



*A publication of the Department of Library and Information Science,  
University of Maiduguri, Borno State, Nigeria*

## **Transforming Libraries through Organizational Culture in the Fourth Industrial Revolution (4IR) Era**

*Nkata U. Kalu*

*Department of Library and Information Science, Faculty of Education, National Open University of Nigeria, Abuja, Nigeria ([nkkalu@noun.edu.ng](mailto:nkkalu@noun.edu.ng))*

*Adeyemi Adewale Akinola*

*Mountain Top University, Nigeria ([akinolaadeyemi@yahoo.com](mailto:akinolaadeyemi@yahoo.com))*

*Ruth Owolabi*

*Department of Information Resources Management, Babcock University, Ilishan, Ogun State, Nigeria*

*Obinna Jeremiah Okoro*

*Department of Information Resources Management, Babcock University, Ilishan, Ogun State*

Corresponding author: [nkkalu@noun.edu.ng](mailto:nkkalu@noun.edu.ng)

---

### **Abstract**

**Keywords**  
Fourth Industrial Revolution, organisational culture, libraries,

**Introduction:** The Fourth Industrial Revolution (4IR) is a crucial aspect of the technological advancement era that has transformed libraries through organizational culture. However, most academic libraries, especially in developing countries, still struggle to design and implement a workable organizational culture that aligns with the 4IR era. This study explores how organizational culture can transform libraries in the 4IR era.

**Methodology:** A survey research method was adopted. Questionnaires were administered to 84 available respondents out of a total population of 112 library staff from two selected universities (Abia State University, Uturu, and the Federal University of Agriculture, Umudike). A structured questionnaire was used to gather data directly from the respondents for analysis.

**Findings:** The study revealed that 4IR has enhanced organizational culture, particularly through innovation and excellent performance among librarians. However, several challenges were identified, primarily skills and technical mismatches.

**Conclusion/Recommendations:** The study concluded that embracing the complexities associated with the 4IR era would significantly influence organizational culture traits, fostering innovation, new service operations, and excellent performance in libraries and among librarians.



## Introduction

The Industrial Revolution (IR) is the products of improved human's ingenuity, innovativeness, and intellectual capabilities. The IR has become a continuous process and each stage exhibits its uniqueness and distinctive features that is different from the other. Generally, each stage of IR has affected the productivity, growth and socio-economic relationship within the society. In other words, the evidence of the emergence of Fourth Industrial Revolution (4IR) can be witnessed in areas of social relationships, health, governance and educational sector including libraries.

According to Hussain (2019) many trades have highly been affected by 4IR, libraries are one of them. The libraries of twenty-first century are shifting their paradigms from traditional setup to services that supports 4IR technologies such as Artificial Intelligent (AI), robot, 3D printing, automation, Internet of Things (IoT) etc. It is therefore pertinent that Libraries and Librarians who want to effectively adapt to these changing times ought to be exposed to all these different 4IR technologies and identify the ones that will increase their efficiency while keeping and adhering to the culture and values of the libraries (Radebe, 2020).

Culture is the people's values, beliefs, worldviews and philosophy. It is a fundamental element of human life, while culture in organization is the norms, values and assumption that are shared within an organisation. Nowadays, 4IR technologies are rapidly changing how organisations interact, produce, employ, and share in philosophy and worldview. Despite the opportunities being offered by these technologies, there are challenges, issues or threats that are associated with it in the area of social relationships, economies, and, more specifically, the workforce (Singaram, 2012).

Each phase of IR evolution is characterized by some technological advancement that significantly impact manufacturing, production, working relationship which to a very large extent, affects the culture of an organization. Perhaps, an organisational culture has proven to be an effective apparatus to increase the efficiency and agility of individuals and organisations. It also forms a significant determinant of how the principle and dynamism of 4IR affect the libraries and Librarians, and how well the university performs as an organization with distinct features that distinguishes them from other types of organizations (Gaus, Tang & Aki, 2019).

Studies have shown that the university library is an organized and unique institution with several levels and chains of workers. The university library like any other formal department in an organization is designed and managed by people whose job is to combine and use organisational resources to achieve organisational objectives (Omeluzor, 2018; Okon, 2005). Organisational culture in library setting is therefore believed to be the product of the activities and experiences of the librarians and other players in the institution which over time has becomes part of the system. Organisational culture is explicitly important to libraries for the reason that there has been significant restructuring of library institutions, particularly with advancement of technologies in 4IR.

