University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Library Philosophy and Practice (e-journal)

Libraries at University of Nebraska-Lincoln

Spring 5-16-2019

RFID Technology in Academic Libraries of North-East India

Anupam Chanda Dr.

Assam Don Bosco University, anupamchnd1988@gmail.com

Manoj Kumar Sinha Professor

Assam University, mksinha1965@gmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/libphilprac>

Part of the [Library and Information Science Commons](#)

Chanda, Anupam Dr. and Sinha, Manoj Kumar Professor, "RFID Technology in Academic Libraries of North-East India" (2019). *Library Philosophy and Practice (e-journal)*. 3005.

<https://digitalcommons.unl.edu/libphilprac/3005>

RFID Technology in Academic Libraries of North-East India

By

Dr. Anupam Chanda

Librarian

Assam Don Bosco University

Airport Road, Azara, Guwahati - 781017

Email: anupamchnd1988@gmail.com

Mo: 7002039631

&

Prof. Manoj Kumar Sinha

Dean & HoD

DLISc, Assam University, Silchar, Assam-788011

Email: mksinha1965@gmail.com

Mo: 9435712447

Abstract

Man has made significant efforts to achieve or to know the unknown from the initialization of civilization. The importance of the library is growing since the use of ICT and modern technologies. Library management software helps libraries to maintain library housekeeping operation easily. In a library kind of environment, RFID has significant potential to speed up library services and streamline time-consuming operations such as check-in and check-out, sorting, stock management and inventory when compared to the barcode-based solution. RFID provides for “sightless” or no line of sight identification of items. It includes the ability to facilitate circulation, re-shelving, and theft detection, and it has several other important advantages. RFID is still a relatively new technology. So far, several libraries in North-East India have implemented RFID system, mostly for self-service and the vast majority of these libraries are positive about their RFID investment and its benefits.

This paper deals with the adoption policy of RFID technology in the library and its significant use in the library for better inventory control, theft detection, quick issue-return etc. The researcher has collected data from various RFID implemented libraries to know the facilities availed and problem faced by the libraries. Lastly then researcher has tried to put some suggestion for those libraries who has not implemented RFID technology in their libraries, the researcher also mentioned some guidelines regarding RFID implementation.

Keywords: *RFID technology, North-East India, Academic Library, ICT.*

1. GENERAL INTRODUCTION

Since the initialization of civilization men has made significant efforts to achieve or to know the unknown. The importance of the library is growing since the use of ICT and modern technologies. Library management software helps libraries to maintain library housekeeping operation easily but to do the same task quickly libraries needed some more advance technology. Automatic identification technology was the solution for this, so libraries have adopted barcode technology for automatic identification of library materials, for some times barcode has supported libraries to automatically identify the library materials but barcode was not sufficient for this, so libraries have adopted RFID technology to serve the purpose. RFID technology not only helps in issue and return but also helps in other works, like library stock verification, arrange the return materials to the shelve more quickly, process newly acquired items more easily and quickly, prevent theft and most importantly security point of view RFID technology is the best solution for any library.

1.1 About RFID Technology

In today's information society the librarians have a great responsibility to organize and manage the knowledge center due to exponential increase the volume of information which leads to the information explosion. Libraries are moving towards adopting latest technological environment. So, libraries have been seeking technological support to improve their organizational setup for providing efficient customer services and also manage various services.

However, as stated by Yu (2008) *"Regulating necessary standards, processes, and interfaces to fit in with current information systems and extend automatic library operations requires continuous effort."* RFID technology promises to change our world. It has the capability of making our personal lives and our professional lives in the library more convenient.

RFID is a combination of radio-frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology, regardless of item orientation or alignment (i.e., the technology does not require line-of-sight or a fixed plane to read tags as do traditional theft detection systems).

1.2 History of RFID Technology

RFID was developed in 1948, but its implementations started in the 1970's. RFID in India was introduced in the 1940's for defense applications. The first time it was used for commercial purpose in 1980 for cattle tracking applications. Recent interest is in making RFID technology more ubiquitous in the global value chain. The first library suppliers started to market their systems in the mid-1990.

