



Barrier in the Implementation of Emerging Technologies in the Development of Libraries of Engineering Colleges Affiliated Sant Gadge Baba Amravati University, Maharashtra: A Study

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ABSTRACT

The adoption of emerging technologies in academic libraries has become essential for enhancing information services, resource accessibility, and operational efficiency. This study examines the obstacles and barriers encountered in the implementation of emerging technologies in the development of libraries of engineering colleges affiliated with Sant Gadge Baba Amravati University (SGBAU), Maharashtra, India. Emerging technologies considered in this study include Integrated Library Management Systems (ILMS), digital repositories, cloud-based services, RFID automation, artificial intelligence-enabled discovery tools, and mobile access platforms.

Using a descriptive and analytical research design, primary data were collected through structured questionnaires, interviews with library professionals, and institutional surveys across selected engineering college libraries affiliated with SGBAU. The findings reveal that while there is growing recognition of the importance of technological integration, several significant barriers impede effective implementation.

The study underscores that these challenges not only delay the adoption of advanced systems but also affect service quality and user satisfaction. To overcome these barriers, the research highlights the need for strategic planning, capacity building through training and professional development, increased investment in IT infrastructure, and supportive institutional policies. The insights from this study aim to guide librarians, academic administrators, and policymakers in fostering a sustainable and technologically robust library environment within engineering colleges affiliated to Sant Gadge Baba Amravati University.

Keywords:- Emerging Technologies, Engineering College Libraries, Colleges Affiliated Sant Gadge Baba Amravati University, Maharashtra, Obstacles/ Barrier in the Implementation of Emerging Technologies.

1. RESEARCH OBJECTIVES

The main objectives of the study are:

1. To identify the emerging technologies adopted in engineering college libraries affiliated with Sant Gadge Baba Amravati University.
2. To examine the major obstacles and barriers in implementing emerging technologies in these libraries.
3. To assess the level of technological readiness among library professionals.
4. To analyze infrastructural, financial, and organizational challenges affecting technology adoption.
5. To study user awareness and utilization of technology-enabled library services.
6. To propose practical solutions and recommendations for effective technology implementation.

2. EMERGING TECHNOLOGIES

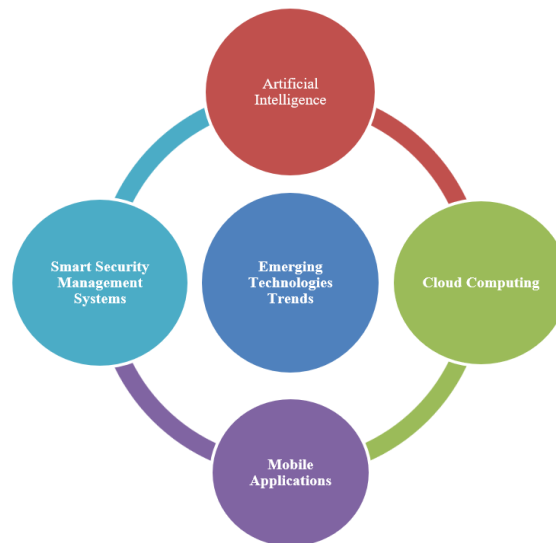
Emerging technologies refer to newly developed or rapidly evolving digital tools such as artificial intelligence, cloud computing, RFID / EAS, mobile applications, and advanced library management systems. In this study, the term represents modern technological solutions adopted to improve library operations, access to information, and user services in engineering college libraries.

2.1 Engineering College Libraries

Academic libraries are knowledge centers within educational institutions that support teaching, learning, and research activities. They play a vital role in providing organized access to scholarly information resources.



Engineering college libraries are academic support centers serving faculty, researchers, and students in engineering institutions. They provide access to technical literature, e-resources, and learning materials essential for engineering education and research.



2.2 SGBAU (Sant Gadge Baba Amravati University, Maharashtra)

Maharashtra is a state in India where Sant Gadge Baba Amravati University and selected engineering colleges are located. It provides the geographical context of the research. Sant Gadge Baba Amravati University is a public university in Maharashtra, India, with several affiliated engineering colleges. This study focuses on the libraries of these affiliated institutions.

2.3 Obstacles/ Barrier in the Implementation of Emerging Technologies

Although the importance of emerging technologies is increasing in academic libraries, their effective implementation in the libraries of engineering colleges is hindered by many obstacles. The current study attempts to investigate the major barriers.

3. LITERATURE REVIEW

Previous studies highlight the critical role of emerging technologies in transforming academic libraries into digital knowledge hubs.

Patil and Kadam (2021), reported resistance to organizational change and insufficient ICT infrastructure as key impediments in engineering institutions. AI-based discovery tools and RFID automation are recognized for enhancing user experience and security.

