E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

Digital Libraries and Smart Services for Viksit Bharat @2047

Radheshyam
Research Scholar,Library and Information Science,Mahatma Gandhi Chitrakoot Gramodaya University Chitrakoot (M.P.)

Raghubansh Prasad Bajpai
Professor, Library and Information Science,Mahatma Gandhi Chitrakoot Gramodaya University Chitrakoot (M.P.)

Paper Received date
05/03/2026
Paper date
Publishing Date
10/03/2026
DOI
https://doi.org/10.5281/zenodo.19950793

IMPACT FACTOR 5.924

Abstract

The goal of India's Viksit Bharat @2047 vision is to make the country a knowledge-driven, advanced, and independent society by the time it celebrates its 100th anniversary of independence. Digital libraries are essential to achieving this goal, which calls for an inclusive and cutting-edge information infrastructure. This study examines the ways in which smart and digital library services help create a knowledge ecosystem that is empowered by technology and promotes learning, creativity, and lifelong learning.

The report emphasizes how libraries are evolving from conventional archives to intelligent digital systems driven by big data analytics, cloud computing, artificial intelligence (AI), and the internet of things (IoT). These technologies support national efforts like Digital India, NEP 2020, and Atmanirbhar Bharat by improving accessibility, automating services, and personalizing user experiences. The study also looks at important government programs that support India's digital knowledge infrastructure, such as NDLI, e-Granthalaya, e-ShodhSindhu, and Shodhganga.Furthermore, the research identifies key challenges including the digital divide, limited digital literacy, inadequate infrastructure, and issues of cybersecurity and copyright. Addressing these challenges through strong policy frameworks, sustainable funding, and capacity building is essential to realize the goals of Viksit Bharat @2047.

In conclusion, digital libraries and smart services are not only innovations in technology but also calculated instruments for changing the nation. By democratizing knowledge, preserving cultural legacy, and promoting equitable access to information, they lay the foundation for an India that is prepared for the future and where knowledge is the key to development, empowerment, and innovation.

Keywords: Digital Libraries, Smart Services, Viksit Bharat @2047, Artificial Intelligence, Cloud Computing, Digital Inclusion, Knowledge Society

1. Introduction

By the country's 100th anniversary of independence, India hopes to have transformed into a developed, independent, and knowledge-driven society through its vision of Viksit Bharat @2047. Building a robust information and knowledge infrastructure that empowers all citizens, fosters innovation, and

supports inclusive growth is essential to achieving this lofty objective.Digital libraries are essential in this regard since they offer easy access to information resources at any time and from any location. They serve as virtual links that span social and geographic divides to link communities, researchers, and students. Libraries are becoming smart libraries—hubs of dynamic learning, collaboration, and innovation—by integrating cutting-edge technologies like artificial intelligence (AI), machine learning (ML), cloud computing, and the internet of things (IoT).

Users' interactions with information are changing as a result of smart services in digital libraries. Libraries are becoming more relevant and prepared for the future because to technologies like digital preservation, remote access, virtual help, and personalized learning recommendations. Digital libraries can play a significant role in achieving the goal of a Viksit Bharat, or a developed India by 2047 where knowledge is sustainable, empowering, and widely available, by promoting inclusion and digital literacy.

2. Research Objectives

1. To study the concept and role of digital libraries in achieving the vision of Viksit Bharat @2047.
2. To examine the impact of smart library services such as AI, IoT, cloud computing, and mobile technologies on library users and knowledge access.
3. To identify the challenges and government initiatives related to digital libraries and smart services in India.

3. Research Methodology

This study is theoretical and descriptive in nature. The research is based on secondary data collected from books, journals, research articles, government reports, websites, policy documents, and digital library platforms related to Digital Libraries and Smart Services for Viksit Bharat @2047. The collected information has been analyzed and interpreted systematically to understand the role, initiatives, opportunities, and challenges of digital libraries in India.

4. Concept of Digital Libraries

The idea of a digital library signifies a radical shift in how information is gathered, arranged, stored, and made available. Digital libraries preserve information in electronic formats and make it accessible over digital networks, in contrast to traditional libraries that rely mostly on physical resources. They act as online knowledge bases that let users access databases, books, journals, research papers, and multimedia from anywhere at any time.