1.3 Statement of the Problem

The topic selected for the study is entitled as ***“RFID Technology in Academic Libraries of North-East India”*** There were no studies conducted on the steps and procedure of adoption of RFID technology in academic libraries of North-East India. The process of adoption of RFID technology in the libraries is not known to the librarian properly. So, the topic has been undertaken to study the steps and procedure of adoption of RFID technology and its impact on library services.

1.4 Objectives of the Study

- to find out the difficulties faced by the librarian while implementing RFID technology in the libraries;
- to know the current status of the RFID implemented academic libraries of North-East India;
- to suggest the steps and procedure for adoption of RFID technology in academic libraries of North-East India.

1.5 Scope and Limitations of the Study

The scope of the study area is limited to the libraries of North-East India. Like other investigators, the researcher has some constraints or limitations like the time limit, financial resources and sufficient authority to collect the information. The study is confined to both Central and State University libraries, Colleges and some other Higher Educational Institution libraries of North Eastern Region.

2. RESEARCH METHODOLOGY

Keeping in view the objectives, problems, and limitations of the study, an effort is made to evolve a suitable methodology for the research. The study has been designed, developed and carried out to determine and analysis the current status of implementation of RFID technology in academic libraries of North-East India. Survey method has been used to collect the data. A well-designed questionnaire, interview, and observation techniques have been adopted for data collection as a data collection tools.

For the present study, the purposive sampling technique has been used by the researcher to collect the data from the library professionals.

3. COMPONENTS OF RFID TECHNOLOGY FOR LIBRARY

An RFID system for library containing the following basic components:

- ✓ RFID tags;
- ✓ Staff check-out station;
- ✓ Self-return book drop with an automatic check-in feature;
- ✓ Tagging station;
- ✓ Security gate(s);
- ✓ RFID smart card;
- ✓ Antenna;
- ✓ Shelf scanner/handheld reader for inventory and administrative station.

The self-check-out station allows library member to borrow books without the help of library staffs; the book drop allows returning of books and updating the database.

4. HOW RFID WORKS IN A LIBRARY

As a part of technology implementation, an RFID tag is implanted in every book and reading material of the library, and complete book information is entered into the software installed in server or workstation. Now whenever a library member brings the book for issue return purpose, the RFID reader from the tag reads the information about that book and transmits the data into the software and books is smoothly issued in a few seconds with a minimum of manual intervention. As the member takes the book outside the library premises, the antenna placed at the exit gate automatically read the information contained on the RFID tag of the book to verify whether the book is properly issued or not. In case the book is not issued to the member as per library norms, or it is being stolen from the library the antenna senses it and gives an instant alert. Thus the technology resulted from successful theft reduction of books.

The same RFID technology is also used for stock taking practice. Earlier, manual stocktaking was an exhausting exercise as every book's detail had been manually entered into the system or registers. Now with the introduction of new technology, it is very easy for the library staff to just place a scanner on the top of the book; the scanner automatically passed on scanned information to the common database or server (Sumi and Kumar, 2007).

4.1 Advantages of RFID Technology in Libraries

- Self-check-in / out can be done using RFID by the users;
- Library staff can be deployed for other works instead of circulation;
- Time-consuming technology for both users and librarians;
- Best tracking system for library theft control;
- Easy to find the misplaced books;
- Fast and exact stock verification can be done using RFID.

4.2 Disadvantages of RFID Technology in Libraries

- High Cost;
- Frequency Block;
- Chances of removal of exposed tags exit gate sensor problems;
- User Privacy concern;
- Reader collision;
- Tag collision;
- Interoperability.

4.3 Steps to be followed for Adoption of RFID Technology in Library

The major issues on RFID while implementing are the below; librarians should take care of this point before adapting to the new technology.

