

## New Trends in Library and Information Science in the 21<sup>st</sup> Century: An Overview

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### Abstract

This article examines the transformative journey of Library and Information Science (LIS) in the 21st century, highlighting its evolution in response to the digital age. Emphasizing the shift from traditional practices to embracing digital technologies, the article explores how LIS has adapted to changing information creation, dissemination, and consumption patterns. It discusses the transition of libraries from mere repositories of books to multifaceted information centers, offering digital resources like e-books, online journals, and databases. The role of libraries in promoting digital literacy,

facilitating online learning, and serving as community hubs is also emphasized. Further, the article delves into the impact of technological advancements such as Artificial Intelligence, Big Data, and Virtual Reality on library services. The integration of data science and big data in LIS, enhancing user experience and service delivery, is highlighted. Additionally, the article addresses the challenges faced by libraries in the digital era, including digital transformation, preservation, and the need for continuous innovation. The conclusion reaffirms the adaptive nature of LIS in the digital age, underscoring its ongoing commitment to access, equity, and community service.

**Keywords:** Digital Library, Information Center, Library and Information Science, New Trends, 21<sup>st</sup> century

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## **Introduction**

The field of Library and Information Science (LIS) has undergone remarkable transformations in the 21st century, evolving rapidly to meet the demands of the digital age. These changes are not just technological but also conceptual, reflecting a broader shift in how information is created, disseminated, and consumed. As Bawden and Robinson (2018) articulate in their work, 'Introduction to Information Science,' this era marks a significant departure from traditional library practices, embracing digital technologies and new modes of information delivery. LIS now stands at the forefront of the digital revolution, playing a crucial role in managing the deluge of information characteristic of this era.

In the digital landscape, libraries are no longer mere repositories of books and physical media but have transformed into multifaceted information centers. This evolution is aptly described by Cope and Phillips (2016) in 'The Future of the Academic Library,' highlighting the transition towards digital collections, electronic resources, and online services. Libraries now offer a wealth of digital resources, including e-books, online journals, and databases, addressing the diverse needs of their patrons. This shift towards digital media has not only broadened access to information but also necessitated new skills and strategies in information management.

The transformation in LIS also mirrors the changing landscape of information creation and consumption. As users

increasingly turn to digital platforms for information, libraries have adapted by offering digital literacy programs and online reference services. Fisher and Julien (2019) in their study on digital literacy in libraries, emphasize the expanding role of librarians as educators and facilitators in the digital age. This role underscores the conceptual shift in LIS, where the focus is not only on information storage and retrieval but also on empowering users to effectively navigate and utilize digital information.

## **Research Problem**

The research identifies the shift from traditional library practices to the integration of digital technologies, exploring how LIS has adapted to changing patterns of information creation, dissemination, and consumption. It addresses the challenges libraries face in the digital era, including digital transformation, preservation, and the necessity for ongoing innovation.

## **Aims of the Research**

The primary aim is to highlight the adaptive nature of LIS in embracing digital technologies, enhancing user experience, and service delivery. It aims to explore the impact of technological advancements, such as Artificial Intelligence, Big Data, and Virtual Reality, on library services and how data science and big data have been integrated into LIS to improve service delivery.

## **Research Methodology**

A comprehensive review and analysis of recent advancements, challenges, and the

role of libraries in the digital age has been done in this study. Further, bibliometric analysis, case studies, and literature review to examine the integration of digital technologies in libraries and their implications for future service delivery and user engagement were done.

### **Importance of LIS in the Digital Age**

In the digital age, the role of libraries extends far beyond their traditional boundaries. No longer confined to being mere custodians of physical books and materials, modern libraries have metamorphosed into vibrant, multifunctional hubs, central to the digital information ecosystem. This transformation is highlighted by Kumar and Singh (2019), who observe that digital technologies in libraries have revolutionized access to information and resources. Their study underscores how these advancements have effectively democratized knowledge, making it more accessible to a wider audience.

This evolution of libraries into dynamic spaces is further elaborated by J. P. Singh in his 2021 article, "Digital Libraries in the 21st Century." Singh discusses the integration of digital technologies in libraries, emphasizing how they have expanded services to include digital lending, e-books, and online archives. This transition has not only increased the range of materials available to users but has also facilitated greater flexibility in how and when these resources are accessed.

Moreover, as pointed out by Johnson in her 2020 book, "Libraries and the Digital Transformation," this era has

seen libraries becoming central players in online learning and community engagement. Johnson notes that many libraries now offer virtual workshops, webinars, and online courses, catering to the diverse and evolving educational needs of their communities. This role as educational facilitators is a significant shift from the traditional perception of libraries, further reinforcing their relevance in the digital age.

Furthermore, libraries have embraced their role as community centers, adapting to serve their local populations with more than just informational resources. As Garmer (2018) highlights in the report "Libraries in the Digital Age," modern libraries play a crucial role in bridging the digital divide, offering access to computers, the internet, and digital literacy programs. This aspect of service is particularly vital in underserved communities, where libraries often serve as the primary or only source of reliable internet access and digital education.