Uddin (2003), investigated the problems of library practitioners in the universities of Bangladesh. Library practitioners usually give priority to conventional services. They don't adopt creative methods to meet the information needs of their users. The findings of the study revealed that the government was not investing sufficient budget in the sector of technologies in the libraries. Consequently, the library practitioners suffered. They couldn't implement latest tools in their libraries. They frequently performed conventional services. The study raised the need of effective government support for the proper development of libraries and to encourage library practitioners to utilize emerging technologies effectively.

Accordin to Breeding (2018), Integrated Library Management Systems and digital repositories have significantly improved access and efficiency in higher education libraries.

Haider (2004), conducted a study focuses to know the technology status in the libraries of Pakistan. The study revealed that there was no proper planning in the libraries of country towards technology. The utility of technology had not been fully realized by the library practitioners, policy makers and the government representatives. Barriers in software and hardware were very common. As a result, satisfactory services to the users couldn't be provided. Library practitioners in the country were not skilled to make a proper utilization of technologies.

Gupta and Rani (2020), observed that engineering college libraries increasingly rely on cloud computing and e-resources to meet modern learner demands. Several researchers emphasize persistent challenges in technology adoption.

Pors (2005), in this study explain stated that lack of financial grant from government was a major obstacle for the application of information and communication technologies in libraries. Without proper grants, innovative technologies couldn't be implemented in libraries. Finance was a major factor for the proper utilization of



information technology. It was stressed to raise grants for the libraries to promote higher learning and research culture.

Younis (2005), Focused that in the university libraries of Jordan, internet was available and latest technologies were also implemented but however there was a passive usage of these technologies by the university community. The users did not feel comfort in using internet and other web-based services. They felt nervousness of using these technologies. They were not enough skilled to utilize internet resources properly. The study recommended an urgent need for continuous learning programs.

Singh (2019), identified inadequate funding and lack of trained manpower as major barriers in Indian academic libraries. Similarly,

Kumar & Sharma 2022, yet their adoption remains limited due to cost and technical complexity.

Chandra (2023), Studies by indicate that digital literacy gaps among library staff significantly affect successful implementation.

Smith and Hayman (2015), highlighted problems related to information technologies in the university libraries. He inferred that library schools were not teaching market-oriented courses. Consequently, the libraries suffered and the library graduates were unable to perform satisfactory services to the users in the virtual age. Library practitioners needed to be taught technology-based courses so that they might develop required skills and implement latest tools of technology in their work places. A positive administrative support was highly required because most of the administrative authorities were not empowering libraries and library practitioners according to the needs of the present age of information and communication technologies.

Regional studies in Maharashtra reveal uneven technological development across institutions, with rural colleges facing greater infrastructural constraints. While emerging technologies offer immense potential, literature consistently suggests that strategic planning, continuous professional training, and institutional support are essential for sustainable library modernization.

This study extends existing research by focusing specifically on SGBAU-affiliated engineering college libraries and systematically analyzing localized barriers and development needs.

4.METHODOLOGY

This study is a social science research aimed at exploring the challenges and obstacles in implementing emerging technologies in the libraries of engineering colleges affiliated with Sant Gadge Baba Amravati University (SGBAU), Maharashtra, which is typically based on interviews, questionnaires, and personal visits. The study is based on a quantitative research method following survey research. The purpose of this study is to identify the barriers for existing and emerging technologies and provide recommendations for the effective use and application of the latest technological tools. To study the technology adoption behavior of engineering library staff comprehensively, a quantitative approach was chosen following a survey research design. The researcher intended to collect data from a large sample size; therefore, quantitative research is most suitable for such studies, as many researchers and experts have also stated that the best way to collect data from a large population is through quantitative research.

Engineering college librarians in the educational sector of India who have a minimum qualification of MLIS. In the Amravati region of India, there were 23 working librarians in engineering colleges with at least an MLIS degree. This sample was based on all the working librarians in engineering colleges of the Amravati region in India. Librarians play a leadership role in the library. They are the main persons for implementing information technology in libraries. Considering their leadership role, they were selected as the subject of the study. They perform various traditional and non-traditional services to meet the information needs of users. Their role and services are commendable. They were selected for this study because they introduced emerging technologies in their libraries. Probability technique was used to collect data and then the census sample was used. The list of these engineering colleges is available on the website of the All India Council for Technical Education (AICTE).

The engineering colleges affiliated to Sant Gadge Baba Amravati University (SGBAU) are spread across the districts of Amravati, Akola, Washim, Buldana, and Yavatmal. In Amravati district, the affiliated institutions include Government College of Engineering, Amravati; Prof. Ram Meghe Institute of Technology & Research (PRMITR), Badnera; P. R. Pote (Patil) College of Engineering & Management; Sipna College of Engineering & Research, Badnera; HVPM College of Engineering; Dr. Rajendra Gode Institute of Technology; Takshashila Institute of Engineering & Technology, Darapur; Prof. Ram Meghe College of Engineering & Management, Badnera; and G. H. Raisoni College of Engineering and Management.

