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Research Article

Role of Digital Transformation in Academic Library services and function

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A B S T R A C T

This paper analysis the new emerging trends & technology in library information science field. This paper main purpose the investigation of their impact on library automation, services new technology and user satisfaction in Technology. This research paper a comprehensive and integrated overview of recent technological trends in Library and Information Science by consolidating multiple emerging technologies within a single framework. The paper offers valuable insights for librarians, information professionals, and policymakers by highlighting practical applications, benefits, and future directions for technology adoption in libraries, thereby contributing to the ongoing discourse on digital transformation in library services.

Keywords:Artificial Intelligence, Digital Libraries, Library Automation, Internet of Things, RFID Technology, Cloud Computing, Big Data Analytics, Mobile-Based Library Services, Digital Preservation, Social Media in Libraries

Introduction

Information and Communication Technology (ICT) is one of the fastest-growing sectors in the modern era and continues to evolve on a daily basis. In recent years, technological advancement has brought revolutionary changes across all fields, including library and information services. Technology has significantly influenced library operations and the functioning of all library sections. Contemporary libraries have integrated technology into almost every activity and service, making it an essential component of daily library operations.

The widespread implementation of technology across various sections such as circulation, periodicals, technical services, reference, and acquisition has enabled libraries to operate more efficiently and systematically. Technological tools assist library staff and users in locating and accessing information with greater ease and accuracy. Through automation and digital systems, libraries can better understand diverse user information needs, adopt innovative service approaches, and effectively demonstrate the value of information resources and services.[1,2]

The use of technology allows libraries to deliver information quickly and efficiently through computers and networked systems. It also enhances library security, helps in tracking misplaced materials, and improves overall resource management. In the present digital environment, libraries are increasingly dependent on technology, which enables faster information dissemination and improved data collection.

Moreover, technological tools and facilities have become more affordable and accessible in the information age, making them widely usable in institutions, universities,

and colleges. Digital resources have emerged as a practical solution to many library challenges, as print materials are costly and difficult to manage. Electronic resources can be accessed anytime and from anywhere without space constraints. Information is delivered through various technological systems, including digital devices, networking infrastructures, servers, and audiovisual tools. Digital information also includes resources that have been converted into electronic formats through digitization processes.

Objectives of the study

- To explore Digital Transformation in Academic Library services
- To explore Digital Transformation in Library Administration & Management function

Methodology

The author uses the descriptive and analytical research review on literature, reports and recent studies related to new AI technological and application use in library function and services. Now-a-days different types emerging technologies using in library services like a Artificial Intelligence, virtual reality, ERM , Library RFID technology, Machine Learning, Internet Thing and Cloud computing etc.

Review of Literature

Neha Goel (2022) analyzed emerging technology trends in library and information science, with particular emphasis on library automation, digitization, institutional repositories, QR code and RFID technologies, and mobile-based library services. The study also addressed the role of integrated library systems, robotics, and social media platforms in enhancing modern library services.[2]

Rajashekara G.R. and Kiran Kumar Doddamani (2024) discussed recent advancements in LIS education and library practices, emphasizing the adoption of digital technologies for effective collection management and service delivery. Their study examined digital archives, online reference services, electronic resource management, cloud computing, the Internet of Things, and augmented reality as key technological innovations in libraries.[3]

Bhaigyashree Boro and F. Chanchimawia (2023) focused on emerging technologies shaping libraries in the digital era. The study discussed future-oriented technologies such as artificial intelligence, the Internet of Things, blockchain, robotics, connected technologies, virtual reality, and unplugged technologies.[4]

Nagaraja Naik and Lokesh Naik (2024) explored how current technological trends are enhancing the Library and Information Science profession. Their study focused on emerging developments such as artificial intelligence, integrated digital technologies, big data applications, open access initiatives, and user-centered services. The authors also analyzed the driving forces behind these changes and their professional implications for LIS practitioners.[5]

Negi, Singh Dheeraj et.al. (2014) describe the aim of this paper is to explore how mobile technologies can be utilized to create innovative services in libraries and information centers. Mobile devices play a crucial role in connecting libraries with their patrons. Developing a library mobile application or a mobile-friendly website can enable users to access library hours, manage their accounts, search databases, and utilize other library services with ease. This paper provides guidance for libraries to plan and establish a mobile presence by analyzing current trends in mobile device usage, offering an overview of available devices, service providers, and key features. It also examines the range of activities that mobile technologies support to enhance library services, highlights how libraries and librarians are adapting to these technologies, and discusses potential future strategies for further integrating mobile solutions to meet users' evolving needs.[6-14]

Digital Transformation of Academic Libraries

Digital Transformation of Libraries are rapidly transforming to meet the evolving demands of information users by integrating advanced technologies and innovative services. This transformation has enhanced libraries' capacity to provide efficient, accessible, and user-friendly resources. Modern libraries are no longer limited to traditional services; instead, they are adopting a wide range of emerging technologies to improve information management, service delivery, and user engagement. Following are of the major recent trends and technologies adopted by libraries are discussed below.

