availability	1	2.94%	3	5.56%	2	7.41%	6	11.54%	1	2.56%	13	6.31%
		Maximum Usage	0	0.00%	2	3.70%	2	7.41%	4	7.69%	0	0.00%	8	3.88%
		Average Usage	1	2.94%	1	1.85%	0	0.00%	1	1.92%	1	2.56%	4	1.94%
		Less Usage	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	1	0.49%
		Not Use	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%

Observation (Table 4.31):

Table 4.31 provides the information on traditional library and information services with its usage. Within the listed traditional library services, some of the traditional services are available in most number of libraries viz. Referral Service (40.29%), Current Awareness Service (85.92%), SDI (55.34%), Newspaper Clipping Service (84.95%), and New Arrivals Display (55.34%).

Observation (Table 4.32):

Among the listed modern library services in table 4.32, some modern services are available in most of the college libraries viz. automated circulation (81.55%), current awareness services (76.21%), e-journals access (56.31%), databases access (55.34%), e-books access (68.45%) and e-document delivery services (77.18%). But some of the modern services are not available in most of the college libraries viz. Online Reservation, Web-OPAC, Mobile OPAC, Library Webpage, Ask Librarian, Virtual Reference Desk, Video Lectures, E-Notes on topic, Translation tools, E-Mail Alert, Instant Messaging, FAQs etc.

28. Opinion of Users Regarding Traditional Library Services:

Table 4.33: Opinions of Librarian Regarding Traditional Library Services

Sr. No.	Opinion	Options	Marathwada Re	Marathwada %	Vidarbha Re	Vidarbha %	Khandesh and North Maharashtra Re	Khandesh and North Maharashtra %	Paschim Maharashtra Re	Paschim Maharashtra %	Konkan Re	Konkan %	Total Re	Total %
1	Traditional Library services have more restriction than modern library services	Agree	29	85.29%	45	83.33%	19	70.37%	31	59.62%	23	58.97%	147	71.36%
		Strongly Agree	0	0.00%	0	0.00%	4	14.81%	12	23.08%	9	23.08%	25	12.14%
		Disagree	0	0.00%	3	5.56%	2	7.41%	1	1.92%	3	7.69%	9	4.37%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	5	14.71%	6	11.11%	2	7.41%	8	15.38%	4	10.26%	25	12.14%
2	Increasing cost of the print resources	Agree	23	67.65%	40	74.07%	19	70.37%	38	73.08%	21	53.85%	141	68.45%
		Strongly Agree	4	11.76%	7	12.96%	6	22.22%	12	23.08%	14	35.90%	43	20.87%
		Disagree	3	8.82%	2	3.70%	1	3.70%	0	0.00%	1	2.56%	7	3.40%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	4	11.76%	5	9.26%	1	3.70%	2	3.85%	3	7.69%	15	7.28%
3	Decreasing use of printed resources due to use of internet by user	Agree	16	47.06%	40	74.07%	18	66.67%	36	69.23%	24	61.54%	134	65.05%
		Strongly Agree	12	35.29%	7	12.96%	6	22.22%	14	26.92%	10	25.64%	49	23.79%
		Disagree	2	5.88%	2	3.70%	2	7.41%	0	0.00%	3	7.69%	9	4.37%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	3	8.82%	5	9.26%	1	3.70%	2	3.85%	2	5.13%	13	6.31%
4	Now days, user gives first preference to the internet instead of library	Agree	19	55.88%	40	74.07%	20	74.07%	36	69.23%	25	64.10%	140	67.96%
		Strongly Agree	8	23.53%	7	12.96%	2	7.41%	12	23.08%	11	28.21%	40	19.42%
		Disagree	2	5.88%	2	3.70%	1	3.70%	2	3.85%	2	5.13%	9	4.37%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	5	14.71%	5	9.26%	4	14.81%	2	3.85%	1	2.56%	17	8.25%

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Sr. No	Statement	Response												
5	Time consuming in terms of processes	Agree	17	50.00%	40	74.07%	21	77.78%	38	73.08%	27	69.23%	143	69.42%
		Strongly Agree	8	23.53%	4	7.41%	0	0.00%	9	17.31%	5	12.82%	26	12.62%
		Disagree	2	5.88%	3	5.56%	5	18.52%	2	3.85%	3	7.69%	15	7.28%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	6	17.65%	7	12.96%	1	3.70%	5	9.62%	4	10.26%	23	11.17%
6	Space problem for traditional library resources	Agree	18	52.94%	43	79.63%	20	74.07%	40	76.92%	26	66.67%	147	71.36%
		Strongly Agree	10	29.41%	8	14.81%	5	18.52%	8	15.38%	11	28.21%	42	20.39%
		Disagree	2	5.88%	2	3.70%	1	3.70%	2	3.85%	1	2.56%	8	3.88%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	4	11.76%	1	1.85%	1	3.70%	2	3.85%	1	2.56%	9	4.37%
7	Emergence of digital & Virtual library services affected on use of traditional library services	Agree	19	55.88%	40	74.07%	22	81.48%	38	73.08%	23	58.97%	142	68.93%
		Strongly Agree	8	23.53%	7	12.96%	3	11.11%	12	23.08%	9	23.08%	39	18.93%
		Disagree	2	5.88%	2	3.70%	1	3.70%	0	0.00%	3	7.69%	8	3.88%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	5	14.71%	5	9.26%	1	3.70%	2	3.85%	4	10.26%	17	8.25%
8	Traditional library services required more manpower than automated library services	Agree	20	58.82%	38	70.37%	20	74.07%	38	73.08%	29	74.36%	145	70.39%
		Strongly Agree	8	23.53%	6	11.11%	5	18.52%	12	23.08%	5	12.82%	36	17.48%
		Disagree	1	2.94%	2	3.70%	1	3.70%	0	0.00%	2	5.13%	6	2.91%
		Strongly Disagree	0	0.00%	2	3.70%	0	0.00%	0	0.00%	0	0.00%	2	0.97%
		Can't Say	5	14.71%	6	11.11%	1	3.70%	2	3.85%	3	7.69%	17	8.25%
9	Preservation issues are more than digital resources	Agree	20	58.82%	40	74.07%	17	62.96%	45	86.54%	26	66.67%	148	71.84%
		Strongly Agree	8	23.53%	7	12.96%	5	18.52%	6	11.54%	7	17.95%	33	16.02%
		Disagree	1	2.94%	2	3.70%	2	7.41%	0	0.00%	2	5.13%	7	3.40%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Can't Say	5	14.71%	5	9.26%	3	11.11%	1	1.92%	4	10.26%	18	8.74%

Figure 4.30: Statements about Traditional Library Services
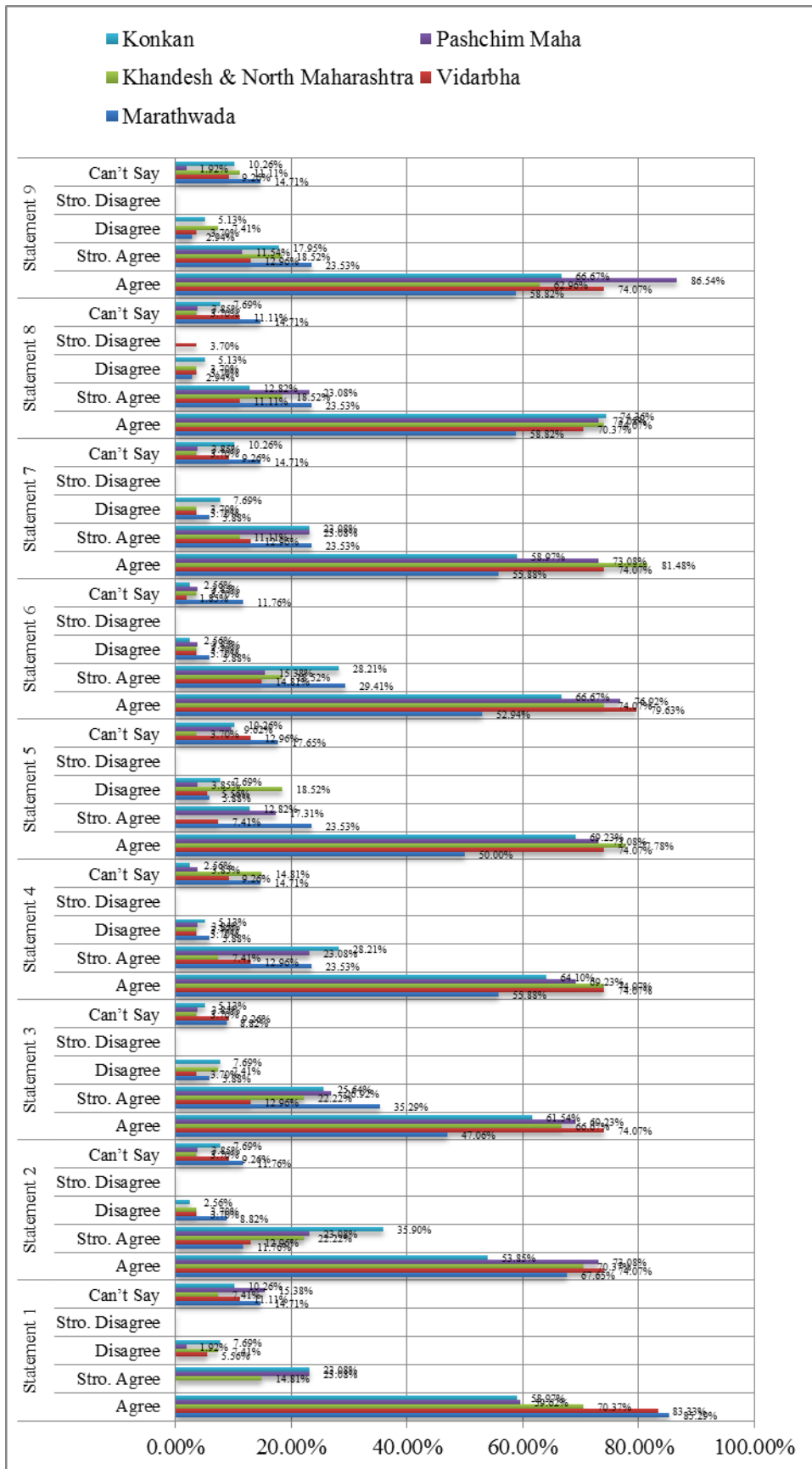
Observation:

From the table 4.33, it is observed that all the opinions are in the side of reengineering of library and information services. More than 90% librarians have agreed to the all nine opinions which shows the problems in traditional library services in present era

29. Implementation of RFID Technology:

Table 4.34: RFID Implementation in Libraries

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Applied RFID	0	0	0	0	1	1
		0.00%	0.00%	0.00%	0.00%	2.56%	0.49%
2	Application in Process	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	Not implemented yet	34	54	27	52	38	205
		100.00%	100.00%	100.00%	100.00%	97.44%	99.51%

Figure 4.31: RFID Implementation in Libraries
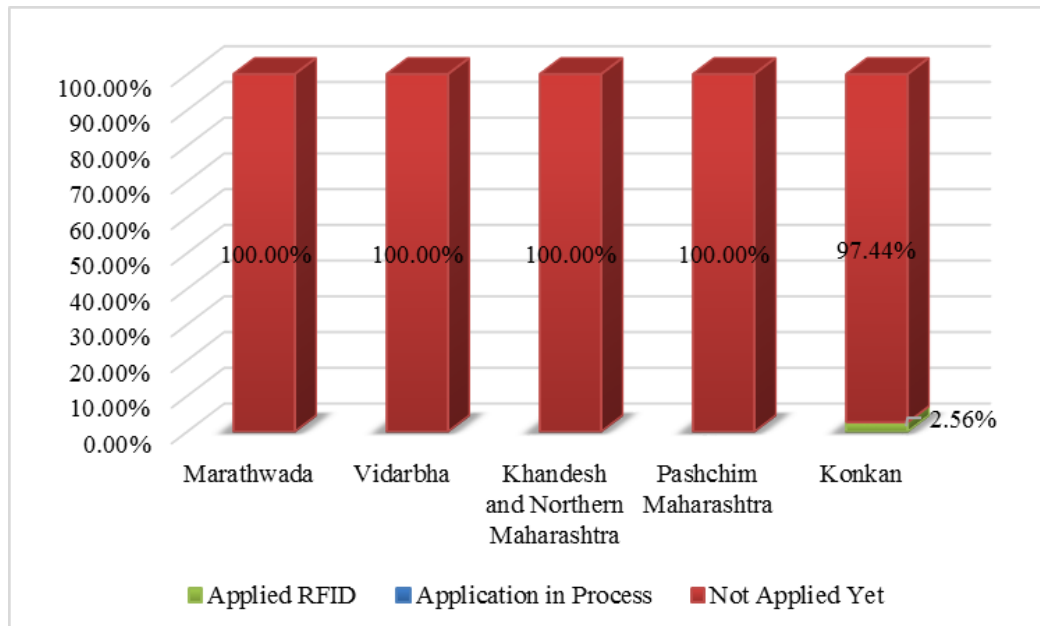
Observation:

In table 4.34, out of 206 libraries of Maharashtra, only 1 college library from Konkan region has applied RFID technology.

30. Reason For Not Applied RFID Technology in Libraries:

Table 4.35: Reasons for Lack of Implementation of RFID Technology

Sr. No.	Reason	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Not Affordable	29	26	15	37	30	137
		85.29%	48.15%	55.56%	71.15%	76.92%	66.82%
2	Management does not Support	2	1	0	4	2	9
		5.88%	1.85%	0.00%	7.69%	5.13%	4.39%
3	Lack of Training	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4	No need for Library	3	27	12	11	6	59
		8.82%	50.00%	44.44%	21.15%	15.38%	28.78%

Figure 4.32: Reasons behind lack of RFID Technology in Libraries
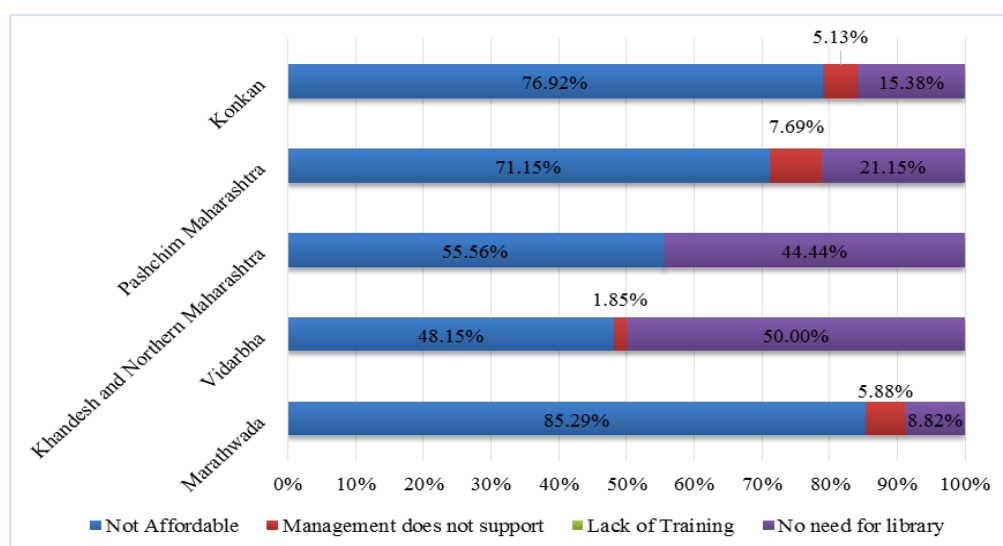
Observation:

In table 4.35, most of the librarians (66.82%) have opinioned that RFID Technogy is not affordable to libraries and few librarians (28.78%) have opinioned that there is no need of RFID technology in their library.

31. Status of Library Automation:

Table 4.36: Status of Library Automation

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Fully Automated	4	14	5	12	8	43
		11.76%	25.93%	18.52%	23.08%	20.51%	20.87%
2	Partially Automated	22	19	15	31	19	106
		64.71%	35.19%	55.56%	59.62%	48.72%	51.46%
3	At Initial Stage	1	12	2	2	2	19
		2.94%	22.22%	7.41%	3.85%	5.13%	9.22%
4	Not Automated yet	7	9	5	7	10	38
		20.59%	16.67%	18.52%	13.46%	25.64%	18.45%
	Total	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.33: Status of Library Automation
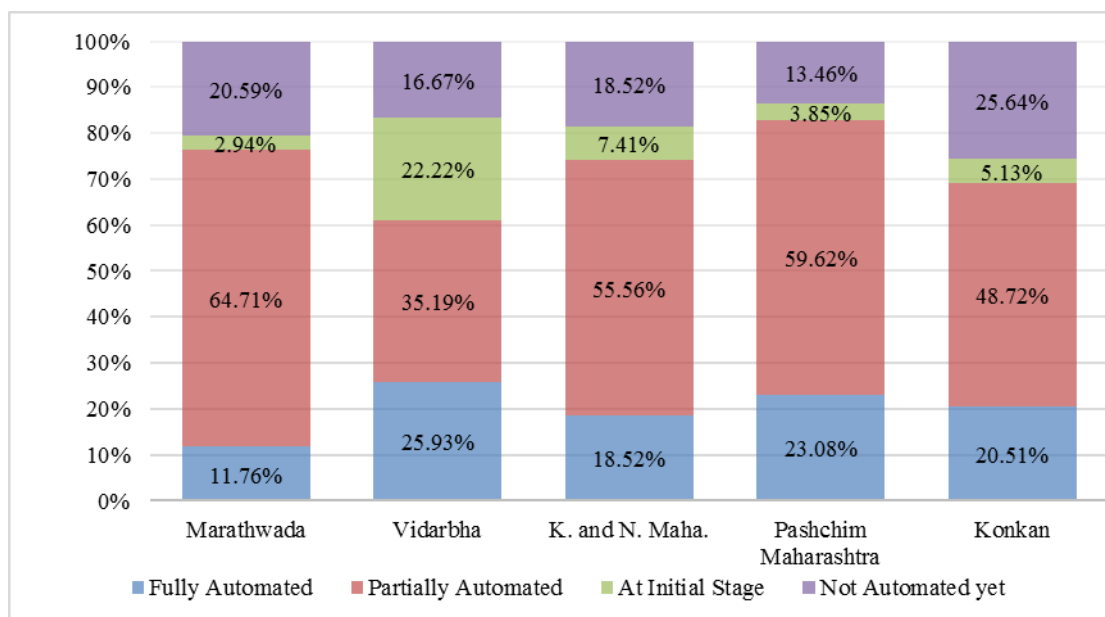
Observation:

From table 4.36, it is found that only 20.87% libraries are fully automated and 51.46% libraries are partially automated. 9.22% libraries have initiated the process of library automation whereas still 18.45% libraries have not proceed for automation.

32. Problems for Non-Automation of Libraries:

Table 4.37: Problems for Non-Automation of Libraries

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Insufficient fund	6	9	3	7	10	35
		85.71%	100.00%	60.00%	100.00%	100.00%	92.11%
2	Lack of support from Higher Authority	4	3	1	2	5	15
		57.14%	33.33%	20.00%	28.57%	50.00%	39.47%
3	Lack of training	2	4	1	2	3	12
		28.57%	44.44%	20.00%	28.57%	30.00%	31.58%
4	Technical Problems	4	3	3	6	4	20
		57.14%	33.33%	60.00%	85.71%	40.00%	52.63%
5	Other Problems	1	0	1	2	0	4
		14.29%	0.00%	20.00%	28.57%	0.00%	10.53%

Figure 4.34: Problems for Non-Automation of Libraries Yet
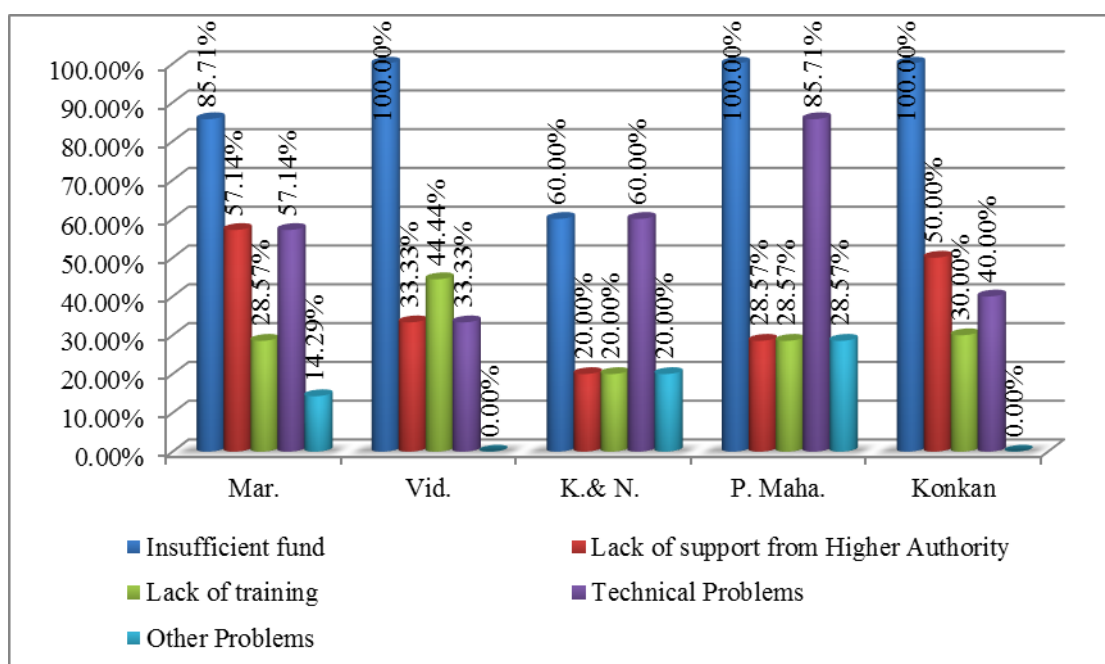
Observation:

As on table 4.37, most of the librarians have financial problems for non-automation of libraries and followed by technical problems.

33. Library Automation Software used in Libraries:

Table 4.38: Software Used in Libraries

Sr. No.	Software	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Autolib	0	0	0	5	0	5
		0.00%	0.00%	0.00%	10.64%	0.00%	2.99%
2	Bi-Lingual Soft Lib Ver-4.0	0	0	0	0	1	1
		0.00%	0.00%	0.00%	0.00%	3.85%	0.60%
3	Book Smith	0	0	1	0	0	1
		0.00%	0.00%	4.35%	0.00%	0.00%	0.60%
4	Book Worm	0	1	0	0	0	1
		0.00%	2.27%	0.00%	0.00%	0.00%	0.60%
5	CMS	0	0	1	0	0	1
		0.00%	0.00%	4.35%	0.00%	0.00%	0.60%
6	Edu Won ERP	1	1	0	0	0	2
		3.70%	2.27%	0.00%	0.00%	0.00%	1.20%
7	E-Granthalaya	1	2	2	4	0	9
		3.70%	4.55%	8.70%	8.51%	0.00%	5.39%
8	IT Soft	1	0	0	0	0	1
		3.70%	0.00%	0.00%	0.00%	0.00%	0.60%
9	KAPSON	0	0	0	0	1	1
		0.00%	0.00%	0.00%	0.00%	3.85%	0.60%
10	Koha	3	3	2	6	5	19
		11.11%	6.82%	8.70%	12.77%	19.23%	11.38%
11	LIBMAN	6	13	5	10	5	39
		22.22%	29.55%	21.74%	21.28%	19.23%	23.35%
12	Libraria	1	0	0	0	2	3
		3.70%	0.00%	0.00%	0.00%	7.69%	1.80%
13	Library Manager	1	0	0	5	1	7
		3.70%	0.00%	0.00%	10.64%	3.85%	4.19%
14	Libsoft	0	0	0	1	0	1
		0.00%	0.00%	0.00%	2.13%	0.00%	0.60%
15	LIBSYS	0	2	0	0	0	2
		0.00%	4.55%	0.00%	0.00%	0.00%	1.20%
16	LMSS	0	0	0	0	1	1
		0.00%	0.00%	0.00%	0.00%	3.85%	0.60%
17	MKCL Libraria	0	0	1	0	0	1
		0.00%	0.00%	4.35%	0.00%	0.00%	0.60%
18	SLIM-21	5	5	1	2	0	13
		18.52%	11.36%	4.35%	4.26%	0.00%	7.78%
19	SOUL	7	13	7	9	11	47
		25.93%	29.55%	30.43%	19.15%	42.31%	28.14%
20	Vriddhi	1	5	2	3	2	13
		3.70%	11.36%	8.70%	6.38%	7.69%	7.78%
	Total	27	45	22	45	29	168
		79.41%	83.33%	81.48%	86.54%	74.36%	81.55%

Observation:

From table 38, it is observed that 168 (81.55%) libraries are using 20 types of library automation software's. Out of these 20 different softwares, most libraries have installed SOUL software and followed by LIBMAN software.

34. Year of Library Automation:

Table 4.39: Year of Library Automation

Sr. No.	Year range (10Years)	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	1991 to 2000	2	2	1	4	3	12
		7.41%	4.44%	4.55%	8.89%	10.34%	7.14%
2	2001 to 2010	13	32	11	27	16	99
		48.15%	71.11%	50.00%	60.00%	55.17%	58.93%
3	2011 to 2018	12	11	10	14	10	57
		44.44%	24.44%	45.45%	31.11%	34.48%	33.93%
Total		27	45	22	45	29	168
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.35: Year of Library Automation
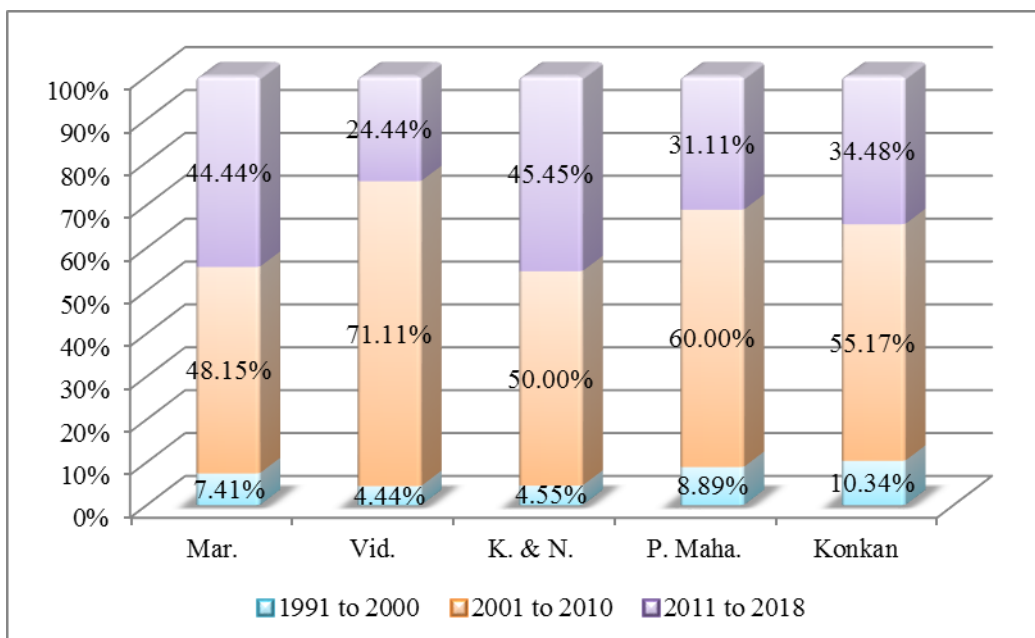
Observation:

As per table 4.39, majority of the libraries (58.93%) have implemented library automation during 2001 to 2010 and followed by 2011 to 2018 (33.93%).

35. Areas of Library Automated:

Table 4.40: Areas of Library Automated

Sr. No.	Areas of library automated	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Acquisition	10	15	9	17	8	59
		29.41%	27.78%	33.33%	32.69%	20.51%	28.64%
2	Physical Verification	11	26	15	30	21	103
		32.35%	48.15%	55.56%	57.69%	53.85%	50.00%
3	OPAC (Web OPAC/ M-OPAC	10	30	9	36	15	100
		29.41%	55.56%	33.33%	69.23%	38.46%	48.54%
4	Circulation	27	45	22	45	29	168
		79.41%	83.33%	81.48%	86.54%	74.36%	81.55%
5	Serial Control	11	18	9	22	12	72
		32.35%	33.33%	33.33%	42.31%	30.77%	34.95%
6	Library Administration	18	26	15	40	21	120
		52.94%	48.15%	55.56%	76.92%	53.85%	58.25%
7	Budget	5	16	9	22	12	64
		14.71%	29.63%	33.33%	42.31%	30.77%	31.07%
8	Reference Desk (FAQ/ Ask Librarian)	16	22	10	30	17	95
		47.06%	40.74%	37.04%	57.69%	43.59%	46.12%

Figure 4.36: Areas of Library Automated
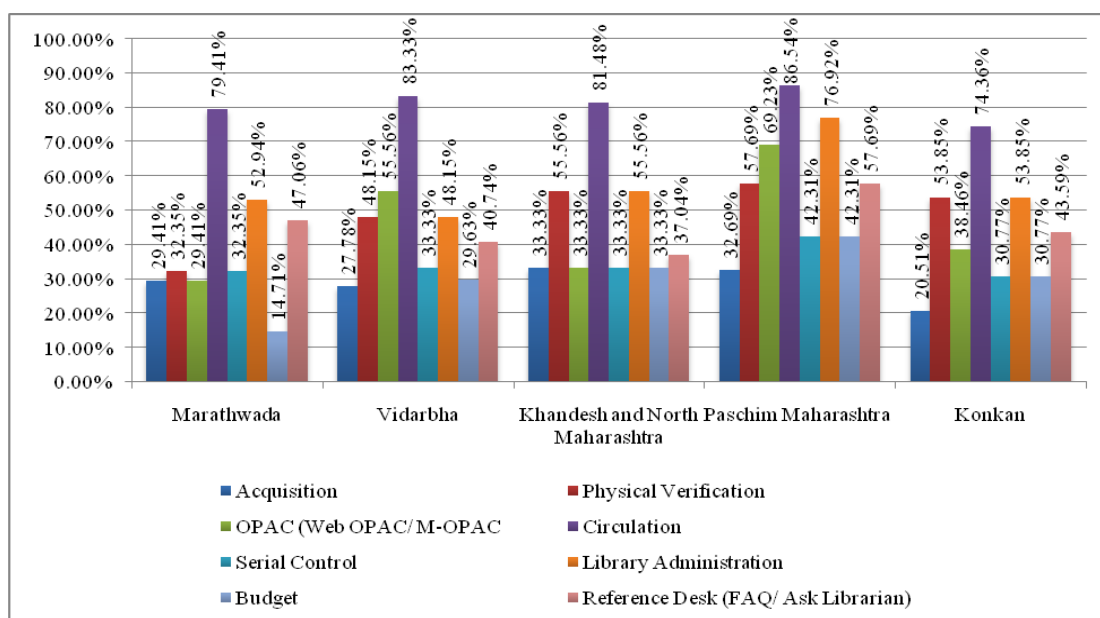
Observation:

From the table 4.40, most of the libraries have automated for circulation (81.55%) and followed by library administration (58.25%). Few libraries have automation in serial control (34.95%) and budget (31.07%).