- ❖ Tuning of the antennas on the RFID tags;
- ❖ Width between security gates need to be checked for reading and accuracy;
- ❖ Size and frequency of RFID tags;
- ❖ Check that the tags are suitable for all the library materials (like books, CD, DVDs, etc.);
- ❖ Transmitting power generator by the reader and collision issue;
- ❖ LMS and RFID integration is essential for successful implementation;
- ❖ Vendors' service and response is one of the significant activities in installation;
- ❖ Cost involved vs. Returns on Investment;
- ❖ Tearing RFID tags by the users;
- ❖ Ensure the replacement of damaged tags by the vendors;
- ❖ Annual Maintenance Cost (AMC) related issue;
- ❖ Power back up is a significant issue nowadays;
- ❖ Programmed to not read of tags of other libraries;
- ❖ Accurate anti-theft alarm should work;
- ❖ Users are prohibiting using devices like laptops and electronic devices that may deactivate the alarm.

5. DATA ANALYSIS AND INTERPRETATION

5.1 Types of Institution having RFID Technology in their Libraries

Figure-1

The study shows that there are 44.44% Colleges, 27.78% Universities and 5.56% NIT, IIT, CIT, IIM and State Open University having RFID technology in their libraries.

5.2 Introduction of Library Automation Process

Figure-2

61.11% libraries has started their automation process after 2010, while 27.78% libraries has started in between 2001-2010. So it is clear from the above figure that library automation has started acceleration from 2010.

5.3 Manpower in the Library

Figure-3

38.89% respondents replied that they have less than 5 staffs in their library, followed by 33.33% respondents replied that they have 5-10 staffs in their library, while 27.78% replied that they have more than 10 staffs in their library.

5.4 Year of Implementation of RFID Technology

Figure-4

From the above figure it is clear that 44.44% libraries has implemented RFID technology in their libraries from 2016 onwards, while 38.89% replied that they have started implementation of RFID technology in between 2011-2015, and 16.67% replied that they have implemented RFID in their libraries before 2010.

5.5 Policy followed for Implementation of RFID Technology in the Library

Figure-5

72.22% respondents replied that they did not follow any policy regarding the implementation of RFID technology in their library, while 27.78% respondents replied that they followed some basic policies for the implementation of RFID technology in their libraries.

5.6 RFID Installation done by

Figure-6

From the above figure it is clearly shows that 100% libraries used outsourcing agencies to install RFID technology in their libraries.

5.7 RFID Tagging done by

Figure-7

83.33% respondent libraries replied that they have pasted the RFID tags in the library materials by using their own staffs, while 16.67% libraries replied that they did the task by using out sourcing agency.

5.8 Duration of full RFID System Setup

Figure-8

The process of full RFID system setup depends on the infrastructure and collection of the library. 33.33% respondents replied that they required 30 days to setup the RFID system in their library, followed by 27.78% replied they required 60-90 days, while 16.67% replied they required 30-60 days for setup the RFID system.

5.9 RFID Components Available in the Library

Figure-9

The above figure shows that 100% libraries have RFID tags, Staff station, RFID smart card, Antenna, Server, Security gates and UPS, these are the basic components to run a RFID system. 83.33% replied that they have Self check-in/out station, 16.67% replied that they have Shelf scanner and only 5.56% libraries replied that they are using RFID label printer.

5.10 Expenditure of RFID System Installation

Figure-10

38.89% respondents replied that they spent 20-30 lakh rupees for installation of RFID system in their libraries, 22.78% replied that they spent 15-20 lakh, 22.22% replied that they spend more than 40 lakhs for RFID installation.

5.11 AMC Policy

Figure-11

Above figure shows that 44.44% respondents libraries preferred 1 year AMC policy, 16.67% libraries preferred 2 years and 5 years respectively, 11.11% libraries replied that they went for 3 years AMC policy and no respondents has taken 4 years & more than 5 years AMC policy.

5.12 Problems Faced by the Libraries after Implementing RFID Technology

Figure-12

94.44% libraries that AMC is the major problem faced by the libraries, followed by 66.67% replied that self-check-in/out kiosk and handheld reader are the major problems faced by the libraries. 33.33% replied RFID smart card issue is the major problem faced by them. Coming to the minor problem, 94.44% replied power supply is the minor problem, 88.99% replied removal of tags, 83.33% replied data collation, 72.22% replied security gate are the minor problem for them.