However, the innovation of 4IR technologies in enhancing efficiency, precision, and service quality in libraries is well recognized. A continuous discussion exists on how extensively 4IR has transformed organizational culture and its implications for libraries. This study delves into how organizational culture can transform libraries in the 4IR era.



## Statement of the Problem

The dynamism of 4IR has become the focus of most scholars in recent time. Available literature have shown that increased efficiency can be achieved with the application 4IR technologies such as Artificial Intelligent (AI), robot, 3D printing, automation Internet of Things (IoT) etc. On the other hand, an organized organisational culture which supports sharing of values, philosophy, and worldview of the people within an organization often increases both individual and collective output of the organization. Unfortunately, most academic libraries especially in the developing countries still struggle to design and implement a workable organisational culture that is compatible to the 4IR era.

Observations have shown that most academic libraries still apply the traditional pattern of library services provision in 4IR era which in turn lower their efficiency and productivity. It is evidenced that not much has been done to apply sound organisational culture and emerging 4IR technologies in academic libraries to boost efficiency. It is based on this premise that the research ascertained how organisational culture and the Fourth Industrial Revolution (4IR) transform the efficiency of libraries.

## Research Questions

The study was based on the following research questions

- i. What are the impacts of 4IR in the libraries?
- ii. What are the effects of 4IR era on the organisational culture in Libraries?
- iii. What are the challenges of 4IR era adoption in the university libraries?

## Literature Review

### Concept of IR and emergency of 4IR

All the emerging Industrial Revolutions have witnessed significance leap in industrial invention and productivity. According to Encyclopedia Britannica (2024) IR is the process of change from an agrarian and handcraft economy to one dominated by industry and machine manufacturing (Encyclopedia Britannica, 2024). This suggests that all the emerging industrial revolutions have experienced a significant increase in industrial innovation and productivity, which is more commonly seen as a process of economic transformation rather than a specific timeframe in a particular context.

Radebe (2020), in the analysis of the stages of IR, stated that the First Industrial Revolution applied the water and steam power to mechanize production, while, during the Second IR electric power was created and used for mass production. The Third IR witnessed the application of electronics and information technology to automate production whereas a Fourth Industrial Revolution (4IR) which is building based on the Third IR's digital revolution is said to have been in place since the middle of the last century. According to World Economic Forum (2022), 4IR is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.

The 4IR is the revolution of the industry that has development from formal industries introduced to make life and living better for all. It is recognised by its emerging technological breakthroughs in a number of fields, including robotics, artificial intelligence, nanotechnology, quantum computing, biotechnology, the Internet of Things, the Industrial Internet of Things (IIoT), decentralized consensus, fifth-generation wireless technologies (5G),



additive manufacturing, 3D printing and fully autonomous vehicles.

#### 4IR and the Library

Nkiko & Okuonghae (2021), examined university library in the Fourth Industrial Revolution (4IR) and the preconditions for achieving and sustaining the same in Nigeria. The study stated that 4IR is characterized by a level of automation, deployment of emerging technologies and artificial intelligence, internet connectivity and accessibility to the global information network, subscription to reputable online databases, quality and comprehensive collection in diverse formats, preponderance of digital natives among patrons, increased demand for seamless access to online resources and virtual operations, new library spaces (learning commons, research commons and maker space), open scholarly communication, research data management, social mediation applications, digital creation and preservation. The study also highlighted the challenges militating against effective crystallization of 4IR university libraries to include: financial constraints, inadequate infrastructure, and resistance to change. Others include; inadequate skills and competencies, security and intrusion issues, lack of exposure to international standards, as well as low leadership and capacity building initiatives among others.

Amoa (2023), asserts that as the world is experiencing technological development, the 4IR is taking prominence in the provision of information to library clients. In a doctoral thesis which investigated performance management in Ghanaian university libraries, the author explored fourth industrial revolution and how it has affected the performance of Ghanaian university libraries. Using a mixed methods research approach, the views of 218 university librarians were elicited from selected universities in Ghana. The study found that a significant proportion of Ghanaian university libraries did not apply any 4IR

technologies although they were aware of their benefits. Furthermore, the few libraries which did, only applied the aspects of Internet of Things (IoT), cyber-security and cloud computing. Moreover, most of the libraries were not adequately prepared for implementing 4IR technologies.

