

CHAPTER I
INTRODUCTION

INTRODUCTION

1.1 Introduction

RFID (Radio Frequency Ratio) which is a combination of radio frequency-based technology and microchip technology is being hailed as one of the most important application in every field including highway toll payments, automotive, packaging and handling, and retail industries, libraries, etc. The widespread of RFID by Wal-Mart (the world largest retailer) and the United States Department of Defence has made other companies and groups aware of the benefits of using RFID. According to Automatic Identification and Data Capture (AIDC), "Radio Frequency identification is a technology that uses radio waves to transfer data between a reader and an electronic tag which is attached to a particular object. Typical uses are for object identification and tracking." According to Harrod's Librarians' Glossary and References Book, "Radio Frequency Identification, an alternative to the barcode that uses tiny microchips in tags to hold and transmit detailed data about the item tagged. RFID has advantages over Bar codes such as the ability to hold more data, the ability to changes the stored data as processing occurs, it does not require line-of-sight to transfer data and is very effective in harsh environment where bar code labels may not work'. RFID thus is a generic term for technologies that use radio waves to automatically identify people or objects.

1.2 Review of Literature:

1. FMC Tsai, & CM Huang (2012)- Studied to conduct the benefit and cost evaluation of the RFID system in Port at Kaohsiung, each year.
2. Hansen,WR,&Gillert F (2008) This book is aimed at two groups: organisation specialist and people who are responsible for optimizing business processes. We wish to assist them in developing concept for improving business processes that are intended to be implemented using IT systems and Radio Frequency Identification system.
3. Schmit,P,&Michahelles F (2008) The RFID technology-even not a new technology was really hyped in the recent years. Today, companies from diverse branches are hoping for solutions to a wide range of management problems through RFID,

1.3 Objective of the study:

- To acquaint with the RFID technology for library users.
- To understand the benefit for library users.

- To know the cost and benefits in terms of ratio.

1.4 Scope of Study:

The scope of the study is to understand the cost benefit ratio of implementing RFID technology in modern libraries.

1.5 Hypothesis:

- The RFID technology is in infancy stage needs awareness.
- Confidence level of the library professional is minimum.
- The budgetary requirement is huge.

1.6 Limitation of the study:

The study will include 20 measure colleges functioning in South Goa district of State Goa.

1.7 Research Methodology:

- The researcher has browsed all the literature available on the topic.
- Further the researcher has also visit all the websites related to the topic.
- The researcher has visited the different stakeholders and experts asserting the opinion.
- The researcher has conducted interview with experts to analyse the functioning of the topic.
- The investigator has discussed with experts to analyse the functioning of the topic.
- The investigator has tried to collect different information by using different tools such as questionnaire, interview and personal discussion.
- This investigator has made the use of suitable statistical techniques in finalizing the data with required charts and graphs in presentation to make the interpretation clear and precise.

1.8 Population of the study:

This study will be conducted of major libraries functioning in Goa.

1.9 Organization of the study:

Chapter I: Introduction

Chapter II: Literature Review

Chapter III: Implementation of RFID technology in Modern libraries

Chapter IV: RFID technology at National and International level

Chapter V: Data Analysis and Interpretation

Chapter VI: Observation, Findings, suggestions and conclusion

1.10 Conclusion:

The modernization of libraries through IT enabled services will have a long term benefit to its readers as well as the LIS professionals to upgrade their skills and expertise. Having through knowledge of the new gadgets will facilitate its readers immensely and optimally. Hence it is our earnest request to all our LIS professionals to adapt new technologies with vigour and enthusiasm.

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CHAPTER II
LITERATURE REVIEW

Literature Review

1. (I Lee., 2010) This article said that as RFID technology vary quickly and major retailers start to push their supplier to adopt technology. RFID replaces barcode system. The taking of this technology is gaining momentum because of the likely benefits gained and high investment of cost raised by RFID. This paper presented the supply chain RFID Investment Evaluation Model.A future research direction is also discussed in this paper.
2. (S Kim., 2010) This article says that the RFID, once a niche technology, it is rapidly gaining attention from industrialisation, retailers. As RFID replaces the barcode system. This study investigates south Korean retailers to identify key organizational characteristics that positively drive the evaluation of RFID. This study offers many opportunities for future research.
3. (SL Ting., 2011) This paper highlights the RFID is one of the emerging tool in recent year. In this recent year RFID also uses in the medical equipment, to monitoring and identifying patients. In this paper a development framework for the implementation of an RFID-enabled system in a medical organizational. Overall, implementing an RFID project is complex task.
4. (Kumar Vishvakarma., 2019) The purpose of this study is to find out the critical success factor of RFID implementation to establish the relationship between RFID and organizational strategies. This article employs two data analysis technique that is cluster analysis and DEMATEL (Decision-making Traial and Error Evaluation Laboratory).DEMATAL has been used to solve the issues of complexity and holding among criteria.

5. (D, 2009) The purpose of this paper is to find out and describes the cost of RFID technology to manage and control the circulation of returnable transport items. This study provides insight into how RFID benefits have been possible in practice and also indicates the cost of introducing RFID technology is not generally barrier.
6. (D.N Bonter., 2011) RFID has been widely used in industry, commerce, animal and veterinary science, and fisheries research etc. This technology can enable researcher to find out novel areas of inquiry and gathered information on their researcher. This article said that novel area of research made accessible by RFID technology of searching behaviour by non breeding teenager.
7. (EWT., 2010) In this article implementation of RFID system to improve their business and operations processes. In this study, the structure provides businesses with a better understanding of the various stages of the RFID. This study analysis of textile dyeing and printing mill china. In this study proposed an RFID system implementation framework that can be viewed as a multi-staged process.
8. (N.Park, 2011) This paper describes the core components required for realising a mobile RFID application, such as a mobile RFID reader and network architectures. While several type of mobile RFID reader are available. It analyses the characteristics of task of mobile RFID technology, which affords several advantages, related to security etc.
9. (M Hingley., 2007) This study focuses on business-to-business implication of RFID to the biodegradable food sectors, particularly in knowing of an under researched area of supplier perspective. This study concludes that in order to keep costs of application RFID supplier need to develop standardized. This paper provides information of value to all those involved with methods of verification in the supply chain.
10. (N Kasiri., 2012) Before adoption of RFID technology, managers from the field institutions, industrialization need to be able to identify its direct and indirect benefits. In this paper this article focuses on application of RFID in the retail sector, especially in the store operations. Later they conducted Delphi study in which 10 consultants & senior managers from leading US retailer were interviewed. The result indicates from this Delphi study the area of marketing may not be realised.
11. (Y Fang., 2016) This paper discussed on the tracking accuracy of indoor localisation technology. This study introduces a Building Information Modelling & cloud enabled RFID. The system consists of three components: passive RFID localisation system, the BIM visualisation system & cloud computing system. While in finding in this study indicates that the BIM & cloud enabled RFID indoor localisation solution a great potential.

12. (SM Shahandashti., 2011) Data fusion can be defined as the process of combining data & information evaluating the state of an entity. Data fusion is an involving field that has several benefits. This paper study on data fusion approaches. Data fusion as been applied in different field, such as automation, intelligent system etc. This article reviews some examples of resend application of data fusion in civil engineering.
13. (AD Ross., 2009)This paper attempts to explore the potential contribution & limitation at RFID in awarehouse setting in two ways. First, it discussed the issue surrounding pallet-level tugging & second insights from the framework to define objects oriented modelling framework.
14. (JS Bohn., 2010) This paper revised the status of high resolution cameras & their present use in construction. Controlling Tasks such as tracking & updating project scheduled can be assisted through remotely operating technology such as high resolution cameras. Although construction cameras have been around for many years.
15. (M Madhusudhan., 2014)The paper attempts to investigate the usage behaviour & the related progress of RFID technology in Delhi. It also evaluates users' ability, knowledge, as well as problem faced while using RFID technology.
16. (Madhusudhan, 2017) In their paper to assess the potential of different aspects after the implementation of RFID technology & factors responsible for the slow influx of the technology, His present study will be help librarians in improving the return on investment and proving the long-term security of the library.
17. (Gogoi, 2014)Attempts the privacy risks of the use of RFID technology in the libraries & the methods for reducing such risks, while covering issues about reliability, interference 7 attacks on privacy & security.
18. (Jain., 2014) Highlights the criteria for adoption and arguments of RFID technology. The author holds that the interaction of RFID in library system is gainful because of its novel communication ability using radio & waves that is contactable.
19. (Kulkarni Anil., 2014) In this study focuses on RFID security issues & challenges and the use of its technology. Developers request the technology not only in traditional applications. Such as inventory tracking but also in security services.
20. (Madkam Somyya., 2015)In their paper they examined the overview the thing of internet and RFID technology and their usage in our daily life.
21. (Shiva, 2008) In this book "RFID Innovation and Essentials, Focus on technology of RFID and their application on library environment & their impact.
22. (Margam Madhusudhan., 2011) This book discussed on implementation of RFID technology and factor responsible for slow influx of the technology and providing long

term security of the library. This paper have discussed in details reason for using RFID in library, their experience and problems faced by them.

23. (Molnar., 2014) In their paper ,Technological innovation such as RFID is considered to reduce the problem of thefts as well as maintaining the inventory of the books ,emphasized the importance of RFID since it combines the features of the security of materials and efficient tracking, charging- discharging, inventory, and materials handling.
24. (Pawar, 2014) In this paper its application in library:- RFID technology discusses underline NCIP standards development, practical issues related to RFID working in a library environment and touch upon basic RFID issues concerning equipment and follow best practices guidelines issued for used of RFID in libraries.
25. (Sarac, 2010)In this paper a state of the art on RFID technology deployment in supply chains performance. Potential benefits particularly against inventory inaccuracy problems.
26. (Saha, 2010) In his paper RFID Technology and its application to the Library and Information Centres the author attempts to highlights the fundamental of RFID and its application to the library and library centres. This article would help the library and information professionals to navigate this complete new field.
27. (Sharma. &. D., 2016)Highlight the paper of RFID and smart card technology in libraries gives brief idea about the emerging radio frequency identification technology, its importance and its working in library.
28. (Sonkar, 2016)In his book Information Technology Application in library highlights the topic of RFID technology application in modern libraries introduced the security measures.
29. (Sewa, 2005)In his paper on Radio Frequency Identification (RFID) in libraries, Application and practice, highlights the past, present and future trend in the field of library and information science in the Indian context as well as the global.
30. (Webber., 2010)In their book Integrated Library System provide information about add on modules such as acquisitions and serials, plus third product such as RFID.
31. (Raju, 2015) In their paper implementation of RFID technology in digital libraries towards saving users time and for efficient security set up analyse the importance of implementation of RFID technology in digital library set up. The basic components, the functioning of system, advantages and disadvantages are briefly discussed.

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CHAPTER III
**IMPLEMENTATION OF RFID TECHNOLOGY IN MODERN
LIBRARIES**

INTRODUCTION

3.1 Introduction

RFID is very important & advanced technology in the 21st century.

RFID which is a combination of radio frequency based on technology & microchip technology .RFID is a technology that uses radio waves to transfer data between reader & electronic tag which is attached to a particular objects. Typical uses are for object identification and tracking. RFID technology is being implemented in a number of industry, hospitals, government agency, museums & libraries. RFID has advantages over bar codes such as the ability to hold more data, the ability to change the stored data as processing occurs, it does not require line-of-sight to transfer data and is every effective in harsh environments where bar code labels may not work. RFID thus is a generic term for technologies that use radio waves to automatically identify people or objects.

3.2 Definition

[RFID] A data collection technology that uses electronic tags for storing data. The tag, also known as an “electronic level”, is made up of an RFID chip attached to an antenna. Transmitting in the kilohertz, megahertz and gigahertz ranges tags may be battery –powered or derive their power from the Radio Frequency waves coming from the reader.

Like barcodes, RFID tags identify items.

3.3 Advantages

1. Rapid charging/discharging

The use of RFID reduces the amount of time required to perform circulation operations. The most significant time savings are attributable to the facts that information can be read from RFID tags much faster than from barcodes and that several items in a stack can be read at the same time.

2. Reduction of staff duties

Use of RFID era in a library can lower the time wished for move responsibilities seeing that multiple tag may be study at a time. Patron checkout stations can additionally free up staff from these duties. The time necessary to complete an inventory of the library collection can be reduced since inventory can be accomplished with a wand reader as a staff member walks through the stacks of the collection. By reducing the staff duties in these areas, staff may be used more efficiently in other areas including increased face-to-face service and increased the number of community programs.

3. High reliability

Correctly operating reader and tags can have near 100% detection rates. Since the tags and sensors communicate with the Integrated Library System (ILS) it is possible to know exactly which items are moving out of the library. The high reliability is especially important when RFID is used in theft detection.