5.13 Level of Satisfaction

Figure-13

52.99% respondents replied that they are very satisfied with the ease of use of self-checkout station, 60.07% replied that they are very satisfied with speed of self-checkout station, 65.67% replied that they are very satisfied with ease of use of self-check-in station and 51.12% replied that they are very satisfied with the speed of self-check-in station.

6. MAJOR FINDINGS, SUGGESTIONS AND CONCLUSION

6.1 Major Findings

- Out of all the RFID implemented institutions 44.44% are colleges, followed by 27.78% are universities.
- 61.11% libraries has started their automation process after 2010.

- Number of staffs are less than 5 in 38.89% respondent libraries, 33.33% libraries have 5-10 staffs in their library.
- 44.44% libraries has implemented RFID technology in their libraries from 2016 onwards.
- 72.22% respondents' libraries replied that they did not follow any policy regarding the implementation of RFID technology in their library.
- 100% libraries used outsourcing agencies to install RFID technology in their libraries.
- 83.33% respondent libraries have pasted the RFID tags in the library materials by using their own staffs.
- 33.33% libraries replied that they required 30 days to setup the RFID system in their library, followed by 27.78% replied they required 60-90 days.
- 100% libraries have RFID tags, Staff station, RFID smart card, Antenna, Server, Security gates and UPS, these are the basic components to run a RFID system.
- 38.89% respondents replied that they spent 20-30 lakh rupees for installation of RFID system in their libraries, 22.78% replied that they spent 15-20 lakh.
- 44.44% respondents' libraries preferred 1 year AMC policy, 16.67% libraries preferred 2 years and 5 years respectively.
- 94.44% libraries that AMC is the major problem faced by the libraries, followed by 66.67% replied that self-check-in/out kiosk and handheld reader are the major problems faced by the libraries.
- 52.99% are very satisfied with the ease of use of self-checkout station, 60.07% are very satisfied with speed of self-checkout station, 65.67% are very satisfied with ease of use of self-check-in station and 51.12% are very satisfied with the speed of self-check-in station.

6.2 Steps to be followed while Implementing RFID Technology in Libraries

- Library should have proper planning for budget/timeline of implementation;
- Clear requirement analysis is very important for any technology change, so the librarians should have an appropriate requirement for the library;
- Librarian should be very careful in selecting vendor and the required components;
- Using some management techniques like PERT, RCA, SWOT analysis is necessary to reviews the current system to have a clear picture of new system;
- Discussion with the management is essential and support team to be sought before starting the work;
- Getting an explicit agreement regarding installation of the RFID system and AMC from the vendor is needed;
- Training the library staffs and users of new technology are required.

6.3 Conclusion

RFID technology in libraries is not new in North-East India, implementation of RFID technology was started before 2010 in libraries of North-East India. Assam has the highest libraries that have implemented the technology. Before implementation of RFID technology in libraries check the privacy policy to protect the patrons and standards. The libraries should ensure that RFID products are manufactured by following the proper policy before procuring for implementation in the libraries and should use accordingly. RFID is still a relatively new technology. So far, several libraries in North-East India have implemented RFID system, mostly for self-service and the vast majority of these libraries are positive about their RFID investment and its benefits.

