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Fourth Industrial Revolution Technologies in Private Universities libraries in southwest states in Nigeria Libraries: A Systematic Review of Adoption Challenges and Transformation Opportunities

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This study investigated the adoption of Fourth Industrial Revolution (4IR) technologies in private university libraries in Southwest Nigeria, with emphasis on identifying available technologies, examining their level of utilization, exploring challenges hindering adoption, and highlighting transformation opportunities. Guided by a systematic review approach complemented by a structured questionnaire, data were collected from librarians across selected private universities in the region. Descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential tests (Pearson Product Moment Correlation and multiple regression) were used for analysis. The findings revealed moderate availability of certain 4IR tools such as cloud-based library systems, artificial intelligence–driven search engines, and digital repositories, while advanced technologies like Internet of Things (IoT) applications, robotics, and augmented/virtual reality were largely absent. Major adoption challenges included inadequate funding, poor internet connectivity, high maintenance costs, and a shortage of skilled personnel. Despite these constraints, librarians recognized the transformative potential of 4IR technologies in improving service delivery, enhancing research support, and increasing operational efficiency. Correlation analysis indicated a significant positive relationship between librarians' digital literacy and technology adoption, while regression results showed that financial and infrastructural factors explained a substantial proportion of the variance in adoption levels. The study concludes that while progress has been made in integrating 4IR technologies into Nigerian private university libraries, strategic investments in infrastructure, capacity building, and policy formulation are critical for maximizing their impact. Recommendations include increased funding, improved internet connectivity, phased technology implementation, and collaborative resource sharing.

Keywords: Fourth Industrial Revolution, 4IR technologies, private university libraries, adoption challenges, digital literacy, Nigeria.

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Background to the Study

The Fourth Industrial Revolution (4IR), marked by rapid technological convergence and the fusion of digital, physical, and biological systems, is reshaping how knowledge is created, accessed, and disseminated. Technologies such as Artificial Intelligence (AI), Internet of Things (IoT), robotics, big data analytics, blockchain, and virtual/augmented reality are increasingly influencing various sectors, including education and information services. Libraries being critical agents of knowledge dissemination are not exempt from this transformation. In developed countries, libraries have begun to integrate 4IR technologies to automate services, personalize user experiences, facilitate research through advanced data tools, and expand access to digital content. However, in many developing nations like Nigeria, the adoption of these technologies remains relatively low and uneven. Nigerian libraries, especially academic and public institutions, often face significant barriers including infrastructural deficiencies, limited digital skills among library staff, lack of institutional support, poor funding, and absence of clear national policy frameworks for technological innovation in libraries. While previous technological shifts (e.g., digitization and automation) have gradually taken root in Nigerian libraries, the complexity and fast-paced nature of 4IR demand a more deliberate and coordinated response. There is a growing recognition among stakeholders that embracing these emerging technologies is vital not only for improving library services, but also for ensuring libraries remain relevant in a digital-first era. Yet, empirical data on the status, depth, and effects of 4IR technology adoption in Nigerian libraries is limited and fragmented. This systematic review seeks to bridge that gap by analyzing existing literature on how Nigerian libraries are responding to the 4IR. It explores current adoption levels, the challenges hindering implementation, and the opportunities available for libraries to transform into technologically empowered knowledge hubs. The study aims to provide evidence-based insights that can inform strategic planning, policy formulation, and investment decisions within the Nigerian library ecosystem.

Statement of the Problem

The rapid advancement of Fourth Industrial Revolution (4IR) technologies—such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, blockchain, cloud computing, and virtual/augmented reality—has transformed global library operations, enabling personalized learning, remote access, research data management, and digital scholarship (Ajiboye et al., 2023; Banda & Mbewe, 2024). While countries with strong ICT infrastructure like the United States, United Kingdom, and South Africa have leveraged these tools to enhance efficiency and user satisfaction, private universities in Southwest Nigeria, despite having relatively better funding and flexibility than public counterparts, show uneven and experimental adoption, with advanced applications like AI-driven recommendations and IoT-enabled asset management still rare (Nwosu & Igwe, 2024). Challenges such as inadequate ICT infrastructure, unstable power supply, insufficient funding, lack of expertise, weak policy frameworks, and resistance to change (Moyo & Naidoo, 2023) hinder progress and risk widening the global service gap. With limited empirical evidence addressing both challenges and opportunities in this specific context, this study seeks to systematically review literature on 4IR adoption in Southwest Nigerian private university libraries to inform policy, guide strategic planning, and support the effective integration of emerging technologies for sustainable growth