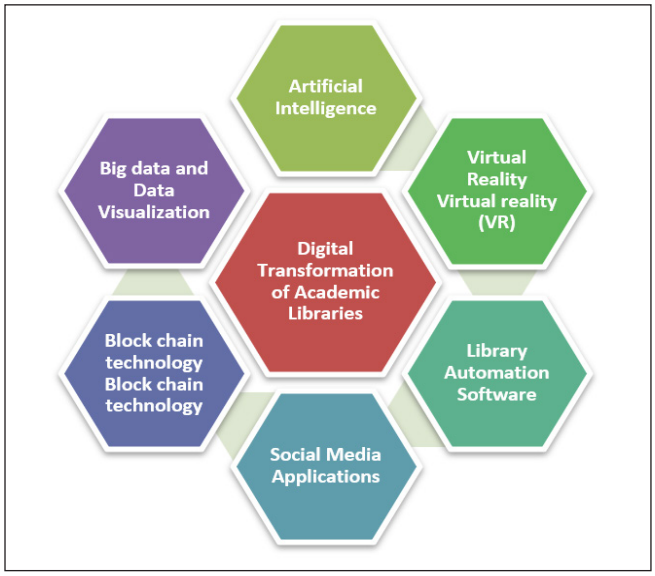

Figure 1. Key Technologies in Digital Transformation of Academic Libraries

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Artificial Intelligence (AI) based Services

Artificial Intelligence has emerged as one of the most influential and widely adopted technologies across various sectors such as agriculture, medicine, education, and cinematography. Artificial Intelligence (AI) refers to the ability of machines, computer systems, or electronic devices to perform tasks that typically require human intelligence, including learning, reasoning, problem-solving, and decision-making. In the library context, AI-based applications are increasingly being used to enhance service delivery and operational efficiency. Libraries employ AI tools such as chatbots and virtual assistants to respond to users' directional and reference queries, assist in information retrieval, and provide personalized support. The integration of AI in libraries contributes to improved user engagement, faster service delivery, and reduced dependency on manual processes.

Virtual Reality Virtual reality (VR) Reference services

Virtual Reality (VR) refers to a computer-generated, three-dimensional environment that allows users to experience and interact with simulated surroundings as if they were real. By using specialized devices such as head-mounted displays and motion controllers, users can immerse themselves in a digital space. In recent years, VR has gained attention in the field of library and information science for its potential to transform traditional reference services into more dynamic and user-friendly experiences.

Library Automation Software and ERP-

Information and communication technologies are being used more and more by high-tech libraries to automate and streamline their operations. Many library operations can be automated with the help of a variety of software applications, such as SOUL (Software for University Libraries), KOHA, Easylib, and E-Granthalaya (including version 4.0). Circulation, reference, acquisitions, serials, cataloguing, and the online public access catalogue (OPAC) are all managed by these systems. By enabling faster access to resources, streamlining cataloguing and classification, and promoting seamless information sharing across departments, automation software implementation improves library efficiency. Consequently, library automation guarantees more convenient access to library collections, lowers manual labor.

Social Media Applications use in batter academic library services and function

These days, people spend a huge chunk of their time on social media. Everyone's scrolling, chatting, or watching something—whether it's for fun, to pick up new info, or even for school and work. Platforms like Facebook, Instagram, YouTube, WhatsApp, and even Email have basically woven themselves into our routines.

Figure 2.Social Media in Academic Library Services

Libraries have caught on to this shift, too. They're using these same platforms to connect with people in ways that actually fit modern life. Now, you can get all sorts of library services online—document delivery, updates about new stuff (that's current awareness), info tailored just for you, reference help, orientation programs, and alerts about what's new or important. It's smart. By jumping onto social media, libraries haven't just kept up. They've made themselves more useful and easier to reach than ever.

