

A Review of Fifth Industrial Revolution as an Opportunity for Rebranding Libraries and Librarians in Nigeria

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doi: <https://doi.org/10.37745/ijliss.15/vol12n24970>

Published July 13, 2026

Citation: Onwubiko E.C. (2026) A Review of Fifth Industrial Revolution as an Opportunity for Rebranding Libraries and Librarians in Nigeria, *International Journal of Library and Information Science Studies*, 12(2),49-70

Abstract: *In recent time, the centre of discussion on global development and environmental sustainability hedges on the fifth Industrial revolution (5IR) that aims at seeing man working with machine as partners without a dent on the environment. To the developed nations of the world, their libraries are already navigating the landscape of this revolution but same cannot be said of developing countries like Nigeria. This paper therefore a review of Fifth Industrial Revolution (5IR) as an opportunity for total rebranding of libraries and librarians in Nigeria. The paper based on its objectives, employed interpretive content and document analysis method. This was adopted as it aided the author to carry out a comprehensive literature review of the topic discussed and to completely analyze materials collected from different sources ranging from journal articles, databases to different websites. Apart from the conceptualization of 5IR to the understanding of libraries and librarians in Nigeria, the paper through the reviewed literature, identified skills to be acquired by the librarians if they are to successfully navigate the landscape of the revolution in ever evolving world of technology which include skills that can facilitate interdisciplinary collaboration and the cross-fertilization of ideas; impact of 5IR on libraries as well as the conundrums ahead of libraries and librarians in Nigeria as they navigate the landscape of the 5IR and the implication of the revolution for librarians of which the issue of transition to full Digital Libraries is one. While the implications among others include that librarians must embrace entirely new roles such as data management, digital preservation, and technology training in this digital era. The conclusion inter-alia is that 5IR has set aside an era that brings reconciliation between man and machine putting into consideration environmental sustainability. In that man and machine are seen as partners in progress therefore should work in unison for the wellbeing of man and the global digital ecosystem without endangering any specie.*

Keywords: fifth industrial revolution, technological development, artificial intelligence, library, librarian, technology

INTRODUCTION

Library traditionally is a social institution that is designated to serve the people with the sole aim of satisfying their information needs and also a place of comfort to acquiring knowledge. On the same vein, librarians are trained to be gatekeepers, custodians of knowledge and managers of information whose sole mission is to ensuring that all available sources of information and processed data are made available to the teeming library users. With the emergence of information and communication technology in the past decades, and exponential growth in information leading to information explosion, the role of libraries and librarians degreed in line with emerging technologies. This technological development resulted to the dynamics of modern library services ranging from hybrid to virtual otherwise called digital library. The paradigm shift is that almost all libraries of developed world have gone digital as most of their services if not all, are automated making them computer driven.

In recent time, the transformation may be said to have gotten to its peak with the emergence of Artificial intelligence (AI) with all the associated branches like the generative AI, machine learning, Metaverse, deep learning, big data, avatar, robotics, internet of things (IoT), 3D printing and cloud computing, blockchain, NLP among others. This technological breakthroughs have given rise to industrial revolutions (IRs). Most notable in recent time are the 4th and the 5th industrial revolutions. While the 4th industrial revolution (4IR) is associated with digital technologies such as “artificial intelligence (AI), robotics, Internet of Things (IoT) cloud computing, big data, 3D printing inter-alia, the 5th I known to be an advanced improvement in activities of digital technologies such as; artificial intelligence (AI), robotics, Internet of Things (IoT) cloud computing, big data, 3D printing in line with the need for higher flexibility to support new information communication devices like the locomotive robots (Satpathy, Dash and Mohapatra, 2020). As disclosed by World Economic Forum (2020), 5IR is a conglomeration of technologies that include artificial intelligence, robotics, nanotechnology and biotechnology. By so being it noted, makes it hard for one to understand the links between the physical, digital and biological spheres. The implication is that the 5th industrial revolution serves as ample opportunities for industrial and commercial sectors, researchers, educationists as well as information specialists, librarians and health managers to address communication challenges facing the systems using wireless devices through 5G.

In this regard, the duty of libraries as home of knowledge is being faced with hydra-headed conundrums with the orthodox means of disseminating information being overshadowed by the emergence of digital platforms and emerging technologies that require libraries to change their modus operandi and the ways they carry out their customary duties. In addition, there is a paradigm shift in the way information is gathered, processed and assessed which require new skills if librarians are to efficiently and effectively take advantage of the new technology so as to tap into a digital ecosystem that is characterized with information overload. Likewise, librarians should

make it possible for users to harness the gain of the 5IR by ensuring that they under compulsion, acquire digital literacy skills, critical thinking, problem-solving abilities, and flexibility to flourish in the 5IR landscape (Association of College & Research Libraries, 2018).

While it is a thing of great tiding that the 5IR has heralded an era of convergence of humans and advanced technologies, it has also resulted into a systematic innovation and transformation of landscape of knowledge systems, information management, and the roles of librarians and information users. This epochal shift underscores the all importance and significance of innovation and the acquisition of new skills as it concerns the knowledge systems. Libraries which are traditionally perceived as noiseless holy places of knowledge are presently undergoing notable changes in this era of the Fifth Industrial Revolution. In the light of the above, evidence has shown that libraries and librarians in developed world are transforming in line with the technological trends and global demands. These cannot be said of librarians and libraries in developing countries like Nigeria where all things seem to be ending in paper instead of being implemented. It is therefore, disheartened to state that no Library in a country like Nigeria can boast of being ready for the 5IR. This is contrary to Tella et al (2023) assertion that libraries are now becoming dynamic hubs actively curating, organizing, and disseminating knowledge. This shift is driven by the evolving needs of users, who increasingly demand innovative technologies and new avenues for learning and research. These changes position libraries to provide users with the necessary tools and resources to navigate the complexities of this digital era. As we move unsteadily on the edge of this monumental transformation, a profound and far-reaching research inquiry emerges and that is; “Can the marriage of innovation and skills be strategically tapped to not only maintain but also strengthen the knowledge systems within the vortex of the 5IR, and what far-reaching effect does this portend for librarians in Nigeria as custodians of knowledge, and the libraries as the custodians of information?