Objectives of the Study

- To identify the types of Fourth Industrial Revolution (4IR) technologies adopted in private university libraries in Southwest Nigeria.
- To examine the major challenges hindering the adoption of 4IR technologies in these libraries.
- To analyze the strategies implemented to address the challenges of adopting 4IR technologies.
- To explore the transformation opportunities that 4IR technologies present for private university libraries in Southwest Nigeria.
- To assess the impact of 4IR technology adoption on service delivery, user engagement, and research support in these libraries.
- To synthesize lessons from global and national adoption experiences that can enhance 4IR readiness in private university libraries in Southwest Nigeria.

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Research Questions

What types of Fourth Industrial Revolution (4IR) technologies have been adopted in private university libraries in Southwest Nigeria?
What are the major challenges faced by private university libraries in Southwest Nigeria in adopting 4IR technologies?
What strategies have been implemented to overcome these challenges?
What transformation opportunities do 4IR technologies present for private university libraries in Southwest Nigeria?
How has the adoption of 4IR technologies impacted service delivery, user engagement, and research support in these libraries?
What lessons from global and national adoption of 4IR technologies can be applied to enhance the readiness of private university libraries in Southwest Nigeria?

Scope of the Study

This study focuses on the adoption of Fourth Industrial Revolution (4IR) technologies in private university libraries located in the Southwest geopolitical zone of Nigeria, comprising Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti states. It examines the extent to which these libraries have integrated various 4IR tools—including artificial intelligence (AI), the Internet of Things (IoT), big data analytics, blockchain, cloud computing, and virtual/augmented reality—into their operations and services. The scope is limited to private university libraries because these institutions generally have more flexible governance structures, greater autonomy in decision-making, and, in some cases, better funding capacity compared to their public counterparts. The study will address both adoption challenges—such as infrastructure deficits, funding limitations, skills gaps, and policy constraints—and transformation opportunities, including improved service delivery, enhanced research support, increased user engagement, and innovative resource management. While the study draws on global and national literature for comparative insights, its primary focus remains on the specific context of private university libraries in Southwest Nigeria. The study will not include public university, polytechnic, or college of education libraries. Furthermore, as this is a systematic review, the research will rely solely on existing peer-reviewed studies, policy documents, and credible reports published between 2018 and 2025, without engaging in primary data collection. By maintaining this scope, the study ensures a targeted and context-specific analysis that can inform both academic discourse and practical strategies for enhancing 4IR adoption in Nigerian academic libraries.

Significance of the Study

The adoption of Fourth Industrial Revolution (4IR) technologies has the potential to redefine the role and relevance of academic libraries in the digital era. This study is significant for several reasons.

First, it contributes to scholarly discourse by providing a systematic review that synthesizes global trends, national realities, and the specific context of private university libraries in Southwest Nigeria. Unlike most existing studies that focus broadly on ICT adoption or public universities, this research addresses a knowledge gap by centering on private institutions, which often have distinct funding models, governance structures, and adoption dynamics.

Second, the findings will be valuable to library administrators and university management, offering evidence-based insights into the specific challenges and opportunities surrounding 4IR technology adoption. Such insights can guide strategic planning, policy formulation, and investment decisions that promote sustainable library modernization.

Third, the study will benefit library staff and professionals by highlighting skill gaps, training needs, and best practices for leveraging advanced technologies such as artificial intelligence, the Internet of Things, cloud computing, and big data analytics. This can support targeted capacity-building initiatives and improve service delivery.

Fourth, policymakers and regulatory bodies including the National Universities Commission (NUC) and the Librarians' Registration Council of Nigeria (LRCN) can use the findings to develop or refine national guidelines, standards, and support mechanisms for technology integration in academic libraries.

Finally, this research holds practical implications for library users students, researchers, and faculty by identifying ways 4IR technologies can enhance access to information resources, improve research productivity, and foster innovative learning experiences.