A digital library is a dynamic knowledge system that makes use of contemporary information and communication technologies (ICTs) to deliver effective, user-centered, and interactive services. It is not just a collection of digitized texts. Without being constrained by time or location, users may quickly search, retrieve, and share information with the use of tools like metadata indexing, online catalogues, and digital repositories.

Digital libraries are seen as the foundation of a knowledge-driven India in the framework of Viksit Bharat @2047. By guaranteeing that everyone, especially members of marginalized, rural, and tribal communities, has equitable access to educational resources, they support the development of the country. Their functionality is further improved by the use of cloud-based storage, artificial

intelligence, and open access platforms, which make information sharing more efficient, inclusive, and quick.

The digital library is essentially a representation of contemporary India's dedication to "Knowledge for All," an inclusive, technologically enabled strategy to provide citizens with knowledge and education. Digital libraries play a key role in achieving the goal of "Viksit Bharat @2047", where access to information is a fundamental human right rather than a privilege, by fusing innovation with accessibility.Examples: National Digital Library of India (NDLI),Digital Repository of IGNOUe-Granthalaya, Shodhganga, and DELNET

5.Role of Digital Libraries in Viksit Bharat

By the centennial of India's independence, the goal of Viksit Bharat @2047 is to create a developed, inclusive, and knowledge-empowered India. Digital libraries are an essential part of the national knowledge infrastructure in achieving this objective. By making information available to all citizens, regardless of their location or socioeconomic status, they serve as catalysts for social change, creativity, and education.

The bridging of the knowledge divide between rural and urban people is greatly aided by digital libraries. They give professionals, researchers, and students nationwide equal access to learning opportunities through open-access platforms, e-resources, and online repositories. The tenets of Digital India and National Education Policy 2020, which place a strong emphasis on ensuring that all people have access to high-quality education and digital literacy, are in line with this inclusive strategy.

Digital libraries also play a vital role in fostering innovation and research. They facilitate the exploration of novel concepts, the exchange of knowledge, and the development of the country's intellectual capital by providing access to an extensive array of international databases, journals, and institutional repositories. By utilizing cutting-edge search engines and metadata linking to connect disparate information sources, these libraries also support interdisciplinarystudy. Additionally, the preservation and transmission of India's cultural and indigenous knowledge is greatly aided by digital libraries. Tribal literature, oral histories, rare manuscripts, and traditional art forms are all being recorded and saved for future generations through digitization projects. In addition to preserving cultural heritage, this endeavor incorporates traditional knowledge into contemporary educational frameworks.

Digital libraries empower citizens via lifelong learning as we move towards a developed India. By supporting programs for digital literacy, vocational training, and skill development, they help people adjust to the demands of a knowledge-based economy. They encourage self-learning and ongoing education, which are crucial for both individual and societal development, by offering remote access to educational resources.

Additionally, by making public information, policy documents, and government reports accessible, digital libraries promote transparency and participatory governance. This unrestricted access promotes informed citizen participation in national development and reinforces democratic values.In conclusion, digital libraries are not just information repositories but strategic instruments for national transformation. They promote inclusive education, innovation, cultural preservation, and lifelong learning—each contributing to the realization of the Viksit Bharat @2047 vision. As India moves

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

toward a digitally empowered future, the role of digital libraries will be central in shaping an informed, enlightened, and progressive society.

6. Vision of Viksit Bharat @2047

India's long-term goal is to become a developed, self-reliant, and knowledge-driven nation by the 100th year of its independence, which is embodied in the vision of Viksit Bharat @2047. This goal encompasses not only economic advancement but also the development of an inclusive, inventive, sustainable, and technologically and educationally empowered society. It embodies the shared vision of making India a world leader in science, knowledge, and human development.

Building a "New India"—an India that guarantees prosperity, equality, and opportunity for all citizens—is the fundamental tenet of Viksit Bharat @2047. It highlights knowledge accessibility, digital empowerment, and human capital development as the main forces behind change. Innovation, research, and education are seen as the cornerstones for accomplishing this goal. Libraries, especially digital libraries, are therefore crucial for developing a populace that is knowledgeable and competent..

