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KNOWLEDGE MANAGEMENT IN THE 5TH INDUSTRIAL REVOLUTION BY LIBRARIANS IN GOVERNMENT-OWNED UNIVERSITY LIBRARIES IN SOUTH-EAST, NIGERIA

Ngozi Ogechukwu Nwogwugwu, PhD, CLN
Confucius Institute Library, Nnamdi Azikiwe University, Awka
Anambra State, Nigeria

Angela Njideka Anike, PhD, CLN
Festus Aghagbo Nwako Library, Nnamdi Azikiwe University, Awka
Anambra State, Nigeria

Blessing Nnenna Otubelu, PhD, CLN
Festus Aghagbo Nwako Library, Nnamdi Azikiwe University, Awka
Anambra State, Nigeria

Abstract
This paper examined knowledge management in the 5th industrial revolutionand the role of knowledge management (KM) in aligning library services in government-owned university libraries in Southeast Nigeria with 5IR goals. A descriptive survey research design was adopted for this study. Three research questions guided the study. The population comprised librarians in government-owned universities in Southeast Nigeria, with a sample size of 120 participants selected using a simple random sampling technique. Data was collected using a validated questionnaire titled "Questionnaire on Knowledge Management in the 5th Industrial Revolution by Librarians" (QKMIRL), and the instrument's reliability was established using Cronbach's alpha. An overall coefficient of 0.78 was obtained. Data were analyzed using mean and standard deviation. The findings revealed that while librarians demonstrated a moderate awareness and adoption of KM practices, their application remains limited due to insufficient infrastructure, inadequate funding, and lack of training. Challenges in integrating emerging technologies included poor internet access, outdated digital tools, and a lack of advanced technical skills. To enhance KM practices, the study recommended strategies such as regular capacity-building programs, increased investment in digital tools, and improved funding to support digital transformation in libraries.

Keywords: 5th Industrial revolution, Knowledge management, Librarians, University libraries, South-East, Nigeria

Introduction

University libraries have long occupied a central position in higher education, particularly within government-owned universities where they function as institutional memory, intellectual infrastructure, and engines of teaching, learning, and research. According to the International Federation of Library Associations and Institutions, university libraries are responsible for the curation, preservation, and dissemination of knowledge, as well as the promotion of information literacy and lifelong learning (IFLA, 2021). In government-owned universities, these responsibilities are magnified by increasing enrolments, diverse academic programmes, and public accountability, making libraries and librarians critical actors in national knowledge development.

In recent years, the operating environment of university libraries has been profoundly shaped by the emergence of the Fifth Industrial Revolution (5IR). Unlike earlier industrial revolutions, the 5IR emphasizes a human-centric approach to technological advancement, prioritizing collaboration between humans and intelligent systems to enhance societal well-being. Xu, David, and Kim (2018) describe the 5IR as a paradigm that integrates advanced technologies with human creativity, ethics, and sustainability. This shift has significant implications for government-owned university libraries, which must balance technological innovation with human expertise to remain relevant and responsive to academic needs.

Within this evolving context, librarians occupy a strategic position as both custodians and active managers of knowledge. The 5IR redefines librarians' roles beyond traditional information provision, positioning them as knowledge facilitators who must engage with emerging technologies while preserving the human elements of judgment, interpretation, and user support. Alhassan and Abdullahi (2022) observed that the 5IR influences library services through digital transformation, personalized information delivery, collaborative knowledge spaces, and advanced data management practices. These developments require librarians to rethink how knowledge is created, organized, shared, and utilized within university environments.

Knowledge management (KM) provides a critical framework for understanding how librarians navigate the demands of the 5IR. KM in university libraries involves the systematic processes of creating, capturing, organizing, sharing, and applying knowledge to support institutional goals (Enakrire, 2023). This includes managing both explicit knowledge embedded in information resources and tacit knowledge derived from the skills and experiences of librarians and users. Ayetigbo et al. (2023) emphasized that effective KM relies on dynamic interactions between people and technology, as illustrated in the SECI model of knowledge conversion, which remains relevant in academic library settings.

The relevance of KM becomes even more pronounced in government-owned university libraries in Southeast Nigeria, where librarians operate within resource-constrained environments while facing rising expectations for digital service delivery.