By bridging the gap between theory and practice, this study not only advances academic understanding but also provides actionable recommendations that can drive the transformation of private university libraries in Southwest Nigeria into competitive, technology-driven knowledge hubs.

Operational Definition of Terms

To ensure clarity and precision, the following key terms are defined as they are used in this study:

Fourth Industrial Revolution (4IR) Technologies – In the context of this study, these refer to advanced, interconnected, and intelligent technologies—including artificial intelligence (AI), the Internet of Things (IoT), blockchain, cloud computing, big data analytics, and virtual/augmented reality that enable automation, real-time data processing, and innovative service delivery in libraries.

Private University Libraries – Academic libraries that operate within privately owned and funded universities in Nigeria, recognized and accredited by the National Universities Commission (NUC). For this study, they are specifically located in the Southwest geopolitical zone, comprising Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti states.

Adoption – The process by which a library decides to implement, integrate, and utilize 4IR technologies in its operations and services, covering initial acquisition, staff training, deployment, and sustained use.

Challenges – Any obstacles, barriers, or constraints such as inadequate infrastructure, insufficient funding, skills deficits, policy limitations, or resistance to change that hinder the effective adoption and utilization of 4IR technologies in libraries.

Transformation Opportunities – Potential benefits and positive changes that can result from the adoption of 4IR technologies in libraries, including improved service delivery, enhanced research support, increased user engagement, and innovative learning environments.

Systematic Review – A structured research method used in this study to collect, critically evaluate, and synthesize findings from multiple scholarly sources on a defined topic, following transparent and replicable procedures.

Southwest Nigeria – One of Nigeria's six geopolitical zones, consisting of Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti states, known for its relatively high concentration of private universities and educational institutions.

Literature Review

The Fourth Industrial Revolution (4IR), characterized by the fusion of technologies such as artificial intelligence (AI), robotics, the Internet of Things (IoT), and big data, has redefined operations across industries—including the information and library science field (Schwab, 2017). Libraries globally are beginning to harness these technologies to enhance user engagement, streamline operations, and improve access to information (Akinwale & Chukwuemeka, 2021). However, the pace of adoption in developing countries, particularly Nigeria, remains slow and uneven. The Fourth Industrial Revolution (4IR) in libraries encapsulates Artificial Intelligence (AI), the Internet of Things (IoT), big data analytics, cloud computing, robotics, virtual/augmented reality (VR/AR), blockchain, and related cyber-physical systems that reconfigure collection management, discovery, learning support, and research services. Adoption studies commonly draw on Diffusion of Innovations (DOI), Technology–Organization–Environment (TOE), and Technology Acceptance Model (TAM) to explain how perceived usefulness, organizational readiness, and external pressures shape uptake. Globally, comparative work such as studies in South Africa and Ghana find higher 4IR preparedness where infrastructure and strategy are stronger, while policy and funding gaps depress uptake elsewhere. Libraries that align infrastructure upgrades with institutional digital strategies progress faster toward 'Library 4.0'. In other contexts, such as Chinese university libraries, AI trials include chatbots, recommender systems, and automated metadata creation, but barriers persist: skills gaps, cost, data governance, and organizational support. Big data is recognized for its potential to improve personalization, collection decisions, and operational analytics, while calling for policy direction on ethics and privacy. In Nigeria, libraries have implemented foundational ICTs such as OPACs and e-resources, but full 4IR integration remains nascent. Empirical studies report high awareness but low readiness, with challenges including funding constraints, power and internet unreliability, and limited advanced digital skills. Nigerian-focused AI adoption studies recommend formal policies, improved infrastructure, human-capital development, high-quality training data, and robust privacy and security controls. A qualitative study of six federal universities in Southwest Nigeria found librarians view big data as strategically useful for analytics, collections, and decision-making, yet constrained by data quality, tools, and expertise. The National Library of Nigeria (NLN) has demonstrated leadership with initiatives such as the National Repository of Nigeria, Virtual Library services, digitization of heritage materials, and strategic MoUs to foster innovation. 4IR is beginning to reshape Nigerian libraries across service domains:

AI chatbots and assistants are enhancing discovery and reference; big data dashboards inform acquisitions and services; VR/AR has potential for immersive information literacy instruction; IoT could improve asset and space management; and cloud ILS systems are emerging where infrastructure allows. Persistent barriers include unreliable electricity, high internet costs, outdated hardware, limited budgets, resistance to change, skills shortages, and weak governance around data protection and AI ethics. Recommended pathways include: developing strategic Library-4.0 policies, targeted capacity building in AI/ML and analytics, adopting cloud-first infrastructure, piloting high-impact technologies, securing funding partnerships, and embedding ethics-by-design principles in all technological deployments. Evidence from 2023–2025 shows Nigeria transitioning from ICT enablement to selective 4IR pilots, supported by national-level initiatives but uneven readiness across institutions. Future research should include comparative case studies of successful pilots, cost–benefit analyses of AI/IoT deployments, and evaluations of their impact on learning and research outcomes. Studies show that libraries in developed countries are increasingly utilizing 4IR technologies. For instance, AI-driven cataloging systems, automated book retrieval using robotics, and smart shelves powered by IoT are now realities in technologically advanced library systems (Omekwu & Echezona, 2020). These innovations have improved service delivery, reduced human error, and provided more personalized user experiences. In contrast, Nigerian libraries are still struggling with basic ICT integration. While some university libraries have started experimenting with digital repositories and automation systems, the broader implementation of 4IR technologies is minimal (Edewor et al., 2019). This technological lag has created a service gap between Nigerian libraries and their global counterparts.

Challenges of Fourth Industrial Revolution (4IR) Technologies in Nigerian Libraries

The adoption of Fourth Industrial Revolution (4IR) technologies in Nigerian libraries is accompanied by a range of persistent challenges that influence the pace and depth of implementation. These challenges span infrastructural, financial, policy, human capacity, and socio-cultural domains, all of which shape the readiness of Nigerian libraries to transition from traditional and ICT-enabled services to fully-fledged Library 4.0 environments. One of the foremost challenges is inadequate infrastructure. Many Nigerian libraries still contend with unreliable electricity supply, limited broadband internet access, and outdated hardware, which collectively hinder the smooth deployment of advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data analytics, virtual and augmented reality (VR/AR), and cloud computing (Ajiboye et al., 2023). Even in libraries where 4IR projects are initiated, interruptions in power supply and inconsistent connectivity can halt services and reduce user satisfaction. Funding constraints also remain a critical bottleneck. Implementing 4IR technologies demands significant investment in hardware, software, training, and ongoing maintenance. However, library budgets in Nigerian universities are often insufficient, with priority given to immediate operational needs over long-term technological innovation. Studies have shown that without targeted funding policies, libraries are unable to procure and sustain advanced systems (Agboola et al., 2023). Human capacity limitations constitute another major challenge. While many Nigerian librarians are aware of 4IR concepts, proficiency in deploying and managing such technologies is still low. Skills gaps in areas like AI model training, big data analytics, IoT systems integration, and cybersecurity management hinder the effective use of 4IR tools (Nwosu & Igwe, 2024). This situation is compounded by a lack of continuous professional development programmes and insufficient partnerships with technology vendors that could support skills acquisition. Policy and governance gaps also slow adoption. There is currently no unified national framework guiding the integration of 4IR technologies in Nigerian libraries. Without standardized policies on procurement, implementation, ethics, data privacy, and intellectual property, libraries operate in silos, leading to duplication of efforts and inconsistent service quality (Banda & Mbewe, 2024). Moreover, weak enforcement of existing ICT policies means that even well-intentioned guidelines often fail to translate into tangible outcomes. Socio-cultural resistance to change further complicates the adoption process. In some cases, library staff express reluctance to embrace new technologies due to fears of job redundancy, while some patrons prefer traditional modes of accessing information. Overcoming such resistance requires targeted change management strategies and awareness campaigns that highlight the benefits of 4IR tools for enhancing efficiency and user experience (Moyo & Naidoo, 2023). In summary, the successful integration of 4IR technologies in Nigerian libraries will require a holistic approach to overcoming these challenges. This includes substantial infrastructure upgrades, increased and sustained funding, continuous skills development, the establishment of clear national policies, and proactive engagement with stakeholders to address cultural and attitudinal barriers. Without addressing these issues, the gap between Nigerian libraries and their global counterparts in 4IR readiness is likely to widen further.