36. Barcoding of Libraries:

Table 4.41: Status of Barcoding

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	All Books are Barcoded	24	32	20	41	23	140
		70.59%	59.26%	74.07%	78.85%	58.97%	67.96%
2	Barcoding in Initial Stage	3	13	2	4	6	28
		8.82%	24.07%	7.41%	7.69%	15.38%	13.59%
3	Not Barcoded Yet	7	9	5	7	10	38
		20.59%	16.67%	18.52%	13.46%	25.65%	18.45%
	Total	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.37: Status of Barcoding to Library Collection
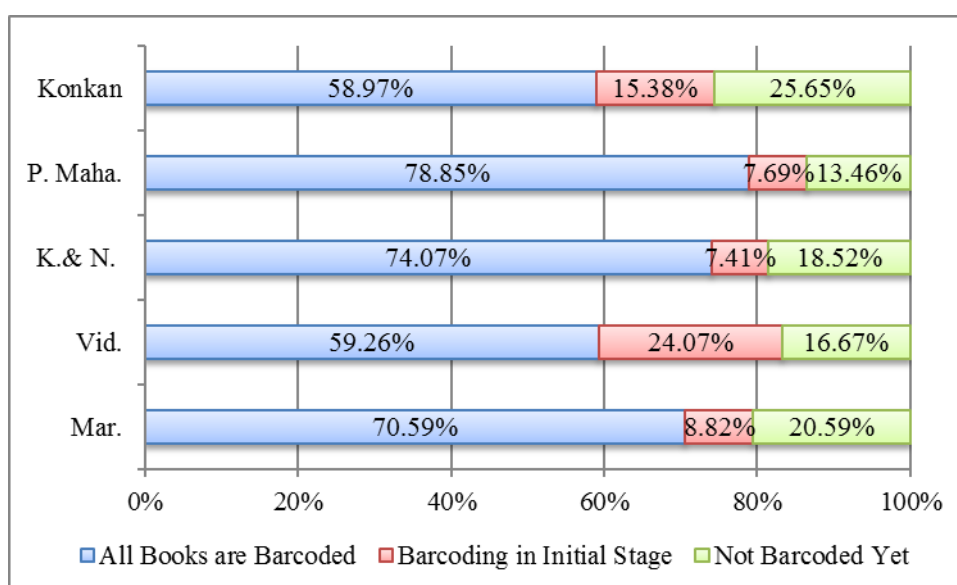
Observation:

It is observed that majority of the libraries (67.96%) have barcoded to library collection and 13.59% libraries have initiated for the barcoding process.

37. Circulation Policy for issuing books:

Usually, the college libraries have specific policies, terms to use library services, rules and regulations. The circulation policy of traditional library services restricted to uses of collection for longer time and working hours.

37.1 Circulation Policy for Student:

Table 4.42: Circulation Policy for Student

Sr. No.	Options	Nos.	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	No. of books allow to each student	Up to 3	20	36	17	38	22	133
			58.82%	66.67%	62.96%	73.08%	56.41%	64.56%
		Up to 6	13	15	8	11	14	61
			38.24%	27.78%	29.63%	21.15%	35.90%	29.61%
		Up to 9	1	3	2	3	3	12
			2.94%	5.56%	7.41%	5.77%	7.69%	5.83%
2	No. of renewals allowed	Up to 2	23	39	18	32	27	139
			67.65%	72.22%	66.67%	61.54%	69.23%	67.48%
		Up to 4	11	13	9	19	10	62
			32.35%	24.07%	33.33%	36.54%	25.64%	30.10%
		Up to 6	0	2	0	1	2	5
			0.00%	3.70%	0.00%	1.92%	5.13%	2.43%
3	Period of loan	Up to 7	17	32	15	32	20	116
			50.00%	59.26%	55.56%	61.54%	51.28%	56.31%
		Up to 16	13	19	11	16	14	73
			38.24%	35.19%	40.74%	30.77%	35.90%	35.44%
		More than 16	4	3	1	4	5	17
			11.76%	5.56%	3.70%	7.69%	12.82%	8.25%

Figure 4.38: No. of Books Allow to Each Student

Up to 3 ☐ Up to 6 ☐ Up to 9
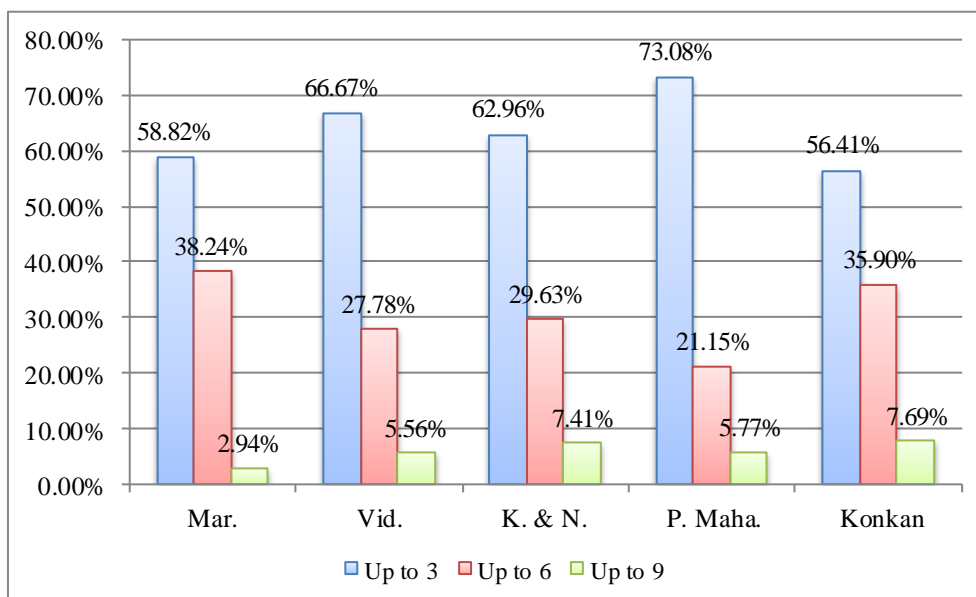
Figure 4.39: No. of Renewals Allowed to Student

Up to 2 ☐ Up to 4 ☐ Up to 6
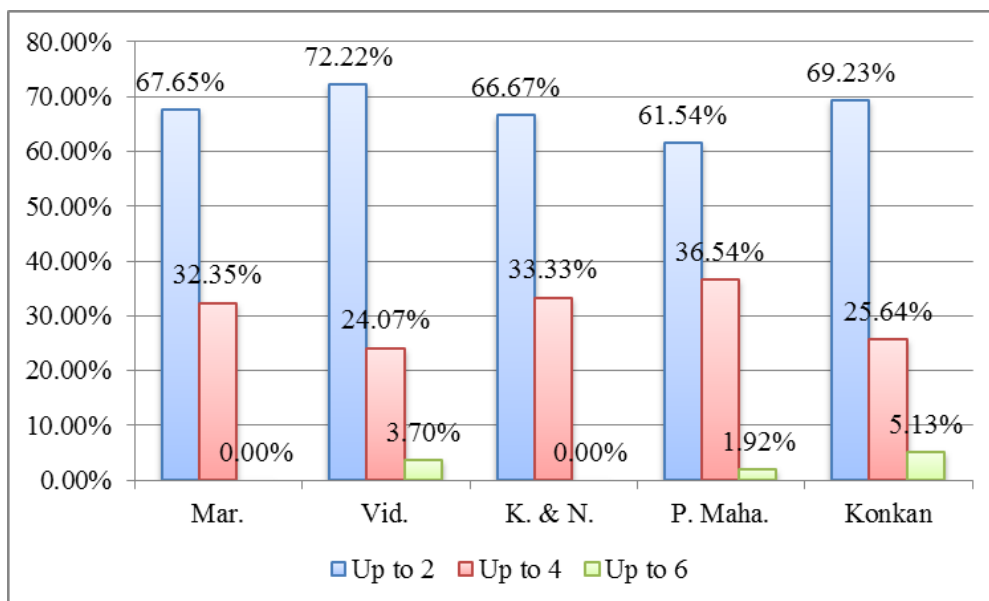
Figure 4.40: Period of Loan for Student
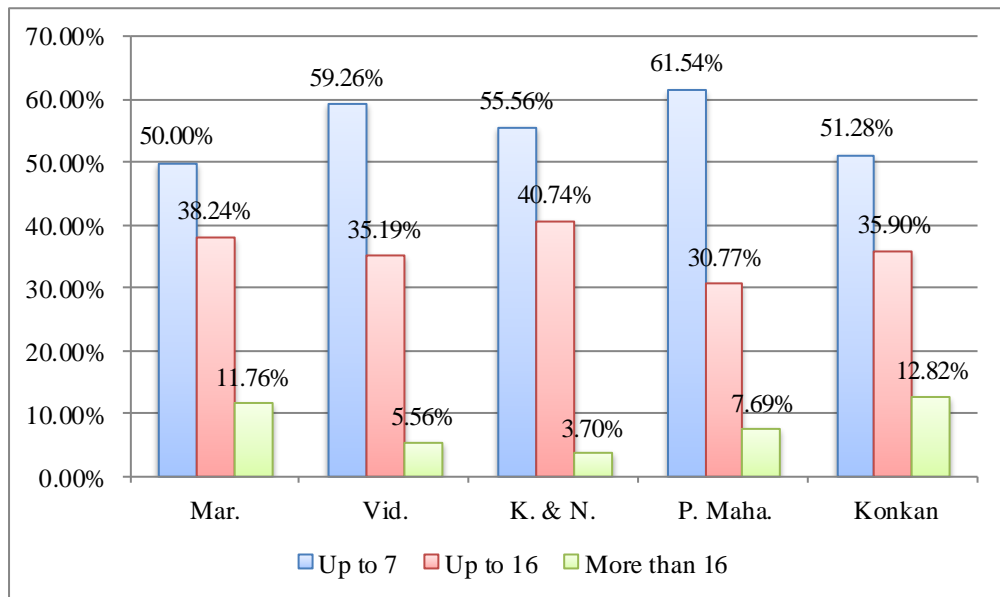
Observation:

According to table 4.42 most of the libraries (64.56%) allowed up to 3 books to each student. Most of the libraries (67.48%) allowed to renewal issued book up to 2 times and most of the libraries (56.31%) issue books for up to 7 days.

37.2   Circulation Policy for Teaching Staff:

Table 4.43: Circulation Policy for Teachers

Sr. No.	Options	Nos.	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	No. of Books Allowed to Teaching Staff	Up to 10	2	5	0	2	4	13
			5.88%	9.26%	0.00%	3.85%	10.26%	6.31%
		Up to 20	26	40	19	47	20	152
			76.47%	74.07%	70.37%	90.38%	51.28%	73.79%
		More than 20	6	9	8	3	15	41
			17.65%	16.67%	29.63%	5.77%	38.46%	19.90%
2	No. of Renewals Allowed	Up to 5	22	33	13	16	24	108
			64.71%	61.11%	48.15%	30.77%	61.54%	52.43%
		Up to 10	1	0	2	5	0	8
			2.94%	0.00%	7.41%	9.62%	0.00%	3.88%
		No rule	11	21	12	31	15	90
			32.35%	38.89%	44.44%	59.62%	38.46%	43.69%
3	Period of Loan	1 to 10	6	12	3	14	16	51
			17.65%	22.22%	11.11%	26.92%	41.03%	24.76%
		11 to 20	8	15	7	26	13	69
			23.53%	27.78%	25.93%	50.00%	33.33%	33.50%
		21 & More	20	27	17	12	10	86
			58.82%	50.00%	62.96%	23.08%	25.64%	41.75%

Figure 4.41: No. of Books Allow to Teachers
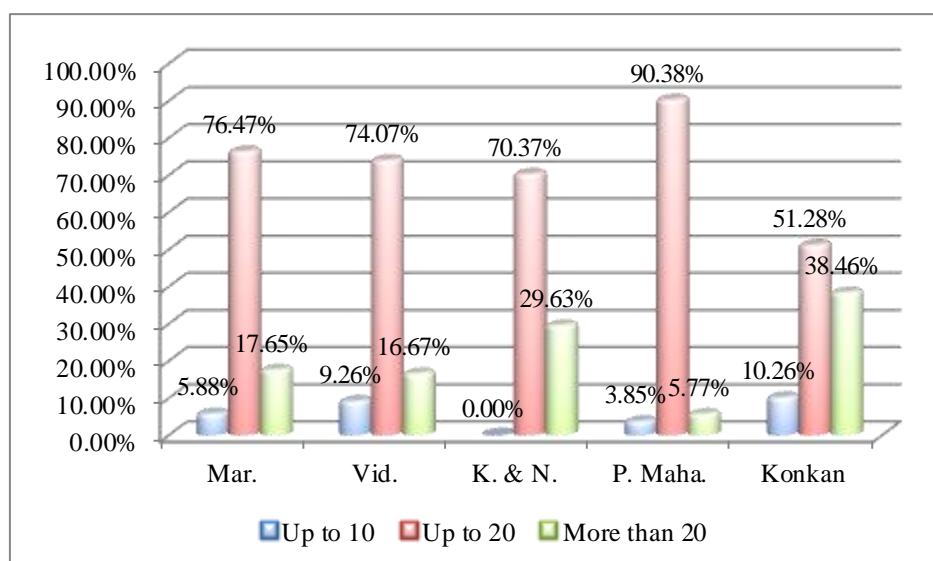
Figure 4.42: No. of Renewals Allowed to Teachers
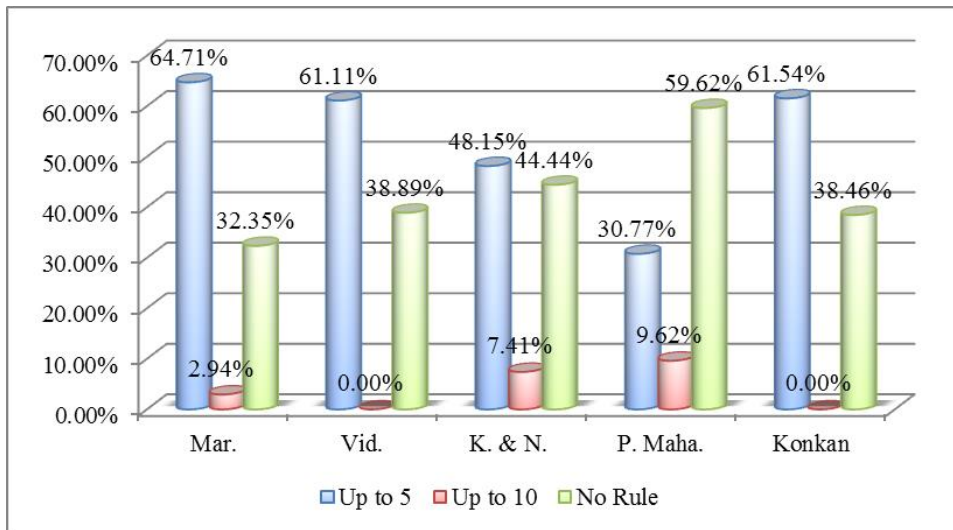
Figure 4.43: Period of Loan to Teachers
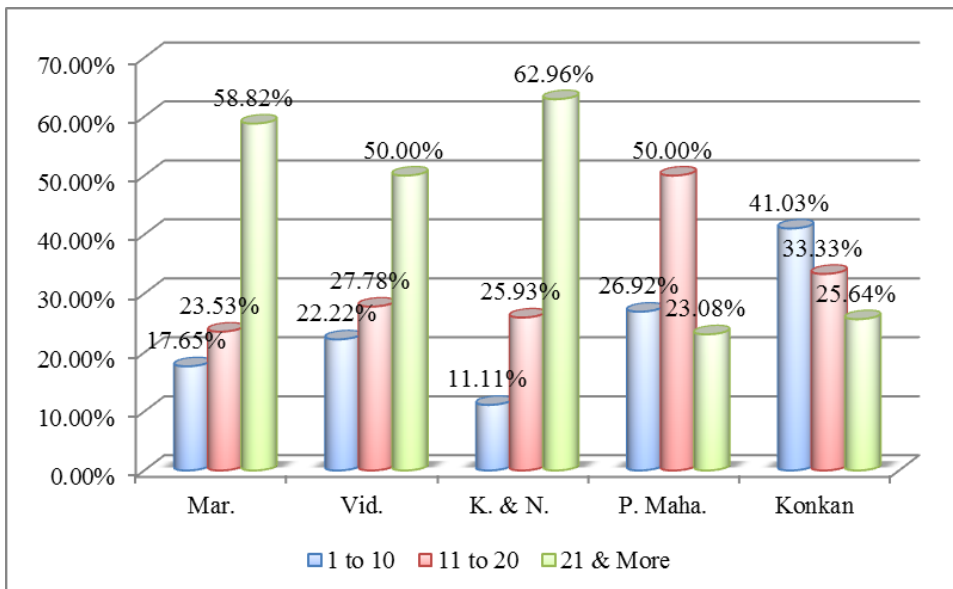
Observation:

As on table 4.43, most of the libraries (73.79%) allowed up to 20 books to each Teacher. Most of the libraries (52.43%) allowed to renewal issued book up to 5 times and most of the libraries (41.75%) issue books for more than 20 days.

37.3 Circulation Policy for Non-Teaching Staff:

Table 4.44: Circulation Policy for Non-Teaching Staff

Sr. No.	Options	Nos.	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	No. of Books Allowed to each Non-Teaching Staff	1 To 5	8	22	16	37	25	108
			23.53%	40.74%	59.26%	71.15%	64.10%	52.43%
		6 To 10	22	26	9	12	11	80
			64.71%	48.15%	33.33%	23.08%	28.21%	38.83%
		11 & More	4	6	2	3	3	18
			11.76%	11.11%	7.41%	5.77%	7.69%	8.74%
2	No. of Renewals Allowed	1 To 5	19	38	16	33	19	125
			55.88%	70.37%	59.26%	63.46%	48.72%	60.68%
		6 To 10	0	0	0	0	0	0
			0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
		No rule	15	16	11	19	20	81
			44.12%	29.63%	40.74%	36.54%	51.28%	39.32%
3	Period of Loan	1 to 10	13	24	18	27	13	95
			38.24%	44.44%	66.67%	51.92%	33.33%	46.12%
		11 to 20	16	20	5	17	7	65
			47.06%	37.04%	18.52%	32.69%	17.95%	31.55%
		21 & More	5	10	4	8	19	46
			14.71%	18.52%	14.81%	15.38%	48.72%	22.33%

Figure 4.44: No. of Books Allow to each Non-Teaching Staff
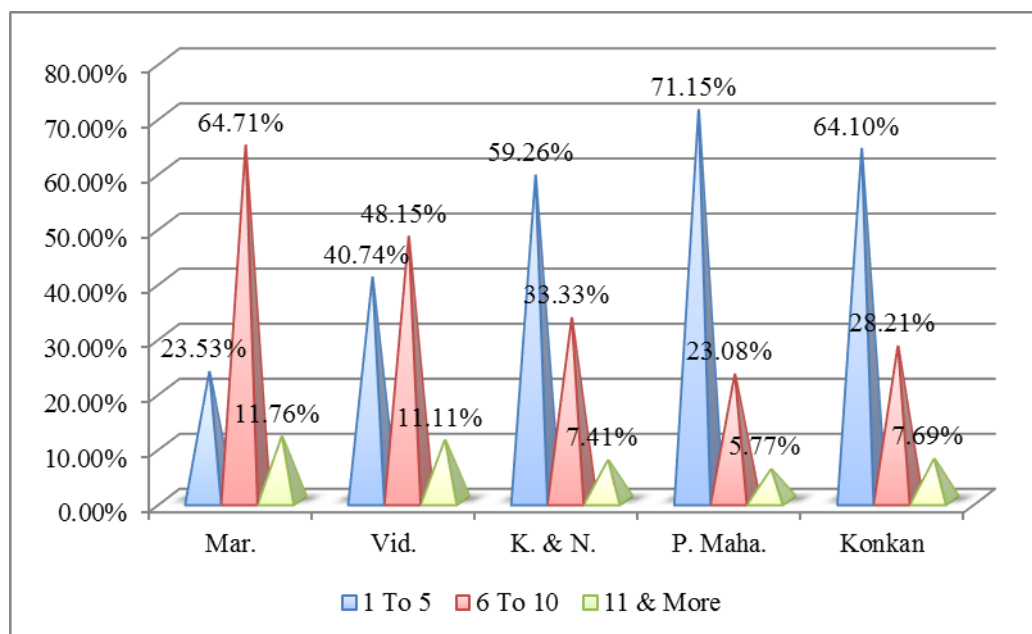
Figure 4.45: No. of Renewals Allowed to Non-Teaching Staff
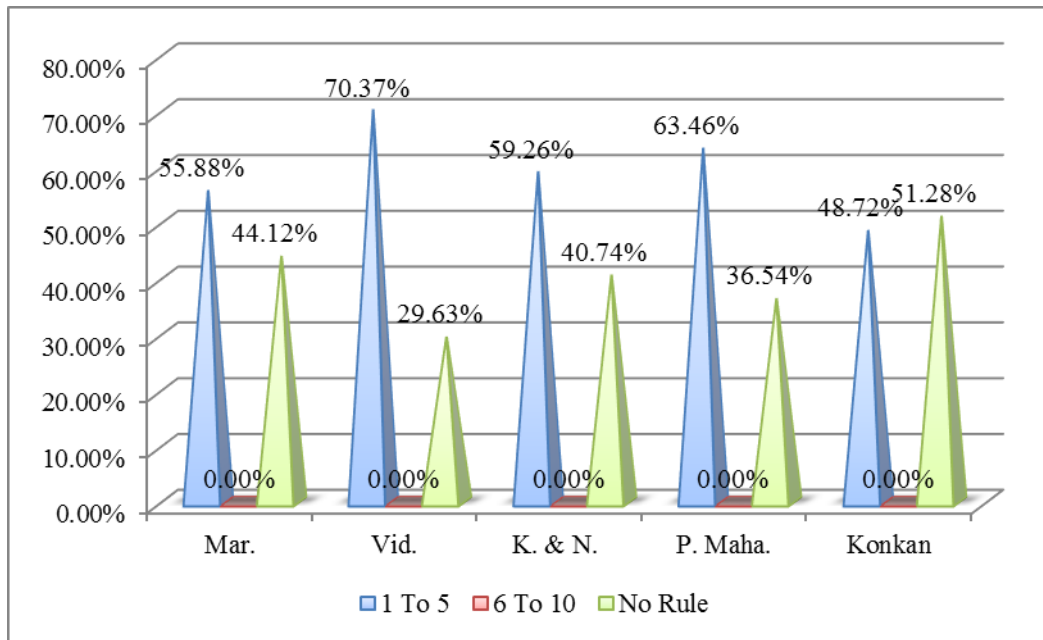
Figure 4.46: Period of Loan for Non-Teaching Staff
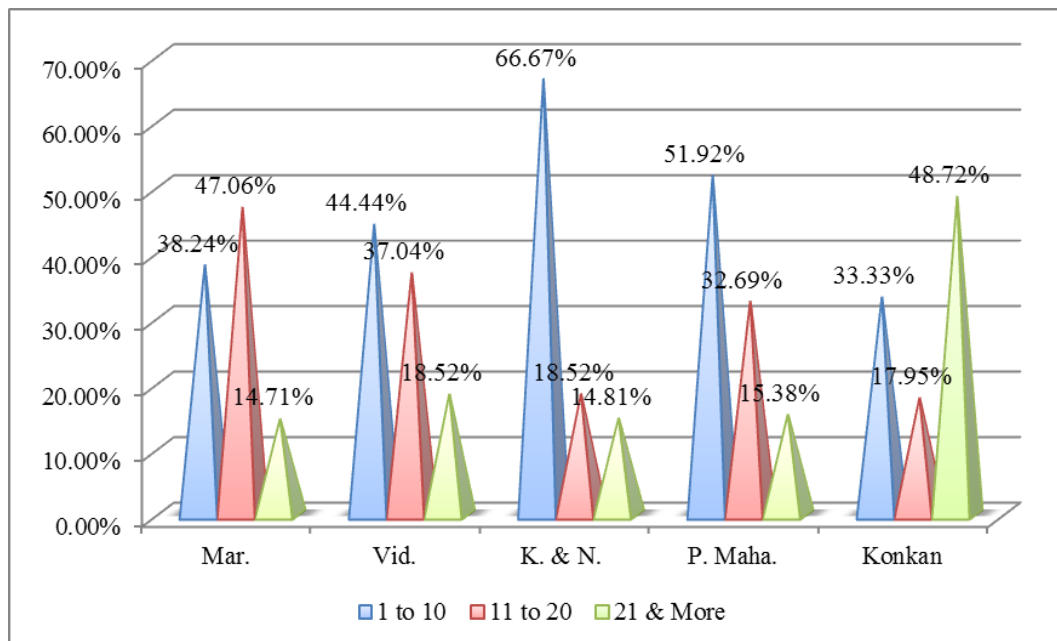
Observation:

As per table 4.44, most of the libraries (52.43%) allowed up to 5 books to each Non-teaching staff. Most of the libraries (60.68%) allowed to renewal issued book up to 5 times and most of the libraries (46.12%) issue books for 10 days.

38. Sufficiently of Printed Periodicals To Satisfy Users Need:

Table 4.45: Printed Periodical Sufficiency

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	5	11	7	13	6	42
		14.71%	20.37%	25.93%	25.00%	15.38%	20.39%
2	No	29	43	20	39	33	164
		85.29%	79.63%	74.07%	75.00%	84.62%	79.61%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.47: Thoughts about Printed Journal's Sufficiency
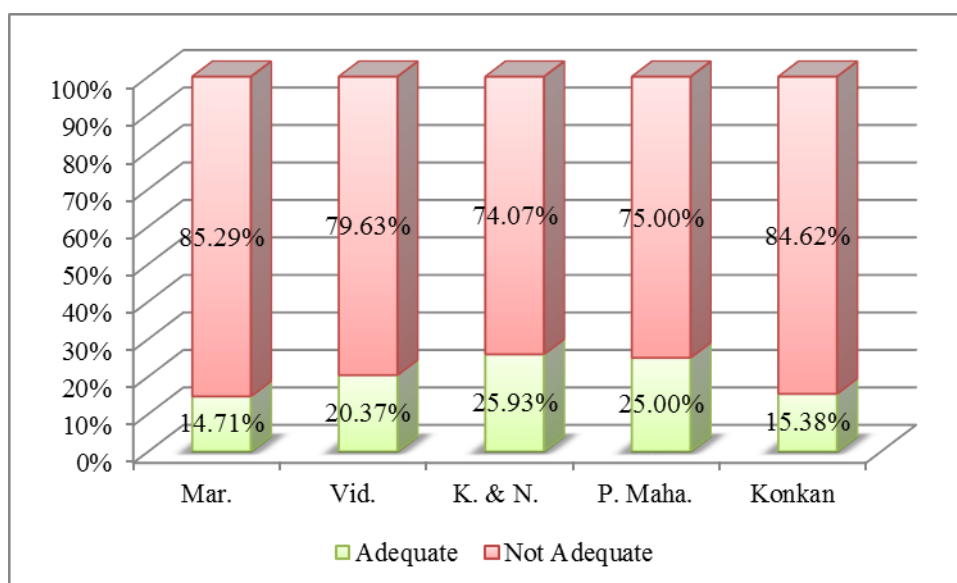
Observation:

Above table 4.45 shows less number of (20.39%) libraries have sufficient periodicals to satisfy users' information need.

39. Allow to Issue Back Issues/Volumes for Home Lending:

Table 4.46: Allow to Issue Back Issues/Volumes for Home Lending

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Issue	5	9	3	12	4	33
		14.71%	16.67%	11.11%	23.08%	10.26%	16.02%
2	Not Issue	29	45	24	40	35	173
		85.29%	83.33%	88.89%	76.92%	89.74%	83.98%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.48: Allow to Issue Back Issues/Volumes for Home Lending
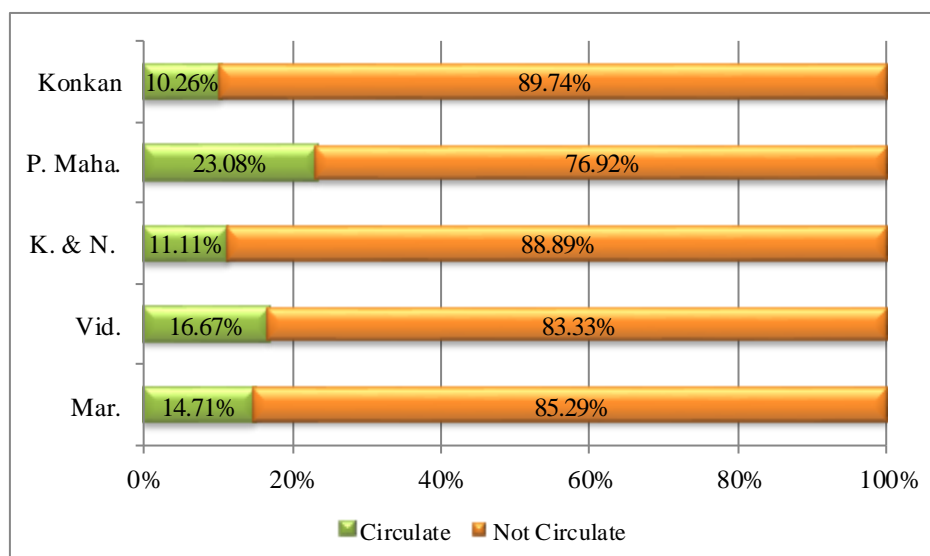
Observation:

It is observed that less number of libraries (16.02%) issue periodicals to the users for home lending.

