

Application of Radio Frequency Identification Technology in the Information-Seeking Behavior of Bhavnagar District Library Users

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Abstract

Purpose: Bhavnagar District Library provides faster information services to the users through new technology by using radio frequency identification technology in the information-seeking behavior of the user. When it comes to providing information services to users through old traditional methods, it takes time to get the information. Today, RFID (radio frequency identification) has become very necessary regarding the behavior of getting information through new technology. The users of this public library are made aware of its environment and users. **Methodology:** This public library was established in 1955 and today has a large collection of information. About two thousand users are provided with information services through RFID technology regarding information behavior. Students, researchers, and the local public are using this library. Here survey method is used to collect data, and data is collected from the librarian by creating questionnaires for data compilation for research. **Finding:** Increased efficiency through reduced staffing in the library. The exchange service was traditional, which became manual so that users could get quick information. When users come to get information, standing in long queues and doing paperwork, information is available later, which can be obtained in a very short time through a paperless operation. Information about whether the information is available in the library can also be obtained. Libraries are developed by the government. Knowledgeable staff are required to be in the library to operate this technology so that any problems can be dealt with quickly. Library staff and users have benefited greatly from this technology. **Originality:** Most of the libraries use traditional methods to access information. Not every library is capable of providing information services through the RFID method, as it requires a large budget. Libraries that have large budgets use this method. RFID technology has been implemented in public libraries regarding the implementation of new technology in the library development programs by the government. This present study is useful for research work related to this topic, and information about RFID implementation in every library is available.

Keywords: Application, radio frequency, identification, technology, Bhavnagar district library, user's information, seeking behavior

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INTRODUCTION

Radio frequency identification (RFID) technology can collect the data of various books one at a time, and as required, can provide information quickly to the users, which is why users get access to data quickly. For the above reasons of various benefits of RFID, in every type of library in the world where a budget is sanctioned as per requirement, automation and RFID technology are used. In our country, public libraries began to function many years before our independence. These public libraries contain a vast collection of books. In these libraries, the number of users was

quite large before, but now, with the growing number of users in public libraries in colleges and universities, the number of users in public libraries has started to decline. Therefore, to increase the number of users, it is necessary to adapt library automation and RFID technology. So, RFID technology has been introduced in public libraries for their development by providing a special budget sanctioned by every state government. The operations of the library become more competent and updated by the use of RFID technology, and the database also improves availability and competence. For this reason, only educational libraries, such as schools, colleges, and universities, whether in the government or public sector, are adopting RFID technology. This technology is useful for determining the physical position of an item. Here, the barcode system's benefits, basic factors, and alternative factors are used by the library system. This technology requires various gadgets and a large budget, which makes it difficult to develop this technology in general libraries. Through this technology in every library management, operations, and service, many benefits of using this technology can be seen. Computers, servers, barcode readers, barcode printers, digital cameras, scanners, and RFID machines. Initially, the data entry of every book is made in the library management software. This means that automation is performed, and then the barcode accession number of every book is generated. The silicon radio tag is prepared and stuck to the barcode in the book with the barcode. This tag operates with radio waves, and barcode readers are required to read them.

RFID technology works with this tag; therefore, it is used during lending and borrowing operations. The primary operation of a library is the lending and borrowing of books; for this purpose, this technology is adopted. With the adoption of new technologies in libraries, operations gain momentum. Various types of operations, records, data, catalog cards, and day-to-day reports are generated using this technology.

REVIEW OF LITERATURE

Studies have also highlighted the role of public libraries in supporting rural communities. Research shows that rural populations must be made aware of the importance of libraries in community development. It has been found that digital libraries and timely access to data can accelerate both rural development and administrative processes, enabling users to receive accurate information more efficiently [1–5].

Other studies have discussed the significance of reviewing existing literature in understanding information-seeking behavior. Literature reviews provide valuable insights into user needs, library services, and resource demands in an ICT-based environment. Modernizing libraries to ensure timely access to information is essential for avoiding barriers for users.