Although KM practices such as knowledge sharing, mentoring, and collaboration are evident, their formalization remains inconsistent (Igbinovia & Adetimirin, 2023; Enakrire, 2023). This gap limits the ability of libraries to fully leverage 5IR technologies such as artificial intelligence, big data analytics, and networked systems for sustainable knowledge services.

Moreover, while emerging technologies present opportunities to enhance KM processes, their adoption in Nigerian university libraries has been uneven. Studies indicate that librarians demonstrate awareness of new technologies but face challenges related to infrastructure, funding, skills development, and institutional support (Ekwueme, 2023; Abasi & Oladokun, 2024). Organizational factors, including communication gaps and limited collaboration, further constrain effective knowledge sharing (Ilechukwu, Chinenze & Okeke, 2023). Consequently, the human–technology synergy that defines the 5IR has yet to be fully realized in many government-owned university libraries.

Globally, evidence suggests that advanced technologies significantly enhance KM outcomes in academic libraries by improving knowledge storage, retrieval, and dissemination (Edeh et al., 2020). However, most existing studies in Nigeria focus largely on KM within the framework of the Fourth Industrial Revolution, emphasizing digitization rather than the human-centred integration that characterizes the 5IR (Igbinovia & Adetimirin, 2023; Enakrire, 2023). This creates a gap in understanding how librarians in government-owned universities adapt KM practices to the distinctive demands of the 5IR.

Addressing this gap is essential for strengthening library services, supporting academic excellence, and ensuring that university libraries remain effective knowledge hubs in an increasingly complex technological landscape.

Globally, evidence suggests that advanced technologies significantly enhance knowledge management (KM) outcomes in academic libraries by improving knowledge storage, retrieval, and dissemination (Edeh et al., 2020). Empirical studies from Nigeria further show that librarians in government-owned university libraries already engage in a range of KM practices, although these practices are largely rooted in conventional and digitization-focused approaches. For instance, Onwuchekwa and Esew (2022) found that librarians actively employ strategies such as digital repositories, cataloguing, indexing, and metadata management to enhance access to scholarly resources. Similarly, Ogbomo and Muokebe (2021) reported increased use of digital tools and library automation systems for organizing and managing information resources, while Igbinovia and Adetimirin (2023) observed widespread adoption of standard cataloguing and classification rules that promote effective knowledge organization in Nigerian university libraries.

These findings indicate that foundational KM practices are well established, yet they remain largely aligned with the Fourth Industrial Revolution's emphasis on digitization rather than the deeper human–technology integration envisioned under the Fifth Industrial Revolution (5IR) these empirical insights reveal a clear disconnect between existing KM practices in government-owned university libraries and the demands of the Fifth Industrial

Revolution. While librarians demonstrate commitment to traditional and digitized KM strategies, gaps persist in advanced technological integration, skills development, and the effective blending of human expertise with intelligent systems. It is this mismatchbetween awareness and application, potential and practicethat motivated the researcher to embark on this study.

Statement of the Problem

In an ideal setting, knowledge management (KM) in university libraries should be a seamless process where librarians effectively harness advanced technologies to acquire, store, share, and utilize knowledge efficiently. With the advent of the Fifth Industrial Revolution (5IR), the integration of artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and human expertise should drive knowledge innovation and improved library services. Globally, libraries in advanced economies have adopted smart systems for real-time data retrieval, automated cataloging, and digital knowledge dissemination, enhancing research support and user experience.

Contrastingly, government-owned university libraries in Southeast Nigeria face several challenges in achieving this ideal KM framework. While technological advancements are acknowledged, their adoption remains inconsistent due to factors such as inadequate funding, lack of technical expertise, and infrastructural deficiencies. Many libraries still rely heavily on traditional methods of cataloging and information

dissemination, with digital resources underutilized due to limited internet access and outdated library management systems.

Empirical observations suggest that while some university libraries have attempted to integrate digital KM practices, the pace of adoption remains slow. For instance, investigations from library professionals found that only a handful of librarians in Southeast Nigeria are proficient in using AI-powered search tools and digital repositories. Additionally, despite the availability of big data analytics tools, their application in university libraries remains limited. These challenges hinder effective KM, resulting in inefficiencies in knowledge retrieval, preservation, and dissemination. The disparity between global KM best practices and the current state of university libraries in Southeast Nigeria underscores the urgent need for strategic interventions to bridge this gap.