4. Long tag life

Vendors declare that the tag lifestyles may be as a minimum 100,000 transaction or as a minimum 10 years. These tags do now no longer intrude with the arrival of the book, and might also be made to seem as a bookplate.

5. High Speed Inventorying

Unique advantage of RFID system is their ability ti scan book on the shelves without tipping them out or removing them. A hand-held inventory reader can be move rapidly across a shelf of books to read all of the unique identification information using wireless technology; it is possible not only to update the inventory, but also to identify items which are out of proper order.

3.4 Disadvantages

1. High cost

The major disadvantage of RFID technology is it is costly. The cost of RFID technology is very costly compare to barcode.

2. Removal of Exposed tags

The RFID Tags can't be concealed in either spine or gutter of the books and are exposed for removal. If a library wishes, it can insert the RFID tags with the spines of all except thin books; however, not all RFID tags are flexible enough.

3. Lack of standard

The tags employed by library RFID vendors aren't compatible even once they conform to an equipment standards because the present standard only seek electronic compatibility between tags and reader.

4. Exist Gate

Exist gate must read tags at up to twice the distance of the other RFID readers. They should sense the tags at least from a distance more than 48 inches (usual width of main exist gate). The performance of exist sensors is better when the antennae on the tags are larger or when the exits lane are 36 to 42 inches, rather than the 48 inches.

3.5 Components of RFID Systems

RFID Tag

An RFID tag is a tiny radio device that is also referred to as transponder, smart tag, smart label, or radio barcode. There are two main components present in the RFID tag. Firstly, a small silicon chip or integrated circuit which contains a unique identification number (ID). Secondly, an antenna that sends and receives radio waves. The antenna consists of a flat, metallic conductive coil and the chip which is less than half a millimetre.

Readers and Antenna

The second component in a basic RFID system is the interrogator or reader. Technically, reader units are transceivers (i.e., a combination of transmitter and receiver) and their usual role is to query a tag and receive data from it. RFID reader converts radio waves from RFID tags into a form that can be passed to middleware software. An RFID tag reader use antennas to communicate with the RFID chip. It can read information stored in the RFID tag and also update RFID tag with the new information. Hence, RFID reader accomplishes two tasks: it receives commands from the application software and communicates with tags.

Middleware

Both middleware and software applications are required in an RFID environment. Middleware manages the flow of information between the readers and the backend. In addition to extracting data from the RFID tags and managing data flow to the backend, middleware perform functions such as basic filtering and reader integration and control. RFID middleware assist with retrieving data from readers, filtering data feeds to application software, generating inventory movement notifications, monitoring tag and reader network performance, capturing history and analyzing tag-read events for application tuning and optimization.

Server

A server may be configured with an RFID system. It is a communication gateway among the various components. It receives the information from one or more readers and checks the information against its own database or exchanges information with the circulation database of the library integrated management system. The server typically includes a transaction database so that the reports can be produced.

3.6 Applications of RFID Technologies in Libraries

1. Book Drops

The Book Drops can be located anywhere, within or outside the library. Possible remote locations outside the library include MRT/ train stations, shopping centres, schools, and etc. This is unprecedented flexibility and convenience of returning library items at anytime of the day, even when the library is closed.

2. RFID Tagging

It is the most important link in any RFID system. It has the capacity to store data referring to the unique object to which they are attached, rewrite again without any requirement for contact or line of sight. Data within a tag may provide identification for an object, proof of ownership and history.

3. Counter Station

Counter station is a staffed assisted station on service such as loan, return, tagging, sorting and etc. It is loaded with arming/disarming module, tagging and sorting module.

Arming/disarming module allows EAS (Electronic Article Surveillance) bit within the tag of the library reset so that it will cause the alarm at the EAS gate.

4. Patron self check-out station

It allows patrons to self-issue items without assistance from the library staff. Complete with a touch screen and receipt printer, the patron self-checkout station helps libraries to manage the human resources efficiently.

5. Shelf management

This solution makes locating and identifying items on the shelves an easy task for librarians. It comprises basically of a portable scanner and a base station.

3.7 Conclusion

RFID era is not always simplest rising however additionally extra effective, handy and value green era in library security. This era has slowly started to update the conventional barcode on library items. The RFID tag can comprise identifying statistics enrich includes a books names or fabric type, while not having to be pointed to a separate. The RFID tag discovered on library materials. It may also update or be brought to the barcode, providing a one of a kind approach of stock control with the aid of using the group of workers and self carrier with the aid of using borrowed.

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- 1) <https://digitalcommons.unl.edu>
- 2) <https://www.researchgate.net>
- 3) <https://www.theseus.fi>
- 4) <https://www.ij.lis.org>
- 5) <https://www.rfid-library.com/>

CHAPTER IV
**RFID TECHNOLOGY AT NATIONAL AND
INTERNATIONAL LEVEL**

4.1 RFID LIBRARIES AT NATIONAL LEVEL

INTRODUCTION

National library is established by the government of a nation to function the pre-eminent repository of information for that country. Unlike public libraries, they rarely modify voters to borrow books. Often, they embody various rare, valuable, or very important works; like the Gutenberg Bible. National libraries are usually notable for their size, compared to those of different libraries inside a country. Many national libraries get along at intervals with the National Libraries Section of the International Federation of Library Associations and Institutions (IFLA) to discuss their common tasks, define and promote common standards and perform common services to them to fulfil their duties. RFID plays a vital role in redefining the library technique to make everyone's job easier right from patron to library staff. RFID provides a platform to automate most of the tasks performed by the library staff like arrival check-out, storing, stock management and inventory.

Many libraries in India have implemented RFID technology for the better functioning of the Library and for security, some of the libraries are:

- ❖ National library of India Kolkata
- ❖ State Central library of Kerala
- ❖ Goa state central Library
- ❖ British Council Library, Chennai
- ❖ Rajiv Gandhi University, Itanagar
- ❖ Sikkim University, Gangtok
- ❖ Chandragupta Institute of Management, Patna
- ❖ University of Agricultural Sciences, Bangalore etc

➤ GOA STATE CENTRAL LIBRARY

The Goa State Central Library is also known as Krishnadas Shama Goa State Central Library. The Goa, central library is the oldest Public library in India. It was established on 15th September 1832 by vice Roy Dom Manuel de Portugal e Castro as 'Public Livaria'. The Library is renamed as Krishnadas Shama Goa State Central Library the founder of Konkani prose & father of Konkani literature in the written word of the 16th Century.

The library has more than 1.8 lakhs books in different languages like English, Hindi, Marathi, Konkani, Portuguese etc. Since its inception on 15th February 1897, the status of library was raised to that of a National Library & renamed as ‘Bibliotheca National de Nova Goa.

- To overcome the increasing productivity demands on employees with very less time invested on repetitive tasks and their associated backlogs.
- To provide efficient and effective customer service to its user commodity.

➤ **ITT Mumbai**

ITT Bombay is one of the India’s largest libraries of Science, Engineering and Technology. The library is located in the heart of the campus it is surrounded with lush greenery. The 90,000sq.ft building accommodates over 500,000 excellent collection of books, journals & non- books material in science, engineering, technology, social sciences & management. The library is core of knowledge in this Academic Campus. The mission of the library is to provide information services and access to bibliographic & full text digital & printed resources.

➤ **IIT DELHI**

The Indian Institute of Technology Delhi [IITD] established in 1961, is one of the premiers engineering institutes of India. The IIT Delhi library system comprises of a Central library & 18 departmental libraries. The central library houses a total collection of over 3,84, 835 documents, comprising books, bound volumes of journals, microfilms, theses.etc.

OBJECTIVE

1. To explore the awareness of the RFID Technology.
2. Ascertain the purpose of using RFID.
3. Examine the efficiency of check- in check out of library circulation services after implementation of RFID.

➤ **IIT MADRAS**

The Indian Institute of Technology Madras (IITM) turned into setup on 1959 through the Government of India as an Institute of National Importance. Recently, IIT Madras has celebrated 58th Institute day in 15-04-2018. The Central Library additionally performing from the year 1959 from the Department of civil Engineering, in 1965 the Central Library shifted to Independent building in the front of Institute Main Guest House.

In view of latest development and future needs, the institute decided to build Millennium Library Building with state-of-the-art facilities in front of Administrative Building. Digital knowledge Center - a unique facility with 101 computer systems facilitating access to large number of e-resources in the library.

The central_library_has also implemented Integrated RFID_Technology, Smart Card,ISO-9001:2015 Standards, Contactless Smart Card Enabled Access Control System Electronic book drop system etc.

➤ **STATE CENTRAL LIBRARY KERALA**

State Central Library Kerala is also known as Trivandrum Public Library. It is situated at the heart of Thiruvananthapuram city, the capital of Kerala. It was established in the year 1829. It is primary library in India. The administration of the Trivandrum library was handed over to college of Travancore [now University of Kerala]. In 1948 the government was directed to require over the administration of the library from the university by a resolution of the state legislature. The library was declared because the 'State Central Library' of Kerala. RFID & online reservation is introduced in the year 2007.

4.2 RFID LIBRARIES AT INTERNATIONAL LEVEL

➤ **LOC(LIBRARY OF CONGRESS)**

Library of Congress, the de facto national library of the United States and the largest library in the world. With lots of books, recording, photos, maps & manuscripts. Its collections are Universal, not restricted by subject, format, or national boundary.

The library's primary mission is:

- ✚ To act, inspire and inform Congress and thus the Yankee folks with a universal and enduring supply of knowledge and creative thinking.
- ✚ To analysis inquiries created by members of Congress, administered through the legislative assembly analysis Service. The library is hospitable the final public,

through solely upper-level establishment and library staff could examine books and materials.

➤ **NEW YORK PUBLIC LIBRARY**

It's a public library system in New York City with nearly fifty three million thousand ninty two location, the New York library is that the second largest library and the third largest within the world. It may be a non-public, non-government, severally managed, Non-commercial Corporation in operation with each non-public and public finance. The "New York Public Library" name Patience and bravery that sit either facet of the doorway. T he branch was declared a National Historic Landmark in 1965,listed on the listed on the National Register of Historic Places in 1966 and selected a New York town Landmark.

➤ **NATIONAL LIBRARY OF SOUTH AFRICA**

National Library of South Africa is the doorkeeper of South Africa's collective national heritage materials and the national depository of published output materials. The NLSA is remitted by the National Library of South Africa Act together documentary heritage and to form accessible, that information is available to all.

Mission

- To build a complete collection of published documents.
- Provide reference and information services, nationally and internationally.
- Promote information awareness and information literacy.

Vision

➤ **LIBRARY OF AMERICA**

LOA is founded in 1979 with seed money from the National Endowment for the Humanities & the ford Foundation. LOA is a non profit publisher of classic American Literature. The LOA has revealed over 3,000 volumes by authors from mark Twin to Philip Roth. The first volumes were published in 1982, ten years after Wilson's death LOA edition include all periods & genres- including acknowledged classics, neglected masterpieces, and traditionally vital documents and text.LOA offers a broad vary of commercial enterprise & public programmes.

Mission:

1. The mission of the LOA is to provide development, promotion and improvement of library and information services and profession of librarianship.
2. To produce leadership for the event, promotion 7 improvement of library information, data, services.

➤ **NATIONAL LIBRARY OF MALAYSIA**

NLM is established in the year 1966 under the National Library Act 1972 in Kuala Lumpur, Malaysia. The library holds close to 5 million items, including books, publications, magazines, newspaper, and online materials.

The National Library is answerable for providing a group of information at national level for this and future generations. The major role of Library material Act 1986, acquisition, gift and exchange. The major role of a National Library is to preserve and expand the utilization of printed assortment from at intervals a individual country still as assortment printed in different countries because the National Library for Malaysia. The Malaysia assortment may be an assortment of national heritage and therefore the Malaysia race. The library has also acquired private collections of well known Malaysian figures comprising books, journals, articles, manuscripts, documents, photos, and letters and so on.

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CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

5.0 Analysis and Data Interpretation

USERS' RESPONSES

Basic Information's

Total no. of questionnaire distributed	40
Total no. of questionnaire received	30

Basic information of the user were asked, which helped to know about the User Education Qualification of the Institution. 40 questionnaire was distributed in all the section of the library, out of which 30 questionnaire were received from the users of the library.

