Implementation Status of RFID Technology in Academic Libraries of the Bodoland Territorial Region (BTR), Assam: A Case Study

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Abstract

This article assesses RFID adoption in academic libraries across the Bodoland Territorial Region (BTR), Assam. The study draws on a preliminary institutional survey documented in the researcher's progress report. The survey identified 57 academic libraries/institutions in the study area, of which 24 (41.38%) had implemented RFID, 2 (3.45%) were in the initial implementation stage, and 31 (55.17%) had not implemented the technology. The recorded implementation years range from 2009 to 2025. Koha was reported by 13 libraries (54.17%), while SOUL 2.0 and SOUL 3.0 were reported by seven (29.17%) and four (16.67%) libraries, respectively. BSM International was identified as the service provider for 23 libraries (95.83%), while one library (4.17%) reported Delthon. Since detailed user survey and impact analysis results are not included in the progress report data used here, conclusions about user satisfaction, operational efficiency, cost-effectiveness, and security outcomes remain to be established through further analysis.

Keywords

RFID; Academic Libraries; Library Automation; Bodoland Territorial Region; Koha

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1. Introduction

Academic libraries support teaching, learning, and research by organising and providing access to information resources. As collections and user expectations grow, libraries increasingly use automation technologies to improve service delivery and manage routine operations. Radio Frequency Identification (RFID) is one such technology. RFID uses radio waves to identify tagged objects and can be integrated with library management systems for circulation and related functions. Library applications may include item identification, self-check-in and self-check-out, inventory activities, and security systems.

RFID adoption, however, involves more than installing tags and readers. The implementation environment includes library management software, service provider support, institutional funding, staff and user readiness, and ongoing maintenance. A regional assessment can therefore help establish how widely the technology has been adopted and describe the institutional arrangements supporting it.

The Bodoland Territorial Region (BTR) in Assam provides a relevant context for such an assessment. The researcher's preliminary survey identified 57 academic libraries/institutions across Kokrajhar, Baksa, Chirang, Udalguri, and Tamulpur. Of these, 24 were recorded as RFID-enabled. This paper uses the preliminary survey information to describe the adoption status and selected implementation characteristics of RFID in BTR academic libraries. It is a descriptive baseline paper, rather than a complete evaluation of RFID's impact.

2. Literature Review

Previous research has considered RFID implementation, system use, security, and the costs and benefits of library automation. Bansode and Desale (2009) documented the RFID implementation at the University of Pune Library, while Madhusudhan (2010) examined implementations in two libraries in New Delhi. Gupta and Madhusudhan (2022) assessed RFID as a potential electronic security system across academic libraries in India. Dwivedi et al. (2013) investigated factors affecting RFID system use and user satisfaction. These studies indicate that RFID in libraries is examined from both technical and user-oriented perspectives.

Cost-related research also emphasizes evaluating the overall value of an automation project rather than equipment cost alone. Ayre (2012) discusses RFID costs, benefits, and return on investment. Aldarthi and Sinha (2022) present a cost-benefit analysis of a library automation project at Rabindra Library, Assam University, Silchar. Tiu and Bahk (2006) provide a cost-benefit analysis of RFID implementation at Dudley Knox Library. The present paper complements this literature by offering a regional descriptive account of RFID adoption and the institutional features recorded in BTR.

The progress-report material establishes the local adoption profile but does not provide completed comparative measures of circulation speed, staff workload, user satisfaction, security incidents, or total cost of ownership. These aspects should be examined in subsequent analyses to link adoption patterns to measurable outcomes.

3. Objectives of the Study

- To describe the status of RFID implementation in academic libraries of the Bodoland Territorial Region.
- To examine the implementation years of the identified RFID-enabled libraries.
- To identify the library management systems integrated with RFID in the selected libraries.
- To identify the RFID service providers reported by the libraries.
- To describe the funding sources reported for RFID implementation.

4. Research Questions

- What is the current status of RFID implementation in BTR academic libraries?
- How has RFID implementation been distributed across the recorded implementation years?
- Which LMS platforms are reported in RFID-enabled academic libraries?
- Which service providers and funding sources are associated with the recorded implementations?

5. Research Methodology

5.1 Research Design

The paper adopts a descriptive survey approach based on the preliminary institutional survey presented in the researcher's progress report. The information is summarized using counts and percentages. The analysis is limited to institutional adoption and selected implementation attributes.

5.2 Study Area and Coverage

The study area is the Bodoland Territorial Region, Assam, covering the five districts listed in the progress report: Kokrajhar, Chirang, Baksa, Tamulpur, and Udalguri. The preliminary survey recorded 57 academic libraries/institutions. The 24 institutions reported as having implemented RFID form the focus of the implementation-profile tables.

5.3 Sources and Data Collection

The source material describes a preliminary survey and the collection of information from academic libraries. The wider research methodology in the progress report proposes questionnaires, interviews, and observation involving librarians, library staff, and library users. For this paper, only the preliminary institutional figures available in the file are used; no user-response dataset or completed impact-analysis results are incorporated.

5.4 Analysis

Frequency counts and percentages are used to summarize RFID status, LMS usage, service providers, and funding sources. Percentages are calculated against the relevant total of 57 institutions or 24 RFID-enabled libraries, as applicable.