The goal of a Viksit Bharat is to create a digitally inclusive nation where all citizens, irrespective of their social or geographic background, can access information, learn, and participate in the development of their country. The project is in line with the tenets of Digital India,National Education Policy (NEP) 2020, and Atmanirbhar Bharat (Self-Reliant India), which all seek to improve employability through skill-based education, encourage open knowledge, and fortify digital infrastructure.

The vision also emphasizes sustainable development, acknowledging that environmental responsibility, cultural preservation, and technical innovation must coexist. In order to create a well-rounded, culturally diverse, and forward-thinking society, it promotes the fusion of traditional knowledge systems with contemporary science and technology.

India wants to become a knowledge superpower by 2047, with innovation, digital transformation, and top-notch research driving the country's development. The vision calls for the use of Artificial Intelligence (AI) and Big Data in learning and governance, as well as inclusive digital education and ubiquitous internet connectivity.

Digital libraries are seen as important change agents in this approach. They facilitate access to a vast array of cultural and educational materials, encourage lifelong learning, and close the digital gap. Digital libraries will contribute to the larger objectives of Viksit Bharat @2047—a future-ready India that thrives on knowledge, equity, and innovation—by democratizing information.In essence, the Vision of Viksit Bharat @2047 is about transforming India into a nation where knowledge is power, technology is inclusive, and development is sustainable. It is a roadmap toward a society that values learning, preserves its cultural roots, and advances confidently toward global excellence.

7.Smart Library Services for Viksit Bharat @2047

The idea of Smart Libraries has become a potent force in the age of digital transformation, changing the way that knowledge is produced, accessed, and used. A smart library is more than just a digital information hub; it is a intelligent, technology-driven ecosystem that improves user experience and library operations through automation, data analytics, and artificial intelligence. Smart library services are a crucial part of India's drive to create a knowledge-based and digitally enabled society under the framework of Viksit Bharat @2047.

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

In order to make library systems more interactive, user-centric, and efficient, smart library services incorporate information and communication technologies (ICTs), including artificial intelligence (AI), the internet of things (IoT), cloud computing, and big data analytics. By providing individualized, automated, and on-demand access to information, these technologies assist libraries in going beyond conventional service models. Smart libraries focus on:

1. Intelligent resource management
2. Real-time user assistance
3. Integration of digital repositories and databases
4. Remote and mobile access to digital collections
5. Enhanced collaboration and communication among users and librarians

7.1 Artificial Intelligence (AI)-Enabled Services AI is at the heart of smart library systems. It enables:

1. Automated indexing and cataloging, which minimizes manual labor
2. AI chat bots that offer round-the-clock virtual support for user inquiries.
3. Tailored suggestions, which make book or article recommendations based on user activity.
4. Tools for semantic search and plagiarism detection that raise the standard of scholarly research. Systems for access control and facial recognition can enhance security and attendance control.
5. AI transforms libraries into sentient beings who can anticipate patron wants and offer proactive assistance for education and study.

7.2 Internet of Things (IoT) Applications

IoT connects physical and digital library environments through smart devices and sensors.Some key applications include:

1. RFID (Radio Frequency Identification) systems for quick issue-return processes and real-time book tracking.
2. Environment monitoring sensors to maintain suitable temperature, humidity, and lighting for resource preservation.
3. Automated attendance and visitor tracking systems that streamline operations.
4. Smart shelves that automatically detect misplaced books.
5. IoT-based libraries thus become more efficient, secure, and responsive to both users and staff.

7.3 Cloud Computing in Smart Libraries

Cloud technology enables libraries to provide seamless, scalable, and cost-effective access to resources.Its benefits include:

Remote access to e-books, journals, and databases anytime, anywhere.

1. Collaborative platforms where multiple institutions can share digital collections.
2. Cloud-based services reduce infrastructure costs and make knowledge resources universally available, aligning perfectly with the Viksit Bharat @2047 mission of inclusivity and accessibility.
3. Data storage and backup, ensuring information security.
4. Software as a Service (SaaS) models for integrated library management systems.