5.1. Which of the class/category are you belongs to?

Sr. No	Class	Response
1	Undergraduate	4
2	Graduate students	10
3	PG student	13
4	Teacher	3

Table No.1

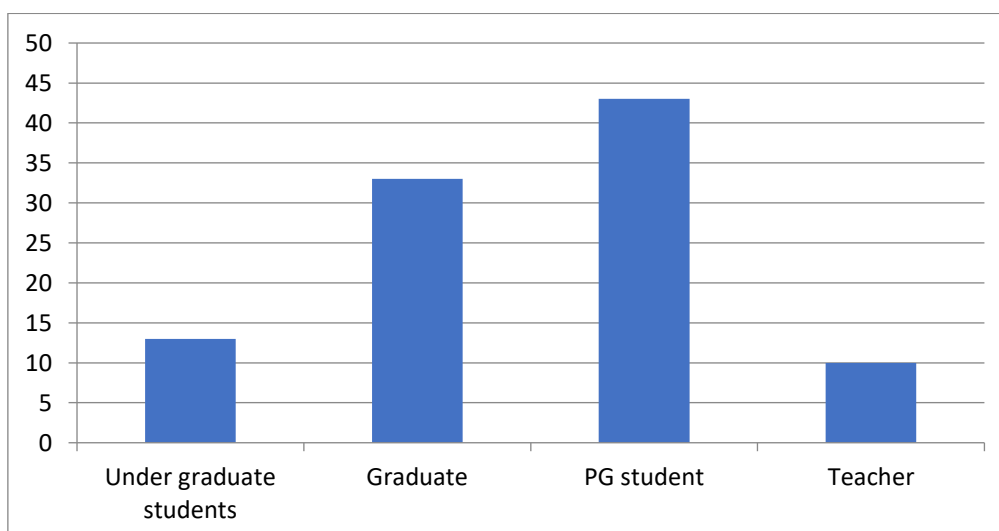


Figure No. 1

5.2. Are you aware any RFID system in library?

Sr. No	Particulars	Response		
1	Aware RFID system	Fully aware	Aware	Not aware
		5	12	13

Table No.2

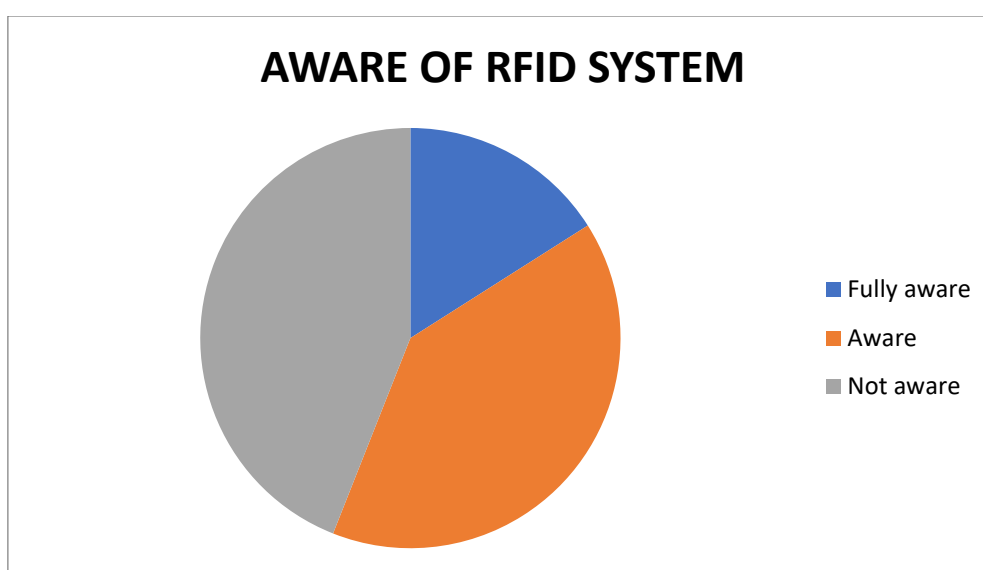


Figure No. 2

The above bar graph represented in the fig.No.3 indicates the awareness about the RFID system in the library. It is observed that 16% of users are fully aware of RFID system, whereas 40% of the users are aware about RFID system and hardly 44% of users among them are not aware.

5.3. Which libraries are suitable to implement for RFID technology?

Types of libraries	No. of Users	Percentage
Public library	15	30
Institutional library	18	60

Special library	3	10
NGO library	0	0

Table No.3

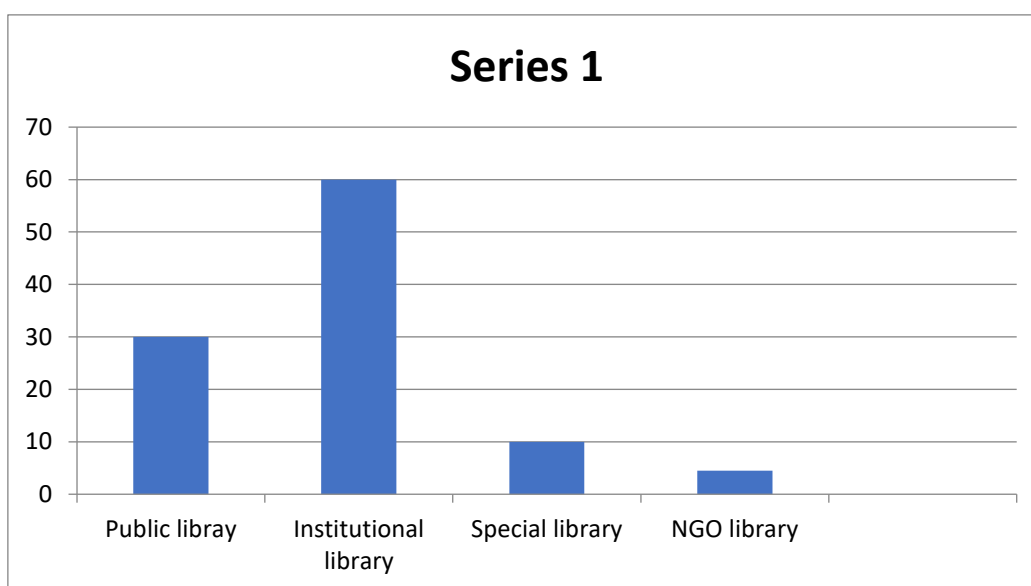


Figure No.3

The figure No.3 and bar graph shows that the 60% of the feels that institutional library is more suitable for implementing RFID technology, while 30% of the among them feels that public library are more appropriate for implanting of RFID whereas 10% of users says that special library is more suitable and hardly 0% of users says that NGO library appropriate for implantation of RFID. Further study reveals that compare to all others library institutional library are most suitable for implementing RFID technology.

5.4. How often do you:

How often do you use	Every time	Often	Rarely	Never
Use of kiosk i.e. check-out station	7	5	2	16
Self check-in	4	9	5	12
Ask service from staff for check in check out books	0	7	8	5

Table No.4

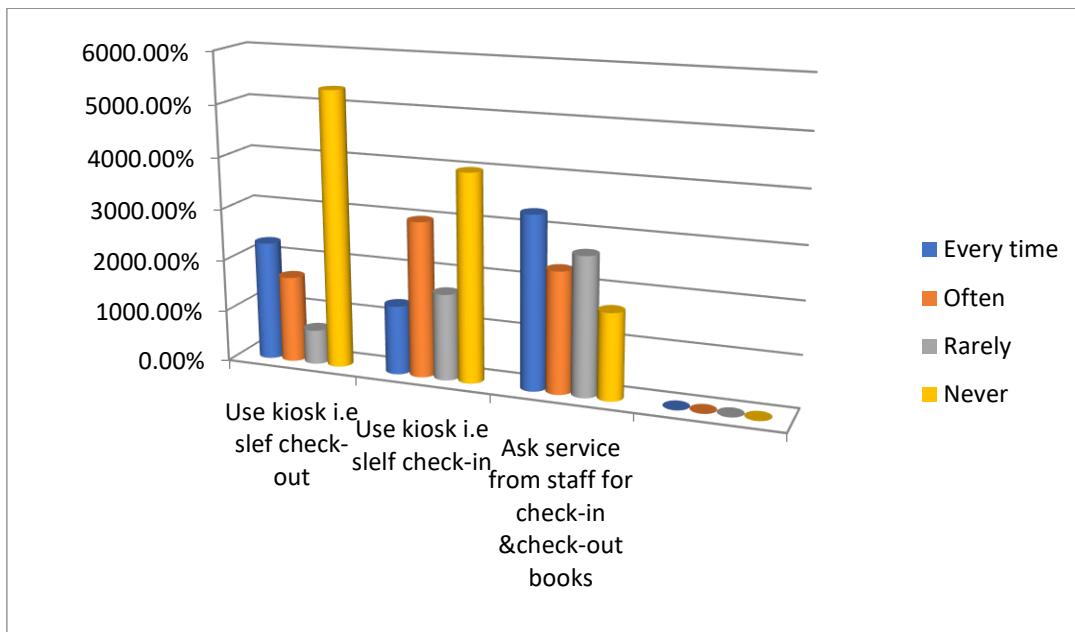


Figure No.4

5.5 Do you feel that smart card is ideal method for circulation process?

Particulars	Response	Percentage
Yes	24	80
No	6	20

Table No.5

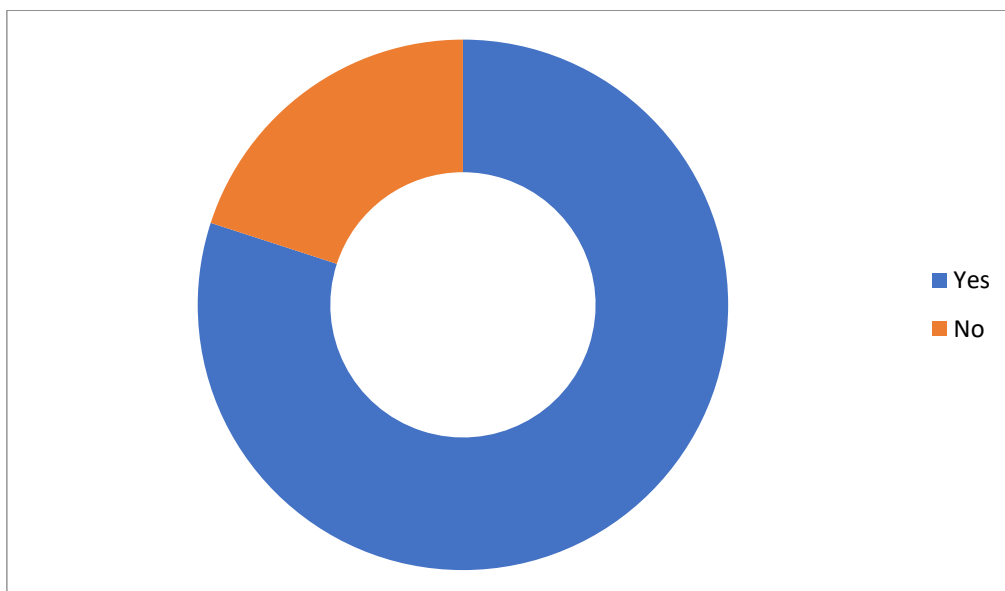


Figure No.5

The above pie chart present that 80% of the respondents said yes that RFID is ideal method for circulation process whereas 20% of the respondents said no with the same.

5.6. Do you think that Kiosk (counter) is better service for users?

Particulars	Response	Percentage
Yes	23	76
No	7	24

Table No.6

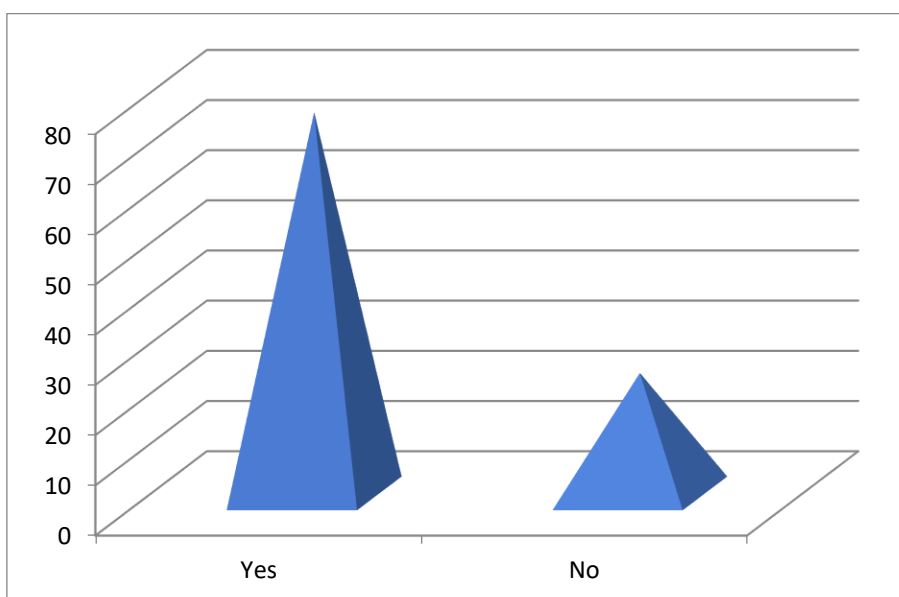


Figure No.6

The above study observed that 76% of the respondents are agree that Kiosk is better service for users whereas 24% of the respondents said no with the same.