It is to find answers to the above question that this write-up has become imperative with a view to emphasizing the need for new skills for librarians and the rebranding of the library in line with the vision of 5IR in Nigeria. In other words, this overarching question encapsulates the core challenges and extraordinary prospects that the 5IR unfolds. It is a clarion call on librarians and the library in Nigeria to embark on an exhaustive exploration of the intricate interplay between innovation, skill acquisition, and the enduring sustainability of knowledge systems in the face of an unquiet and ever-evolving landscape. Ultimately as noted, innovation stands as an epicenter for the sustainability of knowledge systems within libraries during this 5IR. The view is that innovation encompasses a wide range of activities, from digitizing collections and offering remote access to embracing cutting-edge technologies such as data analytics and machine learning to enhance information retrieval. Libraries that foster innovation function as hubs for knowledge creation, making significant contributions to societal progress by facilitating access to the latest information and tools for problem-solving (Awoyemi, 2023).

Against this backdrop, and considering the ever transforming digital ecosystem that has forced libraries to have evolved into vibrant centers offering digital resources, expert data management,

and tailored services, It behooves that they as well as librarians should mandatorily acquire necessary skills such as digital literacy, data literacy, and information curating as well as embracing AI, understanding cyber security, and adapting to evolving responsibilities. The underlying factor is that the 5IR heralds an era of democratized access to knowledge, breaking down geographical barriers and positioning libraries as epicenters for data management. In this situation the need for librarians in Nigeria, to acquire new skills, is not debatable and rebranding the library no doubt a necessity.

Objectives

The main objectives of this paper are:

- I. To conceptualize 5IR to the understanding of librarians in Nigeria in particular
- II. To highlight those new skills needed by librarians in Nigeria for effective service delivery in the epoch of 5IR,
- III. To reveal the impact of 5IR on the library as noticed in developed world,
- IV. To pinpoint likely conundrums to be faced by Libraries and librarians towards sustainable Knowledge Systems in the 5IR.

Methodology

The paper based on its objectives, employed interpretive content and document analysis method. This was adopted as it aided the author to carry out a comprehensive literature review of the topic discussed as well as apple opportunity to completely analyze materials collected from different sources ranging from journal articles, databases to different websites. The paper also meticulously, went through and interpreted all materials in text under content and document analysis which gave room for a two-sided comprehension of the topic being treated. The reason for the addition of materials from related websites is to further prove the good quality of the believability and trust of the outcome of this study. The implication is that the approach allowed for a total outlook for all related materials on the subject discussed ranging from articles, books, research works and other publications.

Understanding What Fifth Industrial Revolution (5IR) is all about

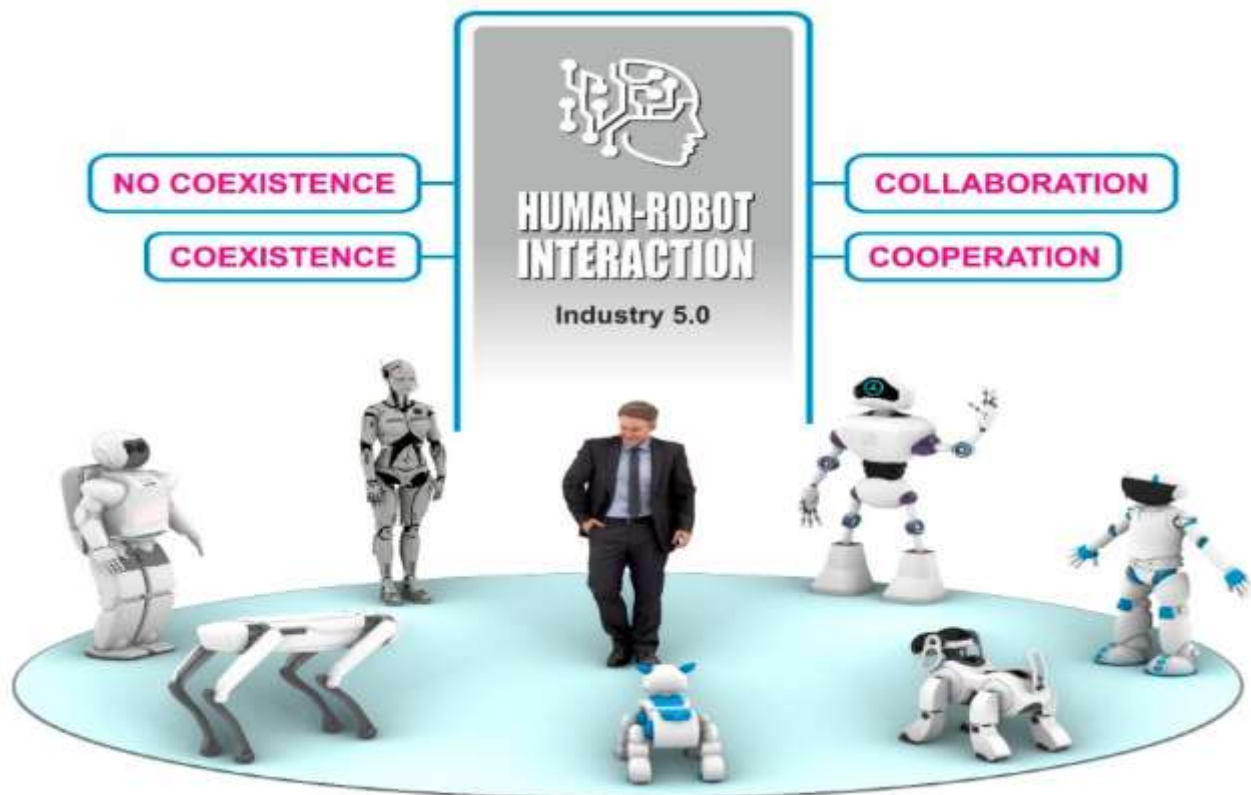
The fifth industrial revolution, also known as Industry 5.0, is characterized by the symbiotic relationship between humans and advanced technologies like AI, robotics, and IoT, with special focus on human-centricity, sustainability, and resilience. It builds upon the fourth industrial revolution (Industry 4.0) by integrating human creativity and emotional intelligence with the power of technology. The symbiotic characteristics of 5IR as emphasized are, Human-centricity in that it prioritizes the well-being and needs of individuals in the workplace and society. This includes creating personalized and customized products and services, and ensuring a safe and healthy work environment, it is tailored towards sustainability which implies that its focus is on minimizing environmental impact and promoting resource efficiency which involves using technologies to optimize production processes, reduce waste, and develop sustainable products, it