40. Subscription of E-Journals:

Table 4.47: Subscription of E-Journals

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	15	31	10	38	22	116
		44.12%	57.41%	37.04%	73.08%	56.41%	56.31%
2	No	19	23	17	14	17	90
		55.88%	42.59%	62.96%	26.92%	43.59%	43.69%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.49: Subscriptions to E-Journals
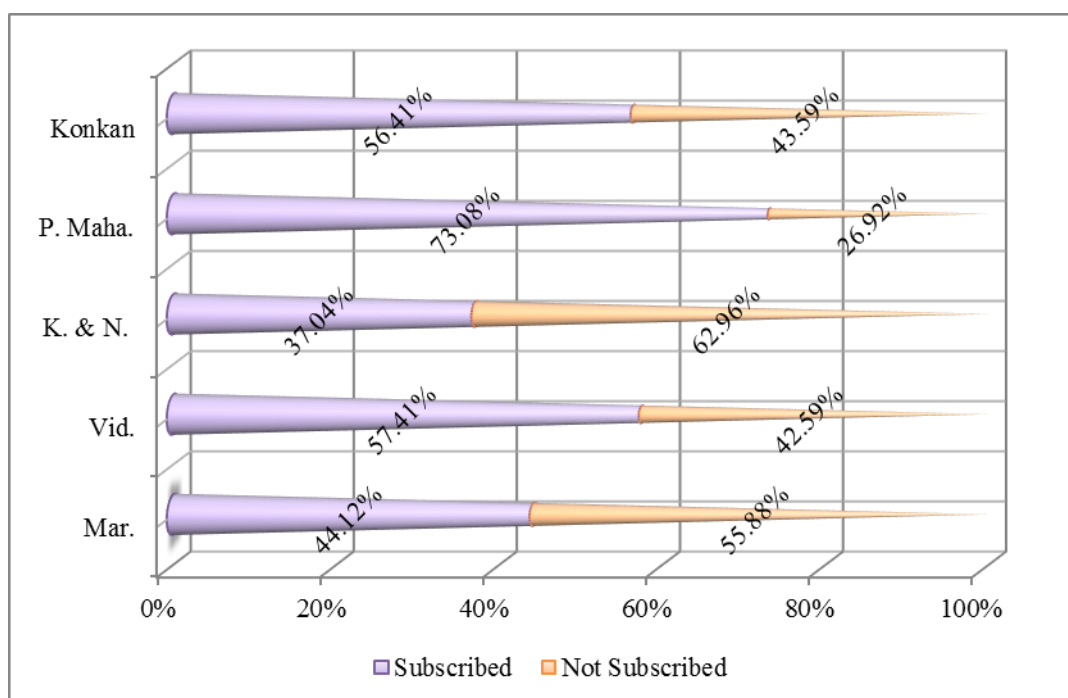
Observation:

Table 4.47 shows, most of the libraries (56.31%) have subscribed e-journal access for their user.

41. Subscription to Databases:

Table 4.48: Subscription of Databases

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	15	30	10	37	22	114
		44.12%	55.56%	37.04%	71.15%	56.41%	55.34%
2	No	19	24	17	15	17	92
		55.88%	44.44%	62.96%	28.85%	43.59%	44.66%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.50: Subscription to Databases
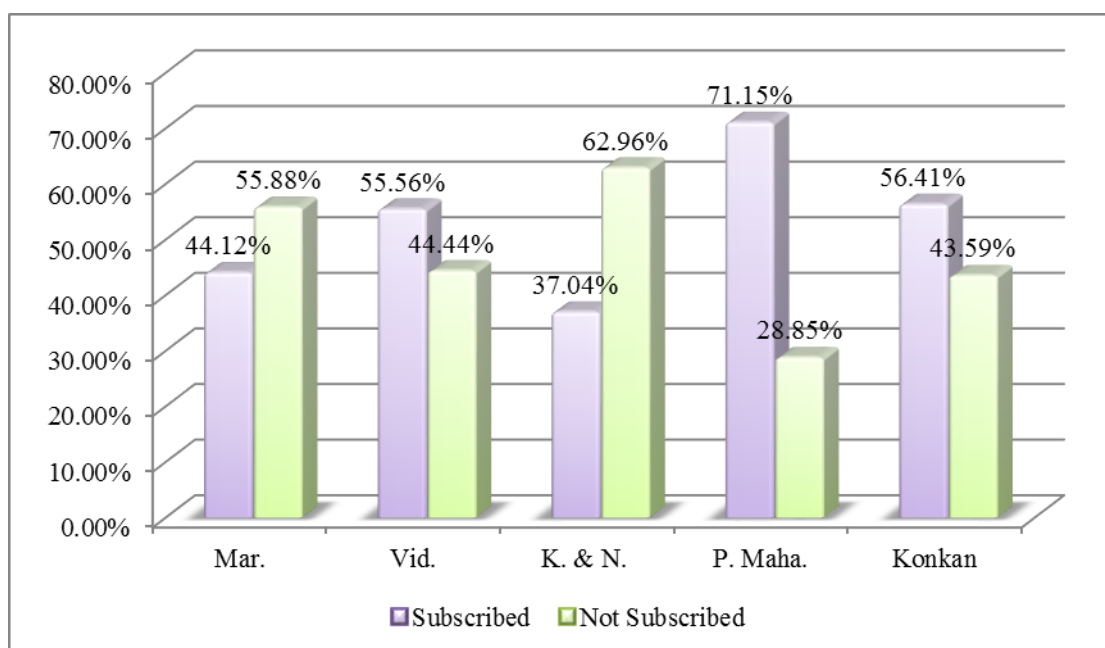
Observation:

As on table 4.48, most of the libraries (55.34%) have subscribed e-journal access for their user.

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42. Databases Subscribed:

Table 4.49: Databases Subscribed by Libraries

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	N-LIST	11	24	7	29	14	85
		73.33%	80.00%	70.00%	78.38%	63.64%	74.56%
2	DELNET	4	6	3	8	8	29
		26.67%	20.00%	30.00%	21.62%	36.36%	25.44%
3	Other Databases	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total		15	30	10	37	22	114
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.51: Databases Subscribed by College Libraries
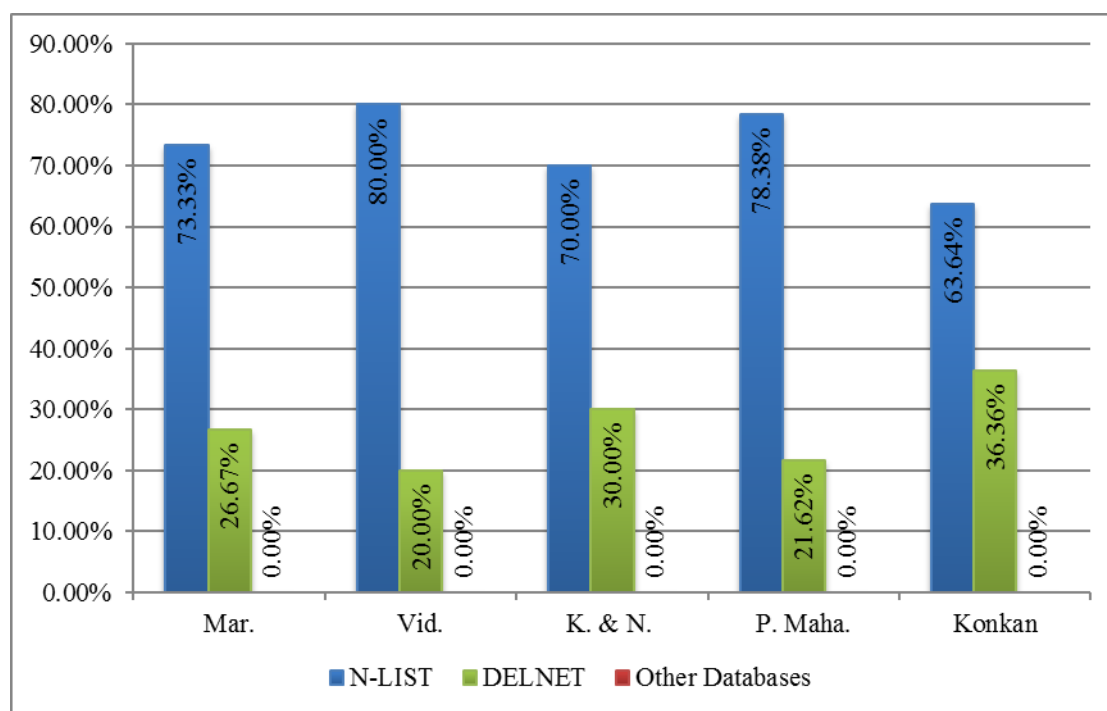
Observation:

It is observed that most of the libraries (74.56%) have subscribed access to N-LIST Database.

43. Participation in Consortiums:

Table 4.50: Participation in Consortiums

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	16	32	10	42	24	124
		47.06%	59.26%	37.04%	80.77%	61.54%	60.19%
2	No	18	22	17	10	15	82
		52.04%	40.74%	62.06%	19.23%	38.46%	39.81%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.52: Participation in Consortiums
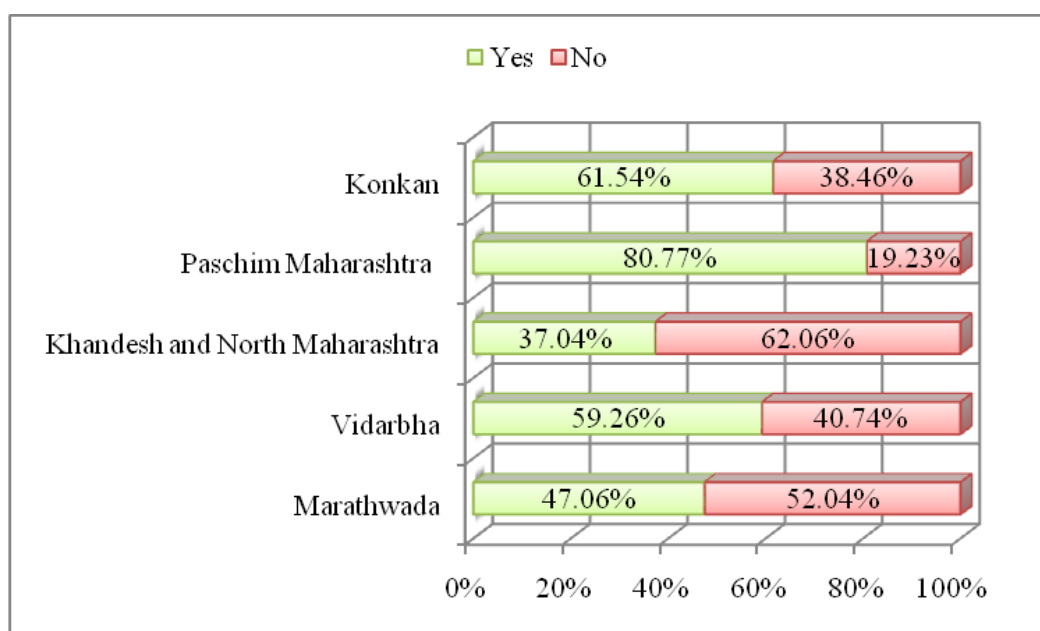
Observation:

As on table 4.50, it is observed that most of the libraries (74.56%) have participated in various consortia.

44. Consortium adopted:

Table 4.51: Consortium adopted by Libraries

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	E-Shodhsindhu	0	1	0	2	1	4
		0.00%	1.85%	0.00%	3.85%	2.56%	1.94%
2	INDEST Consortia	1	0	0	2	1	4
		2.94%	0.00%	0.00%	3.85%	2.56%	1.94%
3	N-LIST	11	24	7	29	14	85
		32.35%	44.44%	25.93%	55.77%	35.90%	41.26%
4	DELNET Consortia	4	6	3	8	8	29
		11.76%	11.11%	11.11%	15.38%	20.51%	14.08%
	Total	16	32	10	42	24	124
		47.06%	59.26%	37.04%	80.77%	61.54%	60.19%

Figure 4.53: Participation in Various Consortiums
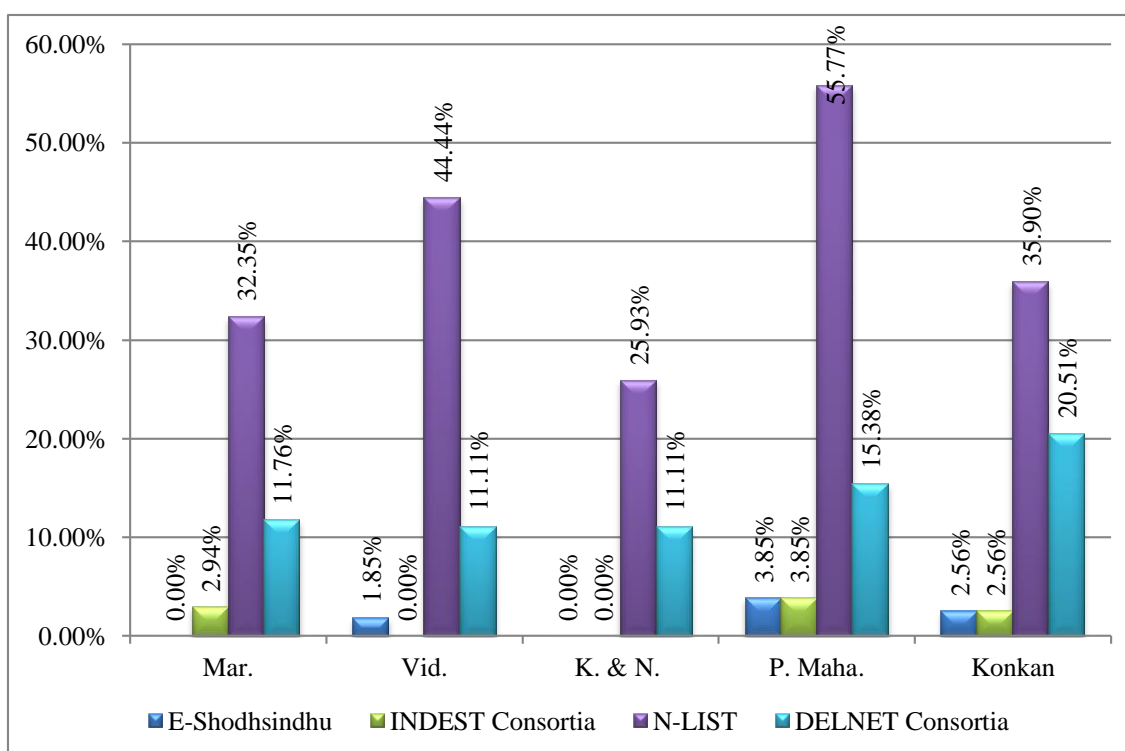
Observation:

As per table 4.51, it is observed that most of the libraries (41.26%) have participated in N-LIST and followed by DELNET Consortium (14.08).

45. Access to Open Education Resources (OER)/ Open Access Resources (OAR):

Table 4.52: Access to Open Education Resources

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	26	42	18	41	29	156
		76.47%	77.78%	66.67%	78.85%	74.36%	75.73%
2	No	8	12	9	11	10	50
		23.53%	22.22%	33.33%	21.15%	25.64%	24.27%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.54: Access to Open Education Resources
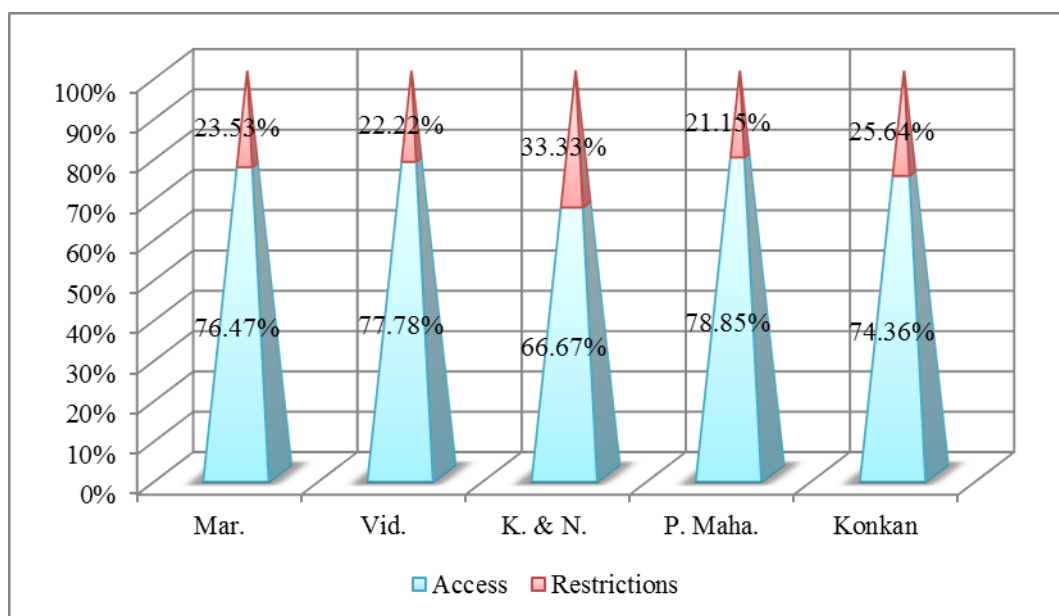
Observation:

Table 4.52 shows that limited number of libraries (24.27%) not provided access to Open Education Resources.

46. Options Available for Accesses Open Educational Resources: (Multiple choice question)

Table 4.53: Options to Accesses Open Educational Resources

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Links at Library Website	3	4	3	8	7	25
		11.54%	9.52%	16.67%	19.51%	24.14%	16.03%
2	Links at Institutional Website	11	14	8	22	13	68
		42.31%	33.33%	44.44%	53.66%	44.83%	43.59%
3	Posters and Guidelines Displayed at library	26	41	16	40	29	152
		100.00%	97.62%	88.89%	97.56%	100.00%	97.44%
4	Through QR Codes	4	10	7	14	3	38
		15.38%	23.81%	38.89%	34.15%	10.34%	24.36%

Figure 4.55: Options to Accesses Open Educational Resources
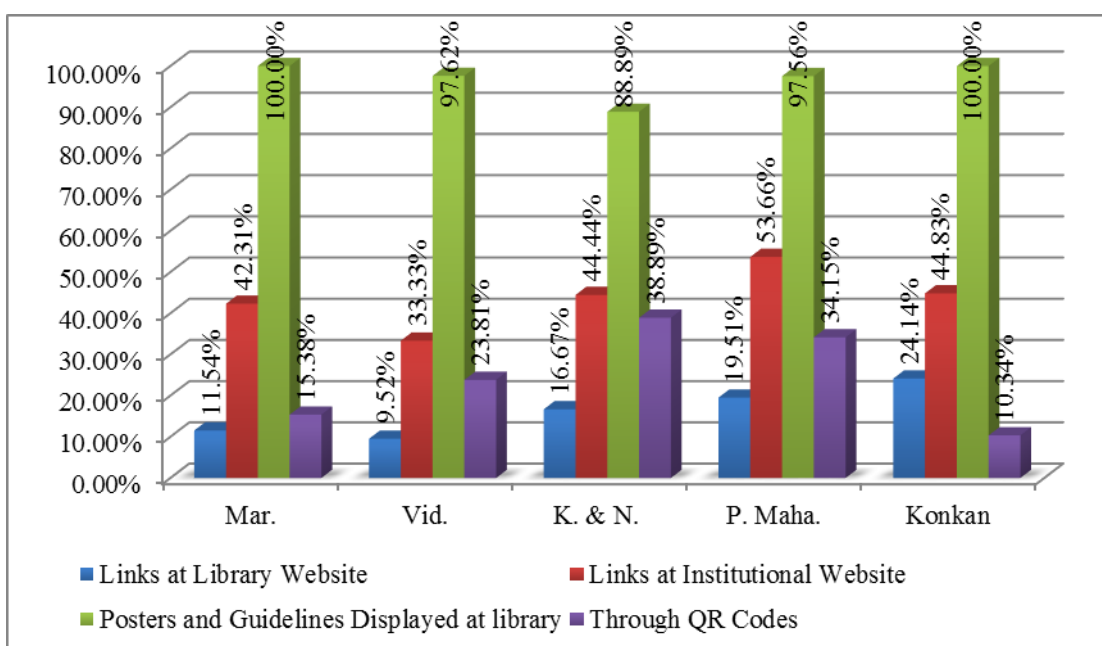
Observation:

As on table 4.53, it is found that most of the libraries (97.14) have used posters and guidelines displayed in library and followed by the option of link provided at website (43.59%).

47. Availability of CCTV for library security:

Table 4.54: Availability of CCTV

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	26	45	22	41	30	164
		76.47%	83.33%	81.48%	78.85%	76.92%	79.61%
2	No	8	9	5	11	9	42
		23.53%	16.67%	18.52%	21.15%	23.08%	20.39%

Figure 4.56: Availability of CCTV
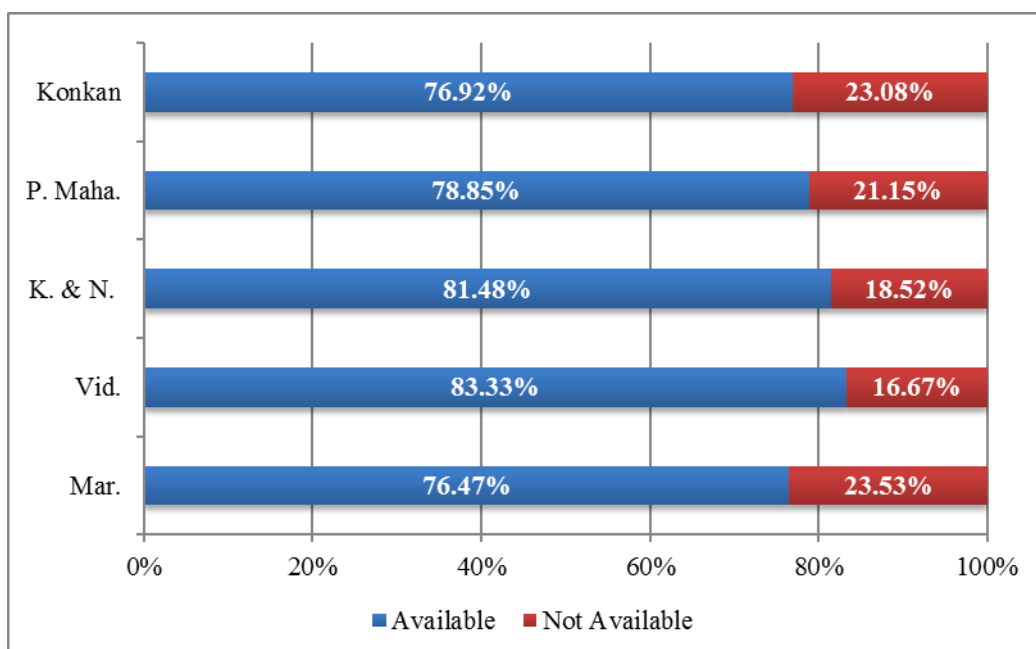
Observation:

As per table 4.54, the maximum number of libraries (79.61%) have installed CCTV camera in their library as a security purpose.

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48. User Education to the User:

Table 4.55: User Education

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	No	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Observation:

All the libraries have provided user education for the purpose of awareness.

49. Methods used to provide User Education: (Multiple choice's question)

Table 4.56: Methods used to provide User Education

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Through Library Website	3	4	3	8	7	25
		8.82%	7.41%	11.11%	15.38%	17.95%	12.14%
2	Pamphlets	4	7	2	5	3	21
		11.76%	12.96%	7.41%	9.62%	7.69%	10.19%
3	Orientation in library	30	51	21	50	39	191
		88.24%	94.44%	77.78%	96.15%	100.00%	92.72%
4	Information Literacy	12	2	5	7	4	30
		35.29%	3.70%	18.52%	13.46%	10.26%	14.56%

Figure 4.57: Method used to Provide User Education
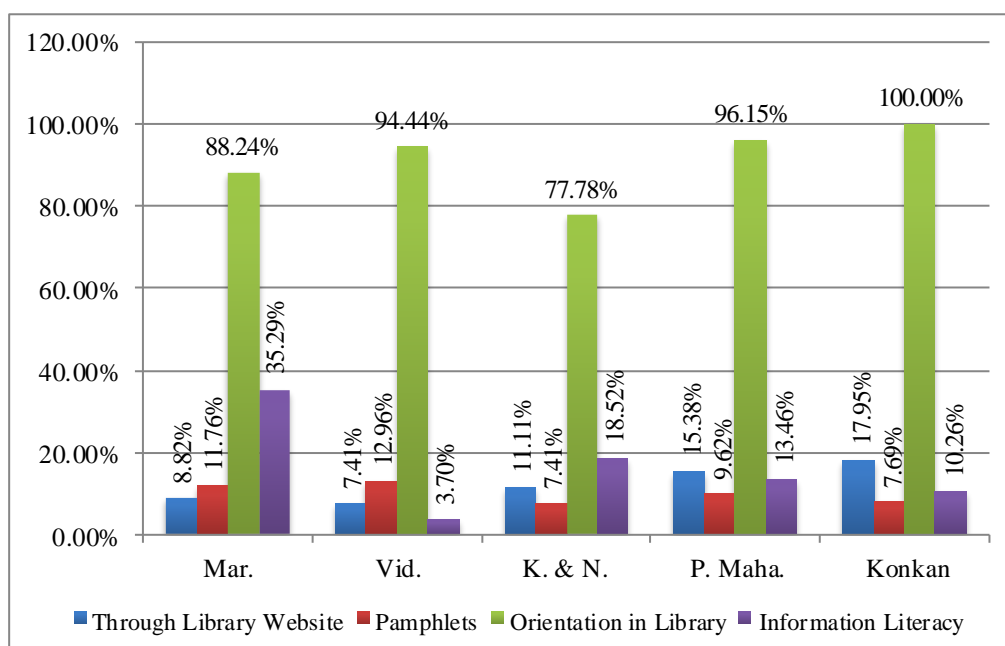
Observation:

From table 4.56 it is observed that majority of the library (92.72%) have used traditional method of library orientation whereas few libraries (12.14%) have used modern tool to provide library awareness.

50. Library Feedback:

Table: 4.57: Library Feedback

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	No	0	0	0	0	0	0
		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Observation:

All the librarians (100.00%) have used library feedback to know the user opinion.

51. Feedback Methods:

Table 4.58: Methods of Feedback

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Printed Questionnaire	24	40	16	31	20	131
		70.59%	74.07%	59.26%	59.62%	51.28%	63.59%
2	Online Questionnaire Link at Library Website	1	3	3	6	5	18
		2.94%	5.56%	11.11%	11.54%	12.82%	8.74%
3	Sharing Online Questionnaire Link on -Email and Social Media	5	5	3	12	11	36
		14.71%	9.26%	11.11%	23.08%	28.21%	17.48%
4	Suggestion Box	4	6	5	3	3	21
		11.76%	11.11%	18.52%	5.77%	7.69%	10.19%

Figure 4.58: Methods of Feedback
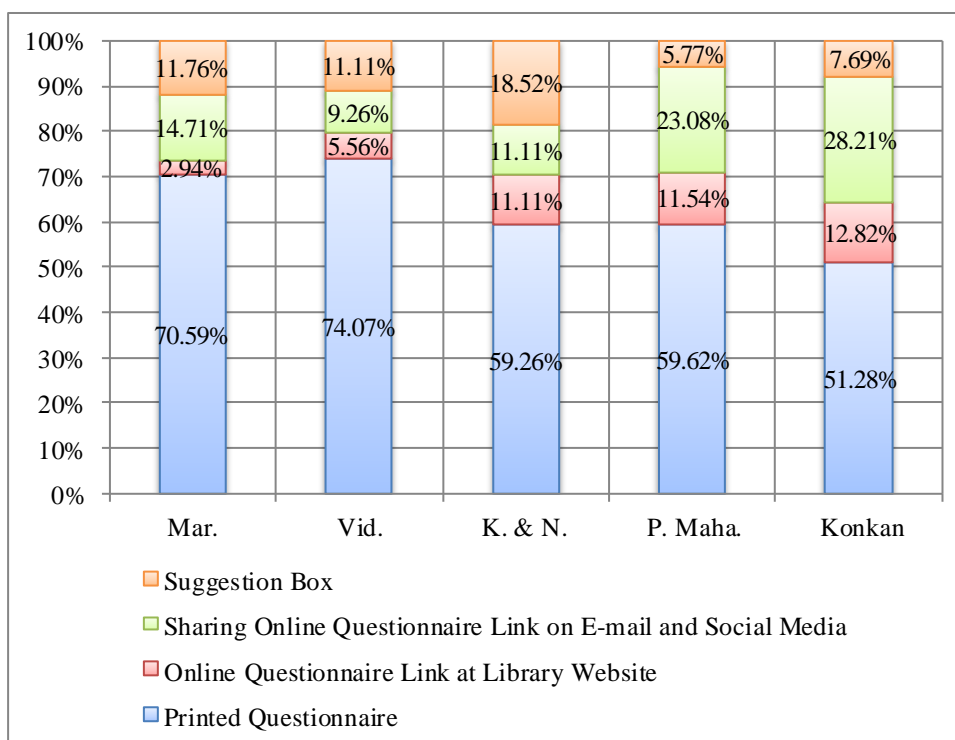
Observation:

From table 4.58, majority of the libraries (73.78%) have used traditional method of feedback whereas few libraries (26.21%) have used modern tools for taking feedback.