5.7. What benefits are associated with RFID implementation is library?

Sr. No	Benefits	Yes	No
1	Self check out	24	1
2	Reduce the work at circulation section	20	3
3	Return item to shelf more quickly	22	4
4	Reduce book damage	23	3
5	Increase security	15	2
6	Reduction of overall library staff costs	15	4

Table No.7

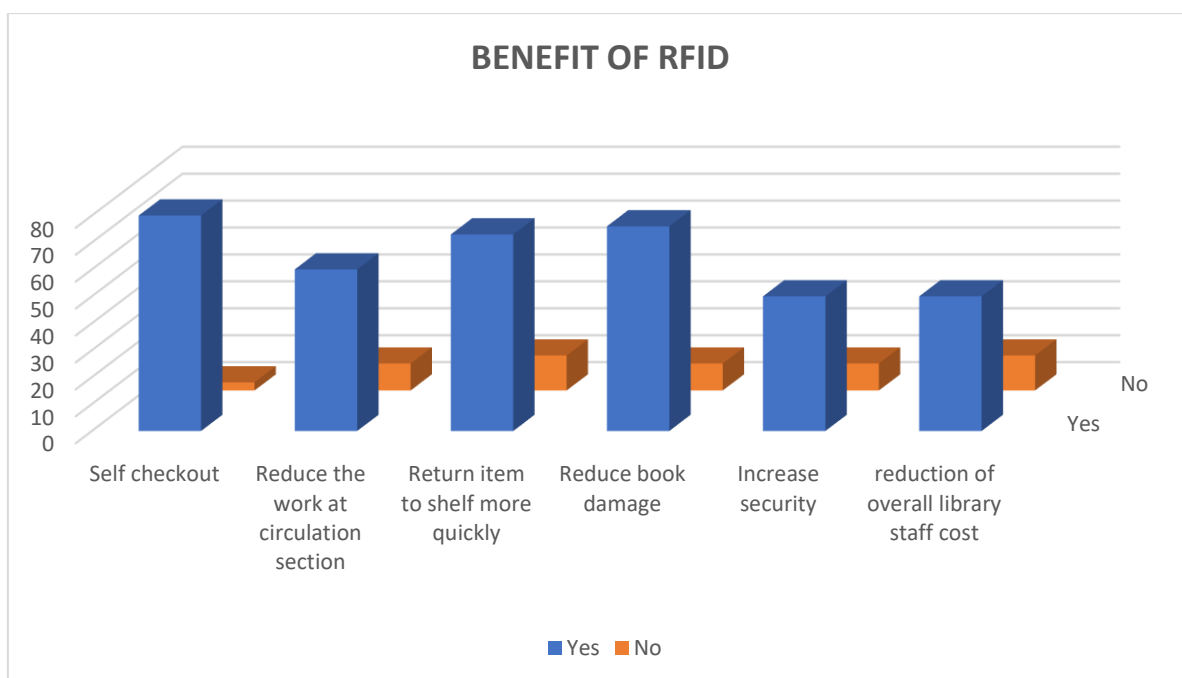


Figure No.7

The above bar graph and table No.7 shows that the benefits with associated RFID implementation in Library. It is seemed that out of total 30 number of users 24 users are agree regarding benefits of self-checkout and 1 users disagree. Survey were also done regarding reduction of work at circulation section 20 users agree whereas 3 users are disagree, next question asked regarding items return to shelf more quickly ,22 users are agree and 4 users are disagree. Similarly, regarding reduce damage book, 76 % are agree and whereas other 10% not. While other questions regarding to increase security out of the 30 users 50% are agree and rest 10% are disagree. At last survey was made regarding to reduction of library staff costs, here almost 50% users to be agree whereas 10% are not reacted.

5.8. Are you satisfied with the service provided using RFID technology in the library?

Particulars	Response	Percentage
Satisfied	15	50
Very Satisfied	10	33
Dissatisfied	2	6
Neutral	3	10

Table No.8

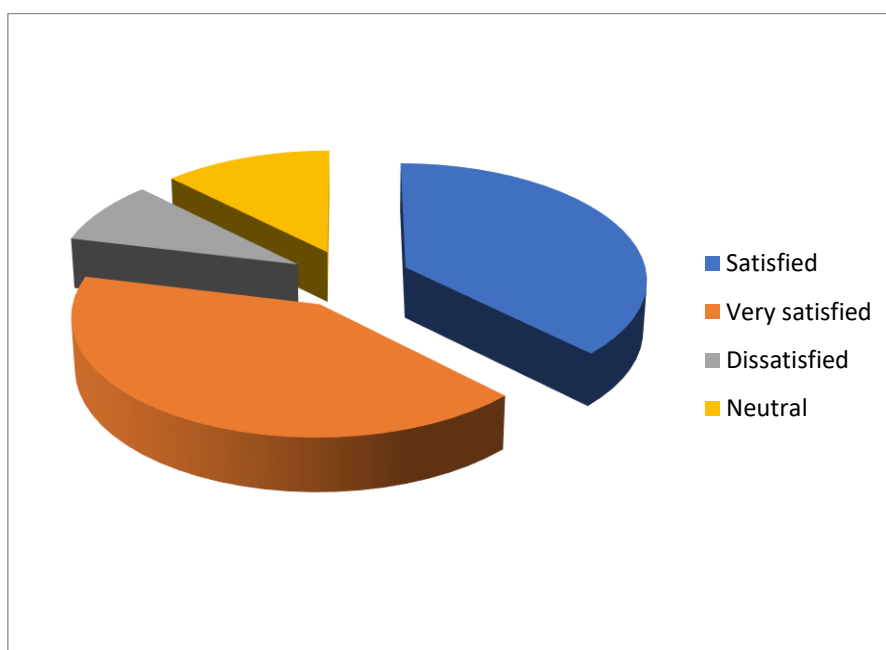


Figure No.8

The above table shows that about the satisfaction of users with the RFID system. It is observed that 50% of users are satisfied with the new system as they found more convenient.33% of users among them are very satisfied whereas 10% users seemed to be neutral and among 10% of users who are not yet satisfied.

5.9. Is RFID reducing theft of books inside the library?

Particulars	Response	Percentage
Yes	25	83
No	5	17

Table No.9

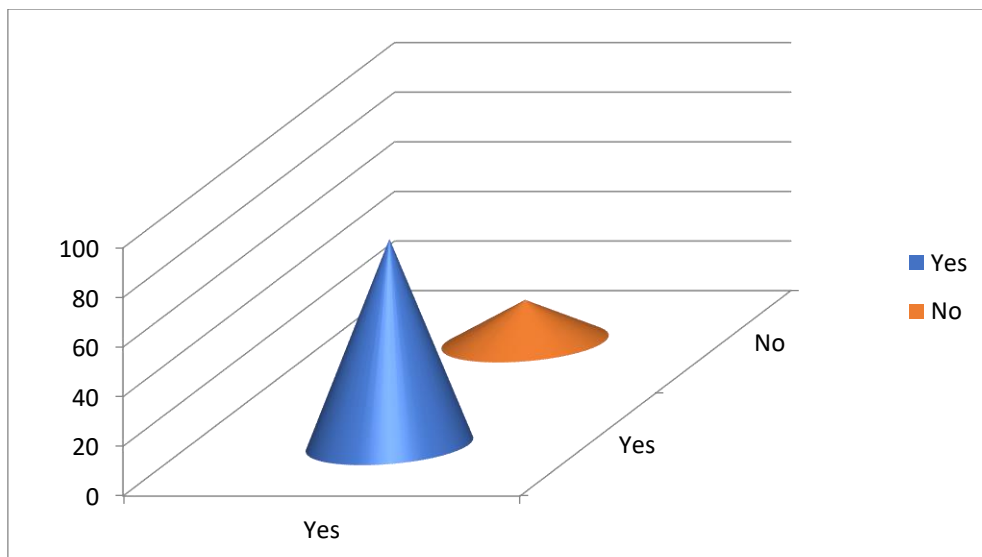


Figure No.9

The above chart specifies the theft of books. The data represented that 15 users found it more helpful in reducing book theft while 5 users responded negatively in this regard. This shoes that it solves the problem of the Libraries.

5.10. Does RFID technology is user friendly?

Particulars	Percentage	Percentage
Yes	25	83
No	5	17

Table No.10

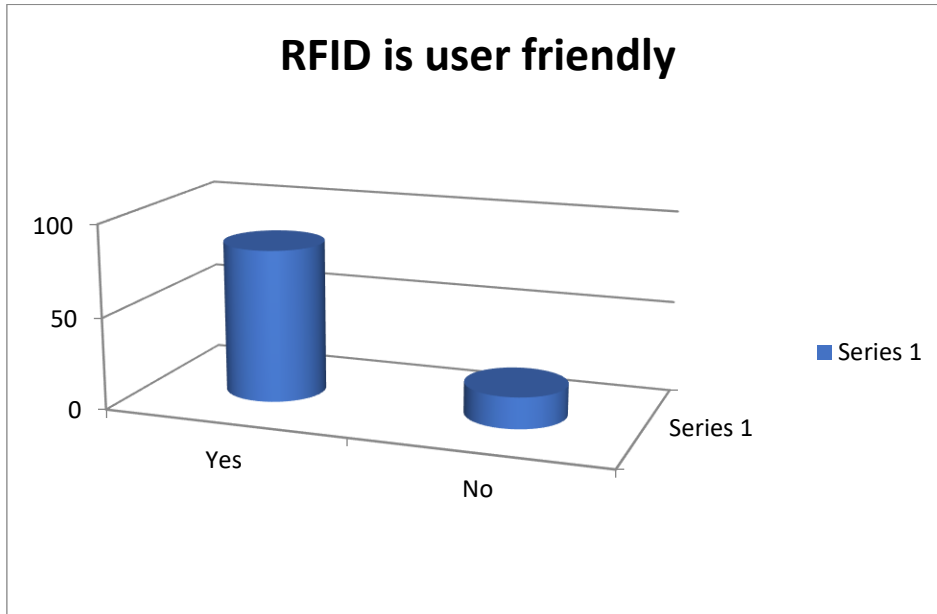


Figure No.10

5.11 Whether the RFID technology has any motivational factor for users?

Particulars	Response	Percentage
Yes	21	70
No	9	30

Table No.11



Figure No.11

The above chart illustrate and table no.11 shows that 70% users are response yes whereas 30% are saying that it is got negative impact. Thus more users feel that RFID has motivational factors for users

5.12 Please give your opinion for using RFID technology compared to manual?

Particulars	Response	Percentage
Time consuming	20	66/66
Time saving	9	30
Easy to use	13	48.33
Difficult to use	13	43.33
More preferred	7	23.33
Less preferred	7	23.33

Table No.12

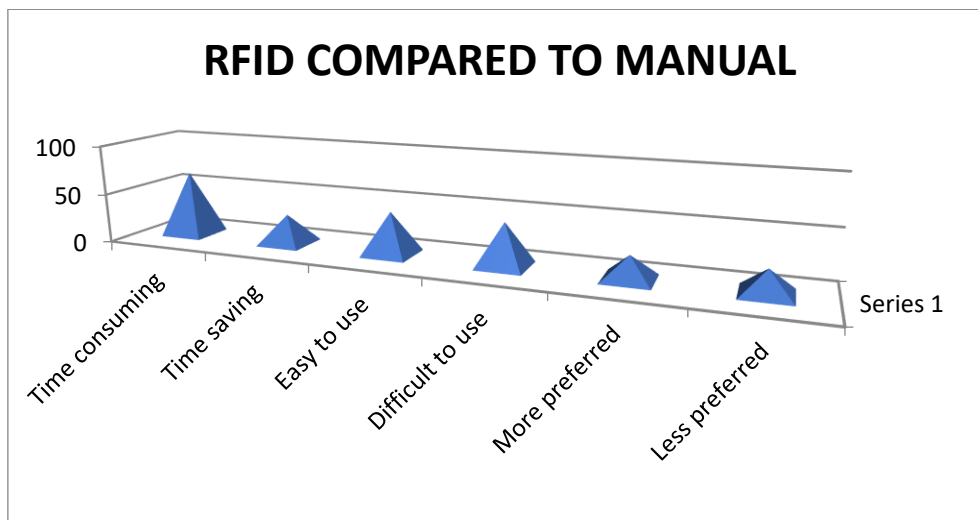


Figure No.12

There are various opinion associated with the use of RFID. To study their respondents were asked whether they come across any problems while using RFID. 20 Users saying as it save the time of Patrons. Whereas 13 users are says it is easy to use. 13 users are seemed it is difficult to use, 9 users are says it is time consuming whereas 7 users are more preferred and 7 users are less preferred. However heavy rush of users has been reduced at the circulation counter with the implementation of RFID.