In Akola district, the affiliated colleges are Shri Shivaji Education Society's College of Engineering and Technology and Manav School of Engineering and Technology. In Washim district, Sanmati Engineering College is affiliated to SGBAU.

Buldana district has several affiliated institutions including Shri Sant Gajanan Maharaj College of Engineering (SSGMCE), Anuradha Engineering College, Chikhali; Rajarshi Shahu College of Engineering; Pankaj Laddhad



Institute of Technology & Management Studies; V. B. Kolte College of Engineering, Malkapur; Mauli Group of Institutions, College of Engineering & Technology, Shegaon; and Siddhivinayak Technical Campus, Shegaon. In Yavatmal district, the affiliated engineering colleges include Babasaheb Naik College of Engineering, Pusad; Jawaharlal Darda Institute of Engineering & Technology; and Jagadamba College of Engineering and Technology.

Overall, these institutions collectively form the core engineering education network under SGBAU, catering to technical education needs across the Vidarbha region of Maharashtra.

A survey questionnaire was used as a tool by the librarian of the engineering college to obtain primary information. A questionnaire is an effective tool for collecting descriptive data to answer research questions. It helps in obtaining information about various trends from a large population. Various researchers have also emphasized the importance of the questionnaire. They have noted that the questionnaire is a tool for collecting primary data. It saves valuable time and financial cost. It provides accurate data in a short time. Surveys are considered very useful for collecting information about behavior.

Questionnaire is a flexible tool. It has many advantages. It is an effective method to obtain the desired data. Considering the effectiveness of the questionnaire, the researchers used this tool to collect data. The questionnaire underwent pre-testing and a pilot study process to verify the validity and reliability of the tool. While designing the questionnaire, assistance was taken from the reviewed literature and subject experts.

5. BARRIERS IN THE IMPLEMENTATION OF EMERGING TECHNOLOGIES

Despite the growing importance of emerging technologies in academic libraries, several obstacles hinder their effective implementation in engineering college libraries. The present study identifies the following major barriers:

5.1. Financial Constraints:

Limited budget allocation remains one of the most significant barriers. High costs associated with hardware procurement, software licensing, RFID systems, digital subscriptions, and maintenance restrict many institutions from adopting advanced technologies.

5.2. Inadequate Infrastructure

Poor internet connectivity, insufficient computer systems, lack of servers, and unreliable power supply adversely affect the deployment of digital library services, particularly in semi-urban and rural institutions.

5.3. Lack of Technical Skills

Many library professionals lack adequate training in emerging technologies such as ILMS, digital repositories, AI-based tools, and cloud platforms. Insufficient ICT competency delays implementation and reduces system efficiency.

5.4. Resistance to Organizational Change

Traditional work culture and hesitation toward adopting new systems often result in slow acceptance of technology. Staff resistance and fear of job displacement further contribute to this challenge.

5.5. Insufficient Institutional Support

Limited administrative commitment, absence of clear ICT policies, and lack of strategic planning weaken technology integration initiatives.

5.6. Limited IT Support

Engineering college libraries often depend on external technical support, leading to delays in troubleshooting and system upgrades.

5.7. Low User Awareness and Digital Literacy

Students and faculty may not fully utilize digital resources due to inadequate orientation programs and limited awareness of available services.

5.8. Data Security and Privacy Concerns

Fear of data loss, cyber threats, and lack of proper backup mechanisms create hesitation in adopting cloud-based and digital systems.

5.9. Lack of Standardization

Absence of uniform technological standards across institutions results in fragmented systems and poor interoperability.

5.10. Sustainability Issues

Long-term maintenance, software updates, and recurring subscription costs pose challenges to sustainable implementation.



Conceptual Model Diagram (Textual Representation)

You may present this in your paper as follows:

Emerging Technologies



6.RESULTS, ANALYSIS AND INTERPRETATION

1.0 Response of Institute

Respondents were all of Librarian staff in Engineering Colleges. The acquired results highlight that 17 (100%) respondents were from highly experience staff academic Engineering College,