52. Having Digital Repository/ Institutional Repository:

Table 4.59: Digital Repository/ Institutional Repository in Libraries

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	6	6	4	10	5	31
		17.65%	11.11%	14.81%	19.23%	12.82%	15.05%
2	No	28	48	23	42	34	175
		82.35%	88.89%	85.19%	80.77%	87.18%	84.95%

Figure 4.59: Digital Repository in Libraries
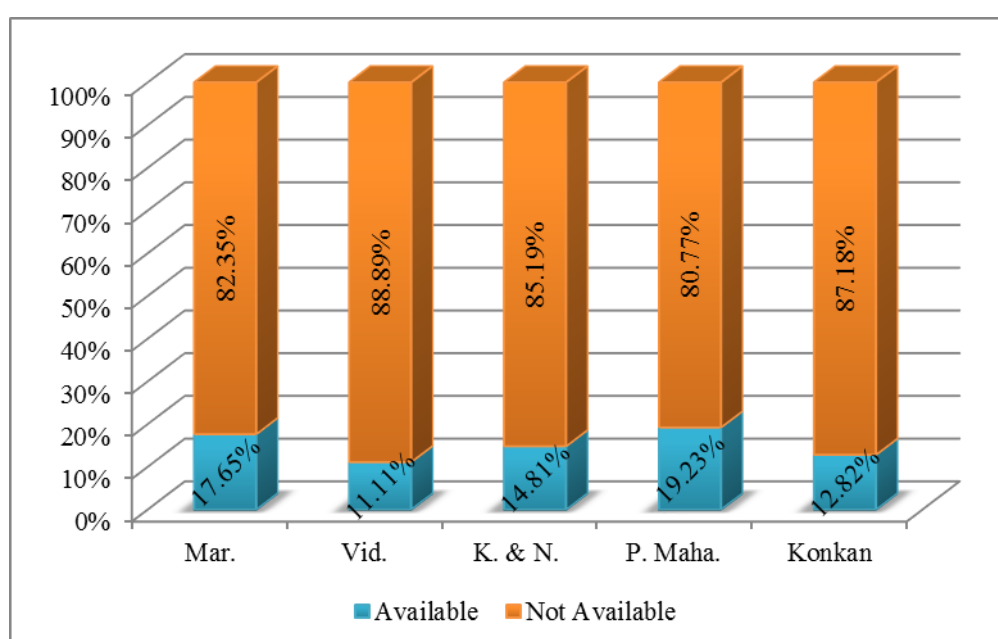
Observation:

Only few libraries (15.05%) in the Maharashtra have Institutional Repository.

53. Software Used for Digital Repository:

Table 4.60: Software Used for Digital Repository

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	D-Space	5	4	4	9	3	25
		83.33%	66.67%	100.00%	90.00%	60.00%	80.65%
2	Green Stone	1	2	0	1	2	6
		16.67%	33.33%	0.00%	10.00%	40.00%	19.35%

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Observation:

Table 4.60 shows the majority of the libraries have used D-Space Digital Library Software for creating Institutional Repository.

54. Information Services provided through Digital Repository:

Table 4.61: Services Provided through Digital Repository

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Previous Question Paper	6	6	4	10	5	31
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	Syllabuses	6	6	4	10	5	31
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
3	Video Lectures / links to NPTEL Videos	4	6	4	9	5	28
		66.67%	100.00%	100.00%	90.00%	100.00%	90.32%
4	E-Books	4	6	4	10	5	29
		66.67%	100.00%	100.00%	100.00%	100.00%	93.55%
5	PPTs	6	6	4	10	5	31
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6	E-notes on topic	3	1	2	1	5	12
		50.00%	16.66%	50.00%	10.00%	100.00%	38.70%
7	Research Papers	6	6	4	10	5	31
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
8	College Magazines	6	6	4	9	4	29
		100.00%	100.00%	100.00%	90.00%	80.00%	93.55%
9	College Prospectus	6	5	4	8	4	27
		100.00%	83.33%	100.00%	80.00%	80.00%	87.10%
10	Annual Reports	6	6	4	10	5	31
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
11	Photos & Videos of various programs	6	6	4	9	5	30
		100.00%	100.00%	100.00%	90.00%	100.00%	96.77%
12	E-News Clipping	6	5	4	10	4	29
		100.00%	83.33%	100.00%	100.00%	80.00%	93.55%

(31=100%)

Observation:

Among all the 12 services of digital repositories mentioned in the table 4.61, e-notes on topic is found less (38.70%) availability in most of the digital repositories.

55. Digitization of Rare Books:

Table 4.62: Digitization of Rare Books

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	7	6	8	13	5	39
		20.59%	11.11%	29.63%	25.00%	12.82%	18.93%
2	No	27	48	19	39	34	167
		79.41%	88.89%	70.37%	75.00%	87.18%	81.07%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.60: Digitization of Rare Books
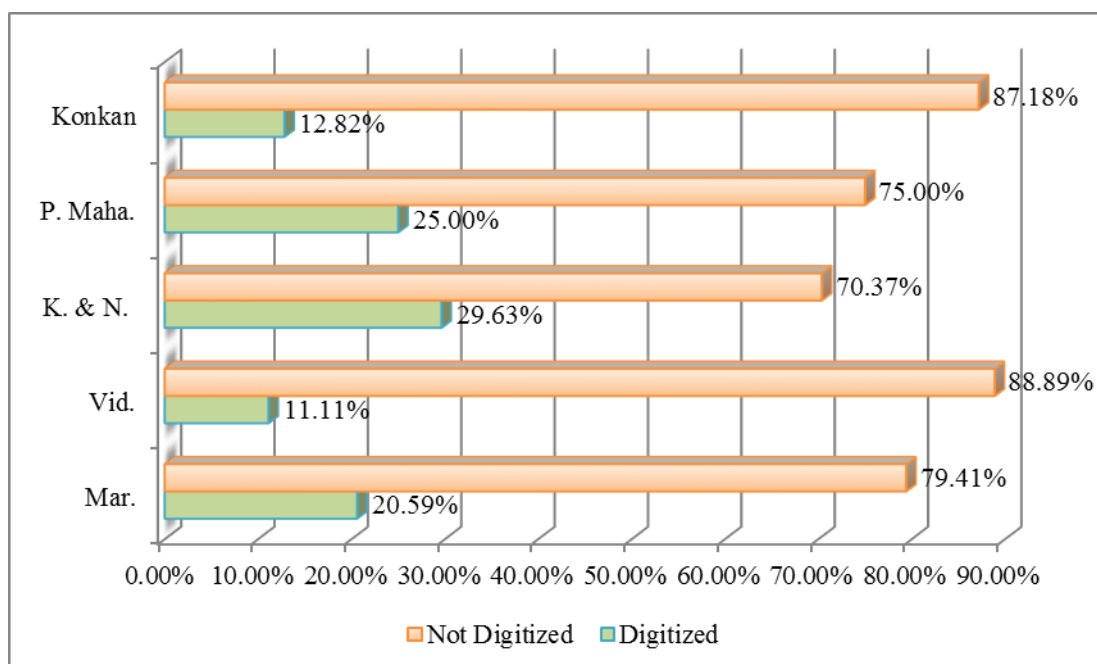
Observation:

As per table 4.62, less number of libraries (18.93%) have digitized rare collection of their libraries.

56. Marketing Strategies used for Library and Information Services and Facilities:

Table 4.63: Marketing Strategies used by the Libraries

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Messaging	8	14	6	12	5	45
		23.53%	25.93%	22.22%	23.08%	12.82%	21.84%
2	Using Social Media	12	18	17	1	0	48
		35.29%	33.33%	62.96%	1.92%	0.00%	23.30%
3	Posters	6	49	23	31	18	127
		17.65%	90.74%	85.19%	59.62%	46.15%	61.65%
4	Bulletin Board	2	6	4	12	5	29
		5.88%	11.11%	14.81%	23.08%	12.82%	14.08%
5	Lectures	12	19	17	5	18	71
		35.29%	35.19%	62.96%	9.62%	46.15%	34.47%

Figure 4.61: Marketing Strategies used by the Libraries
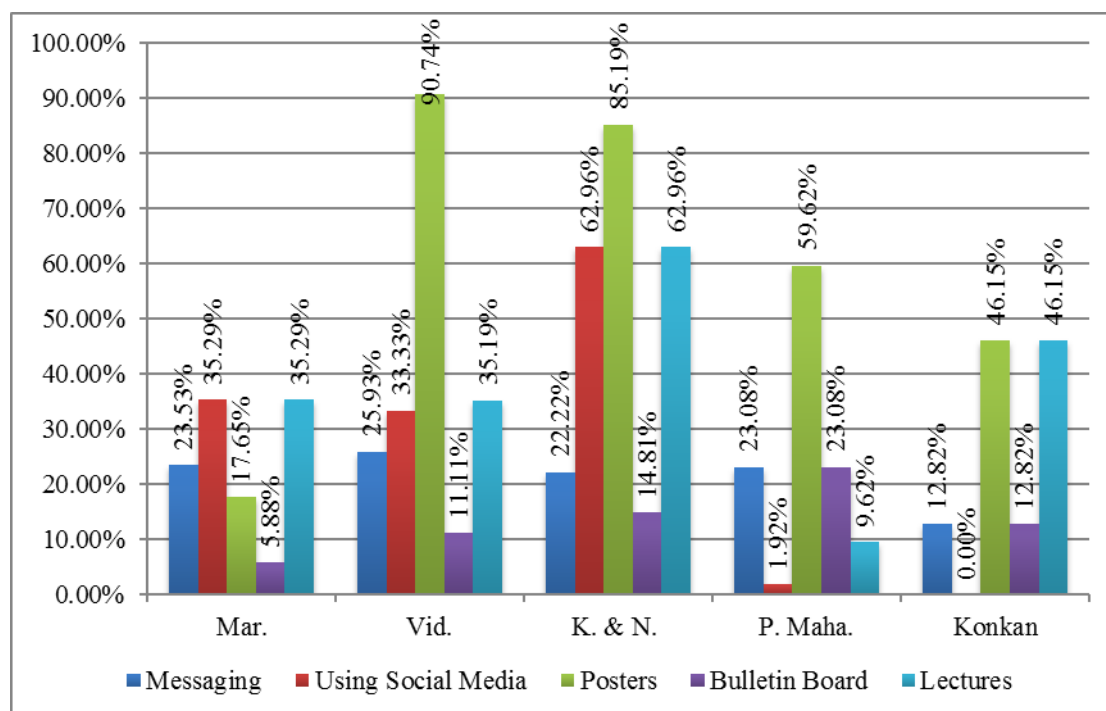
Observation:

As per table 4.63, all the libraries are using marketing strategy. Mejority of the libraries (61.65%) have used poster for marketing library and information services and followed by lecture method (34.47%).

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57. Awareness about New arrival: (Multiple Choice Question)

Table 4.64: Awareness about New Arrivals

Sr. No.	Option	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	E-mail Alert	4	3	5	9	2	23
		11.76%	5.56%	18.52%	17.31%	5.13%	11.17%
2	Display on library/ Institutional Website	2	6	3	11	7	29
		5.88%	11.11%	11.11%	21.15%	17.95%	14.08%
3	Instant Messaging Service	4	3	5	9	3	24
		11.76%	5.56%	18.52%	17.31%	7.69%	11.65%
4	Display on New Arrival Rack	34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.62: Awareness about New Arrival
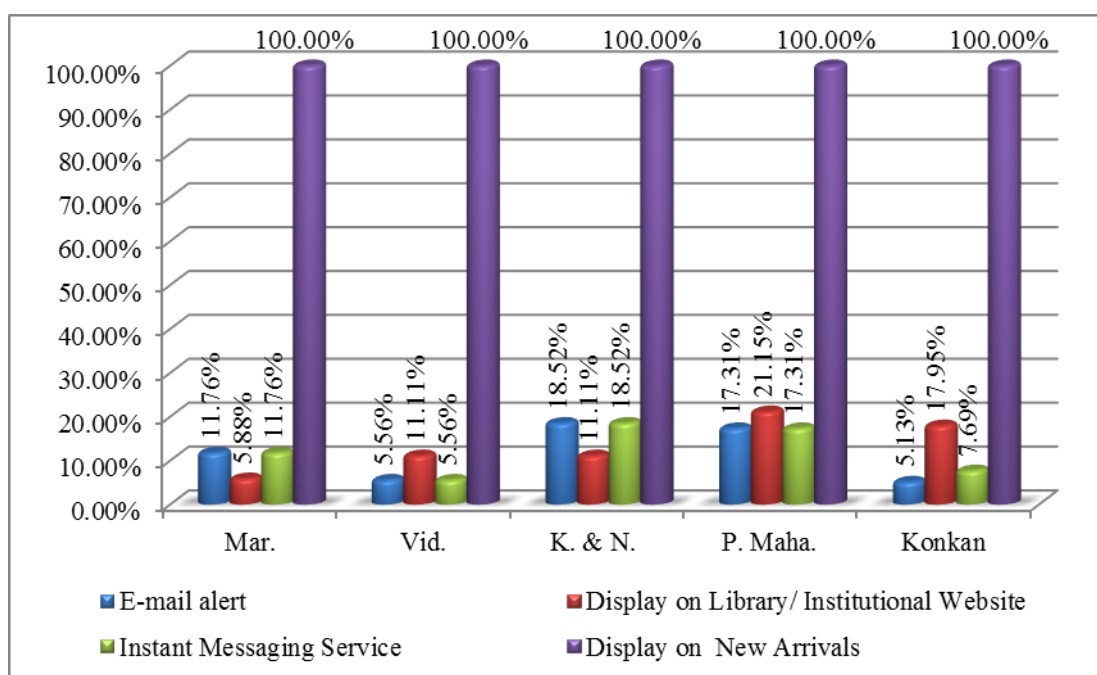
Observation:

As per table 4.64, for the awareness about new arrival, majority of the libraries (100.00%) have used traditional method which displays new book on new arrival rack whereas very few (below 14%) have used modern tools for display new arrival.

58. Use of QR Code:

Table 4.65: Use of QR code in the Libraries

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	10	13	6	16	8	53
		29.41%	24.07%	22.22%	30.77%	20.51%	25.73%
2	No	24	41	21	36	31	153
		70.59%	75.93%	77.78%	69.23%	79.49%	74.27%

Figure 4.63: Use of QR code in Libraries
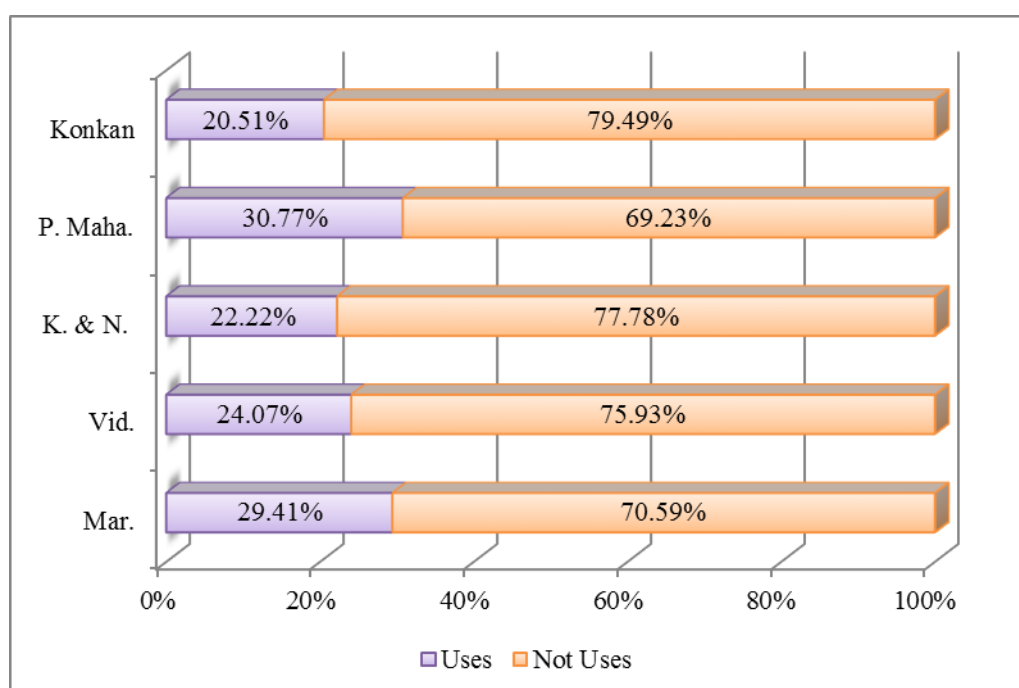
Observation:

As on table 4.65, less number of libraries (25.73%) have used QR code for sharing e-information resources.

59. Traditional Library Service Suitability with Present Library Users:

Table 4.66: Suitability of traditional library services with present library users

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	8	3	2	3	1	17
		23.53%	5.56%	7.70%	5.77%	2.56%	8.25%
2	No	26	51	25	49	38	189
		76.47%	94.44%	92.59%	94.23%	97.43%	91.74%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.64: Suitability of traditional library services with present library users
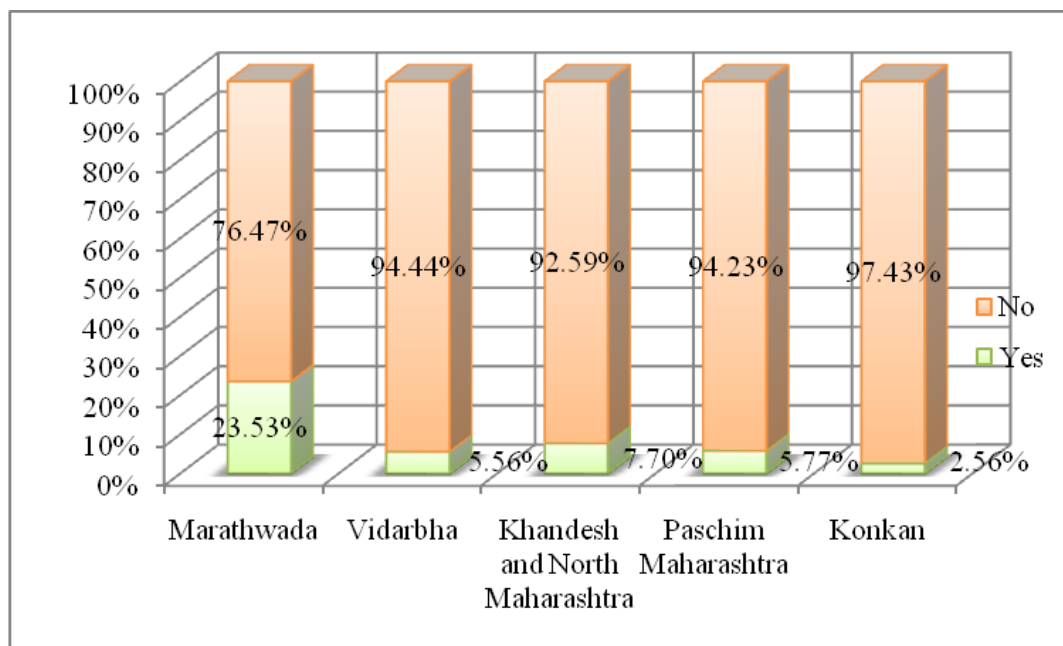
Observation:

From table 4.66, most of the librarians (91.74%) have opinioned that the traditional library services are not able to meet present need and expectations of the today's user.

60. Activities to Satisfy User Needs:

Table 4.67: Activities to Satisfy User Needs

Sr. No.	Statements	Options	Marathwada Re	Marathwada %	Vidarbha Re	Vidarbha %	Khandesh and North Maharashtra Re	Khandesh and North Maharashtra %	Paschim Maharashtra Re	Paschim Maharashtra %	Konkan Re	Konkan %	Total Re	Total %
1	College library should have sufficient infrastructure for ICT applications	Agree	24	70.59%	33	61.11%	17	62.96%	34	65.38%	28	71.79%	136	66.02%
		Strongly Agree	10	29.41%	20	37.04%	9	33.33%	18	34.62%	10	25.64%	67	32.52%
		Disagree	0	0.00%	1	1.85%	0	0.00%	0	0.00%	0	0.00%	1	0.49%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	0	0.00%	1	2.56%	2	0.97%
2	The library staff should have basic knowledge about ICT tools and usage	Agree	26	76.47%	33	61.11%	16	59.26%	34	65.38%	28	71.79%	137	66.50%
		Strongly Agree	8	23.53%	20	37.04%	10	37.04%	18	34.62%	10	25.64%	66	32.04%
		Disagree		0.00%	1	1.85%	0	0.00%	0	0.00%	0	0.00%	1	0.49%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	2	3.85%	1	2.56%	4	1.94%
3	Library should automate all its library housekeeping functions, services etc.	Agree	23	67.65%	36	66.67%	20	74.07%	30	57.69%	26	66.67%	135	65.53%
		Strongly Agree	4	11.76%	13	24.07%	2	7.41%	18	34.62%	10	25.64%	47	22.82%
		Disagree	7	20.59%	5	9.26%	2	7.41%	4	7.69%	2	5.13%	20	9.71%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	0	0.00%	1	2.56%	2	0.97%
4	Library automation can be done using open source software if there is financial crunch	Agree	20	58.82%	37	68.52%	21	77.78%	32	61.54%	26	66.67%	136	66.02%
		Strongly Agree	12	35.29%	13	24.07%	2	7.41%	18	34.62%	10	25.64%	55	26.70%
		Disagree	2	5.88%	4	7.41%	3	11.11%	2	3.85%	2	5.13%	13	6.31%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	0	0.00%	1	2.56%	2	0.97%
5	College library should have Web OPAC Facility for the user	Agree	23	67.65%	33	61.11%	22	81.48%	32	61.54%	26	66.67%	136	66.02%
		Strongly Agree	7	20.59%	16	29.63%	4	14.81%	18	34.62%	10	25.64%	57	27.66%
		Disagree	4	11.76%	5	9.26%	0	0.00%	2	3.85%	2	5.13%	11	5.33%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	5	9.62%	1	2.56%	2	0.97%

#	Statement	Response	n	%	n	%	n	%	n	%	n	%	Total n	Total %
6	College library should have remote access to learned journals	Agree	26	76.47%	42	77.78%	20	74.07%	32	61.54%	26	66.67%	146	70.87%
		Strongly Agree	5	14.71%	10	18.52%	5	18.52%	18	34.62%	10	25.64%	48	23.30%
		Disagree	3	8.82%	2	3.70%	1	3.70%	2	3.85%	2	5.13%	10	4.85%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	0	0.00%	1	3.70%	0	0.00%	1	2.56%	2	0.97%
7	Library should have independent website for providing remote access services	Agree	21	61.76%	30	55.56%	23	85.19%	34	65.38%	30	76.92%	138	66.99%
		Strongly Agree	10	29.41%	20	37.04%	2	7.41%	16	30.77%	7	17.95%	55	26.70%
		Disagree	3	8.82%	2	3.70%	1	3.70%	2	3.85%	1	2.56%	9	4.37%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	2	3.70%	1	3.70%	0	0.00%	1	2.56%	4	1.94%
8	The library website should provide linkages to open educational resources, subscribed journals, databases etc.	Agree	27	79.41%	31	57.41%	23	85.19%	34	65.38%	30	76.92%	145	70.39%
		Strongly Agree	6	17.65%	20	37.04%	2	7.41%	16	30.77%	7	17.95%	51	24.76%
		Disagree	1	2.94%	2	3.70%	1	3.70%	2	3.85%	1	2.56%	7	3.40%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	1	1.85%	1	3.70%	0	0.00%	1	2.56%	3	1.46%
9	Library should have electronic bulletin board to attract the user, to share valuable information and to promote user to use library resources and facilites	Agree	22	64.71%	32	59.26%	20	74.07%	35	67.31%	26	66.67%	135	65.53%
		Strongly Agree	3	8.82%	12	22.22%	1	3.70%	8	15.38%	8	20.51%	32	15.53%
		Disagree	4	11.76%	8	14.81%	5	18.52%	7	13.46%	4	10.26%	28	13.59%
		Strongly Disagree	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	1	0.49%
		Neutral	5	14.71%	2	3.70%	1	3.70%	1	1.92%	1	2.56%	10	4.85%
10	Digitize Unique Information materials for sharing and access	Agree	22	64.71%	34	62.96%	23	85.19%	34	65.38%	25	64.10%	138	66.99%
		Stro. Agree	8	23.53%	15	27.78%	2	7.41%	16	30.77%	8	20.51%	49	23.79%
		Disagree	3	8.82%	3	5.56%	1	3.70%	2	3.85%	4	10.26%	13	6.31%
		Stro. Disagree	1	2.94%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	0.49%
		Neutral	0	0.00%	2	3.70%	1	3.70%	0	0.00%	1	2.56%	4	1.94%
11	Library should have boundary less access to its information resources	Agree	26	76.47%	31	57.41%	23	85.19%	36	69.23%	25	64.10%	141	68.45%
		Stro. Agree	5	14.71%	13	24.07%	2	7.41%	11	21.15%	8	20.51%	39	18.93%
		Disagree	3	8.82%	8	14.81%	1	3.70%	5	9.62%	4	10.26%	21	10.19%
		Stro. Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	2	3.70%	1	3.70%	0	0.00%	1	2.56%	4	1.94%
12	Library should have high speed internet facility to accesses the E-Information resources	Agree	19	55.88%	27	50.00%	21	77.78%	34	65.38%	30	76.92%	131	63.59%
		Stro. Agree	15	44.12%	25	46.30%	4	14.81%	16	30.77%	7	17.95%	67	32.52%
		Disagree	0	0.00%	0	0.00%	1	3.70%	2	3.85%	1	2.56%	4	1.94%
		Stro. Disagree	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%
		Neutral	0	0.00%	2	3.70%	1	3.70%	0	0.00%	1	2.56%	4	1.94%

Observation:

The table 4.67 reveals that among all he librarians of five regions in Maharashtra, more than 90% librarians have expressed their opinion that activities have mentioned in the table 4.67 are true and these are appropriate to achieve today's user satisfaction.

61. Reengineering Is Essential:

Table 4.68: Opinion Regarding Reengineering

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	26	51	26	49	38	190
		76.47%	94.44%	96.29%	94.23%	97.43%	92.23%
2	No	8	3	1	3	1	16
		23.53%	5.56%	3.70%	5.77%	2.56%	7.76%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.65: Opinion Regarding Reengineering
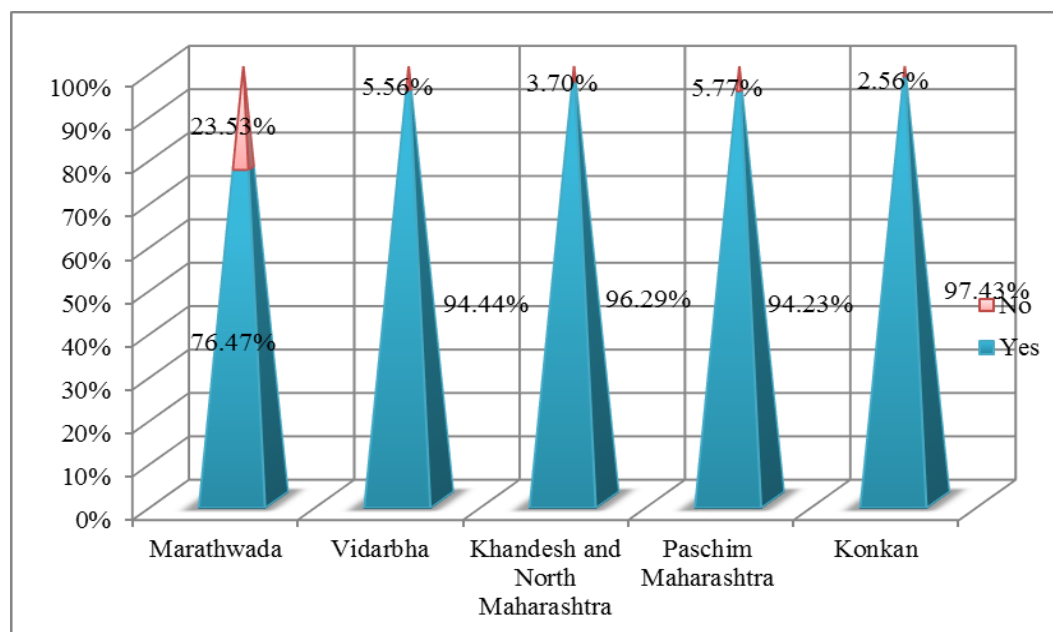
Observation:

From table 4.68, among all the librarians, majority of the librarians (92.23%) have opinioned that reengineering is essential in today's digital era.