5.13. Do you feel the RFID is cost effective?

Particulars	Response	Percentage
Yes	19	64
No	11	36

Table No.13

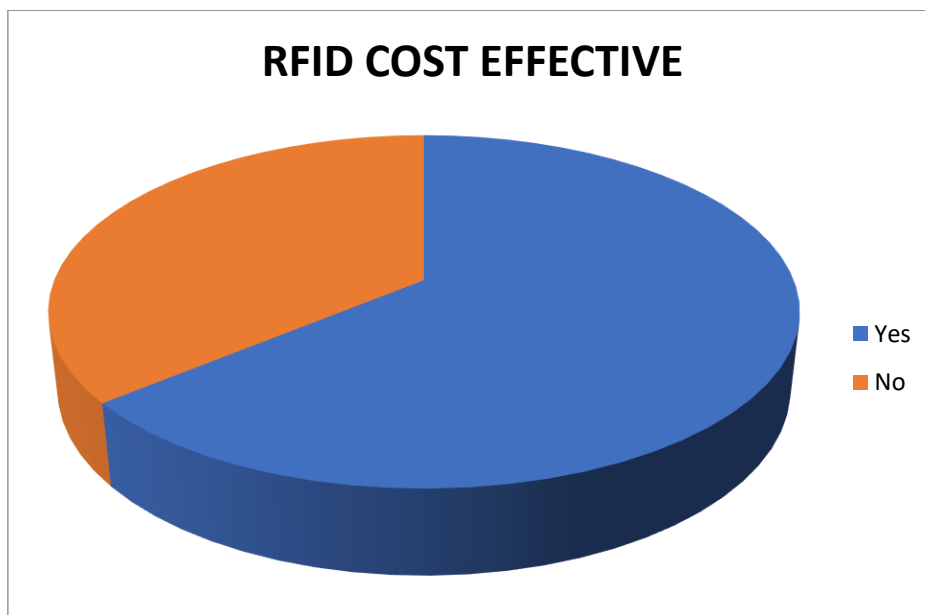


Figure No.13

The above pie chart illustrate in Figure No.13 observed that 64% of users are saying that RFID is cost effectiveness whereas 36% users are saying that RFID is not effective. The study found that RFID provide benefits to users at a certain cost rather their previous system.

5.14 How do you evaluate the RFID technology for study and research?

Particulars	Response	Percentage
Good	13	43.33
Satisfactory	7	23.33
Excellent	6	7.33
Poor	4	13.33

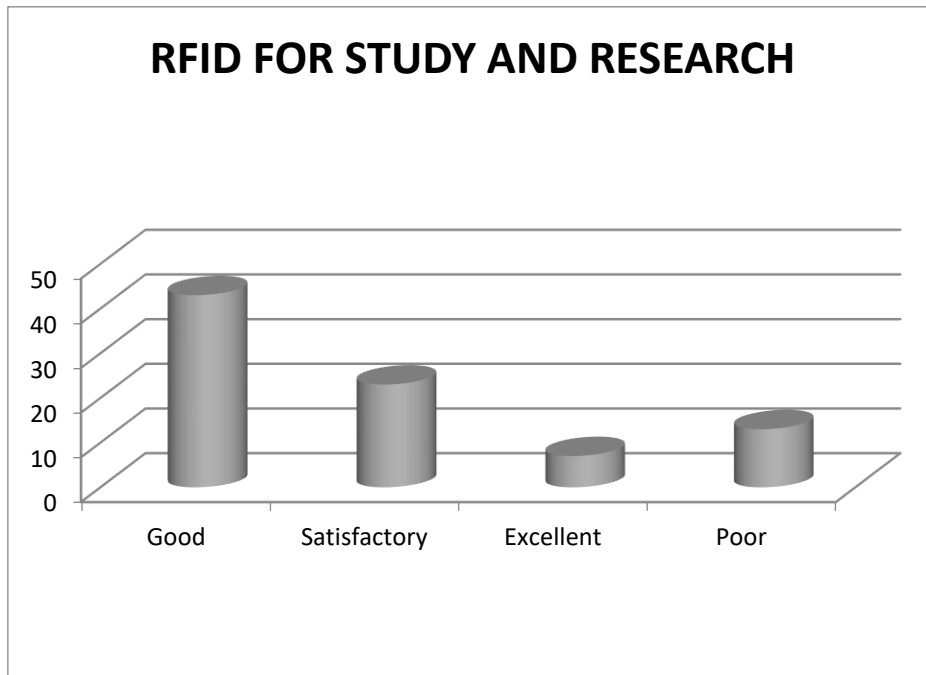


Figure No.14

The above bar graph and tabular indicates the RFID evaluation. It seemed that 13 users responses as good compare to 7 users are satisfactory 6 users feels excellent and hardly 4 users seemed its poor.

5.15 Do you face any problem while using RFID technology?

Particulars	Response	Percentage
Slow internet	18	60
Poor designed	5	16.66
Lack of proper hardware	8	26.66
Insufficient time and training	11	36.66

Table No.15

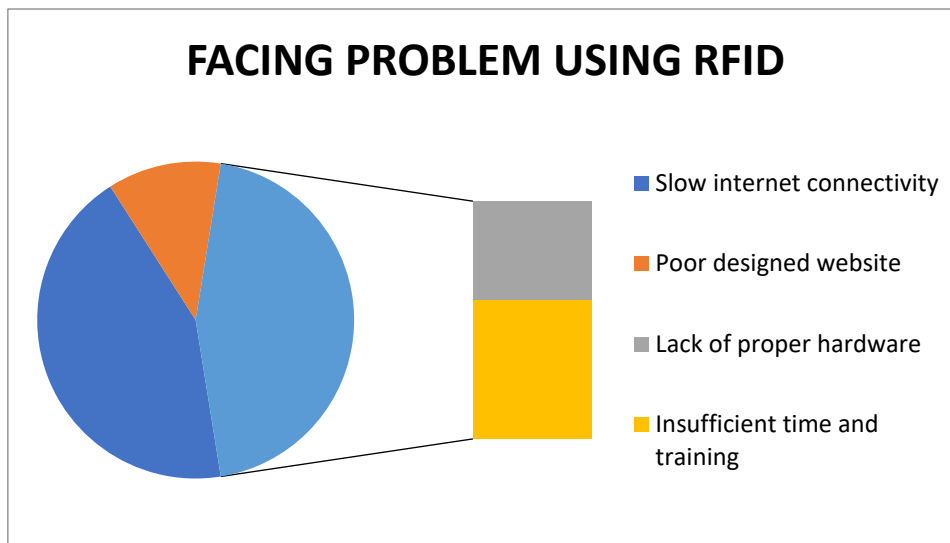


Figure No.15

The above pie chart in Figure No.15 furnishes details about the suggestions received from respondents for improvement of RFID technology in library. It is observed that 60% respondents says slow internet connectivity, 36% of the respondents are says its due to insufficient time training, whereas 26% of the respondents are face lack of proper hardware and almost 16% of the respondents face problem because of poor designed website.

5.2 LIBRARIANS RESPONSES

Print resources

Items	Response	Percentage
Books	10	100
Current journals	10	100
Journal back volume	10	100
Thesis/Dissertation	10	100
Standard/Patent	10	100

Table No.16

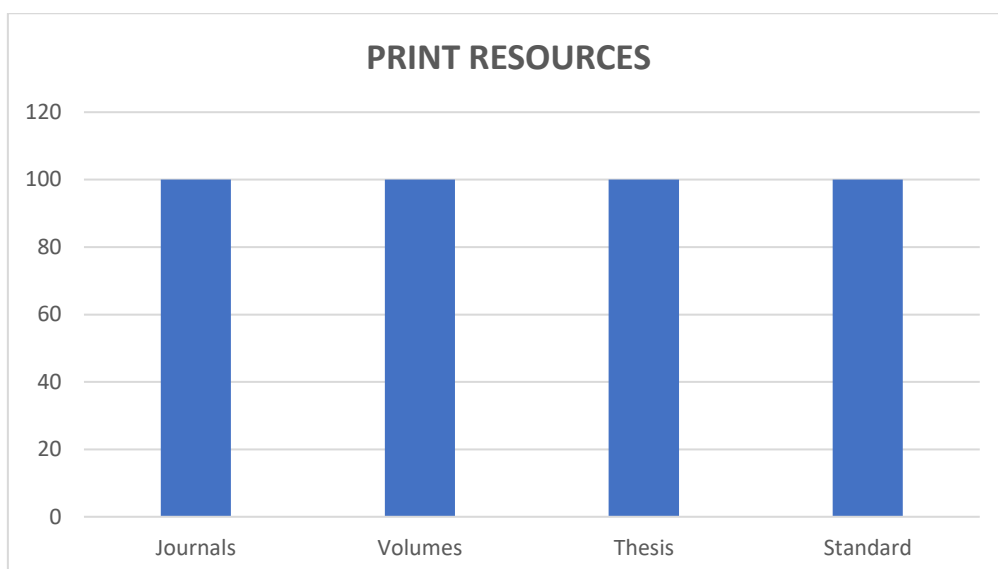


Figure No.16

In the bar graph shows that all the collection are where in the library. All the Librarians says yes that Books, current journals, journal back volume whereas thesis/Dissertation and Standard/Patent are also there .There are huge number of collection in the library.

E-RESOURCES

Items	Response	Percentage
E-books	10	100
Books with CD	10	100
E-journals	10	100
CD ROM	10	100
Online databases	10	100
Multimedia documents	10	100

Table No.17

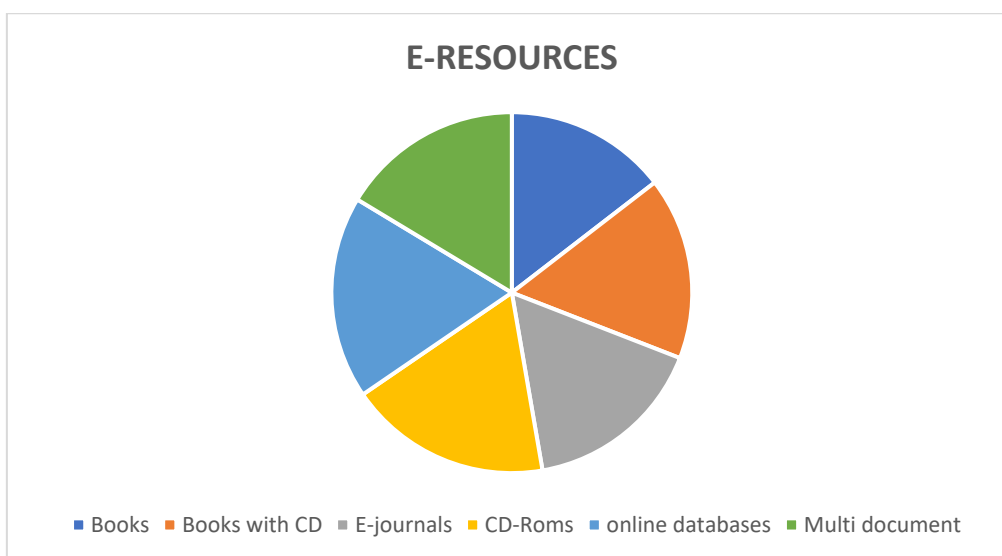


Figure No.17

The above pie chart furnishes that types of electronic resources are used in library. All 10 Librarians says the E-books are used in library, whereas also books with CD collection are also there in the library, E-journals as the same and CD ROM, Online databases and whereas multimedia documents are there in the library collections.

How do you subscribe journals to your library?