Research has also explored the influence of digital resources and the Internet on information behavior. The findings indicate that the widespread use of e-resources has significantly shaped user behavior in academic libraries. While students rely heavily on online resources, proper guidance is required to ensure their reliability and effective use. Moreover, information provision must be tailored to diverse user needs, including academic, social, health, and employment information, to enhance satisfaction and increase library usage [6–10].

Other findings emphasize the need for accurate and abundant data to study information-seeking behaviors. Traditional methods and unrestricted access to information are crucial for supporting user research. Providing sufficient facilities and minimizing barriers are key strategies for improving users' access to the required information [11–13].

Research also emphasizes the importance of having a lot of precise data to analyze user behavior. Conventional research techniques, including surveys and observational studies, are crucial in determining how people use information. At the same time, it is generally acknowledged that addressing user requirements and promoting research activities require free and unfettered access to information. Technical, monetary, and organizational obstacles to information access can seriously impair the

efficacy of libraries. Therefore, ensuring that sufficient facilities are available, streamlining procedures, and eliminating barriers are crucial for enhancing user experience as a whole [14, 15].

Objectives of the Study

For this study, the following objectives were considered:

1. To collect information regarding facilities available related to RFID technology in a public library.
2. To collect information related to management, operations, and services using RFID technology in the public library.
3. To collect information about information-seeking behavior.
4. To collect information about the needs of users of this public library.
5. To keep a check on the information-seeking behavior of the public library.

Requirements for Study

In this research, the topic related to the public problem of the application of RFID technology used in Bhavnagar District Library users' information-seeking behavior was studied. The study was undertaken in this subject with personal interests. In the public library, as the number of users is very large, it is also necessary to know the information-seeking behavior of varied users in this library. With the beginning of information technology facilities, computers and Internet facilities are now available in every public library. These facilities are utilized in the management and operation of libraries. Therefore, if such facilities are provided to users, the primary requirement is the availability of computers and Internet facilities. In such a situation, if the budget is sanctioned per requirement, the RFID technology can be adopted in the library. After using RFID technology in the library, it becomes favorable for users to make suitable decisions regarding information behavior, which means that users receive maximum information as per their requirements through the library. In addition, whatever difficulties users face to avail of information can be easily overcome.

METHODOLOGY

Any research is done through research methods because work is not as easy as anyone can undertake research on any object and complete it quickly before beginning any research work. First, the problems related to the research are determined, and it is inevitable to gather information related to that subject. Whatever research is possible, information related to the possibility of factors related to the subject of the research is to be considered. It is also necessary to see whether the data required for research will be available; if data are not available, research works come to a standstill. To conduct research work, various research methods must be studied, and the database must be prepared by studying various matters, such as instruments of data compilation, and thereafter, research work begins. In this research study, information was collected through a survey, and an information questionnaire was prepared, which contained single-choice and multiple-choice questions. The questionnaire is prepared for collecting data from the public library; after the questionnaires are filled in, they are received back, and thereafter, analysis of the questions is done, and after that, whatever information is collected, this is called research.

Information-Seeking Behaviors and RFID Technology

In information-seeking behavior, users make efforts to receive collected information and fulfill the need for different types of data. The previously collected information and novel information are updated so that users can avail themselves of the information according to their needs. Every public library always has thoughts about the collected information, needs, and how to provide services quickly. If the automation process is performed in the library, only things become possible. Because of automation, it can be easily known which information is easily available in the library and from where to collect new information. If online data were purchased according to the subjects, then data related to information-seeking behavior were collected. RFID technology relates to information-seeking behavior, which refers to the best facilities. When RFID technology is available in libraries, it is easy and quick to access information from the collection of information. The users themselves collect information about

information-seeking behavior because whatever information is needed by users is already available in the library, as the information can be accessed too quickly. As the users also get information about the format in which required information is available, and also about the format in which all the required information by the users is available, so that it becomes easy to use the information in that particular format, and after receiving information, the user gets satisfaction. Different experts have given models for information-seeking behavior, where methods to gather information are shown in every model; then, the model becomes quicker. Information services are provided by RFID technology, which means that to provide lending and borrowing services more quickly, this technology is useful. Here, the information related to the data is read by a radio tag. Where can information be available in the library so that the collection of information becomes quicker? If we look at the benefits of this technology, there are umpteen benefits; therefore, the cost of this technology is somewhat higher, it is not easy to install this technology in the library, and the maintenance cost of this technology is also very high.