62. Reason for Reengineering Essentials:

Table 4.69: Reason for Reengineering Essentials

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	To provide Modern Information Services	26	51	26	49	38	190
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
2	Provide Digital / Online Services	25	51	24	49	38	187
		96.15%	100.00%	92.31%	100.00%	100.00%	98.42%
3	Suitable with today's requirement	21	49	25	47	38	180
		80.77%	96.08%	96.15%	95.92%	100.00%	94.74%
4	Cost Benefits	26	51	26	49	38	190
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
5	Optimum Utilization	26	49	24	49	38	186
		100.00%	96.08%	92.31%	100.00%	100.00%	97.89%
6	Increase Quality in Services	26	51	26	49	38	190
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	Make Library more User Centric	26	51	26	49	38	190
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.66: Reason for Reengineering Essentials
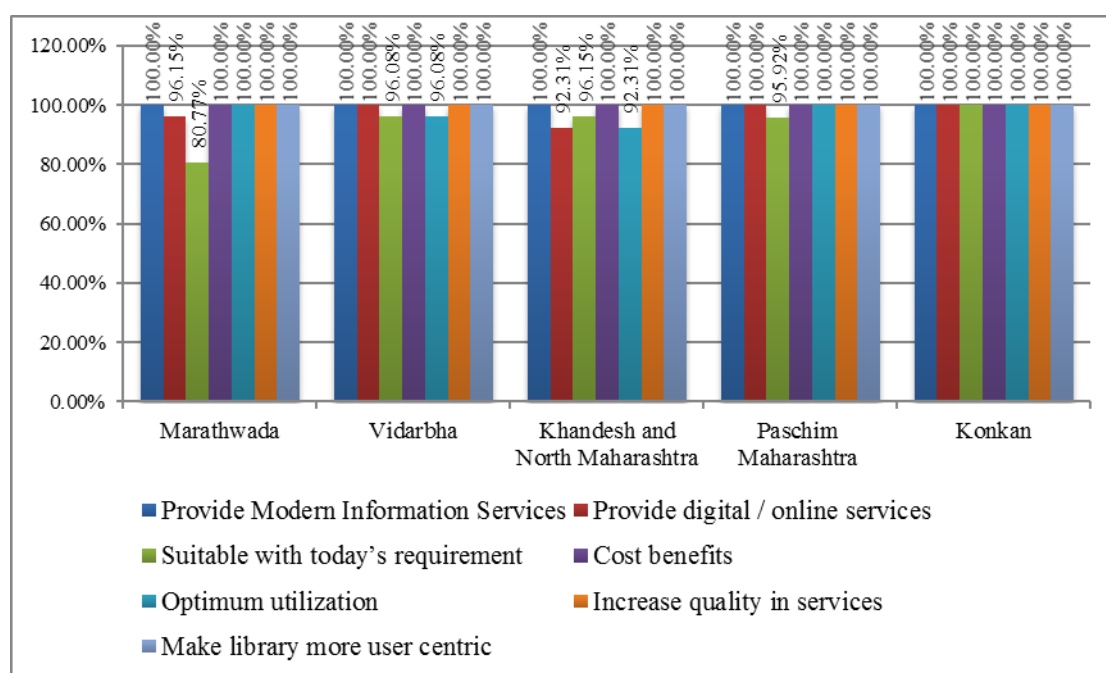
According to table 4.68, out of 190 libraries of Maharashtra, about 99% librarians have opinioned that reengineering is essential for library services and activities to provide advanced information services, online services, suitable with today's information requirement, cost benefit, optimum utilization, increase quality and make library more user centric.

63. Problems faced in the Process of Reengineering Library and Information Services: (multiple choice question)

Table 4.70: Problems Faced by the Libraries in the Process of Reengineering

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Financial Problem	25	37	20	42	33	157
		73.53%	68.52%	74.07%	80.77%	84.62%	76.21%
2	Unwillingness of Library Staff	17	12	9	8	10	56
		50.00%	22.22%	33.33%	15.38%	25.64%	27.18%
3	Technical Problems	20	35	12	17	6	90
		58.82%	64.81%	44.44%	32.69%	15.38%	43.69%
4	Lack of Skills in Library Staff	11	22	4	7	2	46
		32.35%	40.74%	14.81%	13.46%	5.12%	22.33%
5	Lack of Infrastructure	19	28	13	15	10	85
		55.88%	51.85%	48.14%	28.84%	25.64%	41.26%
6	No Problems Faced	8	11	6	10	6	41
		23.53%	20.37%	22.22%	19.23%	15.38%	19.90%

Figure 4.67: Problems faced by the Libraries in the Process of Reengineering
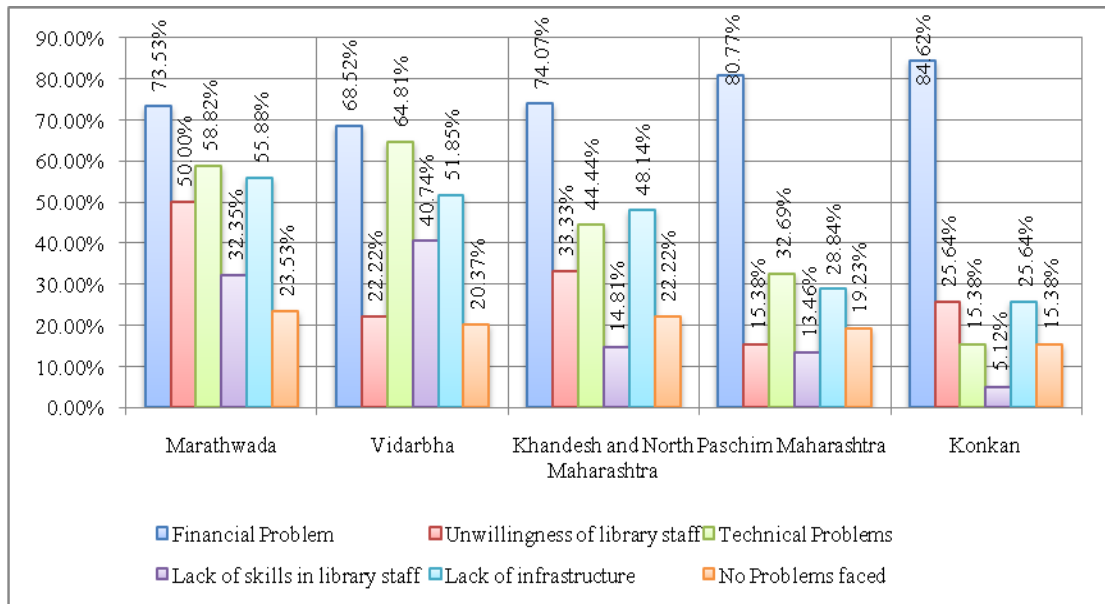
Observation:

As per table 4.70, it is observed that majority of the librarians (76.21%) have faced financial problem for reengineering their library and followed by the technical problems (43.90%).

64. Reengineering serve the purpose:

Table 4.71: Opinion about Reengineering Serve the Purpose

Sr. No.	Options	Marathwada	Vidarbha	Khandesh and North Maharashtra	Paschim Maharashtra	Konkan	Total
1	Yes	26	51	26	49	38	190
		76.47%	94.44%	96.29%	94.23%	97.43%	92.23%
2	No	8	3	1	3	1	16
		23.53%	5.56%	3.70%	5.77%	2.56%	7.76%
Total		34	54	27	52	39	206
		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Figure 4.68: Opinion about Reengineering Serve the Purpose
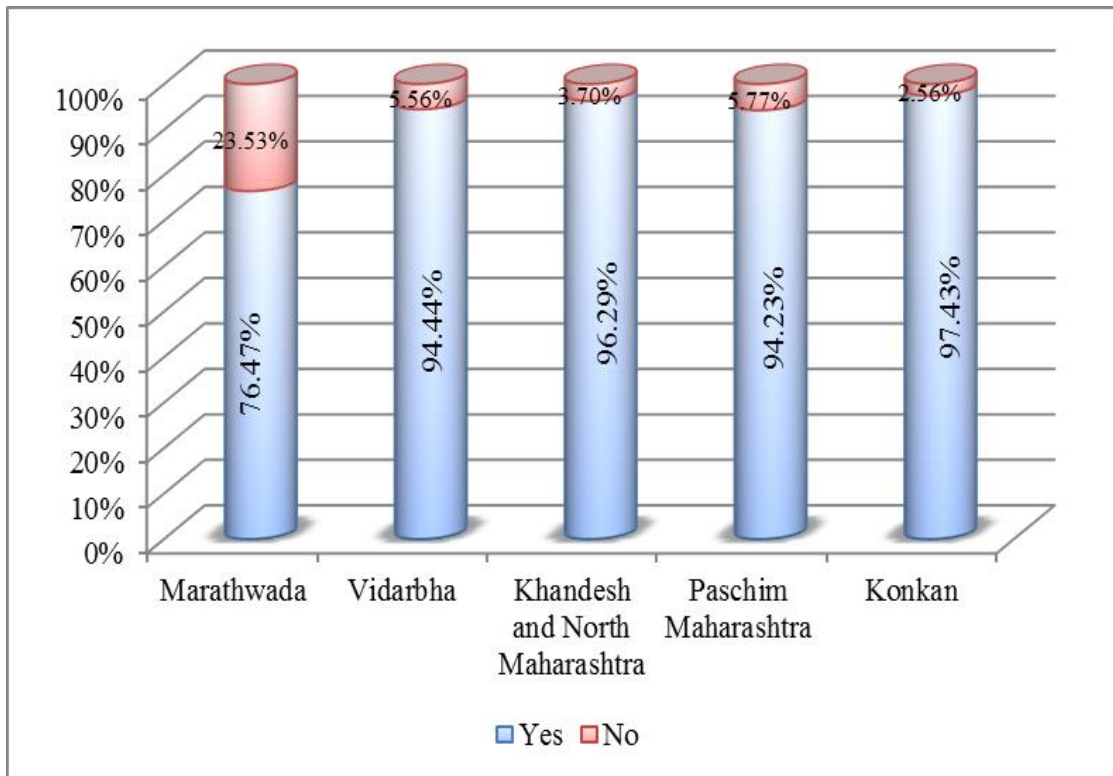
Observation:

As on table 4.71, it is observed that majority of librarians (92.23%) have opinioned, reengineering is essential and it serves the purposes of increase the quality in library services and activities, optimum utilization of library resources and services etc.

65. The Comparison of Traditional Library Services and Modern Library Services:

Availability of traditional library as well as modern library services are as bellow:

Table 4.72: Traditional and Modern Library Services

Sr. No.	Services	Options	Form	Marathwada		Vidarbha		Khandesh and North Maharashtra		Paschim Maharashtra		Konkan		Total	
				R	%	R	%	R	%	R	%	R	%	R	%
1	Circulation	Traditional	Manual	9	26.47%	9	16.67%	7	25.93%	8	15.38%	10	25.64%	43	20.87%
		Modern	Automated	28	82.35%	47	87.04%	22	81.48%	49	94.23%	28	71.79%	174	84.47%
2	Reference service	Traditional	As on printed sources	7	20.59%	10	18.52%	11	40.74%	14	26.92%	9	23.08%	51	24.76%
		Modern	Reference Desk	6	17.65%	5	9.26%	7	25.93%	9	17.31%	6	15.38%	33	16.02%
3	Current Awareness Service	Traditional	Display/ circulate	33	97.06%	41	75.93%	25	92.59%	46	88.46%	32	82.05%	177	85.92%
		Modern	By mail/ website	23	67.65%	38	70.37%	23	85.19%	44	84.62%	29	74.36%	157	76.21%
4	Selective Dissemination of Information	Traditional	Printed & by hand	21	61.76%	27	50.00%	16	59.26%	29	55.77%	21	53.85%	114	55.34%
		Modern	E-document delivery	26	76.47%	42	77.78%	21	77.78%	43	82.69%	27	69.23%	159	77.18%
5	Catalogue Services	Traditional	Card Catalog	1	2.94%	0	0.00%	0	0.00%	2	3.85%	1	2.56%	4	1.94%
		Modern	OPAC	19	55.88%	40	74.07%	21	77.78%	48	92.30%	24	61.53%	152	73.78%
6	Inter Library Loan	Traditional	Lending printed collection	4	11.76%	10	18.52%	2	7.41%	15	28.85%	8	20.51%	39	18.93%
		Modern	Consortia	20	58.82%	33	61.11%	14	51.85%	45	86.54%	22	56.41%	134	65.05%
7	Indexing	Traditional	Manual methods	2	5.88%	9	16.67%	5	18.52%	11	21.15%	8	20.51%	35	16.99%
		Modern	Online search	15	44.12%	26	48.15%	18	66.67%	19	36.54%	12	30.77%	90	43.69%
8	Abstracting	Traditional	Circulating by hand	2	5.88%	4	7.41%	5	18.52%	3	5.77%	5	12.82%	19	9.22%
		Modern	Online databases	15	44.12%	40	74.07%	11	40.74%	35	67.31%	22	56.41%	123	59.71%
9	Newspaper clipping	Traditional	Printed form	33	97.06%	38	70.37%	24	88.89%	46	88.46%	34	87.18%	175	84.95%
		Modern	Digital form	6	17.65%	10	18.52%	5	18.52%	12	23.08%	7	17.95%	40	19.42%
10	New Arrival	Traditional	Display on rack	21	61.76%	27	50.00%	16	59.26%	29	55.77%	21	53.85%	114	55.34%
		Modern	Messaging, mail, website	4	11.76%	3	5.56%	5	18.52%	9	17.31%	3	7.69%	24	11.65%

Figure 4.69: Traditional and Modern Library Services
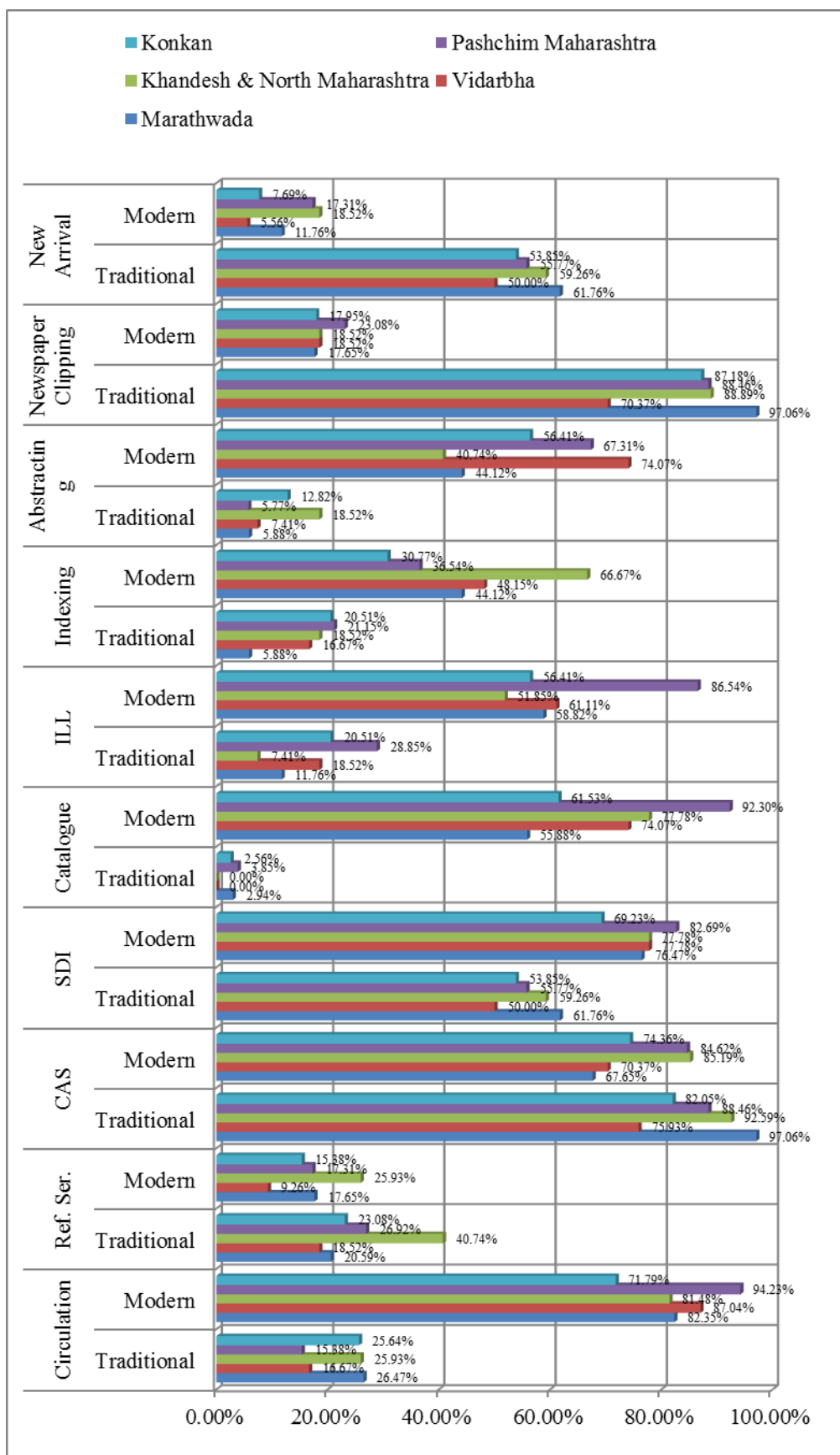
Observation:

From the table 4.72, among the all traditional and modern library services, most of the modern services have more availability in the libraries viz. Circulation (84.47%), SDI (77.18%), Cataloging service (73.78%), Inter library loan (65.05%), Indexing (43.69%), and Abstracting (59.71%) etc. The availability of some traditional services is found more than modern services viz. Reference service, CAS, newspaper clipping and new arrival etc.

66. Region wise Reengineering of Library Services which are Reengineered as well as Advanced Services in all the Libraries of Maharashtra:

Table 4.73: Reengineering of Library Services

Sr. No.	Modern Services	Marathwada No.	Marathwada %	Vidarbha No.	Vidarbha %	Khandesh and North Maharashtra No.	Khandesh and North Maharashtra %	Paschim Maharashtra No.	Paschim Maharashtra %	Konkan No.	Konkan %	Table no.
1	Availability of Internet	31	91.18%	52	96.30%	25	92.59%	52	100.00%	38	97.44%	4.17
2	Availability of Wi-Fi	16	47.06%	31	57.41%	17	62.96%	33	63.46%	31	79.49%	4.2
3	OPAC	19	55.88%	40	74.07%	21	77.78%	48	92.31%	24	61.54%	4.32
4	Automated circulation	27	79.41%	45	83.33%	22	81.48%	45	86.54%	29	74.36%	4.32
5	Virtual Reference Desk	6	17.65%	5	9.26%	7	25.93%	9	17.31%	6	15.38%	4.32
6	Subscription of E-Journal	15	44.12%	31	57.41%	10	37.04%	38	73.08%	22	56.41%	4.32
7	Subscription of Databases	15	44.12%	30	55.56%	10	37.04%	37	71.15%	22	56.41%	4.32
8	E-Books	17	50.00%	39	72.22%	18	66.67%	43	82.69%	24	61.54%	4.32
9	Collection of CDs/DVDs	28	82.35%	39	72.22%	20	74.07%	45	86.54%	35	89.74%	4.16
10	Independent Library Website	3	8.82%	4	7.41%	3	11.11%	8	15.38%	7	17.95%	4.4
11	Online User Education	8	23.53%	5	9.26%	7	25.93%	12	23.08%	4	10.26%	4.32
12	Instant Messaging Service	5	14.71%	4	7.41%	4	14.81%	6	11.54%	2	5.13%	4.32
13	E-Mail Alert	7	20.59%	3	5.56%	5	18.52%	4	7.69%	3	7.69%	4.32
14	Digital Repository	6	17.65%	6	11.11%	4	14.81%	10	19.23%	5	12.82%	4.59
15	E-Notes on Topics	4	11.76%	2	3.70%	4	14.81%	7	13.46%	3	7.69%	4.61
16	Digital Copy of Syllabus	6	17.65%	6	11.11%	4	14.81%	10	19.23%	5	12.82%	4.61
17	Digital Copy of Previous Question Paper	6	17.65%	6	11.11%	4	14.81%	10	19.23%	5	12.82%	4.61
18	Video Lectures/ NPTEL Videos	4	11.76%	6	11.11%	4	14.81%	9	17.31%	5	12.82%	4.61
19	E-Current Awareness Service	23	67.65%	38	70.37%	23	85.19%	44	84.62%	29	74.36%	4.32
20	E-Document Delivery Service	26	76.47%	42	77.78%	21	77.78%	43	82.69%	27	69.23%	4.32
21	Online Reservation/Renewal Service	4	11.76%	7	12.96%	4	14.81%	10	19.23%	8	20.51%	4.32
22	Translation service tools	0	0.00%	0	0.00%	0	0.00%	1	1.92%	0	0.00%	4.32
23	Downloading facility	3	8.82%	4	7.41%	3	11.11%	8	15.38%	7	17.95%	4.32
24	Photocopy Facility	25	73.53%	31	57.41%	19	70.37%	44	84.62%	31	79.49%	4.2
25	Barcoding to Library Collection	24	70.59%	32	59.26%	20	74.07%	41	78.85%	23	58.97%	4.41
26	E-Library	22	64.71%	23	42.59%	16	59.26%	31	59.62%	24	61.54%	4.21
27	RFID	0	0.00%	0	0.00%	0	0.00%	0	0.00%	1	2.56%	4.34
28	Participation in Consortia	16	47.06%	32	59.26%	10	37.04%	42	80.77%	24	61.54%	4.5
29	Use of OER	25	73.53%	40	74.07%	22	81.48%	40	76.92%	25	64.10%	4.52
30	Use of QR Code	10	29.41%	13	24.07%	6	22.22%	16	30.77%	8	20.51%	4.65

Observation:

From the table 4.73, among all the libraries of five regions of Maharashtra, modern library and information services have been analyzed. It is observed that most of the modern services are available in the libraries viz. Photocopy facility, OPAC, Use of OER, E-CAS, E-DDS, Collection of CDs/DVDs, Automated circulation and availability of Internet etc. lack of availability of some modern service in the libraries is found these are Translation tools, RFID, E-notes on topic, Instant Massaging, E-Mail Alert, Library web page, Downloading, Digital Repository, Lecture Videos etc. This also helps to make a comparison within the five regions of Maharashtra.

67. Less availability of the Services in most of the College Libraries:

Table 4.74: Less Availability of the Modern Services

Sr. No.	Library Services and Facilities	Overall Colleges	Overall %
1	Translation Service Tools	1	0.49%
2	RFID	1	0.49%
3	E-Notes on Topics	14	6.79%
4	Instant Messaging Service	21	10.19%
5	E-Mail Alert	22	10.68%
6	Independent Library Website	25	12.14%
7	Downloading facility	25	12.14%
8	Video Lectures/ NPTEL Videos links	28	13.59%
9	Digital Repository	31	15.05%
10	Digital copy of Syllabus	31	15.05%

Observation:

It is observed that the services given in the table 4.74 are not available in most of the libraries of Maharashtra.

Figure 4.70: Less Availability of the Modern Services
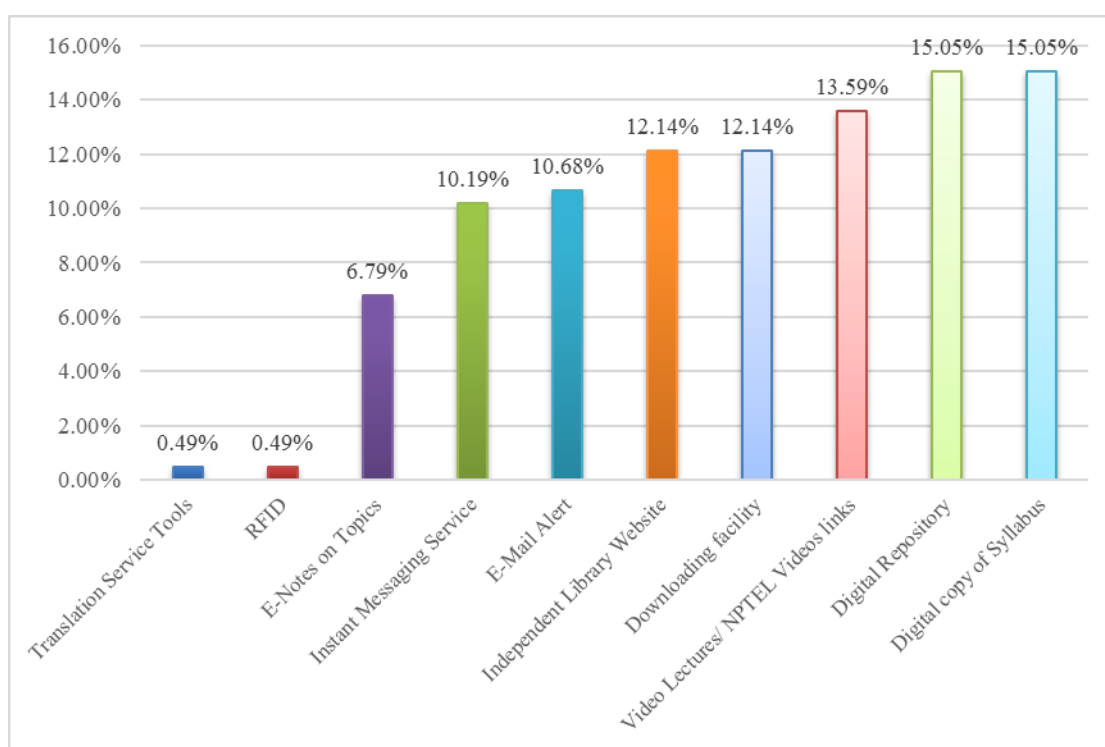
The services mentioned in the Table 4.74 found in a very less number of college libraries where the services need to have in college libraries of Maharashtra.

68. Average number of services:

Table 4.75: Average Availability of Modern Services

Sr. No.	Library Services and Facilities	Overall Colleges	Overall %
1	Subscription of Database	114	55.34%
2	Subscription of E-Journal	116	56.31%
3	E-Library	116	56.31%
4	Participation in Consortia	124	60.19%
5	Availability of Wi-Fi	128	62.14%
6	Barcoding to Library Collection	140	67.96%
7	E-Books	141	68.45%

Figure 4.71: Average Availability of Modern Services
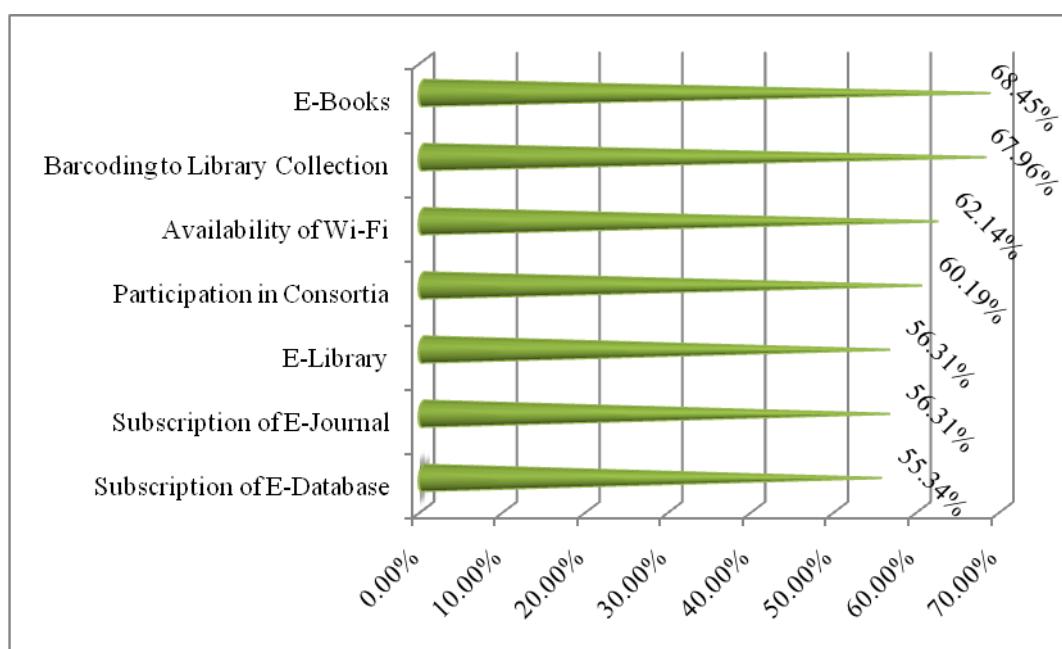
Observation:

It is observed that the services given in the table 4.75 are average availability in most of the libraries of Maharashtra.

69. Maximum Availability of following Modern Services

Table 4.76: Maximum Availability of Modern Library Services

Sr. No.	Library Services and Facilities	Overall Colleges	Overall %
1	Photocopy Facility	150	72.82%
2	OPAC	152	73.79%
3	Use of OER	152	73.79%
4	E-Current Awareness Service	157	76.21%
5	E-Document Delivery Service	159	77.18%
6	Collection of CDs/DVDs	167	81.07%
7	Automated circulation	168	81.55%
8	Availability of Internet	198	96.12%

Figure 4.72: Maximum Availability of Modern Library Services
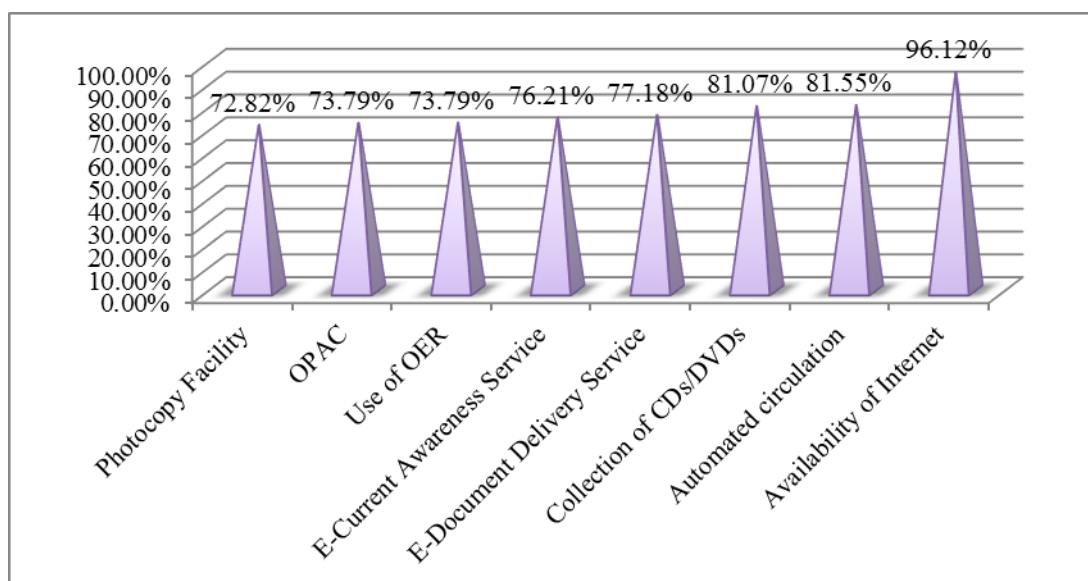
Observation:

It is observed that the services given in the table 4.76 are available in most of the libraries of Maharashtra.