Items	Response	Percentage
Direct from publisher	10	100
Through Vendor/agent	10	100
Through Institutional/Membership	10	100
Through National/International consortia	10	100
Both direct & vendor	10	100

Table No.18

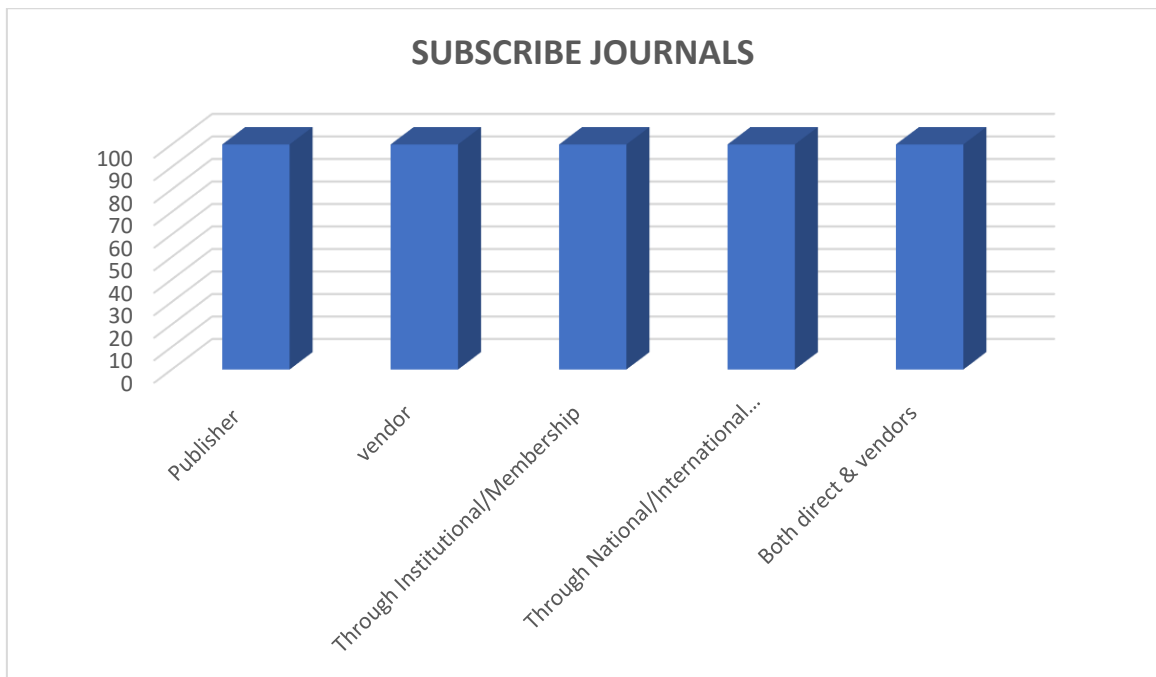


Figure No.18

Question was asked to the Librarians regarding the types of subscribe journals are used in Library. All the librarians say that journals are subscribe through direct from publisher, through vendors, through Institutional/Membership, through National/International consortia and from both direct & vendor.

Have you developed any RFID strategy for your library?

Particulars	Response	Percentage
Yes	10	100
No	0	0

Table No.19

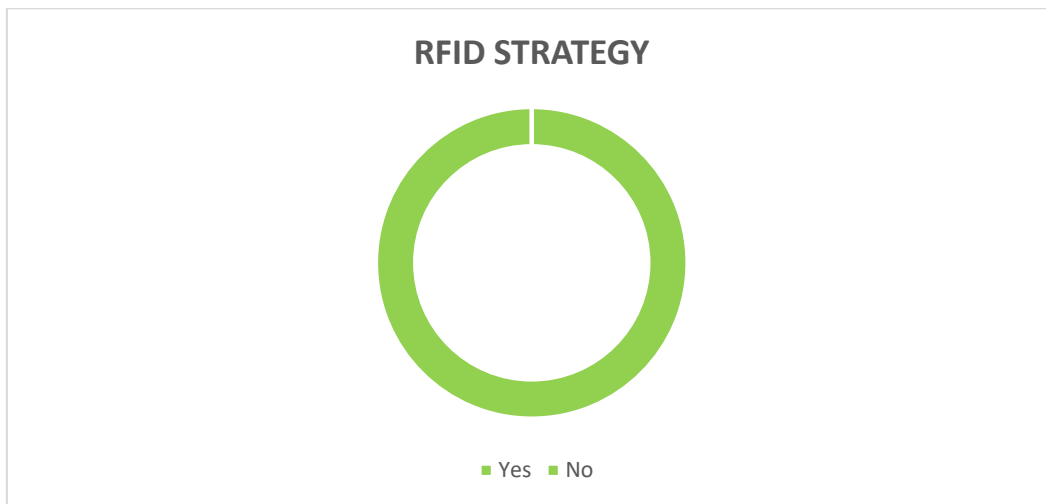


Figure No.19

The above pie chart illustrates that developing RFID strategy for library. All 10 of Librarians say yes.

Which methodology is used by your library while purchasing the RFID system?

Particulars	Response	Percentage
Quotation	4	40
Tender	4	40
None of the above	2	20

Figure No.20

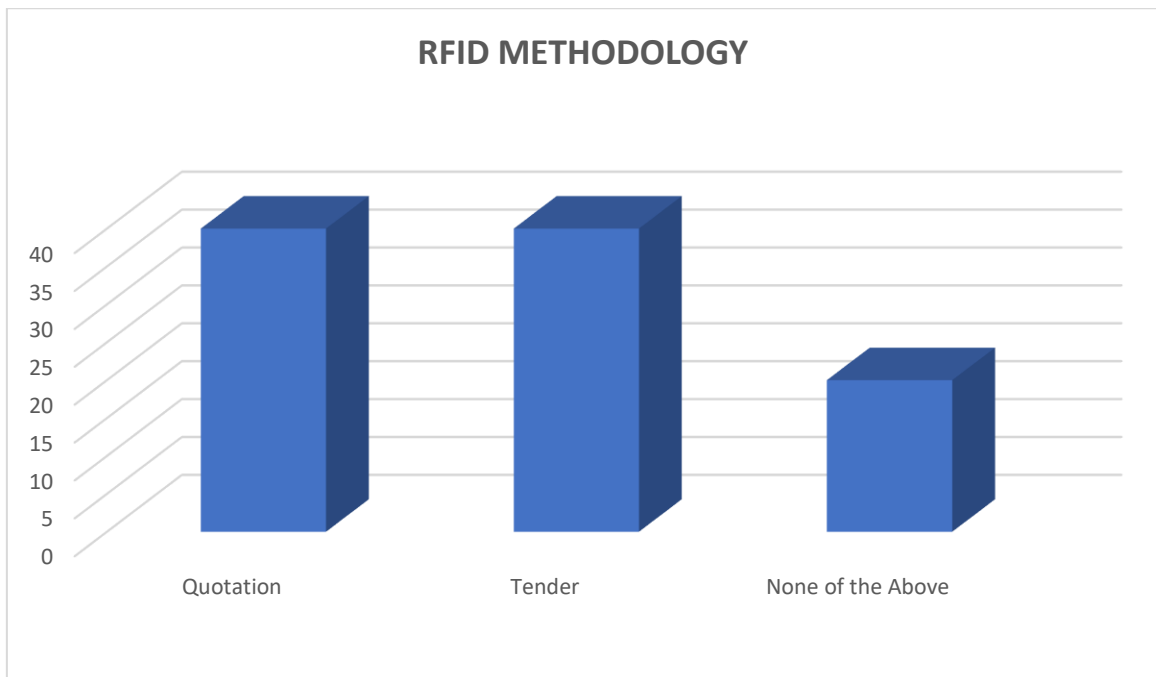


Figure No.20

In the bar graph illustrate that methodology used by library while purchased the RFID system that 40% of the librarians says that RFID is purchasing in library through Quotation and 40% of the librarians says that through Tender while remaining librarians says none of the above.

Which integrated library Management system software used in your library?

Particulars	Response	Percentage
LIBSYS	10	100
NEWGENLIB	0	0
E-GRANTHALAYA	0	0
KOHA	0	0

Table No.21

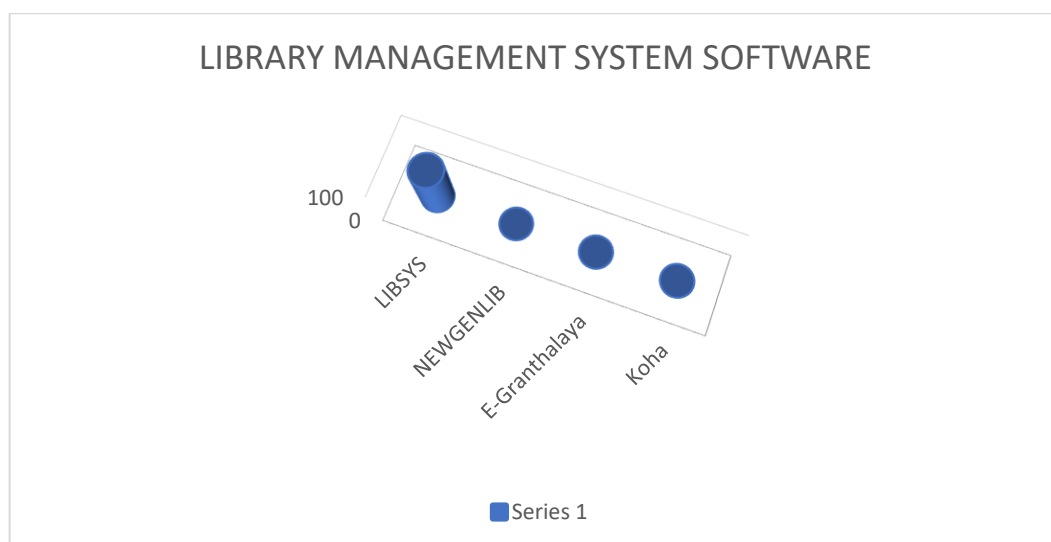


Figure No.21

The above table and bar graph Figure No.21 shows that about the Library Management software used in library. That 10 responses are says that only the LIBSYS software that are using in the library. Regaining library management software are not using in the library.

Objectives for using the RFID technology in your library:

Sr. No	Particulars	Response	
		Yes	No
1	Developed RFID strategy	10	0
2	Self-checkout	10	0
3	Reduce the work at circulation section	10	0
4	Returns items to shelf more quickly	10	0
5	Increase security	10	0

Table No.22

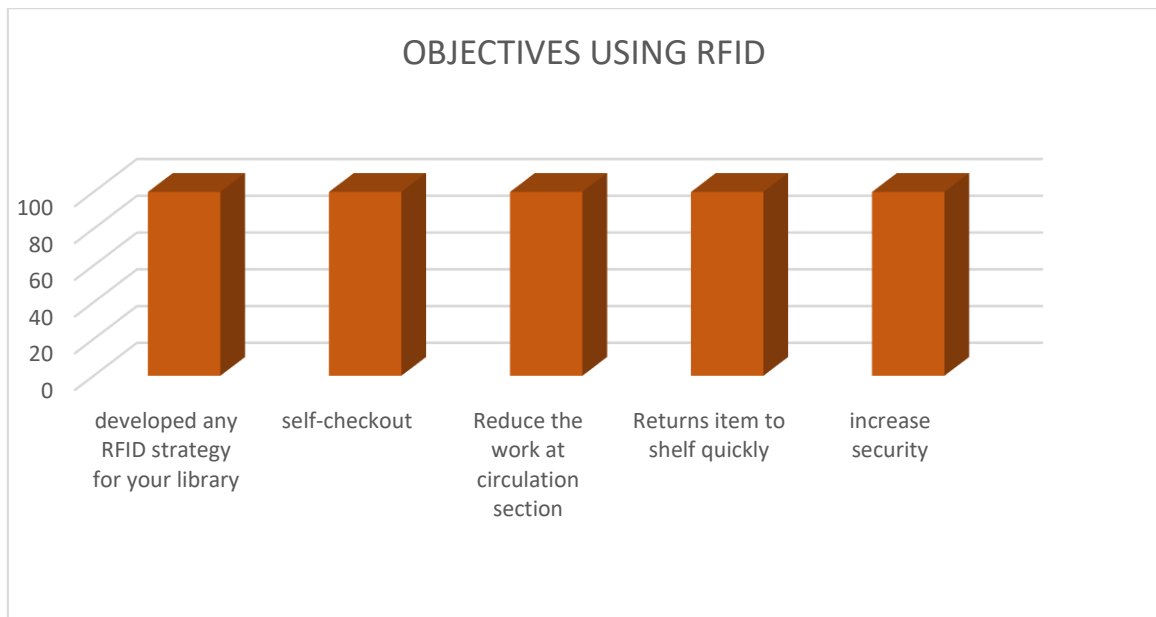


Figure No.22

The above graph and table in figure No.22 depicts the using the RFID technology in library. It is seemed that out of total, 10 users agree regarding the developed RFID strategy for library and no users agree. Survey were also done regarding the self-checkout 10 users seemed to be agree whereas no users are disagree, next question asked regard reduction the work at circulation section all users seemed to be agree and no users are disagree whereas similarly regarding the items return to shelf more quickly, all users are agree and no users are disagree. At last survey was made regarding increase security here almost all users seemed to be agree whereas no are not reacted.

Do you use RFID system in your daily routine?