is resilience inclined as it aims to creating more robust and adaptable systems that can withstand disruptions and unexpected events. This includes building flexible supply chains and utilizing technology to anticipate and respond to challenges. It is also in line with the global trend, as it is Technologies driven. This implies that 5IR involves a high-level integration of various technologies like AI, IoT, big data, robotics, biotechnology, and virtual and physical spaces. This integration enables the creation of "ultra-smart societies" where these technologies work together to achieve human-centered goals and above all, it is fashioned in such a way that there will be collaboration between Humans and Machines. This is because Industry 5.0 envisions a future where humans and machines collaborate effectively to leverage their respective strengths. Humans can focus on tasks requiring creativity, critical thinking, and emotional intelligence, while machines handle repetitive, physically demanding, and data-intensive tasks (Ziatdinov, Atteraya and Nabiyeu, 2024).

Essentially, Industry 5.0 is not just about technological advancement, but also about using technology to enhance human lives and create a more sustainable and resilient future. It is imperative to note that whereas, Industry 4.0 emphasized technological advancements, Industry 5.0 acknowledges the irreplaceable value of human skills, creativity, and emotional intelligence among others and the collaboration between man and machine. In other words, Industry 5.0 fosters a collaborative environment where technology augments human capabilities. Under the Industry 5.0 with sustainable development, machines handle repetitive tasks. This is on the ground that intelligent machines can take over repetitive, mundane tasks, releasing up human time and strength for more innovative responsibilities (George and George, 2020). The underscore is that the Fifth Industrial Revolution, or 5IR, encompasses the notion of harmonious human-machine collaborations, with a specific focus on the well-being of the humans and their environment.

Invariably, the projection is that 5IR epitomizes the contemporary and futuristic epoch of industrial and technological transformation, building upon the legacy of its four predecessors. This era noted Alojaiman (2023), depicts a monumental shift characterized by the convergence of cutting-edge technologies, including artificial intelligence, the Internet of Things (IoT), blockchain, biotechnology, and advanced robotics, among others. Eventually, this convergence ushers in a transformative era in human progress, fundamentally reshaping the very fabric of our existence. In all, the 5IR marks the beginning of a profound societal and technological transition as it introduces a basic digression earlier overlooked due to extensive proliferation of automation, interconnectedness, and data-driven decision making, which permeates every facet of our lives (Callaghan, 2023). Going by the nature of 5IR, there is this great need for the cultivation of a novel set of skills that is a part and parcel of traversing this transformative landscape. The ability to adapt to rapidly changing technologies and environments becomes paramount. One of the defining characteristics of 5IR is its unwavering commitment to sustainability, environmental responsibility, and ethical considerations. The obvious as has been noted is that while the Fourth Industrial Revolution (4IR) was characterized by hyper-connectivity through smart devices linking us to most parts of the planet, 5IR on its par, will amplify and streamline this connection, replacing traditional smart devices with brain-computer interfaces and heralding a transformative evolution

in our engagement with technology (Noack, 2021). Furthermore, whereas the 4IR witnessed a competitive interplay between humans and machines, the 5IR aims to foster a collaborative and harmonious relationship between them (Noble, Mende, Grewal and Parasuraman, 2022).



Bridge knowledge gaps between different fields become imperative, as this fusion of knowledge is the driving force behind innovation. The evolution of 5IR is intrinsically linked to questions of governance, ethics, and the equitable distribution of its benefits. This revolution challenges societies to rethink and adapt existing systems and structures to ensure that the benefits are inclusive and accessible (Porter and Heppelmann, 2015). Furthermore, it underscores the importance of preparing a workforce with the skills and adaptability necessary to thrive in this evolving landscape. Skills such as adaptability, digital literacy, and a deep understanding of ethical considerations in technology become invaluable in this context.

Skills Required by Librarians to Navigate the 5IR Innovations

In a changing world propelled by the Fifth Industrial Revolution (5IR), there is this interaction between innovations and skills that are imperative for proper mastering of this ever evolving contemporary digital ecosystem. These innovations are in the areas of quantum computing in the metaverse, metaverse knowledge graphs, ethical AI and bias mitigation, open access and crowdsourcing in the metaverse. Others are, blockchain for trust and traceability, augmented

reality (AR) and virtual reality (VR), metaverse data integration, personalized metaverse experiences as well as knowledge systems, collaborative metaverse platforms and digital transformation (AbdRazak et al., 2021; Kwon et al., 2022; De Felice et al., 2023; Lee et al., 2023).