Public Library and RFID Technology

The RFID technology service helps increase the number of users in the library, thereby leading to the development of the library. Generally, a public library receives a budget sanctioned by the state government. Therefore, to develop a public library, most libraries are updated using RFID technology and automation. For RFID technology, quotations are asked to decide the cost, and the quotation with the lowest cost is given the order. Generally, in every library, Automation and RFID Technology are installed, and afterward, they are maintained for the next few years. Whenever any new book is purchased, the data are recorded, and the tag is generated by Automation and RFID Technology, which is how the data are updated. For data entry, the service of an employee with expertise in technology must be considered. If RFID technology services are terminated at that time, it becomes inevitable to get them repaired at the earliest and resume the services. For technology, the above-mentioned factors are given.

RFID Technology Application

1. First, budgeting is required to adopt this technology, and this service is useful only in circumstances where the collection in the library and the number of users are very large.
2. It is necessary to recruit employees as per requirements and also the availability of resources in information technology and software.
3. RFID machines and attached devices should be purchased, and the contract related to the repair and maintenance of instruments, machinery, and software should be finalized.
4. The operations and management of the library have become speedy due to the use of machinery and technology.
5. Training should be imparted to the users and employees regarding the use of technology so that no problems are encountered during the operations and management of the library.

RFID Technology and Library Operations

1. In every book, a tag is struck and thereby working takes place; this tag is called a radio tag, which is in microform and is stuck on the backside of the book, and all operations are smoothly carried out by using this tag.
2. The types of equipment in the library are charged and discharged by this tag. The library staff self-checkout station is used to check library equipment.
3. The sensor helps to check whether all types of equipment have been checked before leaving the library.
4. The book drop reader is issued to see if library pieces of equipment are immersed by themselves or not, and to perform security activity against the sorter and conveyor work with an automatic system to return types of equipment to a suitable field of the library.

Bhavnagar District Library RFID Application and Users' Information-Seeking Behavior

From the establishment of this library in 1955 until 2015, when it was traditionally served in this library, the 1955 RFID application was launched. Today, 8536 users are registered in this library. SOUL

software was purchased, and library management work was performed using that software. The library has a collection of 58395 books, of which 40000 books have been registered through RFID applications. Smart tags and cards for users are prepared using this technology. Work is underway to anthologize the rest of the books, so that in the future, a complete RFID application-powered library will be created. When the technology was introduced, all the books that existed in the library were connected to the RFID application by data entry, but as new books were purchased, it could be seen that there was a shortage of staff for data entry. The budget should be allocated by the government as per need, so it can be seen that the development of this library is very good. The number of users is increasing, and new users are registered as users obtain information faster by exchanging books through RFID. Thus, users obtain the information they need according to their information-seeking behavior. The demand of users is met by obtaining the information available in the library, as well as online data that has been purchased in other public libraries. Users' information-seeking behavior provides them with information about what is available in the information library through the OPAC to save time. This technology provides users with maximum information about their behavior.

Data Analysis and Interpretation

The researcher created a questionnaire for this research paper and had it with the librarian of the public library by asking objective questions. The data from this filled-out questionnaire are analyzed as follows.

Table 1 shows that there are six computers available at this library, and each of these computers is connected with big server with networking facilities. Two printers are used as needed in library services. A scanner is also placed through which users' data is prepared. The RFID machine is installed. Two barcode readers are available through which users' data is read. So, the exchange service becomes faster.

Table 2 analyzes and interprets the table given in which key drivers are placed into five factors to start RFID technology in the public library, which is as follows: none, low, moderate, high, and very high. Here is a very high factor regarding key drivers: government support, top management support, and perceived benefits of RFID. The high factor is achieved in the availability of IT infrastructure key drivers. A low factor is achieved in the last key driver, competitive pressure.