70. The Comparison of Reengineering the Library Services within the Regions of Maharashtra is as given below:

The comparison among all the region has been calculated with the help of weighted mean. In Gupta's book on statistical method, the weighed mean has been calculated of all the five regions is as below:

Table 4.77: Assigning Weighted Mean for the Region

Sr. No.	Regions	Number of services in which regions is at				
		1st Position	2nd Position	3rd Position	4th Position	5th Position
1	Marathwada	2	7	3	9	7
2	Vidarbha	1	3	7	6	11
3	K. & N. Maha.	4	4	10	5	3
4	P. Maha.	16	8	4	0	1
5	Konkan	7	6	2	8	6

Weights are assigned to these positions as 100, 80, 60, 40, and 20 respectively. The overall reengineering status of all regions of Maharashtra is calculated using weighted mean as follow:

Table 4.78: Comparison within the Region about Reengineering Status

Sr. No.	Region	Weighted Mean/Overall Status
1	Paschim Maharashtra	8.3
2	Konkan	5.8
3	Khandesh & Northern Maharashtra	5.2
4	Marathwada	4.6
5	Vidarbha	4.0

Figure 4.73: Comparison within the Region about Reengineering Status
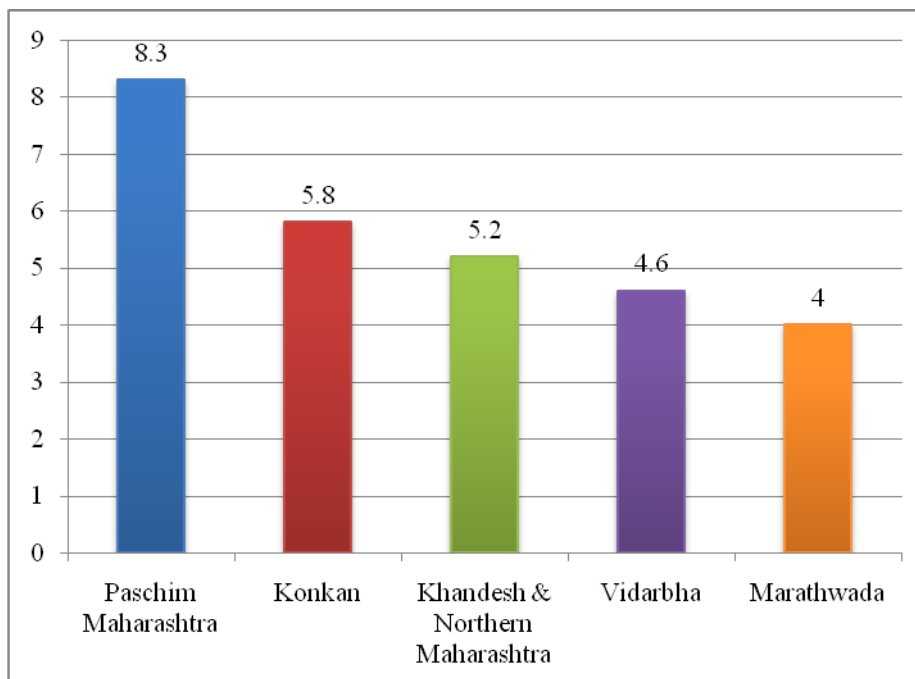
Observation:

Among the 5 regions, the comparison is given in the table 4.78. Among 5 regions, Paschim Maharashtra is found at the 1st rank followed by Konkan region on 2nd rank. On the 3rd rank Khandesh and North Maharashtra followed by Marathwada on the 4th rank and the last among five regions is Vidarbha region.

4.3 Summary:

In this chapter, 206 questionnaires have been analyzed systematically and presented in a tables as well as figures. There are four sections have made in the present chapter. In the first section basic data (Numbers 1 to 5) of the libraries have been analyzed. It is revealed the qualification of librarians, phases of college establishment, number of library staff and separate library website etc. In second section of the chapter (Numbers 6 to 19) focused on the available resources and facilities in the library for serve their user. In this section region wise availability of printed as well as e-collection, available equipments, tools etc. have been analyzed. In the third section (Numbers 20 to 25), library budget of all regions have been analyzed and it is found that most of the libraries suffering from financial crunch. It is also observed that not proper management of the sanctioned budget because more than75% budget is spent on traditional resources which are not well utilized by their user. In the fourth section (Numbers 26 to 63), modern / advanced library and information services and activities have been analyzed and it is observed that most of the libraries of all regions have modern library and information services but not all the modern services which are need to have in the library in present era. As per the librarian's opinions, it is observed that traditional library services are not able to cater todays advanced need of information. As per the availability of modern library and information services, the comparison is made among all five regions of Maharashtra. The comparison shows, Paschim Maharashtra region is more reengineered their library and information services in comparisons to other regions of Maharashtra and followed by Konkan region. Overall, it is observed that there is need to reengineering the library and information activities and services.

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CHAPTER V

RESEARCH FINDINGS, SUGGESTIONS AND CONCLUSIONS

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RESEARCH FINDINGS, SUGGESTIONS AND CONCLUSIONS

5.1 Introduction:

The present study has been carried out through conducting a systematic survey of 206 Arts, Commerce and Science College (aided) libraries in Maharashtra with keeping an approach of reengineering of college library services. College libraries are still under developing because of lack of attention towards quality of library and information services. Limited number of colleges has a good library and has moderate budget and systematic approach to allocate the available budget. In fact, in the present digital era, LIS professional needs very proper approach in select, collect, manage, organize and access the resources.

This chapter is an essence of the present study therefore, researcher has compiled the findings from the observations deduced from the data collection chapter 4. Moreover, the major suggestions and recommendations are presented in this chapter based on the findings. At the end of this chapter, the hypothesis testing and scope for further research has presented.

5.2 Research Findings:

The findings are based on the data collected from 206 Arts, Commerce and Science College (aided) libraries of Maharashtra which have been analyzed in the data analysis chapter. The major findings of the present study are as follow:

1. **Qualifications of the LIS Professionals:**

   It is found that out of 206 college librarians of Maharashtra, 35% librarians have research degrees including M.Phil. & Ph.D. and 50.97% Librarians have SET/NET Qualification.

2. **Phases of Colleges Establishment in Maharashtra:**

   Among the surveyed college libraries and responses received, Collage libraries in Maharashtra initiated prior to 1900 (0.48%). The maximum growth of college libraries took place during the period 1961-1990 (56.31%). Following to this during 1990-2018, 28.64% colleges have been established.

3. Library Websites:

It is found that only 12.13% (25 libraries out of 206) have an independent library website to provide library services online. Remaining 87.86 (181 libraries out of 206) have not library webpage.

4. Library Staff:

Only 1.45 % libraries have more than 21 library staff, but majority of college libraries (60.67%) have 2-4 staff members in their library.

5. Library Collection:

5.1 Books: Only 19.19% libraries have collection more than 60,000 and have better print resources also.41.25% libraries have collection in between 1,000 to 20,000. 38.81% libraries have collection in between 20,000 to 60,000.

5.2 Periodicals: 48.05% libraries have periodicals more than 51 and have better titles also. Majority of libraries (51.95%) have collection up to 50 periodicals.

5.3 E-Resources: Among the five regions of Maharashtra, the libraries of Paschim Maharashtra have more availability of e-books (82.69%) follwed by libraries of Vidarbha region (72.22%). In case of e-journal and databases, more availability is found in the libraries of Vidarbha region. In all the libraries, the collection of CDs/DVDs found more than other e-information resources.

5.4 Collection of Other Printed Information: In other printed information resources, 100% libraries have subscription to daily newspapers, 93.68 libraries have collection of bound volumes. Maps, manuscripts, reports, Theses / Dissertations / Projects have found in limited number of college libraries.

6. Collection Development:

6.1 Books: Average 400 books purchased every year in the college libraries of Maharashtra. Among the five regions of Maharashtra, the libraries of Paschim Maharashtra purchased maximum titles (441) followed by libraries of Konkan region and less title (334) purchased in the libraries of Vidarbha Region.

6.2 Periodicals: In the last three years no any changes in the subscription of printed journal. The trend of subscription to printed journals is same from previous three years.

6.3 E-Resources: Little (1.00%) increment is found in expenditure on e-resources.

7. Internet Connectivity in the Libraries:

Most of the college libraries (96.12%) have Internet connection but still few libraries (3.88%) do not have internet connection. Among these, most of the college libraries (77.18%) have speed of Internet connectivity more than 4mbps whereas 22.82% libraries have speed of internet connectivity is less than 4mbps.

8. Availability of Modern Equipments in the Libraries:

Most of the equipemnts are found in the libraries viz. barcode reader, barcode printer, laser jet printer, server, scannar, UPS, photocopy machine, wifi router etc. But few equiepmnets found in the libraries viz. inkjet printer, dot matrics printer, LCD projector and web camera. Inkjet printer and dot matrics printer are not used in libraries now days.

9. Availability of Modern Facilities in the Libraries:

Modern facilites are available in the libraries viz. Photocopy (67.96%), Internet (96.12%), Ear phones for audio book reader (51.46%) and Wi-Fi facility (62.14%). Few libraries are not implemented the facilities in libraries viz. Laptop (0.00%), Tablet Pcs/e-book reader (0.00%), Discussion Café (0.00%) etc.

10. Sections of Libraries:

Availability of Circulation, periodical and stack section have found in 100.00% libraries of Maharashtra. E-library section (56.31%) and rare and manuscripts section (34.95%) have found in a few libraries of Maharashtra.

11. Students Strength in Colleges of Maharashtra:

It is observed that most number of colleges (38.83%) have students strength in between 500 to 1000 and followed by the strength (20.38%) in between 100 to 1000. It is also observed that 19.90% colleges have student strength more than 2000.

12. Number of Library Users Visits the Library: (Per day)

It is observed that most of the libraries (62.14%) have users visit up to 150 (per day) whereas few libraries (37.36%) have users visit more than 150 per day.

13. Various Purpose to Visit the Library:

The purposes of library visit are as below:

- For study purpose (Daily Average=82)
- For circulation (Daily Average=75)
- Visits for reading newspapers (Daily Average=55)
- Visits for use of Internet (Daily Average=39)
- Visits for use of periodicals (Daily Average=19)
- Visits for use of e-journals/e-books (Daily Average=18)
- Visits for research work (Daily Average=16)
- Visits for use of reference sources (Daily Average=12)

Most number of user visits to library for study (82) and follwed by circulation purpose (75). 16 libraryies have less number of user's vistis to the library.

14. Sources of Library Finance:

In all the sources of library finance, 100.00% libraries have finance form library fees and 75.24% libraries have funds from UGC

15. Library Budget and Expenditure:

It is observed that 98.05% libraries of all the regions of Maharashtra have annual library budget less than 5 lakh.

It is also found that during academic year 2015-16, 2016-17 and 2017-18, no considerable changes have been found in the expenditure. Most of the percentage of library budget (55.50%) is spent on printed books and followed by periodicals expenditure (19.81%). For the e-information resources, only 5.35% budget is spent.

16. Budget Sufficiency:

Most of the libraries (92.23%) have not satisfactory annual library budget. Few libraries (7.77%) have satisfactory budget provision.

While facing financial crunch, most libraries (73.79%) have used the option of OER and followed by Internet facility.

17. Availability of Traditional Library Services in Libraries:

It is found that most number of college libraries provides the library and information services by traditional way viz. Referral Service (40.29%), Current Awareness Service (85.92%), SDI (55.34%), Newspaper Clipping Service (84.95%), and New Arrival Display (55.34%).

18. Availability of Modern Library Services in Libraries:

Among the listed modern library services, maximum services are available in most of the college libraries viz. Automated Circulation (81.55%), Current Awareness Services (76.21%), E-journals Access (56.31%), Databases Access (55.34%), E-books Access (68.45%) and E-Document Delivery Services (77.18%). Some of the modern services are not available in most of the college libraries.

19. Librarians Opinion About Problems Related to Traditional Library Services:

It is observed that all the opinions given in the Table 4.33 are in the side of reengineering of library and information services. More than 90% librarians have agreed to all the nine opinions which show the problems in traditional library services in present era.

20. RFID Status of Libraries:

Out of 206 libraries of Maharashtra, only 1 college library is found from Konkan region which applied RFID technology. Because, RFID Technogy is not affordable to most of the colleges libraries (66.82%) and 28.78% librarians have expressed their opinion that no need RFID technology in their library.

21. Automation Status of College Libraries:

It is observed that most of the college libraries (51.46%) are partially automated and less number of libraries (18.45%) are not automated yet. Among these 18.45% libraries, they have faced problem for automation like financial problem, technical problem, lack of support from higher authorities etc.

22. Software used for Library Automation:

It is observed that 20 different softwares have used to automate 168 (81.55%) libraries. Out of these 20 softwares, most libraries have installed SOUL software and followed by LIBMAN library automation software.

It is also found that maximum number of college libraries have been automated during the year 2001 to 2010.

23. Areas of Library Automated:

Most of the libraries have automated circulation (81.55%) and followed by library administration (58.25%). Few libraries have automated serial control (34.95%) and budget (31.07%).

Hence it is observed that most of the college libraries have used library automation software to automate circulation section only.

24. Barcoding Status of Libraries:

It is observed that majority of the libraries (67.96%) have barcoded their library collection.

25. Circulation Policy:

25.1   For Students: It is observed that most of the libraries (64.56%) have allowed up to 3 books to each student for home lending. Most of the libraries (67.48%) have allowed to renewal issued books up to 2 times and most of the libraries (56.31%) issue books for up to 7 days.

25.2   For Teachers: Most of the libraries (73.79%) have allowed up to 20 books to each Teacher for home lending. Most of the libraries (52.43%) have allowed to renewal issued books up to 5 times and most of the libraries (41.75%) issue books for more than 20 days.

25.3   For Non-Teaching Staff: Most of the libraries (52.43%) have allowed up to 5 books to each Non-teaching staff for home lending. Most of the libraries (60.68%) have allowed to renewal issued books up to 5 times and most of the libraries (46.12%) issue books for 10 days.

26. Subscription of Printed Journals:

Very few libraries (20.39%) have sufficient periodicals to satisfy users' information need. Among the libraries of Maharashtra, few libraries (16.02%) are issuing periodicals to their user for home lending.

27. Subscription of E-journals & E-databases:

Most of the libraries have subscribed e-journal (56.31%) access and Databases (55.34%) access for their user. Among these, most of the libraries (74.56%) have subscribed access to N-LIST Database followed by DELNET Database.

28. Consortia Adopted by Libraries:

It is observed that most of the libraries (74.56%) have participated in various consortia. Among these, most of the libraries (41.26%) have participated in N-LIST and followed by DELNET Consortium (14.08%).

29. Access to Open Educational Resources:

Few libraries (24.27%) have not provided access to Open Education Resources. From the libraries of Maharashtra (97.14) libraries have used posters and guidelines displayed in library as tools for sharing access to OER and followed by link provided at website (43.59%).

30. Library Security:

The majority of libraries (79.61%) have installed CCTV camera in their library for security purpose.

31. User Education:

It is found that all the libraries of Maharashtra provide user education. Majority of the libraries (92.72%) have used traditional method of library orientation whereas few libraries (12.14%) have used modern tool to provide library orientation.

32. Feedback Method:

All the librarians (100.00%) are taking library feedback to know the user opinion. Majority of the librarians (73.78%) have used traditional method to take feedback whereas few librarians (26.21%) have used modern tools to take feedback.

33. Digital Repository in College Libraries:

Only few libraries (15.05%) from the Maharashtra have created Institutional Repository. Among these, majority of the libraries have used D-Space Digital Library Software for creating Institutional Repository.

34. Digitization of Rare Books:

It is found that few librarians (18.93%) have digitized rare collection of their libraries.

35. Marketing Strategies used:

It is found that all the libraries using marketing strategy for library and infoormatiion services. Mejority of the librarians (61.65%) are using poster for marketing library and information services and followed by lecture method (34.47%).

36. Awareness About New Arrievals:

To aware user about new arrivals, all the librarians (100.00%) have used traditional method where display new books on new arrival rack whereas few (14%) are using modern tools to aware user about new arrival.

37. Uses of QR Code:

Few libraries (25.73%) have found which applied QR code technology for sharing e-information resources.

38. Opinion About Traditional Library:

According to the 91.74% college librarians of Maharashtra, the traditional library services and activities are not able to meet the present need and expectations of today's user.

39. Activities to Satisfy User's Needs:

Among all librarians of Maharashtra, more than 90% librarians have expressed their opinion that the activities mentioned in the table 4.67, are true and these are all applicable to achieve today's user satisfaction.

40. Essential of Reengineering:

Among 206 librarians, majority of librarians (92.23%) have expressed their opinion that reengineering is an essential in today's digital era. Among them most of the librarians (99.00%) have expressed their opinion that reengineering is essential for library services and activities to provide advanced information services, online

services, suitable with today's information requirement, cost benefit, optimum utilization, increase quality and make library more user centric.

41. Problems faced by librarians in the Process of Reengineering

It is observed that majority of the librarians (76.21%) have mentioned financial problem for reengineering their library and followed by the technical problems (43.90%).

42. Reengineering Serve the Purpose:

It is observed that majority of librarians (92.23%) have expressed their opinion, reengineering is essential and it serves the purpose of library.

43. Traditional Library Services and Modern Library Services:

Among all traditional and modern library services, most of the modern services have maximum availability in the libraries viz. Circulation (84.47%), SDI (77.18%), Cataloging service (73.78%), Inter library loan (65.05%), Indexing (43.69%), and Abstracting (59.71%) etc. The availability of some traditional services is found more than modern services viz. Reference service, CAS, newspaper clipping and new arrival etc.

44. Region wise Reengineering of Library Services:

It is observed that most of the modern services are available in the libraries viz. Photocopy facility, OPAC, Use of OER, E-CAS, E-DDS, Collection of CDs/DVDs, Automated circulation and availability of Internet, etc. lack of availability of some modern service in the libraries Viz. Translation tools, RFID, E-notes on topic, Instant Massaging, E-Mail Alert, Library web page, Downloading, Digital Repository, Lecture Videos, etc. This also helped to make a comparison within the five regions of Maharashtra.

45. Comparison among the regions in Reengineering of Library Services:

Among the 5 regions, the comparison is given in the table 4.75. Among these 5 regions, Paschim Maharashtra is found at the 1st rank followed by Konkan region on 2nd rank. On the 3rd rank Khandesh and North Maharashtra followed by Marathwada on the 4th rank and the last among five regions is Vidarbha region.

5.3 Hypothesis Testing:

The hypotheses of the present study have been tested as below:

Hypothesis 1: Most of the college libraries provide traditional library services even though there are effective modern tools.

Testing:

While analyzing the collected data, it is found that most of the libraries have not implemented modern technologies to provide advanced library services and facilities to their user as recorded in Table 4.32, Table, 4.55, Table 4.65, Table 4.72, and Table 4.74 etc. Hence, this hypothesis is proved.

Hypothesis 2: Due to financial problems, lack of trainings and lack of skills, most of the Librarians in Maharashtra have not reengineered their library and information services.

Testing:

It is observed from majority of the librarians (i.e.76.21%) have faced financial problem for reengineering their library and followed by the technical problems (43.90%). Hence, this hypothesis is also proved.

Hypothesis 3: In Arts, Commerce and Science college libraries more than 75% budget is spent on traditional resources only.

Testing:

It is found that maximum percentage of total library budget (55.50%) is spent on printed books and followed by periodicals expenditure (19.81%). For the e-information resources, only 5.35% of the total budget is spent. Hence this hypothesis is proved.

All the hypotheses of this study have been proved through systematic study.

5.4   Suggestions:

1.   Library Website:

There is acute need to develop independent library website for providing linkages to commercial as well as open source information resources available on Internet, this will be helpful to librarian in providing remote access to advanced library and information services. It will help in enhance the use of library services and also the status of library professionals. Hence, the library professional need to have knowledge and skills about web technology.

2.   Library Collection:

College libraries by keeping in mind the collections in their libraries have to use resources sharing projects, ICT, Internet and provide better library services like Alert, CAS, SDI, OPAC, etc. using more open source resources. The collection development policy needs to be developed for both print and electronic resources, to develop qualitative and economical collection in the library. The Arts, Commerce and Science College libraries need to subscribe e-resources through consortium like N-LIST Database as well as DELNET Database. These databases are affordable to the college libraries. Moreover, the collection of CDs/DVDs, E-Books need to be increased.

3.   Library Budget:

Due to increasing cost of the printed resources, libraries are facing financial problems, but still the college libraries have more budget for the printed resources whereas very less budget is for e-resources and the ICT infrastructure. Hence, the librarians must re-think on the available budget. The proper balance need to maintain in printed resources as well as e-resources as per the use, present demands and expectations of the user.

The libraries have to provide sufficient budget to develop qualitative collection development which is users need based. Enough budgets are needed to be spent on subscription to e-resources and e-contents, ICT infrastructure, modern facilities, modern equipments etc. However furniture and infrastructure budget have to be separated from book and periodical budget. (It is observed that nearly half of the total budget of library is spent on printed books only.) Moreover e-resources including periodicals may be subscribed in e-form. Most of the library budget need

to be spent on modern library facilities such as computers, Internet, photocopy, e-books, e-journals, federated search, e-book reader, etc.

4. Develop E-Resources:

Librarians have to develop more e-resources using internet based free resource as well as open source resources which adds value to collection development.

5. Modernisation of library activities:

All the college libraries must have high speed Internet connection. Wi-Fi facilities need to be provided for accessing online resources. The Internet facility should provide with need safety measures such as firewall system, proxy servers, etc. All college libraries need to have the modern technological equipments in their libraries for providing quality in their services such as barcode reader, barcode printer, laser jet /inkjet printer, separate server, UPS, document scanner, reprography machine, Wi-Fi router, web camera, etc. The modern facilities need to be provided to the user such as photocopy, computers, internet, e-book reader, ear phones to listen audio books, Wi-Fi facility, etc.

6. Marketing of Library Resources and Services:

The librarians need to develop the marketing strategy for maximum usage of library resources and services. The marketing can be done by using social media, posters, lectures, blogs, websites, instant messaging services, e-mail alert etc. User need to be promoted to use reference sources as well the reference section.

7. Open Source Educational Resources: An Option for Low Budget Libraries:

Open access is a great initiative in India which is popularising now days. In Open Educational Resources the user can access, edit, upload and can share with other freely. No cost is there for open resources. Thus, it is a better option for low budget libraries. The libraries can provide access to user by suggesting the sites by using social media, posters, library bulletin board etc.

The college librarians need to promote users for access to 'open accesses /Open Educational Resources' available on the Internet. Most of the Indian initiatives are there for accessing free educational resources from school to post graduation:

- "Indian Academy of Science (http://www.ias.ac.in/)

- NISCAIR Research Journals (http://www.niscair.res.in)
- Indianjournals.com (http://www.indianjournals.com)
- OJAS@INFLIBNET Centre (http://www.inflibnet.ac.in/ojs/)
- Directory of Open Access Journals (http://www.doaj.org/)
- Indian National Science Academy (http://www.insa.ac.in/)
- The National Academy of Science, India (http://www.nasi.org.in/abst.htm)" etc.

Another is Open Access Digital Repositories. The repositories provide the access to scholarly content created by the scholars of various institutions, organisations etc. The digital repositories can access freely, some of the examples are as below:

- "Open Access Repository Publications of Fellows of the Indian Academy of Sciences (http://repository.ias.ac.in/)
- Indian Institute of Science Bangalore Institutional Repository (http://eprints.iisc.ernet.in/)
- Information and Library Network Centre Institutional Repository (http://ir.inflibnet.ac.in/)" etc.

Another Open Access Initiative is "Digital library of India (http://www.dli.ernet.in/)" which provides free e-books, articles etc. 'The National Repository of Open Educational Resources' is an initiative of MHRD, Govt. of India which provides digital resources across all stages of schools and teacher education in India. Hence, open access resources can be made available to the users of libraries. It can be used to cater the user's need of the educational information materials.

8. **Automation of Library:**

For reengineering libraries, initial development needs automation. Many college libraries have reached to the status of either fully automation or partial automation but facing issues of Annual Maintenance Contract (AMC) as well as developing library networks. It is now possible to automate libraries using open sources softwares like:

- "**Koha:** Koha is full featured library automation software designed for all types of libraries. Currently the software is used in the libraries all over the

world. It is a best alternative for commercial software so; this can be used for library automation".

- "**NewGenLib**: This is Indian software developed in the year 2005. This is an Open Source Library Automation Software which is famous and best software for library automation".

- "**E-Granthalaya**: This is one of the freeware software for all types of libraries. This software has been installed in great number of academic institutions".

These are the suitable softwares for the library automation at economical ways, when libraries do not have sufficient budget for the softwares. Libraries need to have OPAC facility to facilitate the user for search library holdings and their library account transactions also at remote places.

9. Promote to Digital Information Resources:

There are many restrictions to the library user, such as user cannot lend books more than 7 days or 15 days and cannot issue more than 3 books per user at a time. So there is need to provide digital resource or content to user. Providing and promoting digital content helps to save the paper as well as environment.

10. User Education:

Users of the college libraries need to be trained by providing information literacy training and develop awareness of information gathering habits. Use of user orientation, staff orientation helps in developing awareness of information and digital literacy which helps in developing awareness of advance practices at the beginning of Higher Education. The user education program also needs to provide on the library webpage, institutional website, social media etc. Therefore the area of user education becomes broaden and it may help to increase use of libraries.

11. User Feedback Mechanism:

For reengineering, librarians have to consider user feedback. This might be helpful in redesigning library activities and services useful to user. For the purpose of feedback LIS professional may create online questionnaire which can be linked with

library website, institutional website, and may be shared through social medial tools. Hence, librarians should have the user's feedback regularly.

12. User's Satisfaction:

a) College libraries need to have sufficient ICT infrastructure for application of ICT tools.

b) The library staff need to have basic knowledge of ICT tools and its usage

c) Libraries need to automate all library housekeeping functions, services, etc.

d) Libraries need to have hi-speed internet facility for the user.

e) College libraries need to provide Web OPAC and M-OPAC to the user to access the library resources maximum.

f) College libraries need to have remote access to the learned journals and provide the access to the user.

g) Library need to have independent library website for providing remote access to library and information services.

h) Library need to have electronic bulletin board to attract the user and provide library notifications to the user.

13. Need to Reengineering of Libraries:

It is observed from the study that there is an acute need of re-engineering of library activities. For reengineering library services and activities, librarians have to use Web tools and social media like RSS, YouTube, Tweeter, Facebook etc. In the chapter 5 of present study, the researcher has described the model for reengineering which will help to reengineer college libraries.

14. Need to Develop Digital Repository:

All college libraries need to create digital repository to share digital content to their user. Low budget libraries may use Open Source Library Softwares i.e. D-Space Digital Repository Software, Green Stone Digital Library Software, etc. The digital repository can upload and share previous question papers, syllabuses, free e-content, links to video lectures, notes on topics, photos, copyright free e-books, scan copy of rare books, college prospectus, and magazine and etc.

15. Library Networking:

There is a need to develop college library networks at local and regional level to support better resource sharing which helps researcher as well as faculties in contributing knowledge. The only solution for developing advance library system is based on use of ICT and digital e-resources as well as reengineering total library activities by initiating automation, application of barcode technologies, use of retro conversion, digitization, maximum use of internet resources, etc.

The University libraries need to create digital repository to upload and share course content / educational material for the users of affiliated college libraries. Hence all the libraries will save the expenditure on textbooks and related resources. The librarians need to be promoted to reengineering their library.

16. Need to Improve and Update Professional Knowledge and Skills:

The library and information professionals of the libraries of Arts, Commerce and Science of Maharashtra, need to develop ICT skills related to ICT tools and advanced technology viz. computer hardware, application software, library networking, various consortium, web technology to create and maintain, various modern equipment used in library, handle library automation software, creating a digital repository, content management software, reference management tools, digital literacy, digital copyright issues etc.

Summary:

The suggestions are based on the findings from the survey. The above suggestions are helpful to library professionals for redesigning the libraries to provide quality services to their user using advance technological tools. More over the researcher have proposed a model plan for reengineering the library & information services and activities that is presented and described as below.

5.5 Proposed Plan for Reengineering of College Library and Information Services:

College libraries are having very crucial role in achieving the objectives of higher education. Today, college libraries are facing many challenges and problems due to the advancement of ICT and the changing nature of information requirement in the modern information society. The traditional library services are not effective in today's digital era. Now days, it becomes necessity to apply ICT tools in the libraries to serve the user better using electronic resources and ICT. Today's education culture is shifting from formal to e-learning and students are using smartphones, laptops, tablet PCs, Internet etc. Students are giving first preference to the Internet instead of library for searching study material. This is a big challenge for the academic librarians. Hence, college libraries need to reengineer their services to face the present as well as future challenges.

The researcher has tried to propose a model plan for the re-engineering of Arts, Commerce and Science College libraries for redeveloping library activities. The model plan is based on the case study that has been implemented in two college libraries which were serving to users by providing traditional library services in the exiting advanced and developed environment viz. Doshi Vakil Arts & GCUB Sc. & Com. College, Goregaon - Raigad and the Anandibai Pradhan Science College, Nagothane-Raigad. The librarians of both college libraries have decided to reengineere library services to achieve the cost effectiveness, optimum utilisation of resources, increase the use of library resources, and increase the status and quality of library services etc. After reengineering library processes and services, the objectives which set before the reengineering of library services were achieved and the benefits have been found useful after reengineering of library services.