The emphatic is that 5IR has given rise to remarkable innovations that call for the acquisitions of new skills especially by librarians and library users alike, if it gains are to be harnessed to the fullest. It against this backdrop that Ross and Maynard (2021), infer that innovation is the heart of 5IR, and serves as the catalytic force propelling progress and change in unprecedented ways. In all, it embodies the making of new discoveries in technologies, the changing of the nature of orthodox business models, and coming up with futuristic ideas that will tackle urgent global conundrums. Basically, the era of 5IR definitely requires skills that will foster creativity, innovative problem-solving, and adaptability. In this regard Petrakis (2022) reveals that what sets 5IR apart from other IRs, is the perpetual evolution of skills in response to the ever-shifting technological landscape. In this context, 5IR aims at seeing man and machines working hand-in-hand as partners in progress while ensuring the safety of the global ecosystem. This development, is way of ensuring that man on regular basis acquires the desired skills in an ever dynamic ecosystem so as to remain relevant.

Among the interrelated subject areas of 5IR, one outstanding phenomenon is innovation which is prominent and most pronounced in every field and all invented contemporary. In all noted Claus & Wiese (2019) the main emphasis, is the need for skills that facilitate interdisciplinary collaboration and the cross-fertilization of ideas. The implication is that those who have what it takes to close the gaps in knowledge, and scale through the crossed roads will be the arrow-heads of innovations. As result of the emergence of numerous advanced technologies another indispensable skills is technological literacy while, proficiency in understanding and use of technologies like as artificial intelligence, the Internet of Things, and blockchain have all become a sine-qua-non (Choithani *et al.*, 2022). Ultimately, since the power of 5IR lies on technology, there is a mandatory need for ethical guidance. As a result, the advice is that skills that are related to ethical decision-making and understanding the societal implications of innovation should be placed at front burner in that, innovators must adeptly navigate complex ethical dilemmas and ensure that their creations ultimately serve the betterment of society (McIntosh et al., 2021).

Adapting to 5IR innovations should not be envisaged as mere skill rather it should be seen as a thing of mindset. This implies that librarians should have ability to welcome the transformation and get involved in lifelong learning if they are to harness the gain of 5IR. This built on the assertion that individuals who swiftly acquire new skills and discard obsolete ones are those who thrive amidst the ceaseless pace of change (Choithani *et al.*, 2022). Librarians being infopreneurs should have the ability to identify opportunities, take calculated risks, and transform innovative concepts into tangible reality as they have become essential in a landscape where innovation often leads to the creation of entirely new markets (Petrakis, 2022). Furthermore librarians, should develop collaborative competence as the capacity to work effectively with others, is equally vital. Many of the transformative innovations in 5IR are the outcomes of collaborative endeavors.

Proficiencies such as effective communication, teamwork, and the ability to work across geographical and cultural boundaries serve as the foundations of groundbreaking innovation (McIntosh *et al.*, 2021). Since, innovation charges one into unprepared territories, librarians should have the ability to develop, adapt, and leverage a diverse skill set as the compass guiding them through the complexities of this era of great transformation.

The bottom line is that 5IR is a catalyst to knowledge organizations like the library and other information providers, to introduce new methods of ensuring the accessibility, relevance, and efficiency of knowledge within these rapidly changing virtual environments. With ongoing changes propelling the global scheme of things, as drivers of the knowledge system are better placed to leverage the metaverse and tap from her endless possibilities. Be that as it may, the adage ‘unease lies the head that wears the crown’ holds in the case of librarians. This is because the intersection of innovations and skills calls for workable proficiencies and competencies which librarians definitely need to transverse the 5IR knowledge systems and to effectively and efficiently serve their teeming library users. The innovations and skills acquisition for librarians in the present dispensation are therefore a must.

From inception, librarians are known as information curators and in this digital era, the story has not changed. The only thing, that has changed is that instead of curating information in print form, they are required to acquire the skill for curating relevant and high-quality digital contents. As expressed by Khan, *et al.*, (2023), the ability to evaluate, organize, and maintain digital collections is critical adding that librarians curate their information sources and also filter out irrelevant information

Critical thinking in recent time, has become one of the most sought for soft skills. Librarians in this contemporary digital ecosystem are faced with the challenge of information overload as a result of astronomical growth of information via the internet and other electronic sources propelled by information communication technology. With 5IR being all about machine and information to build a new world, the acquisitions of robust critical thinking skills are no longer a luxury but a necessity as they need them to be able evaluate sources, recognize bias, and make well-informed decisions. The emphasis is that critical thinking is foundational to information literacy (Goodsett and Schmillen, 2022)

Furtherance, librarians should be AI literate. AI literacy denotes the complexity of various skills, knowledge and values aimed to help librarians as users to achieve cognitive engagement and develop trust in AI technology in order to ensure effective and secure use of AI applications. As explained by Davenport & Ronanki (2018), engagement of users with AI technology is “cognitive engagement”. AI literacy includes also ethical considerations awareness. It on this ground that Wang *et al*, (2023), defined it as the “ability to appropriately recognize, utilize, and evaluate AI-based technologies by considering ethical principles” While, Ridley and Pawlick-Potts (2021) saw as the relation of people to algorithmic thinking where the latter communicates computer and digital literacy. Per this view AI literacy cannot be seen as the direct successor of all preceding

literacies such as digital literacy, computational literacy, and scientific literacy as well as data literacy; rather, it is a new type of literacy which has inherited relations to the others. AI literacy is conceptualized by Ng taxonomy (Ng et al., 2021) as merger of understanding, capabilities to use, capabilities to evaluate and awareness of ethics challenges in a context of AI technology. The whole issue is that as AI technologies advance, librarians need to understand how to integrate AI tools into library services. This encompasses using chatbots for user support, implementing AI-driven recommendation systems, and automating cataloguing processes. Users should be familiar with AI-based search and recommendation features (Affum & Dwomoh, 2023).