In the work of Islam, Basunia, Islam & Chakrabarty (2023) on 4IR and Library-related scientific production from 2010-2021: A Bibliometric analysis from 2010-2021. The study reveals that 4IR is an impactful part of academic research as it impacts libraries, library functions and library professionals' roles. In the 4th industrial revolution, the library services have indistinct, as library documents entail the efficient analysis of the users' demand. New information may be expanded enormously and multi-dimensions of service oriented activity can be offered adopting the 4IR technology. Additionally, professionals can utilize 4IR analytics to assess as well as develop library facilities and deliver additional effective information amenities to the audience. The study concluded that the industrial revolution is a current issue in various dimensions and disciplines.

The 4IR is an on-going process that has affected aspect of the society especially in the area of information and resources management. According to Musonda (2020), the 4IR is characterized by making systems as well as machines intelligent and connected. The underlying technologies of the Fourth Industrial Revolution include artificial intelligence (AI) as well as block chain. Artificial intelligence is a paradigm where physical and social phenomena are programmed to solve complex problems. AI enables machines to learn, adapt, evolve and optimize, and has had a profound impact in diverse fields such as engineering, medical sciences and social sciences. As technology, research and information rapidly change, dissertations and thesis have evolved



alongside. Dissertations and Thesis are an essential resource for research and teaching in the age of the Fourth Industrial Revolution.

### Organisational culture and Libraries

Culture is people's way of life. It has a very important part to play in establishing the process by which the organization evolves. The indication of diversity in cultural affiliation among the various workers in an organization demonstrates the distinctive nature of libraries and librarians in all academic institutions. This brings to mind that the university library with staff members, users and collections cutting across people with multi-culture and different family background has become a focal point of study by scholars.

According to Omeluzor (2018), culture in organization includes values, behaviour, expectations, experiences, philosophy, self-image, inner workings, attitudes, beliefs and customs. Organisational culture is dynamic and changes with time. In the library, organisational culture is a collective understanding, a shared and integrated set of perceptions, memories, values, attitudes and definitions that have been learned over time and which determine expectations (implicit and explicit) of behaviour that are taught to new members in their socialization into the system (Sannwald, 2000).

Rai, (2011) asserts that organisational culture plays a critical role in creating a work environment where library personnel are committed and contribute to the success of the library. In a study by Ariyo & Okwilagwe (2020) on organisational culture and job performance of library personnel, the study discover amongst others that there a significant positive relationship between organisational culture and library personnel in selected academic libraries in the three states in South-

west, Nigeria. On the other hand, Onifade (2015) asserts that it is evident that practicing good organisational culture in information-based organization like the library may enhance staff development, trust, and mentoring which can lead to staff retention. Hence, positive organisational culture increases staff alignment, resulting in enhanced organisational effectiveness

Kalu (2018) was of the opinion that personnel effectiveness is crucial to the survival of universities hence, the extent to which the effectiveness is achieved depend to a large extent on the prevailing organisational culture within the organization. In a related study, Omeluzor (2018) reveals that imbibing positive organisational culture in the university libraries in the areas of training, promotion, payment of salaries and rewarding deserving librarians have the potential of reducing turnover intentions.

Osinbanjo and Adeniji (2013) studied organisational culture and human resource practices in selected Nigeria Private universities. The study involved 237 respondents and the result showed a close relationship between organisational culture and employees' performance among other human resource practices. In line with Osibanjo & Adeniji, Igbinovia & Popoola (2016) studied 1633 library personnel in Edo State, Nigeria and discovered that their job performance was high and their organisational culture was good. The study further reveals a significant and positive relationship between organisational culture and job performance. Similarly, Osuigwe (2016) carried out a study among the 77 staff members of the Anambra State Library Board, and discover that certain aspects of organisational culture encouraged performance in the area of innovations.

Yesil and Kaya (2013) did a study on organisational culture and financial



performance. The respondents were managers of firms in Gaziatep, Turkey. The result reveals that dimensions of organisational culture had no effect on firm financial performance. The study of Mamza, Bassi and Mohammed (2015) corroborated that of Yesil and Kaya (2013) on the impact of library staff organisational culture on automation in libraries. The respondents were 125 library staff, of the three federal universities in the North-East zone of Nigeria. The findings recorded low implementation of automation in some libraries and highly significant organisational values and norms.

### **Challenges of Libraries in 4IR era**

The 4IR era is not without issues and prospects, Manda & Dhaou (2019) asserts that the 4IR brought economic and social opportunities and challenges which should be handled and dealt with appropriately in order to respond to it.