Research Questions

1. What are the current knowledge management practices employed by librarians in government-owned university libraries in Southeast Nigeria?
2. How can advanced technologies (e.g., AI, IoT, big data analytics) enhance knowledge management practices in university libraries?
3. What is the level of awareness of librarians in Southeast Nigeria regarding the demands of the 5th Industrial Revolution?

4. What are the challenges faced by librarians in managing knowledge effectively in the context of the 5th Industrial Revolution?

Conceptual Clarification

Knowledge Management

Knowledge management (KM) refers to the systematic process of identifying, acquiring, organizing, storing, sharing, and applying knowledge to achieve organizational objectives, encompassing both explicit (documented) and tacit (experiential) forms (Yusuf et al., 2025). In library contexts, KM involves capturing, structuring, and disseminating information to meet user demands efficiently, often through tools like digital repositories and classification systems (Cheng et al., 2024). Recent literature emphasizes KM as a multidisciplinary strategy that integrates technology and human elements to transform raw data into actionable insights, adapting to digital transformations such as AI integration (Kamalruzaman et al., 2025). Definitions have evolved to include phases like knowledge generation, storage, processing, transfer, and utilization, highlighting its role in bridging information gaps (El-Jardali et al., 2023).

The importance of KM lies in its capacity to enhance decision-making, innovation, and competitiveness in dynamic environments, particularly during crises like the COVID-19 pandemic where it doubled research output by fostering adaptability (Kamalruzaman et al., 2025). In academic libraries, KM improves operational efficiency, user support, and

resource allocation, enabling librarians to manage AI-generated data and promote academic excellence (Yusuf et al., 2025). It supports sustainability initiatives by integrating with green practices and digital tools, driving organizational performance and resilience (Cheng et al., 2024). Furthermore, KM reduces barriers such as information overload, ensuring evidence-informed actions that align with Sustainable Development Goals (El-Jardali et al., 2023).

Key components of KM include acquisition (gathering knowledge via tools like document management), organization (structuring through taxonomies), sharing (via collaborations and platforms), and application (utilizing for tasks like AI integration) (Yusuf et al., 2025). Trends show a shift toward AI and digital transformation, with practices like knowledge mapping and data mining enhancing competencies (Kamalruzaman et al., 2025). Challenges involve technical gaps and lack of training, while future directions emphasize interdisciplinary approaches for SMEs and higher education (Cheng et al., 2024).

5th Industrial Revolution

The 5th Industrial Revolution (Industry 5.0) is defined as a human-centric paradigm integrating advanced technologies like AI, IoT, and robotics with human creativity to achieve sustainable, resilient, and adaptive operations, building on Industry 4.0's digitization (Ali et al., 2025). It emphasizes collaboration between humans and machines, focusing on personalization over mass customization, and addresses societal challenges

through ethical innovation (Rejeb et al., 2025). Definitions vary but converge on three pillars: human-centricity, sustainability, and resilience, promoting eco-friendly practices and well-being (Gupta et al., 2025).Its importance stems from countering Industry 4.0's automation drawbacks, such as job displacement, by reintegrating human elements for enhanced efficiency and ethical outcomes (Ali et al., 2025). In education and libraries, it fosters upskilling and sustainable development, aligning with SDGs to balance economic growth with environmental and social equity (Rejeb et al., 2025). It drives innovation in sectors like manufacturing, addressing post-pandemic supply chain fragility (Gupta et al., 2025).

Components include technologies (AI, blockchain, digital twins), human-machine interfaces (cobots, XR), and frameworks for sustainability (circular economy) and resilience (adaptive supply chains) (Rejeb et al., 2025). Trends show exponential research growth from 2019, with Asia Pacific markets projected to grow rapidly (Ali et al., 2025). Challenges encompass skill gaps, resistance to change, and ethical issues (Gupta et al., 2025).

University Libraries

University libraries are central hubs in higher education, providing access to diverse resources, supporting research, and fostering learning environments through physical and digital collections (Quigley et al., 2024). They encompass roles in scholarly communication,

data management, and community engagement, evolving to include open access initiatives and AI integration (Nazarovets, 2025). Definitions highlight their shift to learner-centered spaces promoting intentional learning and equity (Bright & Okunishi, 2025).Their importance is evident in enhancing research outputs through technical services, literacy training, and data management, acting as bridges between academia and industry. They support student success, diversity audits, and well-being amid politicization and anti-DEI challenges (Quigley et al., 2024). In global contexts, they drive open science and sustainability (Nazarovets, 2025).Components involve collections management, policy reviews for DEIAJ, and services like makerspaces and hybrid work (Bright & Okunishi, 2025). Trends include AI literacy, open pedagogy, and unionization for academic freedom (Quigley et al., 2024). Challenges encompass funding, visibility, and censorship (Nazarovets, 2025).