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

7.4 Mobile and Web-Based Library Services

Mobile applications and web portals bring library services to users' fingertips.Common smart services include:

1. Library mobile apps for searching, borrowing, and renewing books.
2. Online alerts and notifications for due dates, new arrivals, and events.
3. Virtual reference desks that assist users through chat or email.
4. Integration with social media for community engagement and knowledge sharing.
5. These services encourage continuous learning and make library use more flexible and interactive.

7.5 Data Analytics and Smart Decision-Making

Smart libraries leverage data analytics to study user behavior and service utilization patterns.Through analytics, libraries can:

1. Recognize user preferences and what they read.
2. Create more effective collection development plans.
3. Assess the necessity for subscriptions and the use of digital resources.
4. Use real-time analytics to inform better decisions.
5. In a continuously evolving information landscape, this data-driven strategy aids libraries in staying relevant and responsive.

7.6 Relevance to Viksit Bharat @2047

Smart library services contribute directly to the vision of Viksit Bharat @2047 by:

1. Promoting digital inclusion and bridging the knowledge gap.
2. Preserving India's cultural and intellectual heritage through digitization.Building a sustainable, paperless, and eco-friendly information system.
3. They transform libraries into intelligent knowledge hubs that support national development goals through technology and innovation.
4. Supporting research, innovation, and lifelong learning.
5. Empowering rural and tribal communities with digital access.

8. Government Initiatives and Policies

To improve the nation's digital infrastructure, increase information access, and encourage lifelong learning, the Indian government has implemented a number of innovative programs and regulatory frameworks. The core of the Viksit Bharat @2047 vision is a knowledge society empowered by technology, which is directly aided by these projects. Through technology-based initiatives, policy changes, and national missions, India is progressively converting its traditional libraries into vibrant hubs of digital knowledge.

8.1. Digital India Mission (2015) The Digital India Mission was started in 2015 with the goal of making India a "knowledge economy and digitally empowered society." It encourages e-governance, digital literacy, and universal access to internet connectivity. As part of this missionLibraries have been encouraged to digitize their collections.

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

- Online government information, open educational resources, and e-books are available to citizens.
- To ensure accessibility and inclusivity for all, the program promotes the growth of Digital Public Libraries, particularly in rural and isolated locations.
- In line with Viksit Bharat @2047, this mission establishes the foundation for an integrated digital ecosystem.

8.2. National Digital Library of India (NDLI)

Millions of educational resources are accessible through the National Digital Library of India, a flagship project created by the Ministry of Education's Indian Institute of Technology (IIT) Kharagpur.

- NDLI offers e-books, research papers, films, and theses to users of all ages and educational levels.
- It incorporates more than 75 million digital objects in many languages and formats.
- The platform is meant to promote inclusive education and lifelong learning.
- The NDLI is a significant step toward democratizing information and establishing a national digital learning environment.

8.3. e-ShodhSindhu: Consortium for Higher Education e-Resources

Established by the UGC-INFLIBNET Centre, the e-ShodhSindhu program provides access to high-quality e-journals, databases, and e-books to universities and colleges across India.

- Its goal is to guarantee fair access to academic content for research and higher education by combining three earlier consortia: INDEST-AICTE, UGC-INFONET, and N-LIST.
- More than 400 universities and institutions are supported.
- This program helps close the knowledge gap across universities and fortifies the research infrastructure.

8.4. Shodhganga and Shodhgangotri

Indian theses and dissertations submitted to universities are publicly accessible through the Shodhganga repository, which is run by the INFLIBNET Center.

- It promotes academic transparency and prevents duplication of research.
- These initiatives enhance the visibility of Indian research output and contribute to global knowledge sharing.
- The companion platform Shodhgangotri hosts research proposals and synopses, encouraging collaboration among scholars.

8.5. National Mission on Education through ICT (NMEICT)

Using ICT tools to improve education is the goal of the National Mission on Education through Information and Communication Technology (NMEICT).

- SWAYAM, e-Yantra, Virtual Labs, and NPTEL are notable projects that fall under this purpose.
- It facilitates the development of e-content for a range of disciplines.

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

- Libraries are essential in giving students of all skill levels access to these free instructional materials.
- This mission integrates digital learning into traditional education, which is in line with Viksit Bharat @2047's goal.

8.6. e-Granthalaya: Digital Library Management Software

Thousands of libraries in India employ e-Granthalaya, an integrated library automation system created by the National Informatics Centre (NIC).