5.5.1 Examples of Reengineering Library and Information Services:

The scenario of information and knowledge sharing is varying from library to library since past decades. Still academic libraries are mostly providing their library services and facilities by traditional way because of several problems such as lack of funds, lack of supports, unwillingness, lack of skills etc. But the reengineering of libraries is one of the solutions on the problems of decreasing use of library resources and facilities, status of libraries and library staff, no cost benefits, and financial crunches also. Traditional ways are not effective in today's era because of the impact

of ICT on information and knowledge based society. Hence, many libraries have reengineered their library services by providing remote access to the library resources. Some of the examples are enlisted as below:

1) **"Digital Library of Bhandarkar Oriental Research Institute":**

The use of the Bhandarkar Oriental Research Institute (BORI) Library was limited. Thus the institute has created digital repository for rare books and provided its access to public free of cost. The use of the resources has increased due to the reengineering of the services. This is one of the good examples of reengineering.

2) **"Library of Gokhale Institute of Politics and Economics - Pune,":**

Gokhale Institute of Politics and Economics has a rich collection in library which is related to rare collection of reports in the area. The Institute has created digital repository using D-Space Open Source Digital Library Software. The repository has more than 25500 digital books, reports, etc. This is also one of the best examples of reengineering of library collection and services based on this.

3) **"Jayakar Knowledge Resource Centre, Savitribai Phule Pune University Digital Library,":**

The Jaykar Library have designed digital library using D-Space open sources digital library software. The digital library contains e-journals access, e-books access and more than 4500 items of books, letters and manuscripts. The digital repository is very useful to the distance learners of the university. Thus, this is one of the best examples of reengineering of library collection and information services based on it.

4) **Knowledge Resource Centre, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad:**

The informative web page has created for KRC of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. Various linkages and remote access resources have provided through webpage. User could use the resources at their home place. Hence, this is the efforts towards reengineering the library and information resources and services.

5) Knowledge Resource Centre, North Maharashtra University, Jalgaon:

The KRC of North Maharashtra University has crated e-resource library portal where the linkages to various licensed resources as well as free open sources resources have been provided.

This indicates that libraries are initiating re-engineering activities using ICT and digital resources. The above examples are observed from their respective library websites. Based on these examples, the researcher has made a systematic plan to implement for re-engineering and reshaping of libraries.

Based on the above few studies, in addition to literature review researcher indicated few best practices for reengineering college libraries as under.

5.5.2 Best Practices in Reengineering of Library and Information Services.

There are many best practices to do in college library. The need of best practices in college library for enable to improve its process and activities, optimum utilization of available resources, provide high quality and efficient services to the library user.

Prabhakar (2017) has stated that 'The best practices adopted in academic institutes should bridge the gap between library collection and user community for maximum utilization of the resources. Library adopted various best practices in its administration, management, collection & services, extent of the use of services and use of technology'

According to NAAC (2007) "Best practice may be innovative and be a philosophy, policy, strategy, program, process or practice that solve a problem or create new opportunities and positively impact on organizations. Institutional excellence is the aggregate of the best practices followed in different areas of institutional activities." The researcher has introduced some important best practices for college libraries are as under:

1) Research Services:

A library professional can extend their practice to assist the researcher by providing help in searching information which required by them. Make available the databases, e-journals, reference books which are most searchable by researchers.

2) Library Automation:

The goal of this practice is to automate all the housekeeping operations of library such as acquisition, cataloguing, searching books, circulation, administration, etc. to give library and information service more quickly, efficiently and effectively. This task require regular attention, updating, data entry work, etc. This is one of the best practice in reengineering libraries.

3) Use of Social Media in Library:

Almost all the users have smart phones and they are using social media mostly. LIS professionals can use social media for create awareness among user, promote for use library resources, marketing library and information services, etc. It might be helpful to utilize library resources and services.

4) User Feedback

User feedback of library is most useful tool to know the users opinion about library resources, services and facilities. Now days, there are many technological tools have developed which are helpful to conduct user survey or feedback such as sharing link of Google forms, mobile apps, feedback from websites, develop auto analysis feedback sheet, etc. conduct feedback in an effective manner may called best practice in reengineering in library and information services.

5) Use of Open Educational Resources (OER):

Open Educational Resources (OER) are important in libraries for number of reason such as sustainable collections in libraries, affordable textbooks for students, new options for curriculum development, and avenues for digital scholarship. OER is a solution of lack of resources in a subject area, quality, content updates, lack of fund, etc. These barriers can turn into opportunities for librarians to cultivate partnerships with faculty in the discovery, advocacy, and preservation of OER (Palazzolo, 2018). Hence, OER is a best practice in reengineering of library and information services.

6) Application of Quick Response Code (QR Code) in Library:

QR Code is an innovative technology for the libraries helps to the information professional to integrate bio dimensional code composed of black and white pixels

into a squared matrix, containing information to be enjoyed with the help of smart phones or similar devices. In libraries, QR code can be used for linking to the online surveys, linking to library contests, on library stacks, journal areas that point to online electronic holdings, linking to library audio tour for orientations, linking to library blog, Websites, linking to digital library, linking to library maps, linking to library Wi-Fi network, etc.

7) Open Source Technology Management in Library:

Open Source technology management in library and information centers is a challenge and an opportunity. 'Open Source culture empowers libraries to try innovative technologies in their working environment. This practice helps them to develop solutions to solve their technology related problem within the walls of libraries. If librarians are able to handle Open Source technology management themselves, libraries can achieve cost effective technology solutions for better services' (Kumar 2011). Hence, the Open Source Software can use in library to avoid financial barrier and provide technology based services to the users.

8) Video Lectures & E-Notes on Topic:

With the help of faculties and students, LIS professionals can develop platform for share lecture videos and e-notes to their user on syllabus contents. Hence the procurement of textbooks can be avoided in the library and students can use library website for this purpose also.

9) Creating Digital Repository, Website, Blogs, etc.:

Institutional Repositories are created for capturing, preserving and disseminating collective intellectual capital, serves as meaningful indicators of an institution's academic quality. All the institutional knowledge can be organized in a digital repository which can be accessed any time. The creativity of website, organization of information, and its management is a best practice for the LIS professional.

10) Provide 24/7 Access to Users:

By applying cloud computing technology, library may provide 24/7 access to library resources and services such as OPAC, e-books, e-journals, databases, photos, audio

video materials, etc. Thus, library professionals need to have knowledge about web page creation, designing and developing digital repository, etc.

11) Speeches of Various Occasions:

Library professional may develop speeches on various occasions like anniversaries of Idol, various functions/programs of college, etc. It will save the time of users by providing readymade speeches. It is a ready reference service which can be share through mail, social media, through mobile app, etc. to their user.

12) Information Literacy Program:

Develop and deliver the Information Literacy Program to library user to make them educate, how to search, locate and optimal use of information. Now days, users are searching required information on Internet. Most part of information literacy need to consider on ICT tools and its usage. Research and study based Information Literacy is need to users.

13) Design Mobile Application:

'The basic purpose is to save a student's time so that he doesn't waste his time by coming to the library to search for some particular books. Instead, he gets to check the availability of the book prior coming to the library by surfing the College Library App, where they can look for a particular book and also know whether it is available in the library or not' (Jain 2018). Many options may provide in the mobile app such as view the availability of books in the library, view circulation status, option to recommend books, download facility, etc.

14) Indexing and Abstracting Service:

Index is a systematic arrangement of entries designed to enable users locate information in a document and Abstracts are formal summaries writers prepare for their completed work. Abstracts helps readers decide if they should read an entire article. Earlier this tasks was difficult to arrange and compile the indexing manually. In present digital era, these tasks become easy due to digital media. Hence, the job is very important for the researcher while providing research services to their user.

15) Paperless Services:

College library users usually takes photocopy of previous question papers, syllabuses, journal article, etc. on paper. The library professional may scan these resources and send them on mail, mobile, sharing apps, etc. in digital form. Hence, the paper will use very less for printing and photocopying for the users. Also, the expenditure on paper and printing will be reduced.

16) Career Notification:

Make separate section of books in the library on competitive exam collection and provide notification to the users on vacancies, hall ticket, exams dates, and results date. Career oriented users will always consult the library for career related information. This is one of the best practice for the library professional.

These are the best practices which may help college librarians to enhance library activities and services more effective than before. Reengineering libraries term denotes performing the same task in different manner by improving quality in existing activities and services as well as introduced new procedures which becomes more economical and beneficial to users in the future.

5.5.3 Proposed Model Plan:

Before presenting the model plan for reengineering library and information centres and services, researcher has reviewed some models relating to the BPR. The models have been proposed for the guidelines to implement the BPR in the systematic manner without failure. Several types of model plan have been reviewed in the related literature and understand that the model plan has been made by taking into consideration the Principles of BPR given by Michael Hammer and Champy.

Chand (2016) has given a model on 'Process Reengineering' in an organisation. She has mentioned three phases of reengineering i.e. Planning, Designing and Implementation. The phases are defined as below:

Figure 5.1: Phases and Steps involved in the Process of Reengineering

Phase	Steps

Phase 1
Plan
	(i) **Determine** "New" Process Requirements
	(ii) **Uncover** "Break Through" Opportunities
	      • Analyse "as is" Capability
	      • Envision Desired State
	      • Identify Process Performance Gaps

Phase 2
Design
	(i) **Map** the "Ideal" Process
	      • Complete Preliminary Work
	      • Set New Goals and Establish Measures
	      • Create a New Process Flow Chart
	(ii) **Redefine** Process Support Requirement
	(iii) **Develop** Change Management Plan

Phase 3 **Implement**	(i) **Implement** on "Trial Run" Basis (ii) **Standardise** the Reengineering Process (iii) **Evaluate** Process Performance on an Ongoing Basis

Thus the above phase based plan is a general plan which is basically used in organisations to implement reengineering process.

The Hong Kong University of Science and Technology Newsletter, (2018) contains the article on Business Process Reengineering in library. The model plan is given in the article as below:

Figure 5.2: Improvement and Management Framework
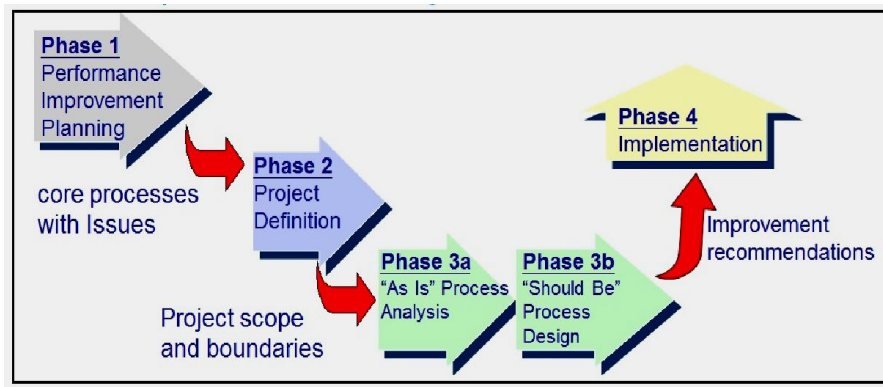
The library of Hong Kong University of Science and Technology expressed their reengineering plan through this newsletter. they had three major process reengineering projects such as,

- Weeding process to withdraw low/no use library items
- Thesis submission process involving different departments and supporting units

- Electronic Resource Management (ERM) process covering acquisitions, cataloguing, and access workflows

For completion of above three projects they had main objectives which are as follow:

o To review processes that have critical issues

o To enhance service standards and operational efficiency

o To improve cross-functional cooperation in delivering quality services

Strategic Resolution Experts (2017) have a business of redesigning business or set up new business. They have provided a model plan for understanding the BPR steps.

Figure 5.3: Steps of BPR
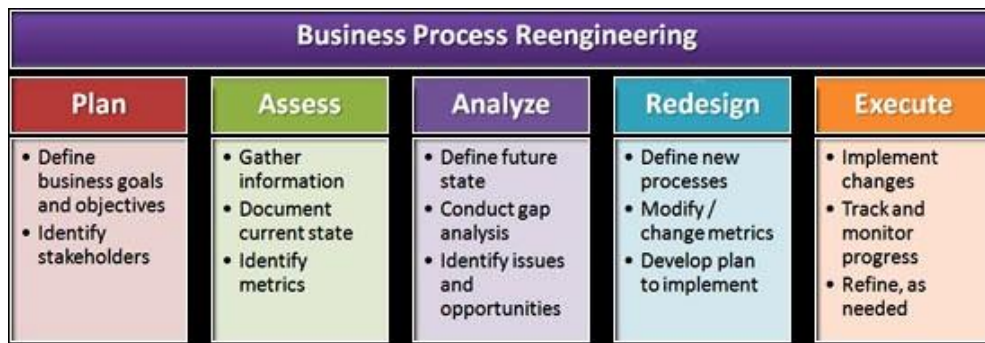
Hence, these are the basic examples which studied through their model plans. With the help of some of the model plans on reengineering, the researcher has made the model plan which proposes for the college libraries.

The models have provided guidelines about the process of reengineering. The researcher has followed their guideline and according to requirement of college libraries, researcher has proposed a model for reengineering college library services and activities. The model has presented as below.

Figure 5.4: Proposed Model for Reengineering Lib. & Info. Services

STEPS	TASKS	OUTPUT
Develop Vision & Objectives	Re-make clear vision and objectives	More focus on the vision and objectives
Understand Existing services and Process	Investigate existing process and think for more effective	Explore drawback of present system
Identify new services, ways & processes	Study the users need and rethink for the services	Innovative & modern services to be identified
Make reengineering plan with involving team	Discuss and make the team positive for reengineering the existing services	Team involvement in the planning
Implement the new processes	Implement the redesigned processes and make user aware	Implementation of technology based services
Make new process & services operational	Start to provide redesigned services to the user	24×7 access to modern library and information services
Evaluate the services and process	Periodically evaluation of the redesigned processes	Explore effectiveness of the new processes
Ongoing continuous improvement	Keep update the system as well as staff's skills with the development	Updated library and information system

Model for Reengineering Library and Information Services

The above plan has been made to explore and implement modern and innovative services and scholarly resources with ease of access in the campus. It also provides facility where students can pursue learning independently beyond the classroom. The model plan contains 8 steps which are the planning based steps for reengineering the college libraries. The steps are described as follow:

1. **Develop Vision and Objectives:**

While making vision statement for libraries and information centres, it needs to think about the innovativeness, speed and quality in the services, cultivate lifelong learning and research environment etc. The objectives should be achievable the vision of the library.

The vision and objectives should be like mentioned below:

- **Vision:**

Library will engage in teaching, learning, research and resource developmental activities. Library will also collaborate with the learning and information centres to fulfil the multidimensional needs of the techno-savvy users.

- **Objectives:**

The objectives need to define while designing the model plan for reengineering library and information services as given below:
   o Make library able for support to achieve the objectives of mother institution
   o Design library system as per the user centric approach
   o Make available electronic resources related to curriculum and provide its access offline as well as online
   o Provide 24/7 access to the library resources and services
   o Make available all the modern library and information services
   o Provide assistance to the user about information searching and download
   o To organise extension programmes to attract the user towards library services and resources
   o Make available reference material in digital form which frequently asked by the user
   o Create digital repository of all the institution information and make it accessible over intranet and internet.

o   Conduct student satisfaction survey periodically and apply changes as on student feedback

2. Understand Existing Services and Processes:

The present services and processes need to analyse by conducting use studies. A questionnaire may be used to understand about the usage of library and status of current services. The library professionals need to rethink for library resources, activities and services when the evaluation results found unsatisfactory.

3. Identify New Services and Ways:

Analyse and identify new ways and means for providing better and quality library and information services. Systematic technological based approach is needed while adopting new ways for providing library and information services. The model plan has been made by taking into consideration the advance technological tools. While designing the new processes and identifying new services and tools to provide library and information services to the user, LIS professionals need to consider following aspects.

- Most of the library and information services can be accessible through smart phones.
- Boundary less services.
- Accessible by 24*7
- Appropriate contents
- Attractive for the user
- User centric approach
- It should supportive to objectives of Higher Education.
  Etc.

These aspects help to identify and redesign the new processes for the reengineering process.

4. Reengineering Plan with Evolving Team:

The library personnel have to understand the new plan and the new process. Also, need to have their involvement in the entire reengineering process. While considering whole team support, it will be great to successful efforts for reengineering

plan. The new objectives should be set and as per the objectives make a new plan to achieve these objectives. Library is a 'System' where 'Services' is a component of library system. The researcher has suggested the model plan for the reengineering of library and information service component.

Figure 5.5: Reengineering of Library Service Component
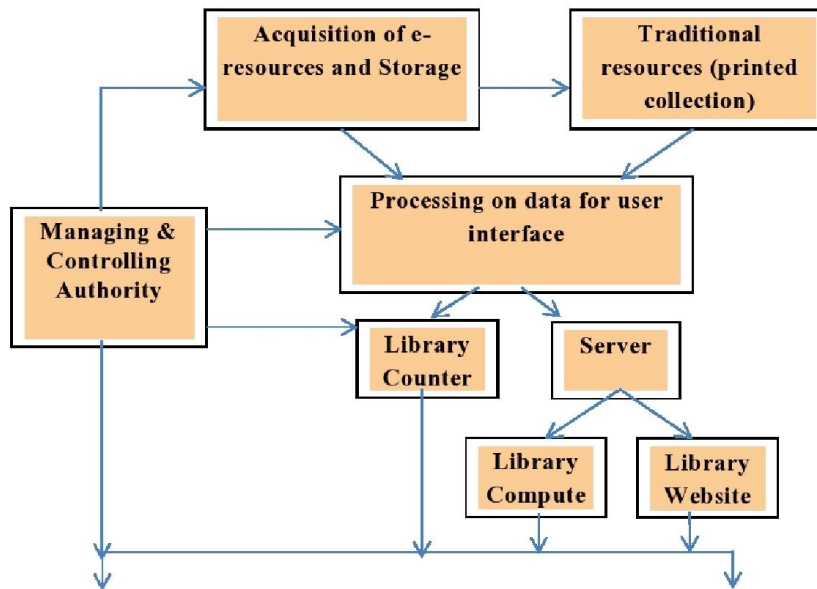
1. **Online Circulation Request**	13. **Translation service**
2. **Career guide**	14. **Photocopy request**
3. **Information literacy**	15. **E-books**
4. **Online Library tour**	16. **E-journals**
5. **News clipping**	17. **E- Databases**
6. **Instructions**	18. **Online exhibition**
7. **Library Chat**	19. **E- Newspaper**
8. **Audio/Video Lectures**	20. **E-reference service**
9. **Bibliographic service**	21. **E-document delivery service**
10. **Subject portals**	22. **Current awareness service**
11. **Institutional repository**	23. **E-notes**
12. **Indexing & Abstracting service**	24. **E-syllabus**

Researcher suggests that apply the above model in the library services which still serve to the user by traditional mode. The library and information services which have mentioned in the above model are modern and technological based services which are defined as per the present needs of the academic library users.

5. Implement the New Processes:

Whatever you have planned and redesigned the new system for reengineer library and information services and processes, adopt the new processes with the involving team. Libraries need to have equipped with the ICT Infrastructure for providing digital resources to the user. The library automation can be done through commercial software as well as open source software. Subscribe the e-contents such as e-books, e-journals, databases, CDs/DVDs etc. The access may provide through library website, sharing links using social media, display guidelines at library etc. Create digital repository to make the institutional knowledge accessible in the digital form. Make available and promote Open Education Resources (OER) among the user to save the expenditure on printed resources.

6. Make New Services and Processes Operational:

As far as possible, make new services and processes operational at the ending of the academic year. If the new processes results will found better than previous, library professional may continue the new practices from the upcoming academic year. In short, take a trial or pilot study about the new designed processes and services. The awareness and training to the user is essential because the proper awareness will make the optimal use of reengineered services and facilities of library.

7. Evaluate the Services and Processes:

The evaluation process gives us information about drawback of our system. Evaluate the new processes and services periodically to improve for the betterment. Find out the usage of traditional resources as well as e-resources. It helps to manage the library budget. Feedback from the user is a good method to evaluate new library and information services.

8. Ongoing Continuous Improvement:

As per the new developments in ICT, library professionals need to upgrade library software, tools to provide library services and the change in the services process wherever necessary. Continuous evaluation of the library and information services achieves the quality in the library services.

5.5.4 Benefits of Reengineering the Library Services and Processes:

While traditional library and information services reengineered by replacing ICT based processes, the reengineered library will have following benefits:

i. The status of library, its services, and the library professionals will be increased.

ii. The quality in library and information services will be increased

iii. The cost effectiveness will be achieved

iv. Utilisation of library resources, services will be increased.

v. Borderless services will be available to the user.

vi. Overall usages of library and information resources will be increased

vii. With the automation, perfection and the speed of work will be achieved

viii. Availability of library services by 24×7

ix. It also helps to achieve 'five laws of library science'.

Etc.

Summary:

It understands that reengineering is absolutely beneficial for the college libraries and its need of the time. Through this chapter, the appropriate guidelines have been provided for reengineering library and information services. The model plan has been experimented in the college libraries and the plan has been made in keeping in the approach to present expectations of the user and the status of the college library services. Hence the researcher has recommended the proposed plan to implement in Arts, Commerce and Science College libraries of Maharashtra for reengineering their library and information services.

5.6 Conclusion:

The present study has been conducted to assess reengineering the library collection, activities and services. The concept of reengineering is initially popularized in the services industries because of the changing scenario in all the service sectors due to the changing demands, competencies, etc. In the academic libraries, most of the areas of libraries have been reengineered in most of the libraries in Maharashtra. But it was a need to investigate the problems encountered in the process of reengineering and to know the present status of libraries in terms of services and activities reengineering. Throughout the study it is observed that libraries

need to reengineer and also need to rethink on the available library budget, demands, changing scenario, etc. In this study, many significant things have been revealed while analyzing the data. Still, few libraries have not implemented library automation even don't have the Internet connection. Budget availability is not satisfactory and its management also needs to rethink and support to redesign. All these facts have been discussed in the findings. The study has been presented in 6 chapters. 1st chapter is the mirror of present study where the detailed background of the study, description of the concept, significance and implications of the study, problem statement, objectives of the study, scope and limitations have been described. In 2nd chapter, detailed reviews of the related literature have been given which helped to design and complete the present study. In chapter 3rd, the Role of Higher Education System and the Reengineering of college library services have been described for understand the relation between Higher Education and the Reengineering of libraries. Few case studies of libraries have presented in the chapter. In the 4th chapter, the collected data from 206 librarians has been analyzed and interpreted. Based on the analyzed data, findings and suggestions have been given in the present study. In the last chapter 5th, researcher has given the findings and suggestions for the librarians of Maharashtra state and also the researcher has proposed a model plan for reengineering college libraries. The objectives kept for the study have been achieved in these five chapters.

Present study has been conducted systematically and it is found that reengineering of college libraries in Maharashtra is essential to fulfil the needs of users in hunting proper information. Libraries need to reengineer their library and it's need of present era that college libraries need to reengineer their traditional library activities and services to make libraries able to adopt all ICT tools in the process of library services. For this purpose, the model plan has been proposed by the researcher and described in the chapter 5 to understand the process and implement the reengineering especially for Arts, Commerce and Science college libraries.

5.7 Areas of Further Research:

While completion of the present study, some of the problem statements are not in the scope of present study. There is still further scope in conducting research in this area and hence researcher has suggested few areas which can be useful for their future users to expand the study:

- The need of developing advanced library and information services using ICT in college libraries in Maharashtra.
- The use of Open Education Resources in the college libraries of Maharashtra.
- A study of reengineering status of university libraries of Maharashtra.

Present study is very useful for the library professionals in re-engineering libraries using advanced technologies. It is a very high time for the academic libraries to initiate re-engineering activities and support to Higher Education.

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B. APPENDICES-I

"REENGINEERING OF COLLEGE LIBRARY SERVICES: A STUDY OF ARTS, COMMERCE AND SCIENCE COLLEGE LIBRARIES OF MAHARASHTRA"

Questionnaire for Librarians

A. General Information:

1. Name of the College: _____

   _____

2. Name of Affiliated University: _____

   _____

3. Name of the Librarian: _____

4. Qualification: _____

5. Experience: _____

6. Establishment Year: _____

7. Contact Details:

   E-mail ID: _____ Mobile No.: _____

8. Institute Website: _____

9. Library Website: _____

10. Library Staff:

Sr. No.	Posts	Numbers
i.	Librarian	
ii.	Asst. Librarian	
iii.	Library Clerk	
iv.	Library Assistant	
v.	Library attendant	
vi.	Other	
	Total Library Staff=	

B. Library Resources and Facilities:

1. Number of Printed Information Resources Procured:

A. Books and Periodicals

Sr. No.	Type of collection	No. of collection added in 2015-16	No. of collection added in 2016-17	No. of collection added in 2017-18	Total collection
i.	Books				
ii.	Periodicals				

B. Other Printed Information Resources:

Sr. No.	Other Resources	Numbers
1	Bound Volumes	
2	Theses/Projects/ Dissertations	
3	Reports	
4	Manuscripts	
5	Newspapers	
6	Maps	
7	Other _____	

2. Number of E-resources Available:

    a. E-Books   :   ☐

    b. E-Journals   :   ☐

    c. Databases   :   ☐

    d. CDs/DVDs/Floppies   :   ☐

3. Does Library have Internet Connection?

    a. Yes   ☐   b. No   ☐

If Yes, Speed of Internet Connectivity:

    a. 1MBPS   :   ☐

    b. 2 MBPS   :   ☐

    c. 4 MBPS   :   ☐

    d. More than 4 MBPS   :   ☐

4. Mention the Availability of Equipments in the Library.

Sr. No.	Equipment	(Tick √)	Sr. No.	Equipment	(Tick √)
I.	Barcode Reader		VII	Digital Scanner	
II.	Barcode Printer		VIII	Photocopy Machine	
III.	Inkjet Printer		IX	LCD Projector	
IV.	Dot Matrix Printer		X	Web Camera	
V.	Laser Jet Printer		XI	UPS	
VI.	Server		XII	Wi-Fi Router	
XIII	Mention if any other:				

5. Mention the Availability of Modern Facilities:

Sr. No.	Library Facilities	Tick (√) if the Facility Available for User
i.	Photocopying Facility	
ii.	Internet	
iii.	Laptop Facility	
iv.	Tablet PCs/E-Book Reader	
v.	Ear Phones for Audio Book Readers	
vi.	Wi-Fi Facility	
vii.	Discussion Cafe	

6. Indicate Various Sections of Library:

    i.   Acquisition Section   : ☐

    ii.   Circulation Section   : ☐

    iii.   Periodical Section   : ☐

    iv.   Reference Section   : ☐

    v.   Technical Processing Section   : ☐

    vi.   E-Library Section   : ☐

    vii.   Reprography Section   : ☐

    viii.   Rare and Manuscript Section   : ☐

    ix.   Stack Section   :   ☐

    x.   Any other (Please specify)   :_____

7. Total Students Enrolled in your College for Current Academic Year.

_____

8. Average Numbers of User Visits to the Library per day:

    a. 01 to 50   : ☐

    b. 51 to 100   : ☐

    c. 101 to 150   : ☐

    d. 151 to 200   : ☐

    e. More than 201   : ☐

9. Purpose of Visiting the Library (Average Number/per day):

Sr. No.	Particulars	Average Numbers
i.	For Circulation	
ii.	For use Internet Facility	
iii.	For refer Printed Periodicals	
iv.	For use E-Journals/E-Books	
v.	For Study Purpose	
vi.	For refer Reference Sources	
vii.	For Research Work	
viii.	For Reading Newspaper	
ix.	For other purpose	

C. Library Budget:

10. Sources for Library Fund: (Tick √**)**

    a. UGC   ☐   b. Library Fees   ☐

    c. Grant form State Government ☐   d. From Management   ☐

    e. Donation   ☐   f. Other: _____

11. Sectioned budget for the last three year:

Sr. No.	For the year	Total Budget Sanctioned (in rupees)
1	2015-16	
2	2016-17	
3	2017-18	

12. Library budget expenditure of previous three years:

Sr. No.	Particulars	Expenditure (in rupees) 2015-16	Expenditure (in rupees) (2016-17)	Expenditure (in rupees) (2017-18)
i.	Printed Books			
ii.	Printed Periodicals			
iii.	E-Resources (e-journals, E-Books, E-Databases, CDs/DVDs etc.)			
iv.	Library Resource Maintenance			
v.	Other Expenditure			

13. Is the budget Sufficient to meet Users' Requirements?

    a. Yes   ☐   b. No   ☐

If yes, how Fund is Sufficient to meet User's Requirement?

    a. Required fund becomes available easily whenever it is needed ☐
    b. Less requirement/demand to the library resources and services ☐
    c. Use of Open Educational Resources on the Internet ☐
    d. Sufficient information resources already available in the library ☐
    e. Any other, please specify _____

If no, how do you meet User's Requirement?

    a. Inter-library loan ☐
    b. Ignore user's requirements ☐
    c. Provide Open Educational Resources ☐
    d. Provide Internet Facility to search online information ☐
    e. Any other source (please specify)_____

D. Reengineering of Library and Information Services:

14. From the following which Traditional Library Services are provided:

Sr. No.	Services	Traditional library services (Manually or traditional way) Please tick (√) for availability and its usage				
		Available	Max. use	Average use	Less use	Not use
1	Circulation (by Card/Register)					
2	Reference Service					
3	Referral Service					
4	Current Awareness Service					
5	Selective Dissemination of Information					
6	Cataloguing service (Card Catalogue)					
7	Inter Library Loan (Get Printed Resources on Loan)					
8	Indexing (Prepare Manual Indexing)					
9	Abstracting (Circulating Printed Abstracts)					
10	Newspaper Clipping (Printed Newspaper cuttings/display/preserve)					
11	New Arrivals (display on library rack)					
12	Any other Traditional Services _____ _____					

15. From the following which Advanced ICT based Library Services are provided to Users and its usage: (Tick √**)**

Sr. No.	Services	Modern library services (ICT based / Automated) Tick (√) for availability and indicate its usage				
		Available	Max. used	Average used	Less used	Not used
1	Automated Circulation					
2	Online reservation/renewal					
3	Web OPAC					
4	Mobile OPAC					
5	Current Awareness Services through E-mail/ Website/ Social Media					
6	E-journals					
7	Databases					
8	E-Books					
9	Library Web Page					
10	Ask Librarian					
11	Virtual Reference Desk					
12	E-Document Delivery Service					
13	Webinars					
14	E-Notes on Topics					
15	Translation Service Tools					
16	Downloading Service					
17	Online Search / Federated Search					
18	E-Mail Alert Service					
19	Online User Education					
20	Instant Messaging Service					
21	Frequently Asked Questions (FAQ)					

22	Any other Advanced Services using ICT, please mention _____ _____					

16. Opinion regarding Conventional Library Services (Tick √)

Sr. No.	Statements	Strongly agree	Agree	Disagree	Strongly disagree	Neutral
1	Conventional library services have more restrictions than modern library services (e.g. time, geographical distances, non-transferable services, limited copies of the books etc.)					
2	Increasing cost of the print resources					
3	Decreasing use of print resources due to Internet					
4	The users gives first preference to the internet instead of library					
5	Time consuming					
6	Space problem to organise the traditional information resources					
7	Emergence of digital and virtual libraries affected on use of conventional library services					
8	Need more manpower to handle resources and services					
9	Preservation issues for printed resources					

17. Use of RFID Technology in your Library. (Tick √)

        a. Already applied RFID technology and using it   ☐

        b. RFID application in the library is in process   ☐

        c.   RFID technology is not yet implemented   ☐

If the RFID Technology not Purchased/Applied yet, what are the reasons?

        a. Not affordable for library   ☐

        b. Management not agree   ☐

        c. Lack of Training   ☐

        d. Not need   ☐

18. Automation in your Library.

        a. Fully automated   ☐   b. Partially automated   ☐

        c. At initial stage   ☐   d. Not automated yet   ☐

If your Library not automated yet, please mention the reasons.

        a. Insufficient fund   :☐

        b. Lack of support from higher authority   :☐

        c. Lack of training   :☐

        d. Technical problems   :☐

        e. Other reasons   :_____

19. Which Softwares do you used for Library Automation?

_____

20. Year of Library Automation:

_____

21. Mention the Areas of Library Automated. (Tick √)

        a. Acquisition (using library software)   :☐
        b. Physical Verification   :   ☐
        c. OPAC (M-OPAC/Web OPAC)   :☐
        d. Circulation (Computerised charging/discharging of books)   :☐
        e. Serial Control (Computerised management of periodicals)   :☐
        f. Library administration (computerised reports, documentations) :☐
        g. Budget (computerised budgetary control)   :☐
        h. Reference Desk (FAQs/Ask librarian)   :☐

22. Status of barcoding library collection

        a. All books Barcoded   ☐   b. Barcoding in Initial Stage   ☐

        c. Not Yet   ☐

23. Please state your Circulation Policy for Issuing Books

Sr. No.	Category	No. of books allow to borrow at a time	Period of loan	Number of renewal allowed
1	Student			
2	Teacher			
3	Non-Teaching			

24. If you are subscribing to Printed Journals, are they enough to satisfy the user's need?

    a. Yes ☐   b. No ☐

If not enough, do you subscribe e-journals for the library users?

    a. Yes ☐   b. No ☐

25. Do you issue back volumes of printed journals to your users for home lending?

    a. Yes ☐   b. No ☐

26. Do you subscribe databases for library user?

    a. Yes ☐   b. No ☐

If yes, which databases you have subscribed?