University Librarians

University librarians are professionals facilitating knowledge access, research support, and information literacy in academic settings, evolving into data specialists and KM experts (Yusuf et al., 2025). They manage resources, provide training, and bridge academia-industry gaps (Pratama, 2025). Definitions include roles in AI competency and ethical data handling (Song et al., 2021).Their importance is in enhancing research outputs

via literacy, data evaluation, and dissemination, crucial for institutional success (Yusuf et al., 2025). They promote innovation and equity in digital eras (Pratama, 2025).

Components encompass KM practices like acquisition, sharing, and application, with data-focused roles averaging 2.3% of staff (Pratama, 2025). Trends involve AI integration and generalist-specialist balances (Yusuf et al., 2025). Challenges include training gaps and technical barriers (Song et al., 2021).Literature reviews note maturity models from basic RDM to specialized expertise, urging empirical studies (Pratama, 2025). Gaps involve tacit knowledge management, suggesting interdisciplinary training (Yusuf et al., 2025).

Methods

A descriptive survey research design was adopted for this study. The population of the study comprised all the 254 professional librarians in the 9 public universities in South East Nigeria. For this study, all the 254 professional librarians formed the sample of this study because the population is manageable. Data for this study was collected by means of structured questionnaire. A validated structured questionnaire titled “Questionnaire on Knowledge Management in the Fifth Industrial Revolution” (QKMFIR). The QKMFIR is divided into four clusters. Each cluster was in line with the specific objectives of the study. A total of 42 items were raised for the questionnaire structured on a 4-point scale of Strongly Agree (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD) with nominal values 4, 3, 2 and 1 respectively

Cronbach Alpha Method was used to check the internal consistency of the four clusters of QKMFIR and respective reliability values of 0.76, 0.88, 0.81 and 0.79 were obtained. Arithmetic mean and standard deviation were used to analyze data related to the four research questions posed. The mean ratings were interpreted using criterion mean. Mean value of 2.50 and above means that such item is agreed while mean score of 2.50 below means that such item is disagreed.

Results and Discussion

Research Question 1: What are the current knowledge management practices employed by librarians in government-owned university libraries in Southeast Nigeria?

Table 1: Respondents' ratings on the current knowledge management practices employed by librarians

S/N	Item statement	X	SD	Remarks
1	I actively engage in collecting, organizing, and storing library materials systematically for easy retrieval.	2.25	0.87	Disagree
2	I regularly update digital repositories and databases to enhance knowledge accessibility.	2.66	1.14	Agree
3	I frequently share professional knowledge and best practices with colleagues in my library.	1.95	1.06	Disagree
4	I utilize digital tools such as Institutional Repositories and Online Public Access Catalogs (OPAC) for knowledge management.	3.33	1.03	Agree
5	My library has a structured system for documenting and preserving institutional knowledge.	2.55	1.02	Agree
6	The library management provides necessary digital tools for effective knowledge management.	2.31	0.96	Disagree
7	I find it easy to access and retrieve archived library resources when needed.	2.53	0.86	Agree
	Cluster Mean	**2.51**		**Agree**

Data presented in Table 1 reveals that items 1, 3 and 6 with mean scores 2.25, 1.95 and 2.31 were rated disagreed while items 2, 4, 5 and 7 with mean scores 2.66, 3.33, 2.55 and 2.53 were rated agreed. The cluster mean of 2.51 summarized that library professionals agreed on the current knowledge management practices employed by librarians in government-owned university libraries in Southeast Nigeria. The standard deviation score ranging between 0.87 – 1.14 means that the respondents' mean scores were closely related.