- It helps modernize and standardize library services in public, academic, and government institutions.
- it facilitates cataloguing, circulation, membership, and the creation of digital repositories.
- it permits resource sharing among libraries via a networked environment

8.7. National Education Policy (NEP) 2020

The incorporation of free materials and technology into the educational system is emphasized in NEP 2020.

- It highlights digital libraries as centers of learning that foster creativity and inquiry.
- The policy ensures accessibility and diversity by promoting multilingual digital content
- In order to conserve India's cultural legacy, it suggests digitizing manuscripts, archives, and local knowledge.
- The foundation for a knowledge-based economy is strengthened by NEP 2020, which incorporates library expansion into educational reforms.

8.8. One Nation, One Digital Platform Initiative

This initiative envisions creating a unified national digital learning ecosystem.

- In order to guarantee that students nationwide have access to reliable, superior educational materials regardless of where they are.
- it aims to combine educational platforms like NDLI, SWAYAM, and DIKSHA into a unified digital framework.
- The inclusivity and scalability intended in Viksit Bharat @2047 are reflected in this policy.

8.9. Digital Repository and Open Access Policies

The Government of India encourages Open Access (OA) to publicly funded research.

- Open-access publication and data sharing are encouraged under the National Science and Technology Information Policy (NSTIP)
- institutional repositories like as DRDO, ICAR, and CSIR have embraced OA requirements for the dissemination of knowledge.
- These regulations encourage openness, creativity, and international cooperation in research and teaching.

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

9.Challenges

Although smart services and digital libraries are revolutionizing information access and knowledge sharing in India, there are a number of structural, technological, financial, and social obstacles to overcome before they can be fully implemented. In order to achieve the goal of Viksit Bharat @2047, which is to establish an inclusive, technologically advanced knowledge society, these obstacles must be removed.

9.1. Digital Divide-: The digital divide between urban and rural communities in India is one of the biggest problems. Many residents still do not have reliable access to digital gadgets, power supplies, or internet connectivity, especially in rural and tribal communities.
Rural researchers' and students' access to digital learning environments is limited by this disparity.

9.2. Inadequate Infrastructure:-Many academic and public libraries lack proper digital infrastructure and modern technology. Poor internet bandwidth, outdated computer systems, and limited storage affect access to digital resources. Small institutions also face financial difficulties in upgrading and maintaining digital library services.

9.3. Limited Digital Literacy:-Digital literacy remains a major challenge among library users and staff in India. Many librarians and users lack proper training to use ICT tools, databases, and e-resources effectively. Regular training and awareness programs are necessary for the successful use of digital libraries.

9.4. Financial Constraints:-Digital and smart library services require high financial investment for e-resources, databases, and maintenance. Small institutions often face difficulties due to limited funding and government support. Poor financial planning also affects staff training, software updates, and infrastructure development.

9.5. Copyright and Intellectual Property Issues:-The usage of digital content presents complex copyright, licensing, and intellectual property issues. Many libraries encounter constraints when digitizing or disseminating copyrighted works. Uncertain policies about digital rights management (DRM) impede the free flow of information. Balancing open access with copyright protection is still a legal and ethical challenge in the digital age.

9.6. Cyber security and Data Privacy:-As libraries rely more on online platforms and cloud storage, cybersecurity threats have become a significant issue. Hacking, virus assaults, data breaches, and identity theft are all potential threats to institutional and user data.Inadequate security measures and a lack of awareness among library staff exacerbate susceptibility. Libraries must strike a difficult balance between protecting user privacy and ensuring free access.

9.7. Lack of Standardization and Interoperability:-The lack of consistent metadata standards, software platforms, and cataloguing techniques complicates resource sharing and integration. Libraries that use multiple automation platforms have difficulty exchanging or federating data.Non-standard formats also impair digital content's visibility and accessibility on national and international networks.

9.8. Resistance to Change:-Transitioning from traditional to digital library models frequently encounters resistance from staff and users who are used to traditional systems. Some librarians are concerned that automation would lead to job instability.Users who prefer printed information may be

E-ISSN No: 2456-6713 Print ISSN No: 3048-6459

International Educational Applied Research Journal

Peer-Reviewed Journal-Equivalent to UGC Approved Journal

A Multi-Disciplinary Research Journal

hesitant to transition to digital platforms. Institutional inertia and reluctance to adopt new technologies impede modernization efforts.