Table 3 provides an analysis and interpretation of the table given, in which the key hindrance is given when RFID technology is used in a public library. Regarding privacy issues, neutral information is received as a key hindrance. Agree information is obtained in the cost-issue key hindrance. Disagreement information is obtained regarding security issues and manpower issues as the key hindrance. Neutral information is obtained on the technical issues that are a key hindrance (Figure 1).

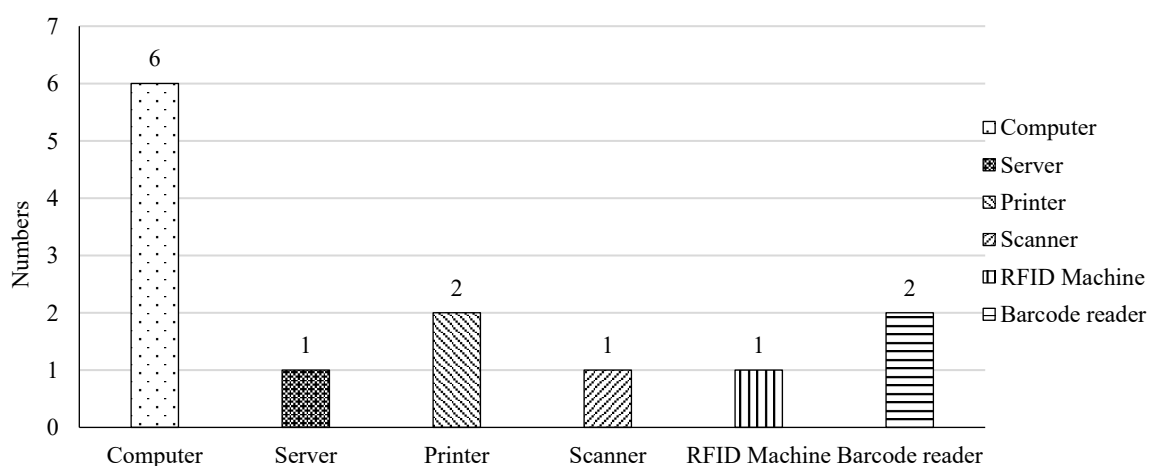


Figure 1. IT Infrastructure in the Bhavnagar district library.

Table 4 analyzes and interprets the table given in which RFID technology is used in a public library, and the factors given here are divided into five sections, such as strongly disagree, disagree, neutral, and agree and strongly agree. The first factor is the accurate work status. Second and third are better quality status and improved data management factors in the data agree is received. Data neutrality is obtained in the fourth is the centralized data storage factor. In the fifth, users' satisfaction factor in receiving information agrees. Information is received strongly agree in the six-fast library services factor.

RQ. 1. IT Infrastructure in Bhavnagar District Library.

Table 1. IT Infrastructure in Bhavnagar district library.

IT infrastructure	Number
Computer	06
Server	01
Printer	02
Scanner	01
RFID machine	01
Barcode reader	02

RQ. 2. Please indicate the extent of the following key drivers to adopt RFID.

Table 2. Key drivers to adopt RFID.

Key drivers for RFID adoption	None	Low	Moderate	High	Very high
Government support					√
Top management support					√
Perceived benefits of RFID					√
Availability of IT infrastructure				√	
Competitive pressure		√			

RQ. 3. To what extent do you consider the following to be the key hindrance to RFID adoption?

Table 3. The key hindrance to RFID adoption.

RFID hindrance in the library	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Privacy issues			√		
Cost issues				√	
Security issues		√			
Manpower issues		√			
Technical issues			√		

RQ. 4. Which agrees to disagree with RFID systems in the library?

Table 4. Agrees to disagree with RFID systems in the library.