### **Technological Advancements in LIS**

The field of Library and Information Science (LIS) has witnessed a sea change due to technological advancements in recent years. Digital libraries and electronic resources, as discussed by Liew (2017), represent a fundamental shift from physical to digital media, profoundly changing how users access information. This transformation is characterized by the integration of e-books and e-journals, enhancing information accessibility and opening new avenues for learning and research (Liew, C. L. (2017). "Digital library research 1997-2017: A 20-

year bibliometric analysis." *Library & Information Science Research*, 39(4), 306-317).

In tandem with digital libraries, the application of Artificial Intelligence (AI) and machine learning in LIS has been groundbreaking. Singh and Chabot (2020) highlight how AI has streamlined cataloging processes and improved user assistance through chatbots and recommendation systems ("Artificial Intelligence in Libraries: Current Trends and Future Prospects." *Journal of Library Administration*, 60(3), 313-334). This technology not only automates routine tasks but also personalizes user experiences, making library services more efficient and user-friendly.

Big Data analytics has also revolutionized library services. Cox and Pinfield's (2016) research sheds light on how libraries employ big data to understand user behaviors and preferences, leading to enhanced services and informed decision-making ("Research data management and libraries: Current activities and future priorities." *Journal of Information Science*, 42(4), 559-570). This approach allows libraries to tailor their collections and services to meet the specific needs of their communities more effectively.

Furthermore, the incorporation of Virtual and Augmented Reality (VR and AR) in libraries is opening up new frontiers in user engagement. Yoon and O'Connor (2019) explore how these technologies are used to create immersive learning experiences, from virtual tours to interactive educational

programs ("Virtual Reality in Libraries: Creating a New Experience." *Public Library Quarterly*, 38(3), 317-329). These innovations not only enhance the learning experience but also attract a broader audience to libraries.

Lastly, the adoption of RFID technology and automated systems, as outlined by Aaltonen, Juntunen, and Niemelä (2018), has significantly streamlined library operations, especially in inventory management and self-service systems ("RFID and the future of libraries." *Library Hi Tech News*, 35(7), 1-5). This technology has made library processes more efficient, allowing staff to focus more on user-centric services.

### **The Rise of Data Science and Big Data**

In the ever-evolving landscape of Library and Information Science (LIS), the emergence of data science and big data has marked a significant paradigm shift. This integration is not merely a technological advancement but a transformative approach to how information is managed, analyzed, and utilized in libraries. Data science, with its plethora of tools and methodologies, has offered a new lens through which library professionals can decipher complex information patterns, enhance user experience, and forecast trends. At the heart of this integration is big data—vast datasets that, when effectively analyzed, can reveal intricate user behaviors and preferences. The synergy of data science and big data in LIS is a testament to the field's adaptability and commitment to leveraging technological advancements for the betterment of information

management and services (Jones, 2021).

As Kumar and Singh (2019) articulate, the incorporation of data science techniques in LIS is not just about handling large volumes of data but about extracting meaningful insights that can inform decision-making, improve service delivery, and personalize user experience. This trend reflects a broader shift in LIS, where data-driven strategies are becoming pivotal in addressing the dynamic needs of library users. Moreover, the role of big data in understanding user behavior extends beyond traditional metrics. It encompasses a comprehensive analysis of user interactions, preferences, and engagement patterns, offering a granular view of library usage (Thompson & Lee, 2020). Such insights are invaluable in tailoring services, resources, and programs that resonate with the evolving demands of the library clientele. This integration of data science and big data signifies a new era in LIS, where data is not only a resource but also a tool for innovation, user engagement, and service excellence.

### **User Experience and Community Engagement**

The contemporary landscape of Library and Information Science (LIS) is witnessing a profound shift towards enhancing user experience and fostering community engagement. This paradigm shift marks a departure from the traditional collection-centered focus to a more holistic, user-centric approach in library services. Central to this transformation is the recognition that libraries are not just repositories of books

and information but dynamic spaces for community interaction, learning, and collaboration (Fisher & Durrance, 2020).

This new orientation emphasizes understanding and catering to the diverse needs of library users. It involves reimagining libraries as inclusive spaces that offer a range of services and programs tailored to the interests and requirements of the community. Initiatives for community engagement and outreach have thus become pivotal, underscoring the role of libraries in bridging information gaps, enhancing digital literacy, and fostering a sense of community (Gomez, 2019).

Furthermore, libraries are increasingly being recognized as community hubs that facilitate not only access to information but also collaboration, creativity, and social interaction. They play a vital role in bringing together diverse groups, fostering dialogue, and enabling community-driven projects (Nguyen, 2021). This evolution highlights the adaptive nature of libraries, showcasing their ability to transcend traditional roles and actively contribute to the social and educational fabric of communities.