The mastery of the digital ecosystem can only be possible if one is digitally literate and with such skills, one can leverage the opportunities it offers. The underscore is that literacy in navigating digital platforms, databases, and electronic resources is now an essential skill. Against this backdrop, for Librarians to effectively manage digital cataloguing and online research tools, they need to acquire digital literacy. Above all, as the metaverse, continues to expand its landscape, there came to lime-light its numerous prospects and bottlenecks for libraries, which requires that for librarians and library users to remain relevant, need to acquire the desired new skills and be more proficient in tandem with the trending technology. In this regard the prime consideration in metaverse landscape is the inclusion of meta-literacy which will allow librarians and library users to acquire skills and proficiencies that are very necessary and important for anyone to thrive in today's digital ecosystem (Onwubiko, 2025)

Another area librarians need to be grounded in, is cybersecurity. It is not in doubt, that advanced technologies are driving efficiency and convenience in various aspects of life, but the same advancement in technologies as averred Deshmukh, Patil, Soni, and Tyagi (2023), have also raised privacy and cybersecurity concerns, in that protecting privacy and cybersecurity is also a goal of Society 5.0. As discussed by Payton et al (2023), the vulnerabilities associated with massive data collection and analysis in Society 5.0, exposed the need for robust data protection mechanisms and privacy regulation. Undoubtedly, this era requires a delicate balance between technological innovation and protecting individual privacy, urging policymakers, businesses, and individuals to adopt strong cybersecurity measures to protect personal data in an increasingly connected and data-driven society. To this end, considering the increasing digital presence of libraries and online research, a strong knowledge of cybersecurity is very important. The implication is that Librarians as information managers and custodians of knowledge have it as a responsibility to safeguard library data and user privacy and this can only be realized if librarians are trained on it (Cornelius et al., 2023).

Another important skill that has been precipitated by the 5IR which librarians must acquire is data literacy (DL). Data literacy which is the ability to read, comprehend, create, and communicate data as information is seen as an essential skill needed for making informed decision in the present day data-driven global digital ecosystem. Suffice to say, that DL is all about acquiring the competency to read, interpret, as well as critically evaluate and effectively communicate data in context. It is an embodiment of a range of skills that permit individuals to change raw data into meaningful

insight and after which, apply these insights in real-world scenarios. This set of skill is tremendously a necessity as long as data remain a central integral part of decision making in various fields, including education, business and government. Evidence has shown, that the era we are in, about 2.5 quintillion bytes of data are produced on daily basis and with scenario data literacy has become a critical skill which must be acquired. Organizations that invest in data literacy are more likely to report improved decision-making, innovation, and customer experience. making, innovation, and customer experience. The assertion is that data literate employees with librarians inclusive can leverage data to drive better outcomes and gain a competitive advantage (Tableau, 2025)

Underlying issue is that, the proliferation of data in the 5IR necessitates the acquisition of data literacy skills. These skills must include, the ability to collect, analyze, and interpret data which will in-turn facilitate data-informed decision-making and understanding complex information (Oseghale, 2023). Generally, the skills are classified into two which are; non-technical skills though it looks like all the data skills are technical and difficult to learn, but in reality, many are completely non-technical and accessible to anyone who wants to build their skills. These include, critical thinking skills which are essential for analyzing and understanding data and these skills are developed through questioning your assumptions, using logic to work through problems, and diversifying where you get your information; research which allows one to knowing about the subject matter of the data is critical to understanding it. One can develop this skill by learning how to evaluate sources, narrow ones search, and spot implicit or explicit biases, Communication, this necessary because a large part of data literacy is being able to communicate to others what one's data is talking about. In this context, librarians can sharpen their communication skills by practicing active listening, working on their public speaking, and seeking feedback from trusted peers and Domain knowledge which most importantly is concerned with keeping up with the industry and latest trends. Librarians can work on expanding their data knowledge by reading books, following blogs, or researching trends.

The second aspect of DL is the technical skills. This is where the fear lies as most librarians are skeptical about them because of the technical angle. The truth behind the mask, is that technical skills are as important as the non-technical skills when it comes to developing data literacy. These range from relatively simple skills to learn like data analysis and visualization, to much more complex such as calculus and statistical programming. Some of the technical data literacy skills as have been pinpointed include; data analysis which is the statistical and logical technique used to interpret and evaluate data. It includes collecting, formatting, cleaning, and processing data as well as analysis and interpretation, data visualization that is the graphical representation of information in different forms, such as charts, graphs, maps, etc., data management which involves the entire process of collecting, vetting, and storing data. It includes data cleaning, data mining, and data warehousing and mathematics, in that for one to really understand data on a deep level, he or she needs to know the basis for its analysis. This involves learning about statistics, linear algebra, and calculus. Even a conceptual understanding of each will further ones knowledge as well as understanding of Programming languages such as Python, R, and SQL, which will be of

help in a situation librarians want to build dashboards or complex data analysis programs (Tableau, 2025).

Emphatically, 5IR is an embodiment of interdisciplinary methods and no individual field can claim mastery of all that is desired for the success of the revolution. In this regard, expressed Ajakaye (2021), there is the need for librarians to partner other researchers in other fields as well as professionals in other fields of study for cross-disciplinary projects while the librarians should as well be meant to embrace interdisciplinary learning and to recognize the value of integrating knowledge from various domains.

We are in a dynamic world and the only thing that is constant, is change. To be part of the moving technological trend and its associated benefits, the issue of learning and re-learning should be a continuum on the part of the librarians. Ultimately the fast pace of 5IR necessitates a commitment to lifelong learning. This implies that librarians should stay updated on emerging technologies, information trends, and research methods (Oseji, 2020).

5IR is all about machine propelled innovation tailored towards unifying man and machine for sustainable environment and knowledge system. To successfully paddle the canoe of 5IR, it is a necessity for librarians to encourage and promote innovative mindset for new technologies and service models. They should also be open to new methods of accessing and utilizing information (Calkins, 2019).