REFERENCES

- Ahmed, J., & Devi, A. (2018). **Adoption and Implication of RFID Technologies: a pathway for Smart Library Services.** *International Journal of Library Science*, 16(1), 103-109. Retrieved January 09, 2018, from <http://www.ceser.in/ceserp/index.php/ijls/issue/view/508>
- Anjaiah, M., & Lingaiah, V. (n.d.). **Application, Implementation & Development of RFID (Radio Frequency Identification) Technology in Modern Libraries.** Retrieved April 04, 2014, from http://libsys.co.in/download/rfid_in_libraries.pdf
- Butters, A. (2007). **RFID systems, standards and privacy within libraries.** *The Electronic Library*, 25(4), 430-439. Retrieved July 21, 2015, from <http://dx.doi.org/10.1108/02640470710779844>
- Chanda, A., & Sinha, M. K. (2015). ***RFID Technology for Managing Next-Generation Smart Library Systems.*** Saarbrücken: LAP LAMBERT Academic Publishing.
- Chanda, A., & Sinha, M. K. (2017). **Introducing RFID Technology for Managing the Next Generation Smart Library Systems and Services: An Overview.** In *Emerging Trends and Human Resource Management in Library and Information Centres*, 181-206. New Delhi: Shankar's Book Agency Pvt. Ltd
- Chanda, A., & Sinha, M. K. (2017). **Transforming library services by using RFID technology: A case study on IIT Guwahati and RGU Itanagar.** In: *1st International Conference on Transforming Library 2017*. Guwahati: MRB Publishers.
- Hong, Q. (2009). **The Analysis of RFID Technology Applying in Libraries.** *Journal of Modern Information*, 6, 130-132. Retrieved July 21, 2015, from http://en.cnki.com.cn/Article_en/CJFDTotalsXDQB200906038.htm

- Shahid, S. M. (2005). **Use of RFID Technology in libraries: a new approach to circulation, tracking, inventorying and security of library materials.** *Library Philosophy and Practice*, 8(1), 8. Retrieved July 12, 2015, from <http://dialnet.unirioja.es/servlet/articulo?codigo=1456563>
- Sinha, M. K. (2004), *Scenario of automation and networking of library and information centres (LICs) of North Eastern region of India: An evaluative study.* Paper presented at 2ndInternational CALIBER-2004 held at New Delhi, 11-13
- Sinha, M. K., & Chanda, A. (2014). **Exploring RFID Technology Application for Managing Library and Information Services in University and Institutional Libraries of North East India: An Overview.** *International Journal of Information Sources and Services*, 1(3), 72-85.
- Sinha, M. K., Bhattacharjee, S., & Bhattacharjee, S. (2013). **A Study on ICT Literacy and Internet Use Pattern among College Library Users of Barak Valley, South Assam, North East India.** *Current Trends in Technology and Science*, 2(3), 301-316. Retrieved January 12, 2017, from <https://www.ctts.in/assets/upload/4958ctts-399%20vol-2%20iss-5.pdf>.
- Sinha, M. K., Chakraborty, S. K., & Bhattacharjee, J. (2007). **Application of Information Communication Technology in College Libraries of Barak valley (Southern Assam).** In 5th Convention PLANNER -2007, Gauhati University, Guwahati, December 7-8, 2007, INFLIBNET Centre, Ahmadabad, 14-25. Retrieved March 18, 2014, from <http://ir.inflibnet.ac.in>
- Sumi, S., & Kumar, J. (2007). **Application of RFID Technology in Libraries.** In 5th International CALIBER -2007, Panjab University ,Chandigarh, 08-10 February,2007, INFLIBNET Centre, Ahmadabad, 459-467. Retrieved February 18, 2014, from [http://ir.inflibnet.ac.in/bitstream/1944/575/1/459-467\(cal%2007\).pdf](http://ir.inflibnet.ac.in/bitstream/1944/575/1/459-467(cal%2007).pdf)
- Tilwani, T., & Agarwal, A. (2011). **RFID Applications and Benefits in Libraries.** *Indian Journal of Information, Library & Society*, 24, N3-4,213-221.
- Yu, S. C. (2008). **Implementation of an innovative RFID application in libraries.** *Library Hi Tech*, 26(3), 398-410. Retrieved July 23, 2015, from <http://dx.doi.org/10.1108/07378830810903328>
- Zhang, M. (2013). **Study on Intelligent Library System Based on FRID Technology.** *International Journal of Digital Content Technology and its Applications*, 7(5), 16-24. Retrieved January 29, 2016. doi:10.4156/jdcta.vol7.issue5.3