RFID practices	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Accurate work status			√		
Better quality status				√	
Improved data management				√	
Centralized data storage			√		
Users' satisfaction				√	
Fast library services					√

CONCLUSION AND SUGGESTIONS

In this research, a paper questionnaire was created and sent to a public library, in which short and objective questions were included. In these questions, information is obtained by filing and analyzing the data. When RFID technology is used in a library, users obtain information-seeking behavior very well and quickly, and can change their behavior to obtain information. Table 4 provides information on RFID, in which the information required in the first research question is available in the right proportions, so that information is obtained that these technologies and services are good. The second question is about the appropriate amount of support from the government for RFID technology. Management and IT infrastructure are good, as per the requirements. When looking at the third question, there was some negative information about cost issues. All other findings were normal. The fourth question contained information on agreement and disagreement about better quality status, improved data management, and user satisfaction. In terms of providing suggestions, this technology is very expensive and requires the necessary manpower to be updated daily. A public library does not have the required manpower, which is why a database of each book is not prepared in the RFID application, as new books are purchased and contracted by a private company, and its data is entered. Therefore, necessary information about the behavior of the information for new books is not obtained, which leads to this negative matter.

REFERENCES

1. Arun G, Thandavamoorthy K. A study on information seeking behaviour of public library users in Thanjavur District, Tamil Nadu. *Rev Res*. 2018;7(18):1–4.
2. Bindhu S, Balasubramanian P. Information seeking behaviour of women library users in the university libraries of South Tamil Nadu: a study. *Libr Philos Pract*. 2019.
3. Jegan P, Javaprakash M. Awareness of information needs and information seeking behaviour of public library users in Salem District: a study. *IJNGLT*. 2018;4(2):1–11.
4. Prakash T, Javaprakash M. Information seeking behaviour toward the library resources and services in Coimbatore District Central Library: a study. *Int J Res Soc Sci*. 2017;7(12):488–499.
5. Sujatha HR, Puttegowada HC. A study on user occupation, education background and working hours on information needs and information seeking behaviour of rural public libraries of Dakshina Kannada District. *Int J Libr Inf Stud*. 2017;7(2):184–190.
6. Kaur A, Lal P. Information seeking behaviour of different types of users of public libraries of Southern Punjab. *Int J Digit Libr Serv*. 2016;6(4):95–104.
7. Sinha MK. A study on information needs and information seeking pattern of public library users of Barak Valley, South Assam. *IOSR J Humanit Soc Sci*. 2015;20(8):13–36.
8. Madhusudhan M, Gupta P. Use of RFID technology and information by students in Indian Institute of Technology Delhi and Indian Law Institute, Delhi: a survey. *World Digit Libr*. 2014;7(2):145–156.
9. Singh NK, Mahajan P. RFID and its use in libraries: a literature review. *Int J Inf Dissem Technol*. 2014;4(2):117–123.
10. Ruthven J. The information seeking behaviour of online public library clients: a conceptual model. *Aust Libr J*. 2013;62(1):34–47.
11. Shakeel GT, Vinayagamoorthy P. Information seeking behaviour of business school students: a special study of universities and colleges located in Academic City, Dubai, UAE. *Int J Libr Inf Sci*. 2013;5(11):447–456.
12. Sugie N. Application of radio frequency identification technology to study library users' information-seeking behavior. *Libr Inf Sci Res*. 2013;35:69–77. doi:10.1016/j.lisr.2012.06.006
13. Balasubramanian P, Shanmugam AP. Information seeking behaviour of users at District Central Library, Tirunelveli: a study. In: *Proceedings of the International Conference on Rejuvenating Libraries for Information Access in the Digital Era (ICRLIB-2018)*; 2018 Mar; Chidambaram, India. Chidambaram: Department of Library and Information Science, Annamalai University; 2018.

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14. Nisha F, Bakhshi SI, Ali PMN. RFID system: a boon for librarians. In: Proceedings of the 4th International Convention CALIBER-2006; 2006 Feb 2–4; Gulbarga, India. Ahmedabad: INFLIBNET Centre; 2006.
 15. Melissa G. Imposed information seeking in public libraries and school library media centers: a common behaviour. Inf Res. 2001;6(2). Available from: <http://InformationR.net/ir/6-2/paper100.html>.