# Open Access and Digital Preservation in the 5th Industrial Revolution: A Case Study of the College Library, Federal College of Education, Yola

**Saad Suleiman**
(suleimanasadu@fceyola.edu.ng)

**Abdulmalik Bappa Mahood**
(bamahmud@fceyola.edu.ng)

**Saad Ibrahim**
(saad.ibrahim@fceyola.edu.ng)

Prof Mustapha Abba Library
Federal College of Education,
Yola, Adamawa

And

Mustapha Aliyu
(Mustaphaaliyu79@gmail.com)

Prof. Jibril Amin Library,
Adamawa State College of
Nursing Sciences, Yola

*Abstract*

*This study explores the integration of open access and digital preservation strategies within the context of the Fifth Industrial Revolution (5IR), with a specific focus on the College Library of the Federal College of Education, Yola. The 5IR is characterized by the convergence of advanced digital technologies with human-centred innovation, requiring academic institutions to rethink how knowledge is stored, accessed, and preserved. The research investigates the current technologies adopted, evaluates their impact on teaching, learning, and research, and identifies the key challenges faced in implementation. Data were collected through a mixed-method approach involving interviews, surveys, and document analysis. The findings reveal that while the library has made notable progress in adopting open access repositories and digitization initiatives, challenges such as inadequate infrastructure, limited funding, and staff capacity persist. The study concludes that for institutions to fully harness the benefits of OA and digital preservation in the 5IR, there must be strategic investment in infrastructure, policy frameworks, and capacity building.*

*Keywords: Open Access, Digital Preservation, Fifth Industrial Revolution, Academic Libraries.*

## 1.1 Introduction

The Fifth Industrial Revolution (5IR) marks a transformative phase characterized by the convergence of advanced technologies such as artificial intelligence (AI), the Internet of Things (IoT), quantum computing, and biotechnology with human creativity and ethical considerations. This revolution builds upon the digital foundations of the Fourth Industrial Revolution, further reshaping how information is created, accessed, and preserved (Schwab, 2017). In this context, open access and digital preservation have become critical components for ensuring equitable, sustainable, and long-term availability of knowledge resources. Empirical research in this area focuses on how libraries and archival institutions integrate cutting-edge technologies to transition towards paperless, intelligent systems that support seamless access, enhanced inclusivity, and effective preservation of digital content (Modiba & Marutha, 2023; Kang et al., 2021).

Studies highlight that AI and intelligent robotic systems play a pivotal role in automating the digitization and management of digital archives, thus improving accessibility and safeguarding digital heritage in the 5IR era (Modiba & Marutha, 2023). Furthermore, the shift to open access frameworks within this technological milieu facilitates the democratization of information, enabling users

worldwide to engage with scholarly and archival materials without traditional barriers. However, challenges such as data security, digital literacy, and infrastructural readiness remain significant, necessitating ongoing empirical investigation to develop robust strategies for digital preservation and open access in the 5IR (Kang et al., 2021; Modiba & Marutha, 2023).

This empirical research seeks to explore these dynamics by examining how open access initiatives and digital preservation practices are evolving within the context of the Fifth Industrial Revolution, emphasizing the role of emerging technologies in transforming library and archival services to meet contemporary and future knowledge demands.

## 1.2 Statement of the Problem

Despite the increasing importance of open access and digital preservation in academic libraries, many college libraries in Nigeria, including the Federal College of Education, Yola, face significant challenges in effectively managing and preserving digital resources. These challenges include inadequate funding, insufficient infrastructure, and the absence of comprehensive digital preservation policies. Furthermore, while open access initiatives aim to provide unrestricted access to educational and research materials, the sustainability and long-term accessibility of these digital resources remain uncertain due to technological obsolescence, copyright issues, and poor organizational strategies. In the context of the Federal College of Education, Yola, there is limited empirical evidence on how open access is integrated with digital preservation practices, the specific strategies employed, and the extent to which these practices support teaching, learning, and research activities. Therefore, this study seeks to investigate the current state of open access and digital preservation in the college library, identify the challenges faced, and propose viable strategies to enhance the management

and preservation of digital resources.

## 1.3 Research Objectives
1.  Examine the current strategies and technologies adopted for open access and digital preservation in the College Library.
2.  To evaluate the impact of open access and digital preservation initiatives on teaching, learning, and research.
3.  To assess the challenges faced by the College Library in implementing effective open access and digital preservation practices.

## 1.4 Research Questions
1.  What are the current strategies and technologies adopted for open access and digital preservation?
2.  What is the impact of open access and digital preservation initiatives on teaching, learning, and research?
3.  What are the challenges faced by the College Library in implementing effective open access and digital preservation practices?

## 2.1 Literature Review

The Fifth Industrial Revolution (5IR) has redefined global approaches to open access and digital preservation, emphasizing human-machine collaboration, intelligent systems, and sustainable knowledge ecosystems. This literature review synthesizes international trends and innovations in these areas, contextualized through the case study of the College Library at the Federal College of Education (FCE), Yola, Nigeria.