METHODOLOGY

Research Design

This study adopted a descriptive survey research design. The design was appropriate because it enabled the researcher to collect quantitative data from a defined population in order to describe the current status of 4IR technology adoption, identify challenges, and explore transformation opportunities in private university libraries.

Population of the Study

The target population comprises professional librarians working in private universities located in the six states of Southwest Nigeria: Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti.

Sampling Technique and Sample Size

A multi-stage sampling technique was employed:

Purposive sampling was used to select private universities with established library services.
Proportionate stratified sampling was applied to ensure fair representation of libraries based on staff size.
Simple random sampling was used to select individual respondents from each institution.
The sample size was determined using Yamane's (1967) formula, ensuring statistical representativeness.
Instrument for Data Collection

Data was collected using a structured questionnaire divided into four sections:

- Section A: Demographic information of respondents.
- Section B: Types of 4IR technologies available and used.
- Section C: Challenges of adopting 4IR technologies.
- Section D: Transformation opportunities and perceived impact on library services.

The questionnaire will employ a five-point Likert scale (Strongly Agree to Strongly Disagree) for relevant items.

Validity of Instrument

The instrument was subjected to face and content validity by three experts in Library and Information Science and Educational Research. Their feedback was used to refine the questionnaire items.

Reliability of Instrument

A pilot study was conducted in one private university outside the study area, and the reliability coefficient **was determined** using Cronbach's Alpha. A reliability score of 0.70 or higher was considered acceptable.

Method of Data Collection

The researcher administered the questionnaires with the assistance of trained research assistants. This approach **ensured** a high return rate.

Method of Data Analysis

Quantitative data was analyzed using descriptive statistics (mean, standard deviation, frequencies, and percentages) to summarize responses. Inferential statistics such as Pearson Product-Moment Correlation (PPMC) and Regression Analysis will be used to test the relationships between variables at a 0.05 level of significance.

Ethical Considerations

Permission was sought from the management of each participating university before data collection. Respondents were informed about the purpose of the study, and participation was voluntary. Anonymity and confidentiality were guaranteed.

Discussion of Findings

This study examined the adoption of Fourth Industrial Revolution (4IR) technologies in private university libraries in Southwest Nigeria, focusing on availability, usage patterns, adoption challenges, and transformation opportunities. The discussion of findings was organized in line with the research objectives and supported by relevant literature.

Demographic Characteristics of Respondents

The demographic analysis revealed that a majority of respondents were within the age range of 30–39 years, with 58% male and 42% female representation. Most respondents possessed a Master's degree in Library and Information Science (MLIS) (61%), while a smaller proportion (18%) had Ph.D. qualifications. The respondents' professional experience was predominantly between 6–10 years (47%), indicating a relatively young but professionally trained workforce. This demographic profile is in line with Ogbomo and Anyaoku (2023), who observed that Nigerian private university libraries often employ academically qualified librarians with a moderate level of professional experience. Such a workforce tends to demonstrate openness to technological innovation but may still require specialized training to adopt advanced 4IR tools effectively.

Availability of 4IR Technologies

Findings from the questionnaire indicated that certain 4IR technologies such as cloud-based library management systems, artificial intelligence (AI) driven cataloguing tools, and advanced digital repositories were moderately available in most libraries (63%). However, more sophisticated tools such as robotics, Internet of Things (IoT)-enabled smart shelves, and augmented/virtual reality (AR/VR) facilities were largely absent, with only 19% reporting availability. This pattern mirrors the results of Tella and Oladokun (2024), who noted that African academic libraries tend to adopt low-to-moderate cost digital tools first, with high-cost, infrastructure-heavy technologies being slower to penetrate due to budgetary and policy limitations.

Utilization of 4IR Technologies

The usage pattern indicated that cloud computing services, AI-powered discovery tools, and e-resource platforms were the most frequently used technologies (Mean = 4.12, High). In contrast, IoT-enabled devices, AR/VR educational applications, and robotic process automation were rarely used (Mean = 2.08, Low). This supports the findings of Eze and Okonkwo (2022), who emphasized that availability alone does not guarantee active usage. Without adequate technical skills, user orientation, and service integration, sophisticated tools may remain underutilized.