One notable role of librarians is engaging in community services as they are known to enhancing knowledge acquisition among members of their host communities by providing their information needs. So the evolution of the 5IR is a further reminder to librarians on the need to enhancing their community engagements. As stated by Okafor (2020), librarians should actively engage with their communities, comprehending local information needs, and tailoring services as through that, they can benefit from participating in library programs, workshops, and community initiatives as well as creating a collaborative and enriching environment

If there in any profession it members should be tagged 'learned', it should be librarianship. This is because librarians by nature of their job are expected to be versatile in knowledge and could vividly discuss any global issue no matter the angle. Under 5IR, librarians are therefore expected to be aware of global trends. As posited by Myers and Rivero (2020), an understanding of global trends, geopolitics, and international dynamics is increasingly relevant and this requires that librarians should provide global perspectives, as well as recognize the impact of international issues on information and knowledge and fostering a more comprehensive worldview.

One of the greatest challenges facing librarians in this digital age is Ethical issues in information usages. As voiced by Wharton (2018), ethical considerations are vital in the digital age. Librarians are by profession supposed to be the arrowhead in the fight against arbitrary use of information. The emphasis is that adhering to ethical standards in information usage is paramount

and librarians more than ever than before knowing that information apart from machine is the driving force behind 5IR, should practice proper citation, comply with copyright regulations, and responsibly handle data.

The underlying point is that the 5IR underscores the critical role of innovation and skills for libraries and librarians. Librarians must adapt to their evolving role as digital curators and data experts and also equip themselves with essential digital literacy, critical thinking, and lifelong learning skills. Both libraries and librarians, should embrace the changing information landscape and adapt to the challenges and opportunities presented by 5IR to foster sustainable and vibrant knowledge systems.

Impacts of 5IR on Libraries

The 5IR has spurred a notable transformation in libraries, giving a new coloration to their role in this digital era and reshaping user expectations. This evolution is ushered in by the meeting of technological advancements and shifting user demands, leading to a reimagining of the library's mission and services. The profound effects brought about by 5IR have paved the way for a digital revolution in libraries in the advanced world, with an emphasis on accessibility, data management, and personalized services. Libraries, traditionally known for their physical book collections, have undergone a significant digital transformation. They now function as digital resource hubs, offering extensive e-book collections, e-journals, and online databases, granting users unprecedented access to knowledge (Ciarli et al., 2021). This transition is a response to the increasing digitization of information, making it more widely accessible to a diverse audience, encompassing students, researchers, and the general public. The central impact of 5IR on libraries lies in the expanded accessibility of information.

The proliferation of online databases and digital collections has allowed users to access information from anywhere, effectively eradicating geographical barriers to knowledge acquisition. This democratization of information access is invaluable in the digital era, facilitating research, learning, and innovation (Suherlan, 2023). In response to the changing data landscape in 5IR, libraries in the advanced world are emerging as critical players in data management. They are now central hubs for data storage, analysis, and visualization. This adaptation is a direct response to the growing importance of big data and analytics, with libraries in the advanced world providing services to help researchers and businesses manage and make sense of extensive datasets (Signé, 2023). This expansion of roles positions libraries in the advanced world as indispensable players in the data-driven economy. Furthermore, libraries in the advanced world are embracing AI and machine learning to offer personalized services. Users receive tailored book recommendations, and libraries in the advanced world can customize their resources and services according to individual preferences. This personalization enhances the user experience, making information retrieval more efficient and engaging (Okunlaya et al., 2022).

It has further be noted that in advanced world, Libraries have also evolved into collaborative spaces, which indicates the transforming posture of work in 5IR. Going by the structure of the

revolution which made explicit areas for group work, discussions, and problem-solving, libraries in advanced nations of the world by their standards back the teaming efforts that define modern workplaces (Suherlan, 2023). These spaces enhance initiation of new ideas, creativity and teamwork. Suffice to say, that libraries in advanced countries do play a key role in skill development as they offer programs and resources for digital literacy. These initiatives empower users to thrive in the digital age by equipping them with the skills needed to navigate and harness emerging technologies (World Economic Forum, 2020). However, the transition to a digitally-driven library ecosystem is not without its challenges. Libraries in the advanced world must address concerns related to user privacy and data security, particularly as they handle vast amounts of data in a world of increasing interconnectivity (Waite, 2022). Striking a balance between open access to information and safeguarding user data becomes a critical task. Incorporating virtual reality and augmented reality, libraries in the advanced world offer immersive educational experiences, enabling users to explore historical sites, conduct virtual experiments, and access content in novel ways (Suherlan, 2023).

In all, the fifth industrial revolution has “cobots” as its primary technological offering. Collaborative robots, or “cobots” are designed to work alongside and, more importantly, assist their human counterparts (Bhandurge, and Bhide, 2021). These technologically advanced machines are designed to be user-friendly and provide physical assistance in performing dangerous tasks. With the introduction of cobots, there should be no fear of losing the production line to automation, which has been a primary concern of Industry 4.0. All of this increases a company’s agility.