The finding in research question one revealed that library professionals agreed on the current knowledge management practices employed by librarians in government-owned university libraries in Southeast Nigeria. The score suggests that the current KM practices in these libraries are somewhat effective but may not be fully optimized or widely implemented. This finding agreed with that of Onwuchekwa and Esew (2022) that librarians in Nigerian university libraries actively employ various knowledge management strategies such as digital repositories, cataloging, indexing, and metadata management to enhance accessibility to scholarly resources. Similarly, Ogbomo and Muokebe (2021) reported that librarians are increasingly using digital tools and library automation systems to manage information effectively. Their findings support the argument that knowledge-sharing culture and collaboration among librarians have improved, leading to more structured and well-managed knowledge systems in libraries.

Research Question 2

How can advanced technologies (e.g., AI, IoT, big data analytics) enhance knowledge management practices in university libraries?

Table 2: Respondents' ratings on how advanced technologies enhance knowledge management practices

S/N	Item statement	X	SD	Remarks
8	I use artificial intelligence (AI) tools (e.g., chatbots, automated cataloging) to improve knowledge organization in my library.	2.78	1.01	Agree
9	Big data analytics helps me track user preferences and improve library services.	2.79	1.04	Agree
10	My library uses automated indexing and classification systems for organizing knowledge resources.	2.07	1.03	Disagree
11	I find AI-driven search engines more efficient for retrieving information than traditional catalog searches.	2.86	0.96	Agree
12	My library integrates social media platforms (e.g., Twitter, Facebook) for knowledge sharing and user engagement.	2.66	0.99	Agree
13	Cloud storage solutions (e.g., Google Drive, institutional repositories) improve the accessibility of library resources.	2.72	1.02	Agree
	Cluster Mean	**2.65**		**Agree**

Data presented in Table 2 reveals that item 10 with mean score 2.07 was rated disagreed while items 8, 9, 11, 12, and 13 with their respective mean scores of 2.78, 2.79, 2.86, 2.66 and 2.72 were rated agreed. The cluster mean of 2.65 summarized that library professionals agreed on how advanced technologies enhanced knowledge management practices in university libraries in South East Nigeria. The standard deviation score ranging between 0.96 – 1.04 means that the respondents' mean scores were closely related.

The finding in research question two revealed that library professionals agreed on how advanced technologies enhanced knowledge management practices in university libraries in South East Nigeria. It means that they recognize and acknowledge the positive impact of these technologies on the way knowledge is created, organized, shared,

preserved, and applied in their libraries. This finding was in line with the finding of Igbinovia and Adetimirin (2023) that librarians widely adopted standard rules in cataloging and classifying information materials, leading to effective knowledge organization. Oyemike, Amaechi, Onuocha and Anyalabechi (2016) examined the awareness and use of social media in KM practices among university libraries in Southeast Nigeria. The findings revealed that a significant number of librarians acknowledged the positive impact of social media tools, such as Facebook and WhatsApp, in facilitating knowledge sharing and collaboration.

Research Question 3: What is the level of awareness of librarians in Southeast Nigeria regarding the demands of the 5th Industrial Revolution?

Table 3: Respondents' ratings on the level of awareness regarding the demands of the 5th Industrial Revolution

S/N	Item statement	X	SD	Remarks
14	I am aware that the 5th Industrial Revolution (5IR) focuses on the integration of human intelligence with advanced technologies in knowledge management	2.41	0.54	Low level
15	I understand how technologies like AI, IoT, robotics, and big data analytics impact knowledge management in university libraries.	2.18	0.69	Low level
16	I am familiar with how human-machine collaboration can enhance library services and knowledge management.	2.72	0.99	High level
17	I am aware of how blockchain technology can be used to secure and authenticate digital information in university libraries.	2.07	0.88	Low level
18	I understand the role of personalized digital learning in providing customized library services to users.	2.68	0.89	High level
19	I am confident in using digital repositories, cloud storage, and data analytics for knowledge organization and retrieval.	2.28	0.91	Low level
20	I am aware of cybersecurity measures needed to protect digital knowledge in the 5th Industrial Revolution era.	1.93	0.86	Low level

Cluster Mean	**2.32**	**Low level**

Data presented in Table 3 reveals that items 16 and 18 with mean scores 2.72 and 2.68 were rated high level while items 14, 15, 17, 19 and 20 with their respective mean scores of 2.41, 2.18, 2.07, 2.28 and 1.93 were rated low level. The cluster mean of 2.32 summarized that library professionals to a low level are aware in the demands of the 5th Industrial Revolution. The standard deviation score ranging between 0.54 – 0.99 means that the respondents' mean scores were closely related.