## Global Trends in Open Access and Digital Preservation

The 5IR integrates artificial intelligence (AI), blockchain, and IoT to enhance digital preservation frameworks and open access initiatives. Globally, libraries are transitioning to paperless systems, leveraging AI for automated metadata tagging, predictive

analytics for resource management, and blockchain for ensuring data integrity. For example, Modiba & Marutha (2023) highlight AI's role in South Africa's public archives, enabling real-time data curation and reducing human error. Similarly, Enakrire *et al* (2024)emphasize the adoption of cloud-based repositories and federated learning systems to democratize access while preserving digital content.

Open access in the 5IR era prioritizes interoperability, with platforms like PubMed Central and institutional repositories adopting FAIR (Findable, Accessible, Interoperable, Reusable) principles. The National Library of Australia's PADI initiative exemplifies this through its gateway to global digital preservation resources, fostering cross-institutional collaboration.

**Synthesis of Global and Local Perspectives**

The 5IR presents transformative opportunities for libraries like FCE Yola, yet its benefits remain unevenly distributed. While global frameworks advocate for AI-driven preservation and decentralized access, institutions in resource-limited settings prioritize basic digitization and infrastructure stabilization. Bridging this gap requires:

1. **Policy Harmonization**: Adopting international standards (e.g., OAIS Reference Model) while tailoring strategies to local infrastructural realities.
2. **Capacity Building**: Partnering with organizations like the Digital Preservation Coalition to train staff in AI and blockchain applications.

**Sustainable Funding Models**: Leveraging public-private partnerships to invest in renewable energy and modular ICT systems. (Adigun et al, 2024)

The Fifth Industrial Revolution (5IR) heralds an era where advanced technologies such as artificial intelligence (AI), robotics, Internet of Things (IoT), and cloud computing converge with human-centric values, reshaping knowledge management globally. Within Africa, academic libraries are increasingly engaging with these technologies to enhance open access and digital preservation, though their experiences reflect distinct regional challenges and opportunities.

Across Africa, there is a growing commitment to digital preservation and open access, driven by the need to safeguard rapidly expanding digital scholarly outputs and cultural heritage. Studies indicate that many African academic libraries have embraced institutional repositories (IRs) as foundational tools for digital preservation, with DSpace being the predominant software platform utilized (Anyaoku et al, 2019). These IRs facilitate the long-term preservation of these dissertations and research outputs, ensuring wider accessibility. Moreover, initiatives such as the Association of African Universities (AAU) and collaborative workshops by UNESCO have promoted capacity building in digital library development, fostering skills in ICT and digital archiving across the continent (Masenya & Ngulube, 2019; Macha & De Jager, 2011).

Information professionals in African academic libraries are increasingly recognized as pivotal agents in navigating the 5IR landscape. Their roles now encompass not only traditional librarianship but also the management of digital resources, policy formulation, and integration of emerging technologies (Masenya & Ngulube, 2019; Macha & De Jager, 2011).Institutional commitment is critical; many African universities have prioritized digital preservation as a strategic objective, establishing dedicated repository managers and digital preservation units to oversee these functions (Anyaoku et al., 2019). However, the shortage of technical expertise remains a significant barrier, underscoring the need for targeted training and international partnerships.

The advent of the Fifth Industrial Revolution (5IR) has accelerated the integration of advanced digital technologies in library and information services globally, including Nigeria. Nigerian academic libraries, such as the College Library at the Federal College of Education, Yola, are increasingly adopting open access and digital preservation strategies to align with these global trends. However, empirical studies reveal that the Nigerian context presents unique challenges and opportunities shaped by infrastructural, policy, and capacity factors.

Digitization and open access initiatives in Nigerian academic libraries have gained momentum as essential tools for preserving information resources and enhancing accessibility. Abdulsalami, Nwachukwu, and Salami (2015) found that digitization helps safeguard deteriorating print materials and facilitates broader access to academic content in Nigerian universities. Similarly, academic libraries are gradually embracing institutional repositories and web archiving to support open access and long-term preservation of theses, dissertations, and other scholarly outputs (Ayodele & Oluwatoyin, 2024). These efforts reflect a growing awareness of the importance of digital preservation in sustaining Nigeria's intellectual heritage amid the rapid technological changes of the 5IR.

The 5IR's emphasis on AI, data analytics, and interconnected systems raises additional considerations for Nigerian libraries. Ethical concerns related to data privacy, equitable access, and responsible use of digital resources are increasingly relevant. Nigerian libraries must therefore not only adopt advanced technologies but also develop policies and training programs that address these emerging issues while empowering users through digital literacy initiatives (Enakrire et al, 2024).