Use a Block Chain technology in Academic Library

Blockchain technology isn't just a buzzword—it's changing the way we run digital systems, right at the heart of today's industrial shake-up. At its core, blockchain is like a giant, shared database, spread out across a network of peers. Instead of one central authority, everyone on the network keeps a copy. Every transaction gets locked in with cryptography, so the record stays secure and open for anyone to check. You can't go back and change what's already there, which makes it a solid, trustworthy digital ledger.

Now, what does this have to do with libraries? More than you'd think. Libraries are starting to look at blockchain for all sorts of reasons: managing digital rights, making sure user identities stay private and secure, protecting sensitive data, even tracking their collections more efficiently. They can use blockchain to prove where information came from, handle transactions without middlemen, and keep tabs on their resources in real time. In the end, bringing blockchain into libraries helps build trust and keeps information safe, all while making library systems more transparent and dependable than ever.

Big data and Data Visualization

Big data and data visualization boil down to making sense of huge, complicated datasets—think charts, graphs, maps, and all sorts of other visuals. These tools help people actually see what's going on in the numbers, so it's easier to spot trends, patterns, or anything unusual. In digital libraries, this kind of tech isn't just a nice extra; it helps

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people make smarter decisions and keeps things running smoothly. Plus, big data and visualization open up digital libraries to the world. They make it simple for users to find what they need from piles of information, no matter which platform they're using.

Figure 3.Big Data and Data Visualization in Digital Libraries

Mobile-based library services

Libraries really want to do three things for people: help them keep learning throughout life, boost their literacy, and make it easier to share everyday knowledge. Mobile library services step in and make a big difference, especially for folks who can't get to the library in person. With apps like WhatsApp and simple text messages, libraries can reach people fast and make it easy for everyone to get the information and services they need.

- RSS Feeds
- WhatsApp group
- M-library

Figure 4.Mobile-Based Library Services for Information Access

QR Code (Quick response) Technology

Many libraries are using QR codes to make things easier for their visitors. Thanks to better tech, these little squares can now connect you straight to whatever you need—whether that's the library catalog, e-books, or help desk info—right on your phone. You see QR codes everywhere: at the entrance, on the shelves, by the service desk. Just scan one, and you've got the info you want in seconds. It's fast, simple, and makes using the library a lot smoother.

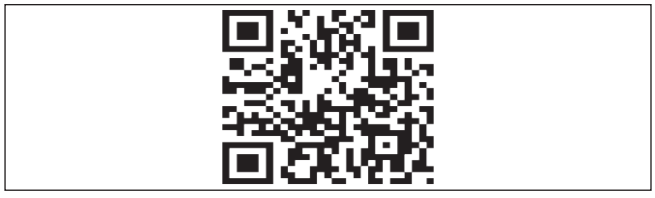

Figure 5.QR Code for Quick Access to Library Resources

Advantages of using technologies for Academic Libraries

Modern libraries are a whole new world now. With new tech, they can share information with people almost instantly, whether you're down the street or across the world. Digital storage means libraries aren't fighting for shelf space—they can pack in so much more than before. Automation takes care of a lot of the routine work, so even if there isn't many staff around, things still run smoothly. On top of that, ICT lets you tap into library resources any time you want, from your laptop or your phone. Digital tools just make the whole experience faster and easier. You get what you need, save time, and walk away more satisfied. Honestly, you don't even have to set foot in the building—just log in and the library comes to you.

Finding

We are found that the adoption of emerging technologies has significantly improved the library services efficiency, accessibility and effectiveness. This technology use such as Artificial intelligence, RFID technology, Mobile technology and Cloud bases services has use library operations, advance services and enabled faster information delivery, Mobile technology and social media given platforms have strengthened user engagement, while digital preservation and big data tools have an improved long-term access to information and decision making.

Conclusion

Libraries aren't the quiet, dusty places they used to be. These days, they're turning into digital hubs, packed with smart tech. It's not just about books anymore—technology is reshaping everything, and people now expect quick answers and easy access. So, libraries are stepping up. They're using new tools to make their services faster and smoother, both for visitors and behind the scenes. AI has really shaken things up across different fields—farming, hospitals, schools, factories—and libraries aren't missing out. With AI-powered chatbots and tools like ChatGPT, you don't have to wait for a librarian to be free. Libraries can answer questions right away, night or day, and the info is spot-on. It saves everyone time and keeps users happy. But here's the thing: if libraries want to stay useful, they can't just install some tech and call it a day. Staff need to keep learning, staying sharp as things change. When libraries keep up with the latest tools and train their teams well, they stay important—not just as places with books, but as real centers for learning and discovery.

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