**Challenges:** Manda & Backhouse (2017) and Schwab (2016) state that the tools and applications of 4IR can disrupt society, business and government through its innovations. The European Parliament (2016) identified the challenges experienced in Europe as changing business models, skills mismatch, intellectual property issues, and the need for investment, data issues, standards, and legal questions of liability. Dregger, Niehaus, Ittermann, Hirsch-Kreinsen, & ten Hompel (2016) pointed out that in Germany; the challenges in the 4IR era are increased social insecurity, job loss, new kinds of stress, and disqualification.

**Opportunities:** Libraries can also take advantage of the opportunities that are offered by the 4IR and those in the developing countries can align themselves with the

developed countries by embracing the use of AI, big data analytics and block-chain. Library users are now able to afford and access the digital world due to the advances in technology regardless of time and location. Academic Libraries are now offering both on and off campus access to information resources and patrons only need an internet connection to enjoy the facilities where they can access the services 24/7. This has greatly increased the use of electronic resources since convenience of accessing library services had been improved. New products and services that increase the efficiency of library services are also being introduced in libraries due to the 4IR technologies. These include the use of social media platforms to communicate with clients, online reference services, online renewal of print materials, and self-services at circulation points.

### **Research Methodology**

The study was conducted to examine how organizational culture can transform libraries in the 4IR era. A survey research approach was adopted. A purposive sampling technique was also adopted for convenient reason. A total number of 84 available respondents were administered the questionnaire out of the total population of 112 library staff from (Abia State University, Uturur and Federal University of Agriculture, Umudike). A structured questionnaire was used to collect data the quantitative data was analysed using the Statistical Product and Service Solutions (SPSS) software version 22.0. The analysed data was presented using table of frequency counts and percentage scores to ensure an easy understanding of the analysis.



**Data Analysis**

**Research question one: What are the impacts of 4IR in libraries?**

**Table 1: Impacts of 4IR in Libraries**

What are impacts of 4IR in libraries?	SA	A	SD	D
	F(%)	F(%)	F(%)	F(%)
Promoting Library advocacy and general administration	17 (20.2%)	30 (35.7%)	21 (22%)	16 (19%)
Limiting direct/face to face contacts between users and librarians	29 (34.5%)	31 (36.9%)	12 (14.2%)	12 (14.2%)
Advancing the management of information resources in all formats	26 (30.9%)	22 (26.1%)	16 (19%)	18 (21.4%)
Advancing virtual and new services in library operations	43 (51.1%)	35 (41.6%)	6 (7.1%)	-

**Sources:** Research fieldwork 2024

Table 1 presented the responses of participants regarding the impact of the 4IR Era in libraries. In terms of promoting Library advocacy and general administration, the table revealed that 20.2% strongly agreed, 35.7% agreed, 22% strongly disagreed, and 19% disagreed. When considering the area of Limiting direct/face-to-face contacts between users and librarians, 34.5% strongly agreed, 36.9% agreed, 14.2% strongly disagreed, and 14.2% disagreed. For advancing the management of information resources in all

formats, 30.9% strongly agreed, 26.1% agreed, 19% strongly disagreed, and 21.4% disagreed. Finally, in the area of advancing virtual and new services in library operations, 51.1% strongly agreed, 41.6% agreed, and 7.1% strongly disagreed.

This indicate that the advancement of virtual and new services in library operations is the most impacted area by the 4IR, with a cumulative frequency and percentage of 92.8% (78 respondents) respectively.

**Research question two: What are the effects of 4IR era on the organisational culture in Libraries?**

**Table 2: Effects of 4IR on organizational culture in libraries**

What are the effects of 4IR era on the organisational culture in Libraries?	SA	A	SD	D
	F(%)	F(%)	F(%)	F(%)
It enhances innovation and excellence performance	59 (70.2%)	18 (21.4%)	4 (4.7%)	3 (3.5%)
Encourages team work and increases productivity	34	21	24	5



	(40.4%)	(25%)	(28.5%)	(5.9%)
Increases mutual relationship and trust	19	21	19	25
	(21.6%)	25%	(21.6%)	(29.7%)
It encourages administrative bottleneck	-	28	29	27
		(33.3%)	(34.5%)	(32.1%)
Rewarding of excellence performance	31	31	11	11
	(36.9%)	(36.9%)	(13%)	(13%)