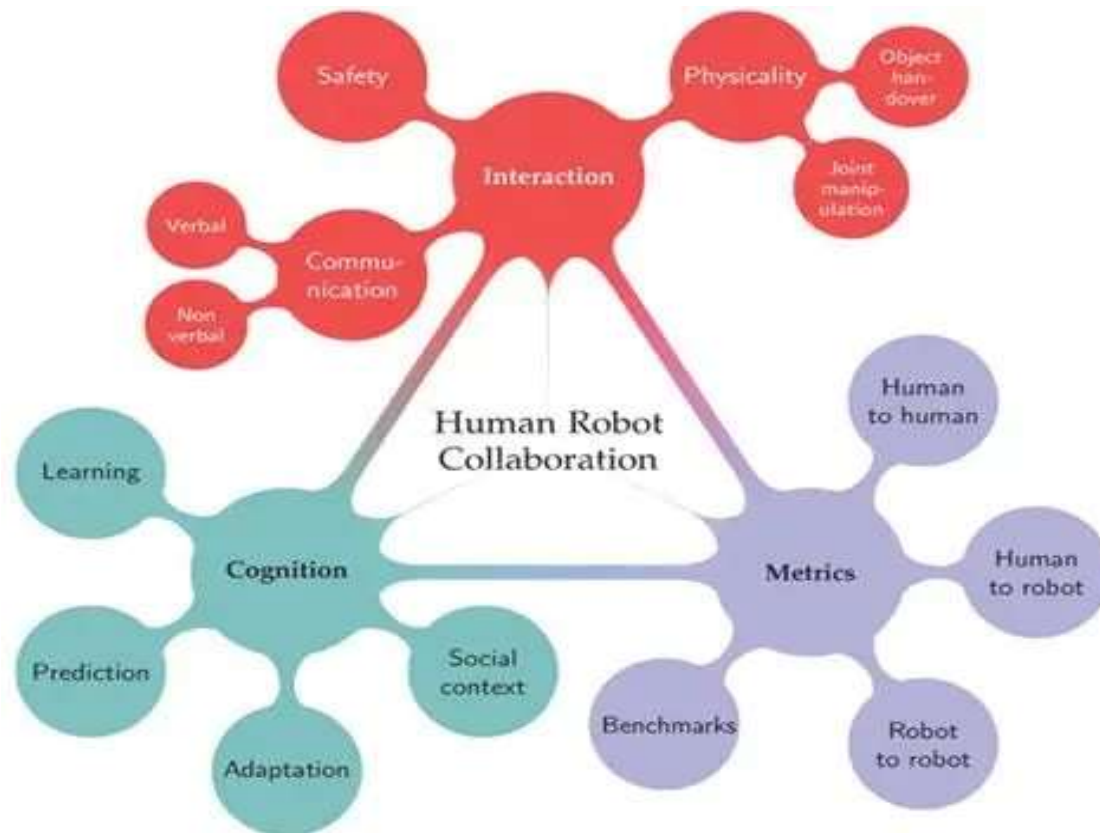


Figure 2: Human Robot Collaboration

This engagement with emerging technologies aligns with the spirit of innovation characterizing 5IR. Furthermore, libraries in the advanced world are at the forefront of advocating for open access to information. They provide platforms for publishing research and educational materials freely, contributing to the global dissemination of knowledge (Waite, 2022). In a world driven by technological advancements and ethical considerations, libraries in the advanced world also play a significant role in educating users about the societal and ethical implications of emerging technologies such as AI, robotics, and biotechnology. They become spaces for critical reflection and ethical discourse (Waite, 2022). Additionally, libraries in the advanced world act as catalysts for global accessibility to information, promoting education and research on a worldwide scale. This is particularly valuable for regions with limited resources, as libraries in the advanced world bridge the gap by providing access to a wealth of information and knowledge (Yin *et al.*, 2018). Thus, the impact of 5IR on libraries in the advanced world and their users are extensive and multifaceted. Libraries in the advanced world have transformed into dynamic, tech-savvy institutions, adapting to the digital age by providing enhanced accessibility, personalized services, data management, and collaborative spaces. While these changes present opportunities for innovation and learning, they also entail challenges related to privacy, data security, and ethical considerations.

The Conundrums Ahead of Libraries and Librarians in Nigeria as They Navigate the Landscape of the Fifth Industrial Revolution (5IR)

Libraries and librarians in Nigeria to navigate the landscape of 5IR are bound to be besieged by hydra-headed bottlenecks going by what was obtained in libraries of developed nations of the world that are already navigating the landscape of the 5IR. To successfully tackle such challenges the librarians and libraries require a well-articulated approach cum strategy if they are to continue in their noble role of upholding the sustainability of knowledge systems. As recorded at the initial stage of upholding the aims of the revolution by both the libraries and their librarians, well notable challenges raised their ugly heads.

One of such challenges writes Singh (2020) is the issue of transition to Digital Libraries. As revealed, transiting from orthodox to digital libraries entails total overhauling of library infrastructure and services which will include digitizing collections, adopting digital cataloguing systems, and ensuring access to electronic resources and at the same time ensuring that the physical materials are properly preserved.

There is also the problem of information overload. It is a stated obvious that in this digital era, library users are awash with vast amounts of data. To subdue this challenge revealed Mahdi et al., (2020), librarians and libraries must implement effective search and content recommendation systems, and also go ahead to provide information literacy programs as to helping users find reliable and relevant sources.

With the emergence of AI and her associated offshoots such as generative AI, machine learning, avatar and AI-Chatbots among others, the challenge of safeguarding user privacy and data security became much pronounced as they remained a major ethical challenge facing libraries and librarians globally in information acquisitions and dissemination. As expressed by Habibza and Odeh et al (2023), safeguarding user data is a complex challenge as it entails implementing strong cybersecurity measures, complying with data protection regulations, and ensuring that user data remains confidential while delivering personalized services.

Furthermore, considering the evolving librarians' roles, librarians as a matter of necessity stated Hickerson et al (2022) must adapt to novel roles, including data management, digital preservation, and technology training. Above all, they need to acquire expertise in these areas to meet the evolving needs of library users and effectively manage digital resources. In addition, librarians should view it as priority in ensuring that all users of their libraries have equal access to digital resources. This implies that libraries and librarians must address the digital divide by offering training programs for users with varying digital literacy levels and providing accessible content, software, and hardware.

Another notable challenge during the formative era is that of digital content curating. As explained Khan, et al (2023), managing digital collections is concerned with selecting, evaluating,

organizing, and preserving of digital resources as to maintaining their relevance and reliability. It also involves addressing content quality and metadata management.

Copyright and Intellectual Property navigation regulations, is another noted challenge. In this regard advised Shrayberg and Volkova (2021) libraries and librarians must provide access to digital content while complying with copyright laws and developing policies that balance user access rights with legal and ethical considerations.

The use of Ethical Technology is not left out of the challenges. The implication is that libraries and librarians must consider before use, the ethical implications of emerging technologies like AI and machine learning. To meet up with this challenge, Nguyen et al (2023) suggest that libraries should develop guidelines for responsible and ethical technology use which will address issues such as bias, privacy, and transparency.