_____

27. Does your Library participate in Consortia?

    a. Yes ☐   b. No ☐

If yes, which Consortia have you adopted?

    a) UGC-INFONET E-journal consortium ☐ **b)** N-LIST ☐

    c) INDEST consortium ☐

    d) Any other, please mention_____

28. Do you provide access to Open Access/Educational Resources available on internet?

    a. Yes ☐   b. No ☐

If yes, how do you provide access to 'Open Access/Educational Resources'?

    b. Links are given at library website ☐

    c. Link are given at Institutional website ☐

    d. Posters and guideline are displayed in the library ☐

    e. Provide information through QR Codes ☐

    f. Any other way, please specify _____

29. Does your library have CCTV for library security?

     a. Yes   ☐   b. No   ☐

30. Do you provide user education?

     a. Yes   ☐   b. No   ☐

   If yes, which method do you use?

     a.   Library website ☐   b. Pamphlets   ☐

     c.   Orientation   ☐   d. Information literacy   ☐

     e.   Any other (please specify) _____

31. Are you taking feedback from the library user?

     a. Yes   ☐   b. No   ☐

 If yes, state the method:

     a.   Printed questionnaire   :☐

     b.   online questionnaire link at library website   :☐

     c.   Sharing online questionnaire link on e-mail and social media   :☐

     e.   suggestion box   :☐

     f.   any other way   : _____

32. Does your library have digital repository/Institutional repository?

     a. Yes   ☐   b. No   ☐

   If yes, mention the software used for digital repository.

     _____

33. Which types of services provided by your library using digital repository?
   (Tick√)

Sr. No.	Services	(Tick√)	Sr. No.	Services	(Tick√)
i.	Previous Question papers		vii.	College Magazine	
ii.	Syllabus		viii.	College Prospectus	
iii.	E-Lectures		ix.	Annual Reports	
iv.	E-Books		x.	Photos & Videos of college faction's	
v.	PPTs		xi.	E-News Clipping	
vi.	E-Notes		xii.	Other services _____	
vii.	Research Papers		xiii.	_____	

34. Do you digitise rare books?

  a. Yes   ☐   b. No   ☐

35. How inform to the user for new arrival?

  a. Messaging   : ☐   b. Social media   :☐

  c. Posters   : ☐   d. Library bulletin board :☐

  e. Lectures   : ☐   f. Any other :_____

  g. Not use any   : ☐

36. How do you aware about new arrivals to your user?

  a. E-Mail Alert   :☐   b. Displayed at library/

  c. Instant Messaging Service :☐   Institutional website :☐

  d. Display on new arrival rack :☐   e. Any other method, _____

37. Do you use QR Code in your library?   ☐   ☐

 a. Yes   b. No

38. Do you think that conventional library services suits the need of present library users?

  a. Yes   ☐   b. No   ☐   c. Neutral   ☐

39. Do you feel following activities satisfy users in digital era? (Tick √)

Sr. No.	Statements	Strongly agree	Agree	Disagree	Strongly disagree	Neutral
1	College library should have sufficient infrastructure for ICT applications					
2	The library staff should have basic knowledge about ICT tools and usage					
3	Library should automate all its library housekeeping functions, services etc.					
4	Library automation can be done using open source software if there is financial crunch					
5	College library should have Web OPAC Facility for the user					
6	College library should have remote access to learned journals					

7	Library should have independent website for providing remote access services					
8	The library website should provide linkages to open educational resources, subscribed journals, databases etc.					
9	Library should have electronic bulletin board to attract the user, to share valuable information and to promote user to use library resources and facilities					
10	Digitize Unique Information materials for sharing and access					
11	Library should have boundary less access to its information resources					
12	Library should have high speed internet facility to accesses the E-Information resources					

40. Do you feel reengineering of college libraries is essential in digital era?

   a. Yes   ☐   b. No   ☐

   If yes, state the reasons

_____

41. Which problems librarians have to face while reengineering college libraries?

    a. Financial problem   ☐   b. Unwillingness of library staff ☐

    c. Technical problems   ☐   d. Lack of skills in the staff

    e. Lack of infrastructure   ☐   f. Not faced any problem

42. Do you feel reengineering serve the purpose?

   a. Yes   ☐   b. No   ☐

Signature & Date

C. THE LIST OF COLLEGES OF MAHARASHTRA

The data has been collected for the study from the following region-wise colleges:

1. **Colleges of Marathwada Region: 34 Colleges**

Sr. No.	Name of the College	Affiliated University
1	Adarsh Education Society's Arts, Commerce, Science College, Hingoli	Swami Ramanand Teerth Marathwada University, Nanded
2	Arts, Science & Commerce College Badnapur, Dist. Jalna.	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
3	Azad Mahavidyalaya, Ausa	Swami Ramanand Teerth Marathwada University, Nanded
4	Balbhim Arts, Science & Commerce College, Beed	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
5	Dayanand College of Commerce, Latur	Swami Ramanand Teerth Marathwada University., Nanded
6	Deogiri College Aurangabad	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
7	Digambarrao Bindu Arts, Science & Commerce College,Bhokar	Swami Ramanand Teerth Marathwada University, Nanded
8	Indira Gandhi (Sr) College CIDCO Nanded	Swami Ramanand Teerth Marathwada University, Nanded
9	Jawahar Arts Science & Commerce College Anadur Tal. Tuljapur	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
10	JSPM's,Mahila Kala Mahavidyalaya Aurangabad	SNDT Women's University
11	Kholeshwar Mahavidyalaya, Ambajogai.	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
12	Lal Bahadur Shastri Sr.College, Partur	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
13	Maharashtra Mahavidyalya, Nilanga	Swami Ramanand Teerth Marathwada University, Nanded
14	Mahatma Phule College Kingaon	Swami Ramanand Teerth Marathwada University, Nanded

15	Matsyodari Shikshan Sanstha's Arts, Commerce & Science College, Jalna	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
16	Mrs. Kesharbai Sonajirao Kshirsagar Alias Kaku Arts, Sci. & Commerce College	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
17	Narayanrao Waghmare Mahavidyalaya, Balapur	Swami Ramanand Teerth Marathwada University, Nanded
18	Padmabhushan Vasantdada Patil College, Patoda.	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
19	Pratishthan Mahavidayalaya Paithan	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
20	R.B.Attal Arts, Science And Commerce College, Georai, Dist. Beed.	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
21	Ramkrishna Paramhansa Mahavidyalaya, Osmanabad. Maharashtra	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad. Maharashtra
22	S.B.E.S. College Of Science. Aurangabad	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
23	Sant Dnyaneshwar Mahavidyalaya Soegaon	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
24	Shankarrao Jawale Patil Arts Science And Commerce College, Lohara	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad
25	Sharada Arts, Commerce & Science College Jintur Road, Parbhani	Swami Ramanand Teerth Marathwada University, Nanded
26	Shivjagruti Senior College, Nalegaon	Swami Ramanand Teerth Marathwada University, Nanded
27	Shri. Muktanand College, Gangapur	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
28	Shri. Sant Gadge Maharaj Arts, Commerce And Science College, Loha Dist. Nanded	Swami Ramanand Teerth Marathwada University, Nanded
29	Sir Sayyed College of Arts, Commerce & Science, Aurangabad	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

30	Smt Sushiladevi Deshmukh Senior College, Latur	Swami Ramanand Teerth Marathwada University, Nanded
31	Vaidhunda Maharaj Deglukar College, Degloor	Swami Ramanand Teerth Marathwada University, Nanded
32	Vasantrao Naik Mahavidyalaya, Aurangabad	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
33	Vivekanand Arts, Sardar Dalipsing Commerce & Science College, Aurangabad	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad
34	Yogeshwari Mahavidyalaya, Ambajogai	Dr.Babasaheb Ambedkar Marathwada University, Aurangabad

2. Vidarbha Region: 54 Colleges

Sr. No.	Name of The College	Affiliated University
1	Amolakchand Mahavidyalaya	Sant Gadge Baba Amravati University, Amravati
2	Anand Niketan College Of Arts, Science And Commerce, Anandwan, Warora	Gondwana University, Gadchiroli
3	Arts And Commerce College, Bhisi. Tah.Chimur, Dist. Chandrapur	Gondwana University, Gadchiroli
4	Arts Commerce & Science College, Arvi ,Dist.Wardha	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
5	Arts, Commerce & Science College, Amravati	Sant Gadge Baba Amravati University, Amravati
6	Arts, Commerce And Science College, Maregaon	Sant Gadge Baba Amravati University
7	B.S.Patil College, Paratwada	Sant Gadge Baba Amravati University, Amravati
8	Babaji Datey Kala Ani Vanijya Mahavidyalaya, Yavatmal	Sant Gadge Baba Amravati University, Amravati

9	Bapuraoji Butale Arts, Narayanrao Bhat Commerce & Bapusaheb Patil Science College, Digras	Sant Gadge Baba Amravati University, Amravati
10	Bar. Ramrao Deshmukh Arts, Smt. Indiraji Kapadiya Commerce & Nya. Krushnarao Deshmukh Science College, Badnera	Sant Gadge Baba Amravati University, Amravati
11	Dharampeth M.P. Deo Memorial Science College, Nagpur	Rastrasant Tukdoji Maharaj Nagpur University, Nagpur
12	Dr. Ambedkar College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
13	G S Commerce College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
14	G. S. Commerce College, Wardha	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
15	G. S. Cience, Arts & Commerce College, Khamgaon, Buldhana	Sant Gadge Baba Amravati University, Amravati
16	G.S.Tompe Arts, Commerce & Science College , Chandur Bazar	Sant Gadge Baba Amravati University, Amravati
17	Jagat Arts, Commerce & I.H.P. Science College, Goregaon	Rashtrasant Tukadoji Maharaj Nagpur University,Nagpur
18	Janta College of Education.Chandrapur	Gondwana University, Gadchiroli
19	Kamla Nehru Mahavidyalaya, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
20	L A D Mahila College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
21	Late Babasaheb Deshmukh Gorthekar Arts , Commerce And Science College, Umri	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
22	Lokmanya Tilak Mahavidyalaya, Wani	Sant Gadge Baba Amravati University, Amravati
23	Mahatma Gandhi College, Parshivani,Dit.Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur

24	Mahatma Jyotiba Fule Mahavidyalaya, Amravati	Sant Gadge Baba Amravati University, Amravati
25	Nagarparishad Shivaji College, Mowad Dist. Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
26	Nilkanthrao Shinde Science College, Bhadrawati Dist Chandrapur	Gondwana University, Gadchiroli
27	P W S College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
28	Priyadarshani Mahila College, Wardha	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
29	R.S Mundle Dharampeth Arts And Commerce College	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
30	Raje Vishweshwarrao Arts & Commerce College, Bhamragad Dist.Gadchiroli	Gondwana University, Gadchiroli
31	Rani Laxmibai Mahila College, Sawargaon, Dist. Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
32	Rashtrapita Mahatma Gandhi Arts & Science College, Nagbhid	Gondwana University, Gadchiroli
33	Renika Art College, Manewada Ringroad, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
34	S F S College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
35	S. N. Mor College, Tumsar Dist Bhandara	Rashtrasant Tukdoji Maharaj University, Nagpur
36	S.S.S.K.R. Innani College, Karanja Lad	Sant Gadge Baba Amravati University, Amravati
37	Samarth Mahavidyalaya, Lakhani	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
38	Shivshakti Arts, Commerce and Science. College, Babhulgaon	Sant Gadge Baba Amravati University, Amravati
39	Sant Gadge Maharaj College, Hingna, Dist.Nagpur	Rashtrasant Tukadoji Maharaj Nagpur University Nagpur

40	Sardar Patel College, Chandrapur	Gondwana University, Gadchiroli
41	Sharadchandra Arts & Comm.College, Butibori, Nagpur	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
42	Shri Mathura Mohta Science College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
43	Shri. Samarth College, Aashti, Dist. Wardha	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
44	Shri. Shivaji Arts, Commerce & Science College, Motala	Sant Gadge Baba Amravati University, Amravati
45	Shri Shivaji Science College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
46	Shri. Vasantrao Naik Mahavidyalaya, Dharni	Sant Gadge Baba Amravati University, Amravati
47	Shri Vyankatesh Arts & Commerce College, Deulgaon Raja	Sant Gadge Baba Amravati University
48	Shri. K.N.G. Arts & Commece College, Karanja Lad	Sant Gadage Baba Amravati University, Amravati
49	Smt. Salunkabai Raut Arts & Commerce College, Vanoja	Sant Gadge Baba Amravati University, Amravati
50	Suwalal Patni Arts & Science College Pulgaon, Dist. Wardha	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
51	Tai Golwalkar Science College, Ramtek	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
52	Vidya Vikas College, Samudrapur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur
53	Vinayak Vidnyan Mahavidyalaya, Nandgaon	Sant Gadge Baba Amravati University, Amravati
54	Yashoda Girls Arts & Commerce College, Nagpur	Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur

3. Khandesh and Northern Maharashtra: 27 Colleges

Sr. No.	Name of the College	Affiliated University
1	Adv. Sitaram (Babanbhau) Anandramji Baheti Arts, Commerce and Science College, Jalgaon	North Maharashtra University Jalgaon
2	Arts And Science College, Bhalod,	North Maharashtra University, Jalgaon
3	Arts Commerce & Science Collge Bodwad,	North Maharashtra University Jalgaon
4	Arts, Science And Commerce College, Chopda, Dist- Jalgaon	North Maharashtra University Jalgaon
5	D.M.E.S.'S. Arts College Amalner	North Maharashtra University, Jalgaon
6	Dadasaheb Digambar Shankar Patil Arts, Commerce & Science College	North Maharashtra University, Jalgaon
7	Dncvp's Shirish Madhukarrao Chaudhari College, Jalgaon	North Maharashtra University, Jalgaon
8	Dr. Annasaheb G.D. Bendale Mahila Mahavidyala, Jalgaon	North Maharashtra University, Jalgaon
9	G T Patil College, Nandurbar	North Maharashtra University, Jalgaon
10	Gram Vikas Sanstha's Arts College, Bamkhede, Tal - Shahada, Dist - Nandurbar	North Maharashtra University, Jalgaon
11	KVN Arts, Commerce And Science, Nashik	Savitribai Phule Pune University
12	M. V. P. Samas, Arts, Science & Commerce College, Saikheda.	Savitribai Phule Pune University
13	M.D. Palesha Commerce College, Dhule	North Maharashtra University
14	Mahatma Gandhi Vidyamandir Arts, Science and Commerce College,	Savitribai Phule Pune University

	Surgana	
15	Mahatma Gandhi Vidymandir's M.S.G. Arts, Science And Commerce College, Malegaon-Camp	Savitribai Phule Pune University
16	Mahatma Gandhi Vidymandir's Samajshri Prashantdada Hiray Art, Science And Commerce College, Nampur.	North Maharashtra University, Jalgaon
17	MGV Arts, Science and Commerece College, Manmad	Savitribai Phule Pune University
18	MGV's Arts & Commerce College Yeola (Nashik)	Savitribai Phule Pune University
19	MVP's Arts And Commerce College Library, Vani-Dindori	Savitribai Phule Pune University
20	Nandurbar Taluka Vidhayak Samiti Gajmal Tulshiram Patil College	North Maharashtra University, Jalgaon
21	R. C. Patel College, Shirpur	North Maharashtra University Jalgaon
22	RFNS Senior Science College, Sorapada, Akkalkuwa, Dist-Nandurbar.	North Maharashtra University, Jalgaon
23	S.S.V.P.S's L.K. Dr.P.R.Ghogrey Science College, Dhule	North Maharashtra University, Jalgaon
24	Sau. Rajanitai Nanasaheb Deshmukh Arts, Commerce & Science College, Bhadgaon	North Maharashtra University, Jalgaon
25	Smt. G.G.Khadse College, Muktainagar	North Maharashtra University Jalgaon
26	Smt. H. R. Patel Arts Mahila College, Shirpur	North Maharashta University, Jalgaon
27	Smt. Padmabai Kapurchandji Kotecha Mahila Mahavidyalaya, Bhusawal	North Maharashtra University, Jalgaon

4. Paschim Maharashtra: 52 Colleges

Sr. No.	Name of the College	Affiliated University
1	Agasti Arts, Commerce & Dadasaheb Rupwate Science College, Akole	Savitribai Phule Pune University
2	Ahmednagar College, Ahmednagar	Savitribai Phule Pune University
3	Annasaheb Awate College, Manchar	Savitribai Phule Pune University
4	Arts And Commerce College, Taharabad, Tal. Baglan, Dist. Nashik	Savitribai Phule Pune University
6	Arts, Commerce And Science College, Satral, Tal.Rahuri, Dist. Ahmednagar	Savitribai Phule Pune University
7	Arts, Science & Commerce College, Rahata, Tal.Rahata, Dist.Ahmednagar	Savitribai Phule Pune University
8	Bharatratna Dr. Babasaheb Ambedkar College, Pune	Savitribai Phule Pune University
9	Devchand College, Arjunnagar	Shivaji University, Kolhapur
5	Dr. B.N.P.Arts & Smt S.G.G.Commece College	Savitribai Phule Pune University
10	Dr. Patangrao Kadam Mahavidyalaya, Sangli	Shivaji University, Kolhapur
11	Ho.Shri. Annasheb Dange Arts, Commrce & Science College, Hatkanangale	Shivaji University, Kolhapur
12	Hon. Balasaheb Jadhav Arts, Commerce & Science College, Ale, Tal- Junnar, Dist-Pune	Savitribai Phule Pune University
13	Jijamata College of Science And Arts, Bhende	Savitribai Phule Pune University
14	Kamala College, Kolhapur	Shivaji University, Kolhapur
15	Kanya Mahavidyalaya,Miraj	Shivaji University, Kolhapur
16	Khadki Education Society's Tikaram Jagannath Arts, Commerce & Science College	Savitribai Phule Pune University
17	Kisan Veer Mahavidyalaya, Wai	Shivaji University, Kolhapur

18	Krishna Mahavidyalaya, Rethare Bk. Post: Shivnagar, Tal: Karad, Dist: Satara	Shivaji University, Kolhapur
19	Ktspms Hutatma Rajguru Mahavidyalaya	Savitribai Phule Pune University
20	Laxmibai Bhaurao Patil Mahila Mahavidyalaya, Satrasta	Solapur University
21	M.E.S. Garware College Of Commerce, Pune	Savitribai Phule Pune University
22	M.H.Shinde Mahavidyalaya, Tisangi	Shivaji University, Kolhapur
23	Maratha Vidya Prasarak Samaj's Karmaveer Ganpat Dada More Arts, Commerce And Science College, Niphad	Savitribai Phule Pune University
24	Marathwada Mitra Mandal's College Of Commerce, Pune	Savitribai Phule Pune University
25	Modern Arts, Science & Commerce College, Shivajinagar, Pune	Savitribai Phule Pune University
26	New Arts Commerce & Science College, Parner	Savitribai Phule Pune University
27	New Arts, Commerce & Science College, Ahmednagar	Savitribai Phule Pune University
28	New Arts, Commerce & Science College, Shevgaon. Dist- Ahmednagar	Savitribai Phule Pune University
29	Night College of Arts & Commerce , Kolhapur	Shivaji University, Kolhapur
30	Night College of Arts And Commerce, Ichalkaranji	Shivaji University, Kolhapur
31	Nowrosjee Wadia College, Pune	Savitribai Phule Pune University
32	NVPM's Arts, Commerce & Science College, Lasalgaon. Tal. Niphad, Dist. Nashik	Savirtibai Phule Pune University
33	Padmabhushan Vasantraodada Patil Mahavidyalaya	Shivaji University, Kolhapur
34	Padmashree Dr.D.Y.Patil Arts, Commerce & Science College, Pimpri, Pune	Savitribai Phule Pune University

35	R.B.Madkhaolkar College, Chandgad	Shivaji University, Kolhapur
36	Radhabai Kale Mahila Mahavidyalaya, Ahmednagar.	Savitribai Phule Pune University
37	Raje Ramrao Mahavidyalaya, Jath	Shivaji University, Kolhapur
38	Rayat Shikshan Sanstha's Mahatma Phule Mahavidyalaya, Pimpri, Pune	Savitribai Phule Pune University
39	S.G.K.Arts, Com & Sci. College, Loni Kalbhor	Savitribai Phule Pune University
40	S.S.G.M. College, Kopargaon.	Savitribai Phule Pune University
41	Sadguru Gadage Maharaj College, Karad	Shivaji University, Kolhapur
42	Sampatrao Mane Mahavidyalaya, Khanapur	Shivaji University, Kolhapur
43	Sharadchandraji Pawar College, Jejuri	Savitribai Phule Pune University
44	Shardabai Pawar Mahila Mahavidyalaya, Shardanagar, Tal - Baramati, Dist. Pune	Savitribai Phule Pune University
45	Shri Padmamani Jain Arts & Commerce College, Pabal	Savitribai Phule Pune University
46	**Shri Shahaji** Chhatrapati Mahavidyalaya in **Dasara Chowk**, Kolhapur	Shivaji University, Kolhapur
47	Shri Vijaysinha Yadav Arts & Science College, Peth-Wadgaon	Shivaji University, Kolhapur
48	Chakan Shikshan Mandal's C.S.M. College of Arts, & Commerce , Chakan	Savitribai Phule Pune University
49	Sir Parashurambhau College, Pune	Savitribai Phule Pune University
50	Smt. Kusumtai Rajarambapu Patil Kanya Mahavidyalaya, (Arts, Commerce & Science), Islampur	Shivaji University, Kolhapur
51	Vivekanand College, Kolhapur	Shivaji University, Kolhapur
52	Yashwantrao Chavan (KMC) College Kolahpur	Shivaji University, Kolhapur

5. Konkan Region: 39 Colleges

Sr. No.	Name Of The College	Affiliated University

1	Adarsh College Of Arts & Commerce,	Mumbai University, Mumbai
2	Anjuman-I-Islam Akbar Peerbhoy College Of Commerce & Economics	Mumbai University, Mumbai
3	B. K. Birla College Of Arts, Science & Commerce (Autonomous), Kalyan	Mumbai University, Mumbai
4	B. M. Ruia Girls' College, Mumbai	Smt. Nathibai Damodar Thakersey Women's University, Mumbai
5	Bhavans Hazrimal Somani College Of Arts &Science And Jayaramdas Patel College Of Commerce, Girgaon	Mumbai University, Mumbai
6	Cosmopolitan's Valia College Of Commerce, Andheri	Mumbai University, Mumbai
7	D.T.S.S. College Of Commerce, Malad	Mumbai University, Mumbai
8	Dr. Babasaheb Ambedkar College Of Arts. Science & Commerce, Mahad	Mumbai University, Mumbai
9	Elphinstone College, Mumbai	Mumbai University, Mumbai
10	G.B. Tatha Tatyasaheb Khare Commerce, P.G. Dhere Arts And M.J. Bhosale Science College, Guhagar	Mumbai University, Mumbai
11	Gokhale Education Society's Arts, Commerce & Science College, Shriwardhan	Mumbai University, Mumbai
12	Gokhale Education Society's Arts, Science and Commerce College, Jawhar	Mumbai University, Mumbai
13	Gokhale Education Society's Dr. T. K. Tope Arts & Commerce Night College, Parel, Mumbai-12	Mumbai University, Mumbai
14	ICLES Motilal Jhunjhunwala College Of Arts, Science And Commerce, Ghatkopar	Mumbai University, Mumbai
16	K.J.Somaiya College Of Arts And Commerce, Mulund	Mumbai University, Mumbai
15	K.J.Somaiya College Of Arts And Commerce, Vidyavihar	Mumbai University, Mumbai

17	K.J.Somaiya College of Science and Commerce, Vidyavihar	Mumbai University, Mumbai
18	KES Dr.C.D.Deshmukh Commerce And Sau.K.G.Tamhane Arts College Roha Dist.Raigad	Mumbai University, Mumbai
19	KMC College, Khopoli	Mumbai University, Mumbai
20	Konkan Gyanpeeth Uran College Of Commerce and Arts, Uran	Mumbai University, Mumbai
21	Maharshi Dayanand College of Arts Science & Commerce, Parel	Mumbai University, Mumbai
22	Nagindas Khandwala College Of Commerce, Arts and Management Studies, Malad	Mumbai University, Mumbai
23	Pillai College of Arts, Commerce and Science, Rasayani	Mumbai University, Mumbai
24	Pillai College Of Arts,Commerce And Science, New Panvel	Mumbai University, Mumbai
25	Public Night Degree College, Santacruz	Mumbai University, Mumbai
26	R.D. National College of Arts, Commerce an W. A. Science College, Bandra	Mumbai University, Mumbai
27	Ramnarin Ruia College, Matunga	Mumbai University, Mumbai
28	S. B. College of Arts and Commerce, Shahapur	Mumbai University, Mumbai
29	S.I.C.E.S. Degree College of Arts, Science & Commerce Jambhulphata Ambernath	Mumbai University, Mumbai
30	Sant Rawool Maharaj Mahavidyalaya, Kudal	Mumbai University, Mumbai
31	Shri. Manohar Hari Khapane College Of Arts & Commerce, Pachal	Mumbai University, Mumbai
32	Sir J. P. Senior College of Science and Commerce	Mumbai University, Mumbai
33	Smt. MMK College Of Commerce & Economics, Bandra (W)	Mumbai University, Mumbai
34	Sophia College For Women, Mumbai	Mumbai University, Mumbai
35	Tatkare Arts Commerce College, Tala	Mumbai University, Mumbai

36	Tikambhai Metha Commerce College, Mangaon	Mumbai University, Mumbai
37	V K Krishna Menon College Of Commerce And Economics and Sharad Shankar Doghe College Of Science, Bhandup - East, Mumbai	Mumbai University, Mumbai
38	V.E.S. College Of Arts, Sc. & Com.	Mumbai University, Mumbai
39	Vivek College of Commerce, Goregaon (W)	Mumbai University, Mumbai

D. Table given by Krejcie R. V. and Morgan D. W. for Sample Size Determination

Table for Determining Sample Size from a Given Population

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.