**Sources:** Research fieldwork 2024

Table 2 illustrates the impact of organizational culture within libraries during the 4IR era. In terms of enhancing mentorship and promoting excellence performance, 70.2% of respondents strongly agree, 21.4% agree, 4.7% strongly disagree, and 3.5% disagree. Additionally, in fostering teamwork and increasing productivity, 40.4% strongly agree, 25% agree, 28.5% strongly disagree, and 5.9% disagree. The aspect of building mutual relationships and trust saw 21.6% strongly agree, 25% agree, 21.6% strongly disagree, and 29.7% disagree. Furthermore, in

addressing administrative bottlenecks, 33.3% agree, 34.5% strongly disagree, and 32.1% disagree. Regarding the recognition of excellence performance, 36.9% strongly agree, 36.9% agree, 13% strongly disagree, and 13% disagree.

In conclusion, the findings revealed that a majority of respondents believe that organizational culture plays a crucial role in enhancing innovation and excellence performance among librarians in the 4IR era, with a cumulative frequency and percentage of 77 and 91.6% respectively.

**Research question three:** What are the challenges of 4IR era adoption in the university libraries?

**Table 3: Challenges of 4IR era adoption in the university libraries**

What are the challenges of 4IR era adoption in the university libraries?	SA	A	SD	D
	F(%)	F(%)	F(%)	F(%)
There are skills and technical mismatch	32 (38%)	41 (48.8%)	-	11 (13%)
4IR has increased social insecurity	27 (32.1%)	31 (36.9%)	8 (9.5%)	18 (21.4%)
There are increasing Intellectual Property Right issues	18 (21.4%)	30 (35.7%)	18 (21.4%)	18 (21.4%)
Lack of fund to finance the system	23 (27.3%)	33 (39.2%)	14 (16.6%)	14 (16.6%)
Lack of capacity building initiative	29 (34.5%)	20 (23.8%)	20 (23.8%)	15 (17.9%)
Decreasing face-to-face interaction and social bond among workers and between clients	24 (28.5%)	20 (23.8%)	20 (23.8%)	20 (23.8%)

**Sources:** Research field 2024

The result in Table 3 explore the challenges of adopting the 4IR era in university libraries

provides insightful data on various aspects. The findings indicate that skills and technical





mismatches are a prominent concern, with 38% strongly agreeing and 48.8% agreeing. Furthermore, the rise of social insecurity due to 4IR is acknowledged by 32.1% of respondents who strongly agree and 36.9% who agree. Intellectual Property Rights issues are also on the rise, as seen with 21.4% strongly agreeing and 35.7% agreeing. Financial constraints in financing the system are a challenge, with 27.3% strongly agreeing and 39.2% agreeing. Additionally, the lack of capacity building initiatives is a concern, with 34.5% strongly agreeing, 23.8% agreeing, 23.8% neutral, and 17.9% disagreeing. Lastly, the decrease in face-to-face interactions and social bonds among workers and clients is observed, with 28.5% strongly agreeing and 23.8% in each of agree, neutral, and disagree categories.

In conclusion, the findings revealed the challenges of 4IR era adoption in university libraries are encompassing skills mismatches with a cumulative frequency and percentage of 73 and 86.6% respectively. Others include social insecurity, Intellectual Property Rights issues, financial limitations, capacity-building gaps, and diminishing interpersonal connections. These challenges require strategic interventions to navigate the complexities of technological advancement in academic library settings.

### **Discussion of finding**

Research question one (1) ascertained the impact of 4IR on the Libraries. The study reveals that the advancement of virtual and new services in library operations is the most impacted area by the 4IR, with a cumulative frequency and percentage of 78 respondents and 92.8% respectively. This is in line with the study of Islam, Basunia, Islam & Chakrabarty (2023) which reveals that 4IR is an impactful part of academic research as it impacts libraries, library functions and library professionals' roles. Also in line with the findings in the study of Nkiko & Okuonghae

(2021) which asserts that 4IR promotes automation, deployment of emerging technologies and artificial intelligence, internet connectivity and accessibility to the global information network, subscription to reputable online databases, quality and comprehensive collection in diverse formats, preponderance of digital natives among patrons, increased demand for seamless access to online resources and virtual operations, new library spaces (learning commons, research commons and maker space), open scholarly communication, research data management, social mediation applications, digital creation and preservation.