9.9. Sustainability and Maintenance Issues:-Creating a digital library is a continual process that requires updates, data backups, and technology improvements. Many organizations struggle to keep long-term digital repositories because of personnel turnover and a lack of technical skills.Obsolete software and technology present extra hurdles to data retention. Without long-term planning, digital libraries risk becoming outmoded or unavailable.

9.10. Language and Content Diversity:-India's language variety creates a unique barrier for digital content generation and access. The majority of e-resources are exclusively available in English, which limits access for regional and vernacular language users.The lack of multilingual metadata and translation tools limits inclusion.Digitizing local knowledge, folk literature, and tribal resources is still an underdeveloped area.

9.11. Institutional Coordination and Policy Gaps:-The lack of a coordinated national policy for digital library development causes duplication of efforts and unequal results. Coordination across ministries, academic entities, and governmental institutions is often lacking.A centralized structure is required for the integration of digital library networks at the local, regional, and national level.

Conclusion

Digital libraries and smart services are the cornerstones of India's quest to achieve the goal of Viksit Bharat @2047, a developed, inclusive, and knowledge-driven nation. Libraries are transforming into intelligent learning environments that promote access, creativity, and lifelong education for all by using sophisticated technologies such as artificial intelligence (AI), cloud computing, big data, and the Internet of Things (IoT).
These digital information platforms not only bridge the divide between rural and urban communities, but they also protect India's rich cultural and intellectual heritage. They provide citizens with information, improve research and education, and assist national projects such as Digital India, NEP 2020, and Atmanirbhar Bharat. Digital libraries are changing the way knowledge is created, shared, and used by leveraging open access, digital preservation, and smart learning technologies.

However, issues like the digital divide, insufficient infrastructure, low digital literacy, and cyber security risks must be addressed effectively. Strong policy coordination, adequate funding, capacity building, and inclusive digital content creation are critical for sustaining this transformation. In essence, digital and smart libraries serve as accelerators for national development rather than simply storing information. They exemplify the ethos of a future-ready India, where technology enables learning, knowledge drives innovation, and information becomes the key to equitable progress. The success of Viksit Bharat @2047 will be determined by how successfully the nation uses these smart knowledge systems to create a digitally empowered, informed, and progressive society.

Reference

1. Laxman, K., & Sharma, P. (2021). Digital libraries in India: Challenges and opportunities for the future. *International Journal of Library Science*, *10*(2), 45–58.

2. Singh, R., & Kaur, J. (2020). Smart library services: Transforming user experience in the digital era. *Journal of Information Science and Technology*, *15*(1), 12–27.
3. Gupta, A., & Verma, S. (2019). Role of digital libraries in promoting digital literacy in India. *Library Philosophy and Practice*, Article 2168.
4. Ministry of Education, Government of India. (2022). *National digital library of India: Vision and roadmap for digital learning in India*.
5. Kumar, V., & Chawla, R. (2020). Smart services for enhancing access to digital knowledge resources. *International Journal of Digital Library Systems*, *11*(3), 34–50.
6. Ministry of Electronics and Information Technology, Government of India. (2021). *Digital India initiative: Progress and future directions*.
7. Tripathi, S., & Joshi, P. (2019). Emerging trends in digital libraries: A study on Indian scenario. *DESIDOC Journal of Library & Information Technology*, *39*(4), 200–207.
8. Sharma, N., & Singh, M. (2022). Artificial intelligence and machine learning in smart library services. *International Journal of Advanced Research in Computer Science*, *13*(5), 89–95.
9. World Bank. (2021). *Digital infrastructure for development: Opportunities for India*. World Bank Publications.
10. Ministry of Education, Government of India. (2022). *National knowledge network (NKN): Enabling digital transformation in India's educational institutions*.
11. Rao, B., & Das, A. (2020). Implementation of smart services in public libraries: Case studies from India. *Library Management*, *41*(6/7), 405–419
12. Indian Space Research Organisation. (2021). *Space technology for digital connectivity in rural India*. ISRO.