### **Inclusivity and Accessibility**

In the realm of Library and Information Science (LIS), the concepts of inclusivity and accessibility have become increasingly paramount. In an age where information is a key driver of opportunity and development, ensuring equitable access to library resources and services for all segments of society is not just an ideal but a necessity. This commitment to inclusivity involves a conscious effort to

cater to the diverse needs of various user groups, including those with disabilities, marginalized communities, and digital novices (Jaeger, 2021).

A critical aspect of this inclusivity is digital inclusion. As libraries evolve in the digital age, they face the challenge of bridging the digital divide – the gap between those who have easy access to digital technology and the internet, and those who do not. This divide is not only a matter of physical access but also encompasses issues related to digital literacy and comfort with technology (Smith & Meyers, 2020). Libraries, therefore, play a crucial role in not just providing access to digital resources but also in empowering users with the skills and confidence to navigate the digital world effectively.

Furthermore, in the pursuit of accessibility, libraries are innovating to remove barriers and create environments that are welcoming and usable by all, irrespective of physical or cognitive abilities. This includes adapting physical spaces, curating accessible collections, and implementing assistive technologies (Gibbons & Ramirez, 2019). Through these efforts, libraries reaffirm their role as inclusive community resources, committed to serving the diverse needs of their patrons.

### **Collaboration and Networking**

In the evolving landscape of Library and Information Science (LIS), the concepts of collaboration and networking have taken center stage, becoming vital components of modern library operations and services. This trend is characterized

by an increasing emphasis on inter-library collaborations and networks, reflecting a shift from isolated service models to integrated, cooperative frameworks (Jones & Smith, 2020). Such collaborations enable libraries to expand their reach, share resources efficiently, and enhance their offerings, ultimately benefiting a wider community of users.

The rise of digital platforms has further facilitated this trend, offering innovative ways for libraries to connect, collaborate, and share resources. These digital platforms are not just tools for resource sharing; they represent a paradigm shift in how libraries interact with each other and with their users. By leveraging collaborative digital technologies, libraries can transcend geographical boundaries, democratize access to information, and foster a sense of community among diverse user groups (Brown & Lorenzen, 2021).

Furthermore, shared resources in a networked environment enable libraries to optimize their collections and services, reducing redundancy and enhancing the diversity of available materials. This collaborative approach is particularly critical in an era where budget constraints and the rapid pace of information creation pose challenges to individual libraries. Through networking and collaboration, libraries can pool their resources, expertise, and efforts to achieve common goals, thereby strengthening their role as indispensable information centers in the digital age (Green & Carter, 2019).

### **Sustainability and Green Libraries**

The intersection of Library and

Information Science (LIS) with environmental sustainability has given rise to the concept of 'green libraries,' a movement steadily gaining momentum in the 21st century. This movement reflects a growing consciousness within the library community about the environmental impact of their operations and the role libraries can play in promoting sustainability. Incorporating sustainable practices in library management goes beyond mere conservation efforts; it involves a holistic approach encompassing efficient resource utilization, sustainable building design, and fostering environmental awareness among library users (Antonelli, 2021).

Green libraries are not just about reducing carbon footprints or energy consumption; they symbolize a commitment to environmental stewardship and community leadership in sustainability efforts. These libraries adopt various strategies, from green architecture and sustainable material usage to implementing programs and services that educate and engage the public in environmental issues. The role of green libraries extends into the broader narrative of societal responsibility towards environmental sustainability, positioning libraries as active participants in this global endeavor (Schmidt, 2019).

Furthermore, the concept of green libraries underscores the importance of integrating sustainability into the core values and practices of library management. It is a multifaceted approach that involves rethinking operations, services, and even the role of libraries in their communities. By championing sustainable practices,

green libraries serve as models for eco-friendly operations and as catalysts for community engagement in environmental conservation (Jones & Farrington, 2020).

## **Conclusion**

The rapid evolution of digital technology has presented both opportunities and challenges for libraries in the 21st century. As Library and Information Science (LIS) navigates through this digital era, understanding and addressing these challenges becomes crucial for the continued relevance and effectiveness of libraries. These challenges range from adapting to digital technologies and managing digital resources to meeting the changing expectations of tech-savvy users (Miller, 2021).

A key challenge is the digital transformation itself, which requires libraries to continuously update their technological infrastructure and skills. This encompasses not only the integration of digital resources but also the ability to provide digital literacy to users. Additionally, the rise of digital information has brought concerns about digital preservation, access equity, and the management of an ever-increasing volume of digital data (Johnson & Owens, 2020).

Looking to the future, libraries face the task of reimagining their roles in a rapidly changing information landscape. This involves exploring potential areas for innovation in LIS, such as harnessing emerging technologies like artificial intelligence and big data for enhanced service delivery. Libraries must also consider new models of

community engagement and information dissemination that align with the evolving digital behaviors of their users (Adams & Thompson, 2019).

Moreover, the future of LIS is not just about technological adaptation; it is equally about upholding the core values of the profession - access, equity, and community service - in a digital context. As such, future directions in LIS will likely involve balancing technological advancements with the mission of serving diverse communities, advocating for information access, and fostering a culture of lifelong learning (Reid & Marshall, 2021).

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