Research question two (2) find out effects of 4IR era on the organisational culture in Libraries. The study reveals that organizational culture plays a crucial role in enhancing innovation and excellence performance among librarians in the 4IR era, with a cumulative frequency and percentage of 77 respondents and 91.6% respectively. This conformed to the study of Osuigwe (2016) which discovered that certain aspects of organisational culture encouraged performance in the area of innovations. Furthermore, the findings also support the study of Rai (2011) which asserts that organisational culture plays a critical role in creating a work environment where library personnel are committed and contribute to the success of the library.

Research question three (3) was designed to ascertain the challenges of 4IR era adoption in the university libraries. The finding shows that there are several challenges confronting the 4IR as it relates to organisational culture and the Libraries. Chief among them is the skills and technical mismatch with a cumulative frequency and percentage of 73 respondents and 86.6% respectively. This is in line with the study of Amoa (2023), which asserts that a significant proportion of Ghanaian university libraries did not apply any 4IR technologies



although they were aware of their benefits. The study further explained that the few libraries which did, only applied the aspects of Internet of Things (IoT), cyber-security and cloud computing. Moreover, most of the libraries were not adequately prepared for implementing 4IR technologies. In addition The European Parliament (2016) identified the challenges experienced in Europe as changing business models, skills mismatch, intellectual property issues, and the need for investment, data issues, standards, and legal questions of liability.

### Conclusion

Based on the detailed examination of the impact of the Fourth Industrial Revolution (4IR) on university libraries, it is evident that this technological advancement has significantly influenced various aspects of library operations. The transition towards virtual and innovative services within library functions emerged as the most profoundly affected area by the 4IR, underscoring the fundamental shift towards digital platforms and advanced technologies. Furthermore, the crucial role of organizational culture in promoting innovation and excellence among librarians in the 4IR era highlights the importance of fostering a conducive work environment that encourages creativity and continuous improvement.

Additionally, the challenges associated with the adoption of 4IR technologies in university libraries, particularly the skills and technical mismatches, pose significant obstacles to the seamless integration of advanced tools and systems. Addressing these challenges and bridging the gap between awareness and implementation of 4IR technologies is imperative for libraries to adapt and thrive in the evolving digital landscape. The findings underline the complex interplay between technological advancements, organizational culture, and the need for strategic planning and preparedness to navigate the complexities of

the 4IR era within the context of library settings.

### Recommendation

Based on the finding of the study recommends the following;

1. Libraries should implement training programs focused on enhancing the skills of library staff to effectively navigate and utilize 4IR technologies. Prioritize training on emerging technologies, artificial intelligence, and digital tools to bridge the skills and technical mismatch identified in the study.
2. The management of the library should cultivate an organizational culture that fosters innovation and encourages library professionals to explore new ideas and technologies. Establish mechanisms for continuous learning and adaptation to promote excellence performance in the 4IR era.
3. Library management should allocate resources for upgrading library infrastructure to support the adoption of 4IR technologies. Ensure access to high-speed internet connectivity, robust cybersecurity measures, and adequate support for implementing digital initiatives within library operations.
4. There must collaboration among university libraries to exchange best practices and experiences in implementing 4IR technologies. Create platforms for knowledge sharing and networking to address common challenges and leverage collective expertise.
5. Library should develop strategic plans that outline clear goals and roadmaps for integrating 4IR technologies into library functions. Emphasize the importance of proactive planning, assessment of readiness, and the establishment of measurable outcomes to drive successful adoption and implementation of innovative technologies.