Particulars	Response	Percentage
Rarely	1	10
Daily	7	70
Sometimes	1	10
Not used	1	10

Table No.23

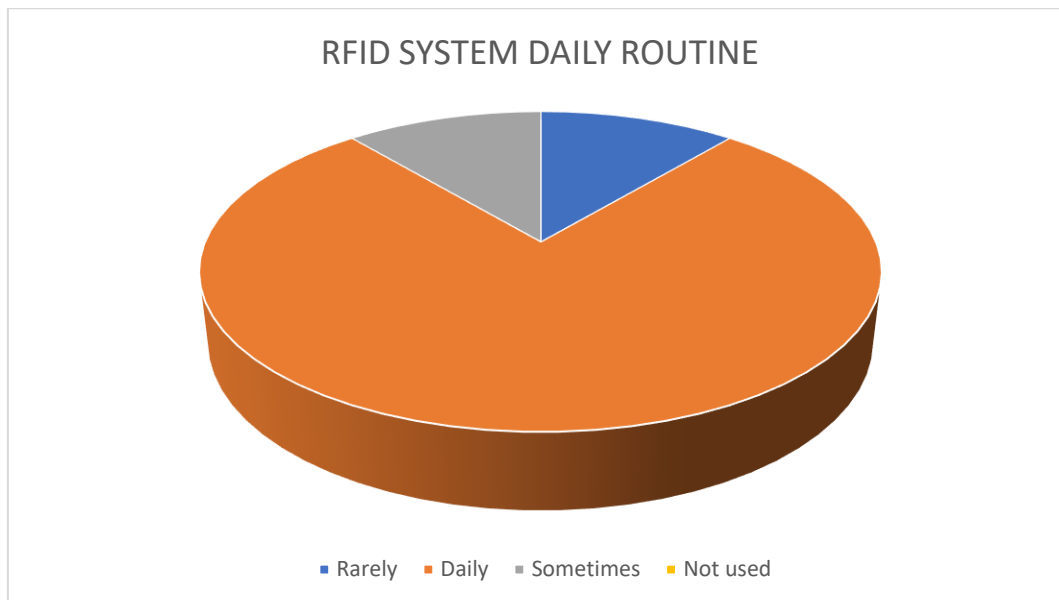


Table No.23

The above pie chart indicates the response of Librarians towards used of RFID system in their routine works. The study reveals that 70% of Librarians are using RFID daily routine works, whereas 10% of Librarians are using sometimes in their official work, others 10% are rarely used and remaining 10% are not using. Almost 70% of the Librarians seemed to be used of RFID in their daily routine.

Quality of books being tagged per day?

Quality	Response	Percentage
1-100	2	20
100-500	8	80
500-1000	0	0
More than 1000	0	0

TableNo.24

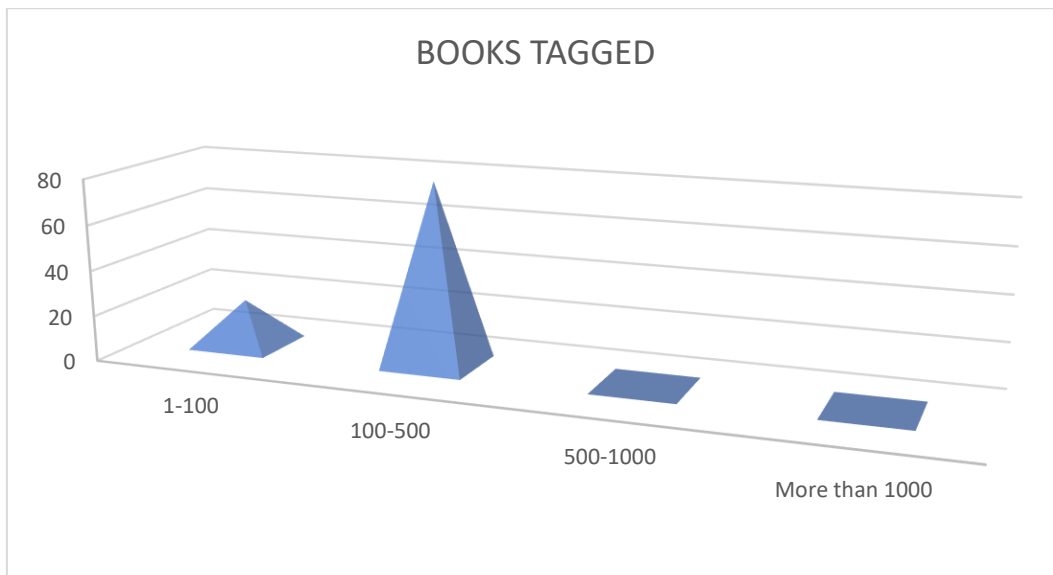


Figure No.24

Above chart illustrated in figure No.24 the quantity of books being tagged per day. The questions were asked to Librarians regarding the quantity of books being tagged per day. 80% of Librarians says between 100-500, 20% of Librarians are between 1-100 whereas above 500 to more than 1000 are not tagging per day.

How long the initial tagging did takes place?

Particulars	Response	Percentage
2mnts	9	90
5mnts	1	10
10mnts	0	0

Table No.25

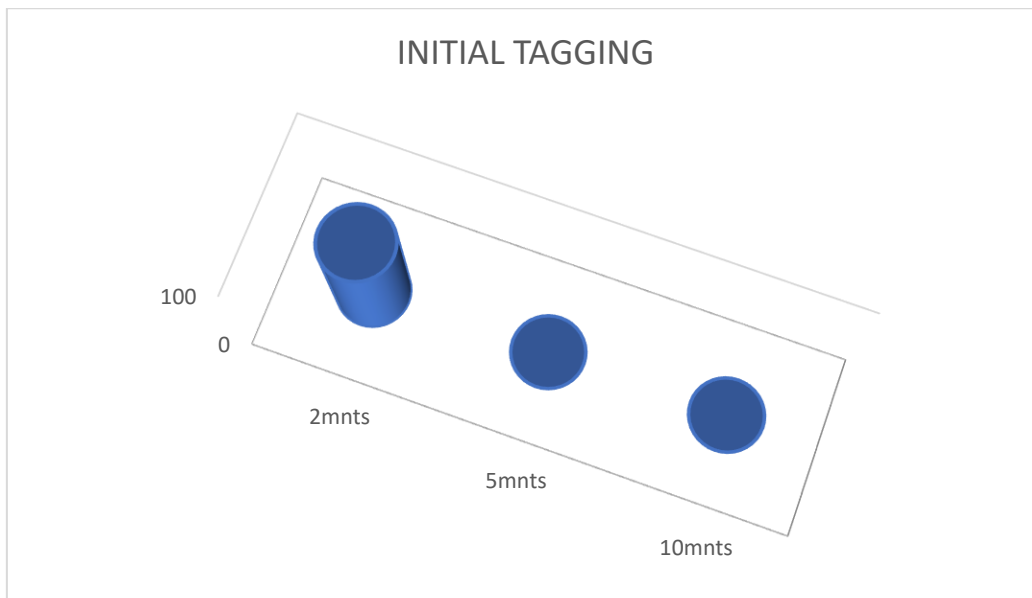


Figure No.25

The above graph illustrate the minutes diverted for initial tagging of books. The study reveals that 80% of the Librarians are feel that it tag just 2 minutes whereas 20% of Librarians said its using 5 minutes.

Which is the RFID equipment installed in the library?

Particulars	Yes	No
RFID gate	10	0
RFID Scanner	10	0
RFID Kiosk	10	0
RFID drop box	10	0

TableNo.26

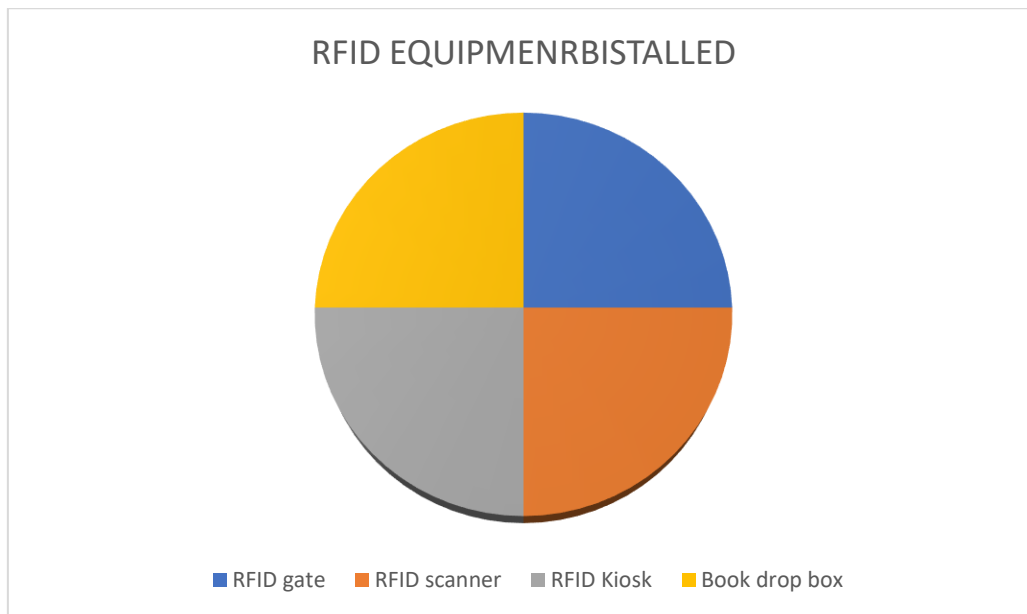


Figure No.26

The above pie chart indicates in Figure No.26 RFID equipments installed in library .It is conformed that almost 100% of all librarians are agree about the installation of RFID equipment in the Libraries. RFID gate, RFID Scanner, RFID Kiosk and RFID Drop box.

15. Does RFID generate more data storage to make it difficult for IT system to handle?

Particulars	Response	Percentage
Yes	8	80
No	2	20

Table No.27

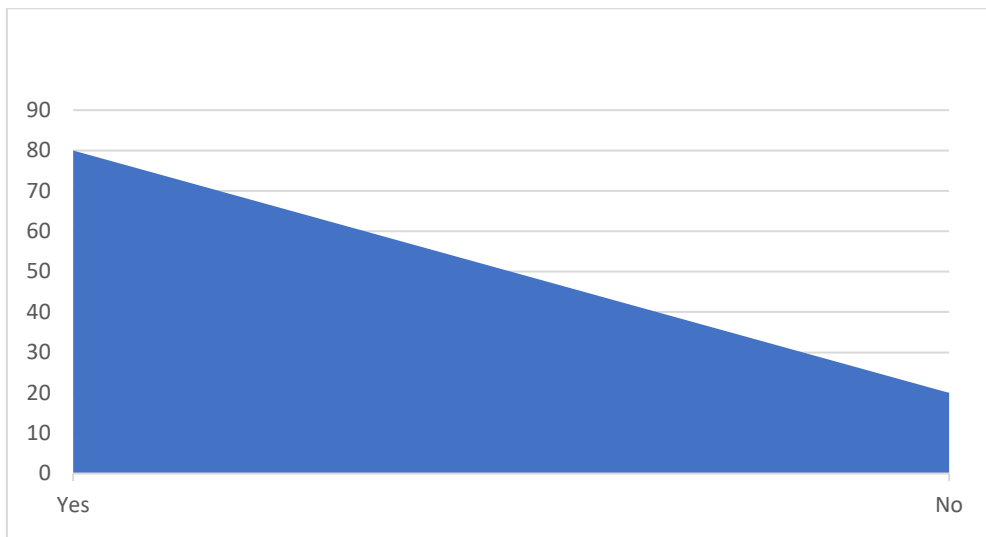


Figure No.27

The response abstract of this table and graph No.27 acknowledges that 80% of Librarians are agrees in response to RFID generate more data so that it make difficult to handle data,whereas 20% Librarians says no with the same.

Do you feel that RFID technology is required in library?

Particulars	Response	Percentage
Yes	10	100
No	0	0

TableNo.28

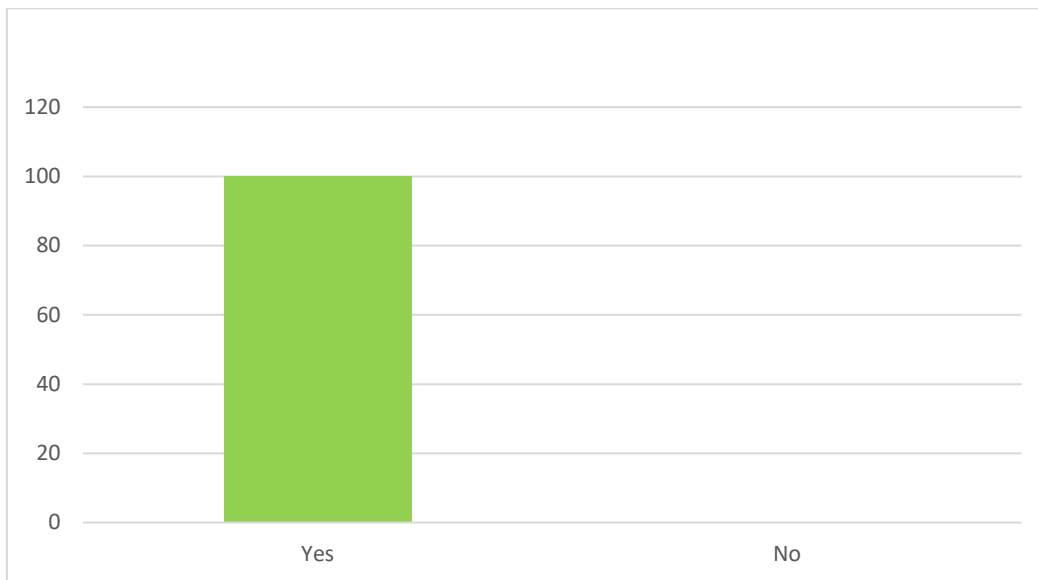


Figure No.28

The above bar graph and table in figure No.28 shows that RFID technology is required in library all the librarians are agree with this.