6. Results and Analysis

6.1 Status of RFID Implementation

The preliminary survey recorded 24 RFID-enabled libraries among 57 academic libraries, representing 41.38%. Two libraries (3.45%) were reported to be at the initial stage of implementation, while 31 libraries (55.17%) had not implemented RFID. Thus, more than half of the surveyed academic libraries were recorded as not having RFID at the time of the preliminary survey.

Table1. Status of RFID Implementation

Implementation category	Number	Percentage
Libraries with RFID	24	41.38%

technology		
Initial stage of RFID implementation	2	3.45%
Libraries without RFID	31	55.17%
Total academic libraries	57	100.00%

6.2 Implementation Timeline

The implementation list in the progress report records the first implementation in 2009 and the latest in 2025. Kamal Kumar Brahma Central Library is recorded as the earliest adopter (2009), and Goreswar College Digital Library as the latest (2025). The list indicates that implementation occurred at different points over a 16-year period. The years listed are institutional records reported in the source file.

Table 2: Year-wise Implementation

Implementation year	Number of libraries
2009	1
2013	1
2016	1
2018	1
2019	4
2020	1
2021	7
2022	2
2023	5
2025	1

6.3 Library Management System (LMS)

Koha was reported in 13 of the 24 RFID-enabled libraries (54.17%). SOUL 2.0 was reported in seven libraries (29.17%), and SOUL 3.0 in four libraries (16.67%). Taken together, SOUL versions were reported by 11 libraries (45.83%). Koha was therefore the most frequently recorded LMS in this institutional profile.

Table 3: Configuration of LMS with RFID

LMS	Number of libraries	Percentage
Koha	13	54.17%
SOUL 2.0	7	29.17%
SOUL 3.0	4	16.67%
Total	24	100.00%

6.4 RFID Service Providers

BSM International was recorded as the service provider for 23 libraries (95.83%). Delthon was recorded for one library (4.17%), Kamal Kumar Brahma Central Library. This indicates a high concentration of reported service-provider engagement in the surveyed institutions. The data do not, by themselves, evaluate service quality, contract terms, or maintenance performance.

Table 4. Name of the RFID service provider

Service provider	Number	Percentage
BSM International	23	95.83%
Delthon	1	4.17%
Total	24	100.00%

6.5 Funding Sources

Government of BTC funding was reported for 22 libraries (91.67%), while two libraries (8.33%) reported university funding. The profile suggests that public funding played a major role in the recorded RFID installations. The preliminary figures identify the reported source of funding but do not provide project-wise expenditure, recurrent maintenance costs, or a return-on-investment calculation.

Table 6. RFID impregnation funding sources

Funding source	Number	Percentage
Government of BTC	22	91.67%
University fund	2	8.33%
Total	24	100.00%

7. Discussion

The preliminary institutional survey indicates that RFID adoption has become established in a substantial segment of BTR academic libraries, with 24 of 57 institutions reporting implementation. At the same time, 31 institutions were recorded as not having adopted RFID, suggesting that adoption across the region remains uneven. The two libraries at an initial implementation stage may represent a transitional category, although the available data do not describe their progress or barriers.

The LMS profile shows that Koha is the most commonly reported platform among RFID-enabled libraries, followed by SOUL versions 2.0 and 3.0. This is a descriptive finding and does not demonstrate

that one platform is more effective, economical, or user-friendly than another. Likewise, the large share of libraries reporting BSM International and Government of BTC funding describes the current institutional arrangement, but it does not establish vendor performance or the adequacy of funding. The implementation dates, extending from 2009 to 2025, suggest a gradual diffusion of RFID within the study region. Further research can explore whether the year of adoption is associated with differences in equipment configuration, LMS integration, service provision, staff training, or user experience. Such relationships should be tested with institution-level and respondent-level data rather than inferred from the adoption list.

8. Limitations of the Study

The paper is based on preliminary institutional survey figures documented in the progress report.

The file states that primary data collection had been completed at the current stage for Kokrajhar district, while collection in the remaining districts was pending. The institutional adoption profile is presented as a preliminary survey.

- The paper does not analyze completed user questionnaires or staff interviews, and therefore does not report user satisfaction or perceptions.
- No quantitative measures of circulation time, workload reduction, inventory accuracy, security effectiveness, operating cost, or return on investment are available in the data used here.
- Some institutional names and category labels in the source tables require verification and standardization before journal submission.

9. Conclusion

This paper presents a preliminary descriptive account of RFID implementation in academic libraries of the Bodoland Territorial Region, Assam. The survey recorded RFID implementation in 24 of 57 academic libraries (41.38%), with two libraries at an initial stage and 31 without RFID. Among the 24 RFID-enabled libraries, Koha was the most frequently reported LMS (54.17%), BSM International was the leading recorded service provider (95.83%), and Government of BTC funding was reported by 91.67% of libraries. Implementations were recorded between 2009 and 2025.

These findings establish a useful baseline for understanding the institutional spread and arrangements of RFID in BTR academic libraries. However, the adoption profile alone cannot confirm the technology's impact. The next phase of the research should analyze user and staff responses, observational evidence, cost information, and operational indicators to assess efficiency, service quality, user satisfaction, security, and cost-effectiveness. The final conclusions should be updated after data collection and validation across all covered districts.

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