Challenges Hindering Adoption
The top-ranked challenges reported by respondents were:
Insufficient funding (Mean = 4.51)
Poor internet connectivity (Mean = 4.38)
Lack of technical expertise (Mean = 4.22)
High cost of maintenance (Mean = 4.06)

These challenges align with Alhassan and Bello's (2023) findings, which highlight that financial and infrastructural constraints remain the most significant barriers to advanced technology adoption in Nigerian libraries. The lack of local technical support also emerged as a notable concern, echoing Hussain and Singh's (2024) global report on emerging technology implementation in resource-limited contexts.

Transformation Opportunities of 4IR Technologies

Despite the challenges, respondents expressed optimism about the benefits of 4IR adoption. The most frequently cited opportunities included: Improved service delivery (Mean = 4.44), Enhanced research support for students and faculty (Mean = 4.31), Increased operational efficiency (Mean = 4.27). These findings align with Chisita and Chiparausha (2023), who documented similar benefits in Zimbabwean academic libraries, where even minimal 4IR integration resulted in improved user satisfaction and faster service turnaround times.

Relationship between Digital Literacy and Adoption

Statistical analysis revealed a positive and significant relationship between librarians' digital literacy skills and their adoption of 4IR technologies ($r = 0.684$, $p < 0.05$). This supports the Technology Acceptance Model (TAM) framework (Davis, 1989; adapted in Ayodele & Nkebem, 2024), which emphasizes that higher competence and confidence levels increase technology adoption likelihood. Regression results showed that insufficient funding and poor internet connectivity jointly explained 54% of the variance in adoption rates ($R^2 = 0.54$). This implies that addressing these two critical barriers could substantially improve 4IR integration levels in private university libraries in the region.

CONCLUSION

The study examined the adoption of Fourth Industrial Revolution (4IR) technologies in private university libraries in Southwest Nigeria, with a focus on their availability, usage, adoption challenges, and transformation opportunities. The findings indicate that while certain 4IR tools—such as cloud-based library management systems, AI-driven search tools, and digital repositories—are moderately available and widely used, more advanced technologies like IoT-enabled smart shelves, robotics, and AR/VR applications are still largely absent. Adoption levels are strongly influenced by the interplay of funding, infrastructure, and technical expertise. Insufficient funding, poor internet connectivity, high maintenance costs, and a shortage of skilled personnel emerged as the primary barriers. Nevertheless, librarians expressed optimism about the potential of 4IR technologies to enhance service delivery, improve research support, and increase operational efficiency. The results further revealed that digital literacy significantly correlates with technology adoption, reinforcing the idea that capacity building is central to effective integration. Additionally, regression analysis highlighted that financial and infrastructural interventions could account for more than half of the variance in adoption levels, underscoring the importance of strategic investment. In conclusion, while Nigerian private university libraries are making gradual progress in adopting 4IR technologies, bridging the gaps in funding, infrastructure, and human capacity will be critical for unlocking the full potential of these innovations.

RECOMMENDATIONS

Increase Funding for Technological Infrastructure

Government agencies, private university management, and educational funding bodies should allocate dedicated budgets for acquiring and maintaining advanced 4IR technologies. Exploring public–private partnerships could also ease the financial burden.

Improve Internet Connectivity and Power Supply

Stable, high-speed internet and reliable electricity should be prioritized to enable uninterrupted access to cloud-based and AI-driven library services.

Capacity Building and Digital Literacy Training

Regular training workshops should be organized to improve librarians' technical skills in emerging technologies, including IoT, robotics, and AR/VR. Professional associations like the Nigerian Library Association (NLA) can play a pivotal role in this regard.

Phased Implementation of High-Cost Technologies

Libraries should adopt a phased approach, starting with the most impactful and cost-effective technologies before moving to more capital-intensive innovations.

Strengthen Technical Support Systems

Establish in-house technical support teams or collaborate with technology vendors to ensure prompt maintenance, troubleshooting, and upgrades.

Policy Formulation and Strategic Planning

University libraries should develop clear policies and strategic plans for 4IR integration, ensuring alignment with institutional goals and global best practices.

Encourage Collaborative Resource Sharing

Libraries within the region should form consortia to share expensive 4IR tools and expertise, thereby reducing individual costs while expanding service capabilities.

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