Do you suggest RFID technology for the Modern Libraries?

Particulars	Response	Percentage
Yes	8	80
No	2	20

Table No.29

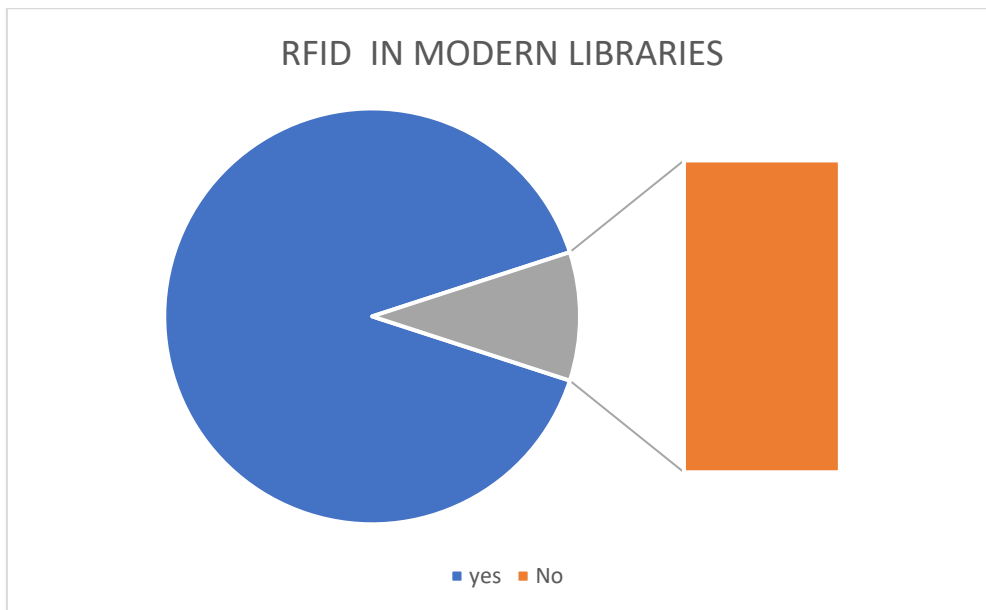


Figure No.29

The question was asked to Librarians regarding RFID technology in Modern Libraries. It was recommended that 80% of Librarians are saying yes whereas 20% are saying no as the same.

Does the library benefit in terms of cost

Particulars	Response	Percentage
Yes	10	100
No	0	0

TableNo.30

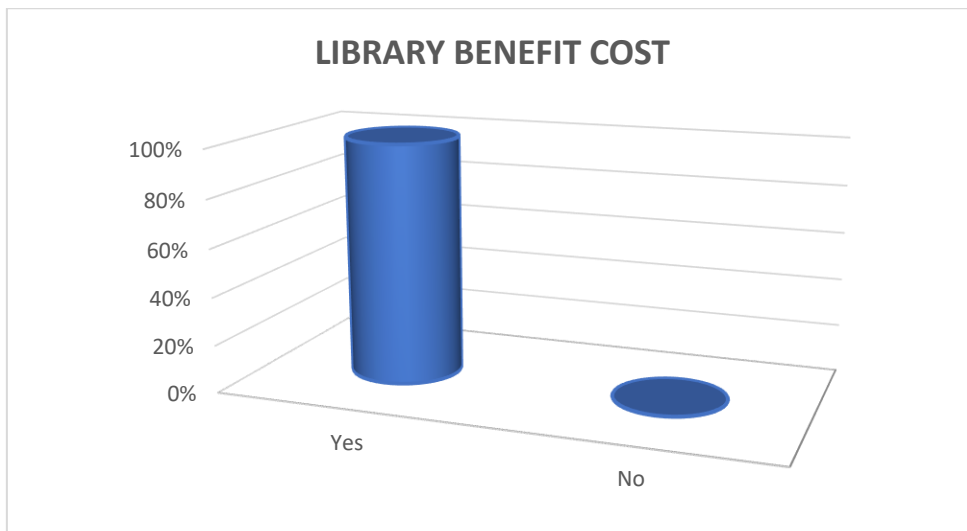


Figure No.30

The above graph and figure No.30 indicates that the benefit if library in terms of cost all the librarians say same as the

Is RFID better than Barcode?

Particulars	Response	Percentage
Yes	9	90
No	1	10

Table No.31

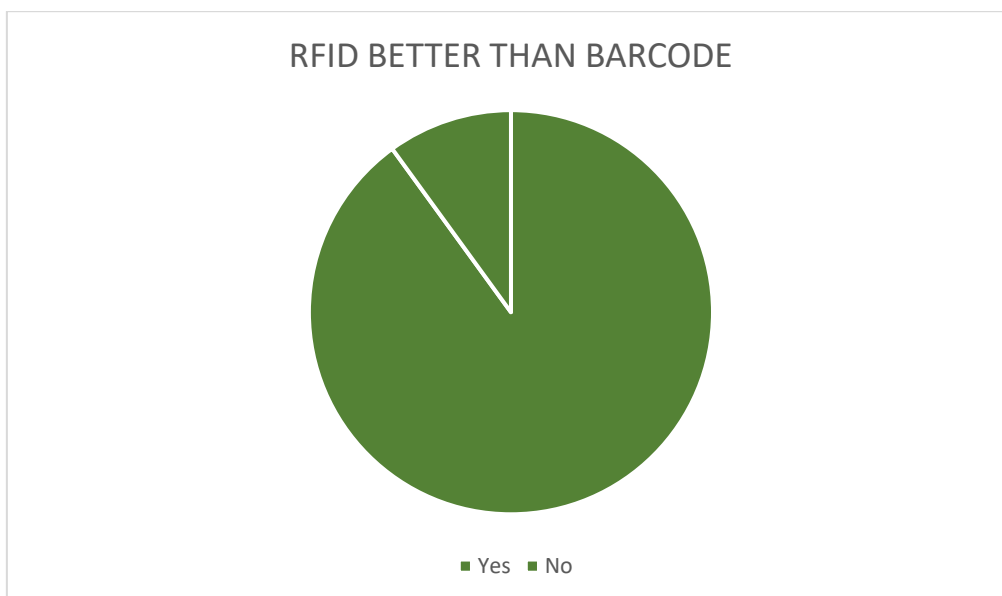


Figure No.31

The above pie chart in Figure No.31 indicates that whether RFID is better than Barcode. This question has been asked to Librarians and 90% of Librarians responses that RFID is better than Barcode whereas 10% of Librarians says no, as that not agree on this statement.

CHAPTER VI

OBSERVATION, FINDINGS, SUGGESTION AND CONCLUSION

6.1 OBSERVATION

The present thesis is an attempt to analyze the most implement and benefit ratio for use of RFID Technology Modern Library. Study will identify one most benefit ratio for implementation of RFID in library.

The Thesis aims to ascertain the different pros and cost of RFID technology. This chapter discusses the finding observation and conclusion on the basis of data presented. It also deals with the limitation and the centre research on the topic.

Having introduced the basic research problem in chapter I along with the objectives hypothesis, methodology, significance, scope and limitation of the study. Chapter II proceeds to give brief review of literature on various aspects reveal to the use of RFID Technology. Chapter III and IV aims to analyzing the different concept of RFID Technology and the latest tried in RFID at National and International levels. Data analysis and interpretation is done in the form of chapter V. The finding of questionnaire is presented in the form of chapter VI under the following components.

6.2 FINDING BASED ON USERS RESPONSE:

- The finding reveals that majority of respondents are not fully aware of RFID system there is a need for library to introduce necessary program to explore the use of RFID in the Library.
- The study reveals that compare the public library is same suitable to implement RFID Technology.
- The study reveals that smart card is the ideal method for circulation purpose. As there is new modern Technology introduced in Library for identify if users.
- The data highlights that most of the respondents are refused that there are benefit associated for implementation of RFID in Library.
- It is observed that majority of respondents are satisfied with the service provided using RFID Technology system has they found it more convenience less time consuming and the work can be done speedily and at use others are dissatisfied and unaware about the services . The study reveals that the Management should be given more orientation

program to users and widely publicity, so that more respondents get attracted and make the use of services in library.

- The study reveals that the more respondents are aware about that of books inside the library. It is observed that RFID system control the security system for the Library.
- It is observed that RFID Technology is more friendliness as this system is preferred more due to it convenient to use and less time consuming and most favourable.
- It is observed that the majority of respondents feel that RFID has motivation factors for users.
- From the survey it is observed that there are various opinions associated with the use of RFID. To study these, respondents were asked whether they come across any problems while using RFID, it is observed that most respondents are aware that it's save time of respondents and it is easy to use and most of the respondents are preferred. Hardly some of respondents are less preferred as they found it difficult to use.

6.2.1 Finding Based on Librarians Response

- The study research found that print reveals available most of the library and it is positive sign for academic pursuit.
- It is observed that the books and Electronic materials are most preferred. The study reveals that all these documents are essentials as they are assets of Library.
- The study reveals that majority of the professionals developed RFID strategy in Library.
- It is noticed from the above survey that the majority of Library Professionals responses that using the RFID technology in library is most benefit.
- The study reveals that majority of library Professionals are using RFID daily on their routine works, some of Library Professional are using sometime their official works, and others are not using RFID in their daily routine works.
- It is observed that the quantity of being tagged per day. It is observed that majority of Librarians feel that quantity of books tagged per day is between 100-500.
- The study reveals that time taken for tagging of books. It is observed that the majority of the Librarians feel that it tag just 2 minutes for tagging of books.

- From the survey it is observed that majority of Librarians are not aware of data storage so that it make difficult for IT to handled data.
- The study reveals that majority of the Librarians are RFID technology is required in library.
- It is observed that most librarian Professionals responses that majority of RFID technology suggested for the Modern Libraries.
- It is observed that majority of Librarians feels that library possess a major benefit in terms of costing.
- It is noticed from the above survey that the majority of Librarians responses that RFID is better than Barcode.

6.3 Suggestion

- Adoptions of RFID Technology bring development in the library. It reduces effort of the staff as well as users.
- The use of RFID technology increases the speed of work done. The use of RFID system is very effective as far as speed is concerned. The library staff has saved their time using new technology.
- RFID technology can be used as one of the security measures in the library.EAS gates read information from RFID labels that pass through the doors.
- RFID technology saves the time of the users as well as that of the staff. The users do not have to wait for long queues.
- Time keeping during this study has identified that the issue/return is done in least possible time.
- Feedback from the users holding smart cards also indicates that they are pretty happy as far as tome saving concerned.
- RFID is a technology with enormous benefits. Its potential has not been fully realizes by end users.
- Along with wider adoption. new technology will help make RFID more reliable and cost-effective for a larger number of applications.

6.4 Conclusion

RFID era has end up an essential a part of each present day library with inside the virtual age.

RFID technology has a big potential to become ubiquitous in the near future. Today it is already successfully used in library operation. RFID is a technology that offers many advantages to the library by creating time saving process management efficiencies, thus enabling staff to provide more value added services to users RFID also provides the patron with self service check-in and check-out options.

Benefits are not to be only observed in terms of cost, but also in terms of users satisfaction, employee time saved in performing repetitive task, increased flexibility provided to users, security benefit, user time saved etc.

From a futuristic point of view, RFID will help the Library to accommodate growth, provide value added services to users wherever possible and drive priorities in other key areas, all without the need for additional staffs. RFID systems complete the library automation, thus the standard of the library is raised and a lot of readers are attracted towards the library.

Change always brings noise to the system. The modernization of libraries through IT enabled services will have a long benefit to its readers as well as librarian professionals to upgrade their skill and expertise. Having through knowledge of the new gadget will facilitate its readers immensely and optimally. Hence it is our earnest request to all our librarian professionals to adopt new technology with vigour and enthusiasm.

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