The research question three reveals that library professionals to a low level are aware in the demands of the 5th Industrial Revolution. This means that they have limited understanding or recognition of the transformative changes and requirements brought about by this new era. This findings supported that of Nwobu, Dumbiri, Ibia and Oladokun (2024) highlighted that while librarians are aware of emerging technologies, there is a significant gap in understanding how to integrate these technologies into library services effectively. Ekwueme, Oluwaseun, Ajie, Ofodu and Ambrose (2024) revealed that although librarians recognize the potential of 5IR technologies to enhance service delivery, there is a lack of in-depth knowledge and skills required for implementation.

Research Question 4: What are the challenges faced by librarians in managing knowledge effectively in the context of the 5th Industrial Revolution?

Table 4: Respondents' ratings on the challenges faced by librarians in managing knowledge effectively

S/N	Item statement	X	SD	Remarks
21	Lack of adequate training and skill development in 5IR technologies affects my ability to manage knowledge effectively.	2.81	1.04	Agree
22	My library lacks the infrastructure and digital tools needed for effective knowledge management in the 5IR era.	3.14	0.79	Agree
23	I experience difficulty in transitioning from traditional to digital knowledge management practices.	3.17	0.87	Agree
24	Resistance to change among library staff affects the adoption of new knowledge management technologies.	2.85	0.92	Agree
25	Cybersecurity risks and data privacy concerns make it challenging to manage digital knowledge effectively.	2.76	0.87	Agree
26	There is limited awareness and understanding of the 5th Industrial Revolution among librarians in my institution.	3.13	0.78	Agree
	Cluster Mean	**2.98**		**Agree**

Data presented in Table 4 reveals that all items 21 – 26 with their respective mean scores of 2.81, 3.14, 3.17, 2.85, 2.76 and 3.13 were rated agreed. The cluster mean of 2.98 summarized that library professionals agreed on the challenges faced by librarians in managing knowledge effectively in the context of the 5th Industrial Revolution. The standard deviation score ranging between 0.78 – 1.04 means that the respondents' mean scores were closely related.

The finding in research question four revealed that library professionals agreed on the challenges faced by librarians in managing knowledge effectively in the context of the 5th Industrial Revolution. This means they recognize and acknowledge the significant barriers that hinder the successful implementation of knowledge management (KM) practices in this new era. This finding agreed with that of Nwobu et al. (2024) highlighted that librarians often lack the necessary skills and knowledge to navigate the complexities of

library management in the 5IR. Enakrire (2023) observed that reluctance to adapt to technological advancements has hindered many librarians, particularly in developing nations, from acquiring the broad knowledge necessary to effectively cope with evolving library practices.

Recommendations

Based on the findings, the following recommendations were made:

1. University library management should institutionalize and standardize these practices through formal knowledge management policies and guidelines. This will ensure consistency, continuity, and sustainability of practices such as cataloguing, classification, digital repositories, and metadata management.
2. Library administrators should collaborate with ICT units and external technology partners to deploy tools that support intelligent information retrieval, automation of routine tasks, and data-driven decision-making, thereby maximizing the benefits of technology-enhanced knowledge management.
3. Professional associations, library schools, and university management should organize workshops, seminars, and continuous professional development programmes focused on human–technology collaboration, ethical technology use, and sustainability within the 5IR framework.
4. Universities should prioritize funding for ICT infrastructure, promote collaborative work environments, and incentivize innovation among librarians.

5. Mentorship and skills development initiatives should be strengthened to equip librarians with the competencies needed to navigate the complexities of knowledge management in the Fifth Industrial Revolution.

Conclusion

This study shed light on knowledge management practices among librarians in government-owned university libraries in Southeast Nigeria. While these professionals recognize and utilize existing knowledge management strategies, there is an urgent need for innovation to adapt to the evolving landscape of the Fifth Industrial Revolution (5IR). The adoption of advanced technologies like AI, IoT, and big data analytics is seen as crucial for enhancing knowledge management, emphasizing the importance of digital transformation in libraries. However, a significant gap remains in librarians' awareness of the 5IR's demands. Many lack the necessary knowledge and skills to navigate emerging technologies, which could hinder their transition into this new industrial era. Additionally, challenges such as skill deficits, resistance to change, limited technological infrastructure, and insufficient institutional support further complicate effective knowledge management. These issues highlight the critical need for structured interventions to empower librarians in a rapidly digitizing society.

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