## References

- Ahmat, M. A., & Hanipah, R. A. A. (2018). Preparing the libraries for the fourth industrial revolution (4th IR). *Journal PPM: Journal of Malaysian Librarians*, 12(1), 53-64. Accessed from <https://core.ac.uk/reader/196237350>
- Amoah, G. B., & Minishi-Majanja, M. K. (2023). Ghanaian University Libraries' Preparedness for the Fourth Industrial Revolution. *African Journal of Library, Archives & Information Science*, 33(1), 51-64. Available on <https://ir.ucc.edu.gh/xmlui/bitstream/handle/123456789/9786/>
- Echem, M., & Lulu-Pakubo, B. P. (2022). Examining the impact of industry 4.0 on academic libraries: Accessed from: <https://www.researchgate.net/publication/358047235>
- Encyclopedia Britannica (2024). Industrial revolution: definition, characteristics <https://www.britannica.com/event/Industrial-Revolution/The-first-Industrial-Revolution>
- European Parliament (2016). Towards a digital single market Act: European Parliament resolution of 19 January 2016 on Towards a Digital Single Market Act (2015/2147(INI)). <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016IP0009&rid=7>
- Gaus, N., Tang, M., & Akil, M. (2019). Organisational culture in higher education: mapping the way to understanding cultural research. *Journal of Further and Higher Education*, 43(6), 848-860. Accessed from <https://www.academia.edu/101481404/> (28<sup>th</sup> February, 2024)
- Islam, M. M., Basunia, D. R., Islam, M. N., & Chakrabarty, R. (2023) 4th Industrial Revolution and Library-Related Scientific Production from 2010-2021: A Bibliometric Analysis" *Library Philosophy and Practice (e-journal)*. 7838. <https://digitalcommons.unl.edu/libphilprac/7838>
- Kaarst-Brown, M. L., Nichol森, S., vonDran, G. M., & Stanton, J. M. (2024). Organisational culture of libraries as a strategic resources <https://www.researchgate.net/publication/474>
- Kalu, N. U. (2018) Records management practices, organisational culture and administrative effectiveness of Registry staff of National Open University of Nigeria, North Central Zone, Nigeria. *An unpublished PhD Thesis submitted to the Department of Information Resources Management, Babcock University, Ilisha Remo, Ogun State, Nigeria.*
- Makinde, O. O., & Opeke, R. O. (2018). Organizational Culture and Job Effectiveness of Librarians in South-West Nigerian Universities. *Library Progress (International)*, 38(1), 12-27DOI: 10.5958/2320-317X.2018.00002.8.
- Mamza, W. P., Bassi, M. D., & Mohammed, Z. A. (2015). Impact of staff organisational culture on the implementation of automation in libraries of Federal Universities in the North East Zone of Nigeria. *Information Impact: Journal of Information and Knowledge Management*, 6(2), 159-168.
- Nkiko, C. & Okuonghae, O. (2021) Achieving the 4IR University Library in Sub-Saharan Africa: Trends, opportunities and challenges <https://apcz.umk.pl/FT/article/view/33998>



- Okon, H. I. (2005). Effective communication and smooth administration of academic libraries in the 21st century: a new paradigm in Nigeria. *Library Philosophy and Practice*, 8.1.
- Onifade, F. N. (2014). Knowledge sharing and organisational culture as factors affecting organisational effectiveness among Federal University Librarians in Nigeria. Being a Ph.D. thesis submitted to the Department of Library and Archival Studies, University of Ibadan, p.17
- Omeluzor, S. U. (2018) Organisational culture variables as factors influencing librarians' turnover intentions in University Libraries in South-South and South-East of Nigeria. *Library Philosophy and Practice (e journal)*1693.  
<https://digitalcommons.unl.edu/libphilprac/1693>
- Osibanjo, O. A., & Adeniji, A. A. (2013). Impact of organisational culture on human resources practices; A Study of Selected Nigerian Private Universities. *Journal of Competitiveness*, 5(4) 115-133.
- Osuigwe, N. E. (2016). Leveraging on organisational culture for innovative services: A case study of Prof. Kenneth Dike State Central e-library Awka. *Library Philosophy and Practice (e-journal)*, 1447. Available at <http://digitalcommons.uni.edu/libphi/prac/1447>.
- Popoola, S. O. (2003). *Preservation and conservation of information resources*. Ibadan: Distance Learning Centre.
- Radebe, M. C (2020). Dynamics that fourth industrial revolution will change on organisational culture. Accessed on 25<sup>th</sup> February, 2024 from <https://www.linkedin.com/pulse/dynamics-fourth-industrial-revolution-change-culture-radebe>
- Rai, R. K. (2011). Knowledge management and organizational culture: a theoretical integrative framework. *Journal of knowledge management*, 15(5), 779-801.
- Sannwald, W. (2000). Understanding organisational culture. *Library Administration and Management*, 14(1), 8-14.
- Sinaram, S. (2012). The influence of 4IR on organisational culture. Being a Master of Philosophy Degree Thesis submitted to the University of Johannesburg. Access from: <https://www.proquest.com/openview/a0ad11041053/2> (26<sup>th</sup> February, 2924)
- Yesil, S., & Kaya, A. (2013). The effect of organisational culture on firm financial performance: Evidence from a developing country. *Procedia-Social and Behavioural Sciences*, 81, 428-437.