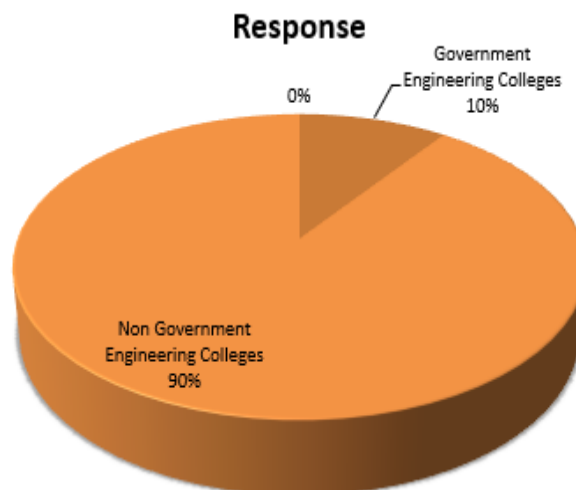
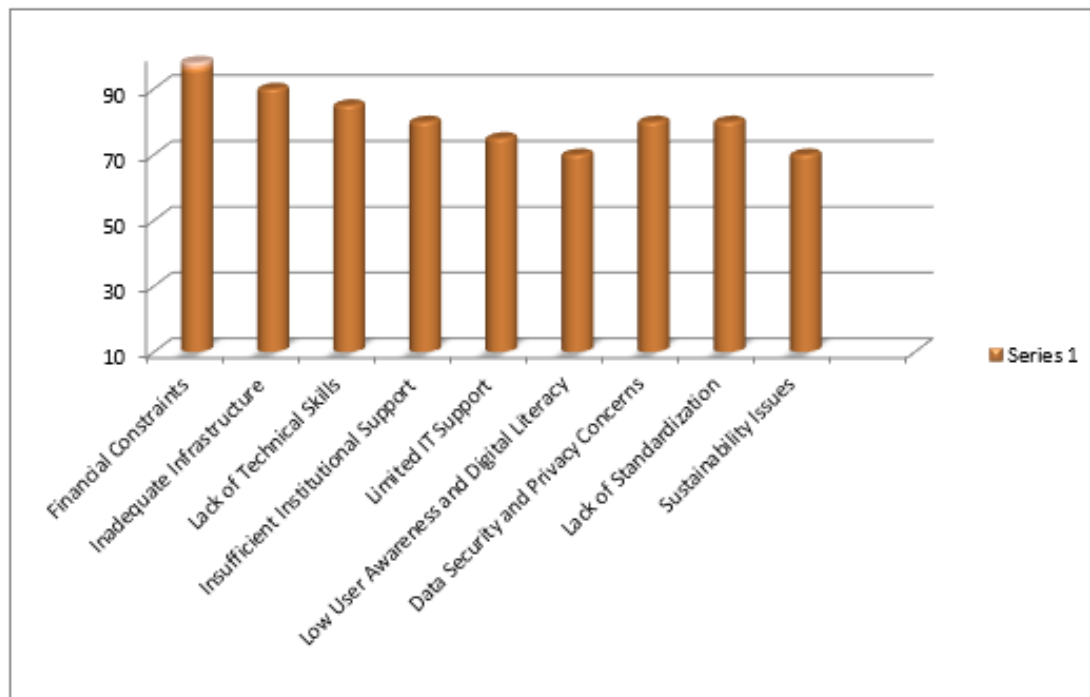


Fig. 1.0 Response of Engineering Colleges

Barriers for Utilizing Technology

The participants were asked to reveal barriers that took place for utilizing information technology. These barriers included Financial Constraints, Inadequate Infrastructure, Lack of Technical Skills, Insufficient Institutional Support, Limited IT Support, Low User Awareness and Digital Literacy, Data Security and Privacy Concerns, Lack of Standardization, Limited IT Support, Low User Awareness and Digital Literacy, Data Security and Privacy Concerns, Lack of Standardization, Sustainability Issues



According to the collected information, it appeared that participants were facing various challenges in using emerging technology in their libraries. The main obstacles encountered by respondents included insufficient budget for emerging technology resources, inadequate IT infrastructure, lack of technical support, the library organization's lack of an active role, and a shortage of training opportunities.

7.CONCLUSION

The study reveals that emerging technologies have strong potential to transform engineering college libraries affiliated with SGBAU into efficient digital knowledge centers. Technologies such as ILMS, DLMS, SLMS, CCS and ICT tools significantly enhance access to information, streamline operations, and improve user services.

However, the research has identified several significant obstacles such as financial constraints, inadequate infrastructure, lack of technical skills, resistance to institutional changes, insufficient institutional support, limited IT assistance, low user awareness and digital literacy, concerns about data security and privacy, lack of standardization, and sustainability issues, which hinder the full benefits of technology. The study concludes that strategic planning, continuous professional development, adequate funding availability, and institutional commitment are essential for successful implementation. Strengthening collaboration among libraries affiliated with SGBAU and adopting standardized technology frameworks can accelerate digital transformation. This finding provides practical guidance for librarians, administrators, and policymakers aiming to modernize academic libraries.

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