We are in a dynamic digital ecosystem that call for Lifelong Learning. Eventually, the end of the proliferation of nuanced technology seems not to be insight. To overcome the associated challenges of emerging technologies, librarians are encouraging to embrace lifelong learning knowing that digital literacy is an ongoing challenge. In addition posited Vodă et al (2022), libraries must offer educational programs and resources to cater for diverse needs, including digital literacy courses, technology workshops, and skill development resources.

Resource Management is generally seen as a big challenge and when it concerns managing resources for digital acquisitions, technology upgrades, and staff training it is always envisaged as a complex task. To this end, Bansal et al. (2023) underscores the need for an efficient resource allocation with strategic planning and decision-making to meet the demands of the digital era. One other major challenge that lies ahead of librarians and libraries in Nigeria in their cause of navigating the landscape of the 5IR is community engagement. Inasmuch as one may say, that most libraries in Nigeria lack the means to get involved in community engagement, one thing that they should bear in mind is that under 5IR, the community and understanding their evolving information needs is crucial. The assertion is that libraries must actively involve the community in programs and decision-making processes to remain responsive to changing demands and preferences (Maspul and Almalki, 2023).

Finally, there is the challenge of inter-institutional collaboration. Under 5IR libraries will benefit immensely as they can enhance their services through collaboration with other institutions. This challenge asserts Mahardhani (2023), involves building partnerships, sharing resources, and expanding services to create a more comprehensive and accessible information ecosystem. Looking at these challenges and tackling them with the utmost urgency they require is a sine-qua-non for libraries and librarians in Nigeria to ensuring that the vibrancy, relevancy and sustainability of the knowledge systems remain in the dynamic landscape of 5IR. The fifth industrial revolution therefore requires proactive measures, adaptability, and a commitment to creating a future that balances technological advancement with ethical, social, and environmental responsibility.

CONCLUSION AND RECOMMENDATIONS

The deduction is that 5IR has set aside an era that brings reconciliation between man and machine putting into consideration environmental sustainability. In that man and machine are seen as partners in progress therefore should work in unison for the wellbeing of man and global digital ecosystem without endangering any specie. To this end, it has spearheaded a period of remarkable change in the enclave of knowledge system, information management as well the roles of librarians as information managers and custodians of knowledge which in turn requires librarians to acquire new sets of knowledge if they are to fully leverage the gains of the revolution, sustain and strengthen knowledge systems within this ever changing digital ecosystem, and for libraries to be adequately equipped in line with the digital trend in information and knowledge curating. It is not in doubt, that in past two decades or more, librarians and libraries have come to realize that we are in a milieu of relentless transformation and which has resulted to libraries undergoing what may be christened a digital metamorphosis, evolving from traditional repositories of physical books into dynamic hubs of digital resources. Basically, libraries have been playing pivotal role in data management, knowledge curating and digital content dissemination. Both librarians and libraries have harnessed the power of emerging technologies to offer personalized services, fostering a more engaging and efficient service delivery. Against this backdrop the following recommendations are put forward:

- I. In the first instance, and as streamlined earlier in this paper to navigate successfully the landscape of the 5IR and ever-changing digital ecosystem, librarians in Nigeria mandatorily require a holistic set of skills. These skills must encompass both technical and non-technical skills which include, digital literacy, data literacy as well as the ability to critically evaluate sources in an era of information overload. The imposition is that continuous learning and global awareness are prerequisites for understanding and adapting to a rapidly changing world.
- II. The transition to digital libraries, the preservation of privacy and data security and managing an evolving librarian's role are all formidable tasks. To this end, librarians should strive to strike a balance between open access to information and the ethical use of technology is a challenge. Moreover, resource management, community engagement, and inter-institutional collaboration require meticulous planning and execution. Sustainability and environmental responsibility should also be of paramount concerns, as libraries strive to minimize their ecological footprint while fulfilling their educational and information dissemination missions.
- III. Furtherance, in this millennium of monumental transformation with the evolving 5IR, it behooves libraries and librarians in Nigeria just like their counterparts in developed nations like UK and the US to be on the same page to confront 5IR associated conundrums, adapt to the evolving landscape, and shape the future of knowledge systems. Through the seamless integration of innovation and skill acquisition, librarians and libraries alike can

embark on a transformative journey to ensure the sustainability, relevance, and vibrancy of knowledge systems in the ever-evolving landscape of the Fifth Industrial Revolution. This endeavor is a testament to the enduring spirit of human progress, innovation, and adaptability, which will serve as the guiding light through the complexities and opportunities that 5IR unfolds.

- IV. As a follow up to the above, librarians in Nigeria just like their counterparts in developed nations of the world, should embrace continuous learning and embark on upgrading of skills in line with trending technologies as desired in the 5IR. The underlying fact is that in a rapidly evolving technological landscape, staying ahead requires a commitment to continuous learning and adaptability. By librarians embracing the principle of continuous training and strategies, they can ensure that their skills remain relevant and they will continue to grow as professionals. The emphasis is that nuanced technologies which are the bedrock of 5IR, are constantly evolving with new features and updates. It is imperative that librarians stay informed about new development and encourage exploration and experimentation with fresh capabilities to continuously optimize their workflow and stay ahead of the curve.
- V. Planners of curriculum for library schools in Nigeria need to restructure the curriculum in line with the aims of 5IR. New library schools' curriculum should be bent towards the acquisitions of digital and technological knowledge for effective service delivery as librarians are expected to mandatorily embrace new roles in this digital era, including data management, digital preservation, and technology training. Acquiring expertise in these areas is essential to meeting the evolving needs of users and effectively manage digital resources.
- VI. Government and other financiers of library schools in Nigeria, should equip the schools with state-of-the-art equipment to meet up with international standards so as to enable libraries meet up with information needed for the realization of the aims of the revolution.

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