## 2.1 Strategies Adopted on Open Access and Digital Preservation in the 5th Industrial Revolution

The 5th Industrial Revolution (5IR), characterized by the convergence of advanced technologies and human-centric innovation, has introduced transformative strategies for enhancing open access and digital preservation in academia, libraries, and information centres. The following strategies reflect the integration of cutting-edge technology with inclusive and sustainable knowledge sharing practices.

### (a) Human-AI Collaboration for Digital Curation

In the 5IR, artificial intelligence (AI) is leveraged alongside human expertise to automate metadata creation, content classification, and predictive preservation. This synergy enables faster and more accurate digital archiving while allowing librarians to focus on strategic decisions (Raimo et al., 2023).

### (b) Blockchain for Secure and Transparent Access

Blockchain technology is increasingly adopted to ensure the authenticity and integrity of digital records. Through decentralized ledgers, institutions can provide transparent and tamper-proof access to open educational resources and research outputs (Turkanović et al., 2020).

### (c) Cloud-Based and Edge Computing Infrastructure

Scalable cloud solutions and edge computing technologies are used to support long-term storage, quick retrieval, and distributed access to digital content. These tools reduce reliance on local servers and improve preservation resilience across geographies (Gantz & Minton, 2021).

### (d) Inclusive and Ethical Open Access Models

The 5IR emphasizes ethical access and the democratization of knowledge. Institutions are

adopting inclusive open access policies that remove barriers for underserved populations while encouraging knowledge equity through Creative Commons licensing and global repositories (UNESCO, 2021).

### (e) Sustainable Digital Preservation Frameworks

Environmental sustainability is now a key factor in digital preservation. Institutions are adopting green IT practices, such as energy-efficient storage systems and carbon-conscious data centers, aligning with the human-centric ethos of the 5IR (Xiao et al., 2022).

### (f) Policy and Institutional Integration

Effective open access and preservation strategies in the 5IR require strong institutional policies. Organizations are embedding digital preservation into institutional strategic plans and aligning them with national and international mandates, ensuring long-term commitment and compliance (IFLA, 2020).

### (g) Impacts of Open Access and Digital Preservation in the 5th Industrial Revolution

The 5th Industrial Revolution (5IR) signifies a paradigm shift from purely technological advancement to a human-centered approach that harmonizes artificial intelligence (AI), robotics, and digital innovation with empathy, sustainability, and inclusivity. Within this framework, open access (OA) and digital preservation have become critical enablers of equitable knowledge dissemination, lifelong learning, and innovation.

### 1. Democratization of Knowledge

Open access in the 5IR has accelerated the global democratization of knowledge, enabling scholars, students, and professionals, especially in developing regions, to access high-quality academic resources without cost barriers. This fosters inclusive education and

bridges the knowledge gap between the Global North and South (UNESCO, 2021).

### 2. Enhanced Research Visibility and Collaboration

OA initiatives have amplified the visibility, reach, and citation impact of scholarly work. Researchers can now share findings more rapidly and engage in cross-border collaborations, leading to more interdisciplinary and impactful research outcomes (Piwowar et al., 2018).

### 3. Preservation of Cultural and Scientific Heritage

Digital preservation ensures the long-term safeguarding of academic, cultural, and scientific data, protecting them from loss due to obsolescence, disasters, or degradation. This supports historical continuity and the availability of legacy research for future generations (Conway, 2020).

### 4. Support for Data-Driven Innovation

The 5IR thrives on data-intensive innovation. Open access to research data and preserved digital content enables machine learning, big data analytics, and AI-driven solutions in health, education, agriculture, and climate science (Raimo et al., 2023).

### 5. Promotion of Ethical and Sustainable Practices

Digital preservation and open access align with sustainable development goals (SDGs) by promoting ethical, transparent, and environmentally responsible access to information. Institutions are adopting green IT practices and inclusive access models to support equitable and eco-friendly digital infrastructures (Xiao et al., 2022).

### 6. Empowerment of Lifelong Learners

The integration of OA and digital preservation in the 5IR empowers lifelong learners by offering continuous access to evolving

knowledge bases. Learners outside traditional academic settings can engage with the latest research, fostering continuous personal and professional growth (OECD, 2020).

### 3.1 Methodology

The study adopted a survey research design through the use of a qualitative research method. Surveys are effective for gathering information directly from your sample population. It is a common research plan that researchers across different industries, such as marketing, manufacturing, and technology, employ. The questionnaire was used to solicit data from the respondents (Indeed, 2024). The total population of the study is 86 respondents. 30 respondents were selected from the college library staff, while 56 staff members were selected from various schools in the college. The researchers adopted the stratified, random sampling technique. The population of the study is made up of two strata: 46 males and 40 females.

### 3.2 Method of Data Analysis

Data was analyzed by using frequency and simple percentages. Results were also presented in tables. The percentage of respondents was used to simplify and reduce the presentation of the raw data. These include the calculations of percentages and tables that were necessary. A percentage of 99.9% - 50% was accepted as Strongly Agree (SA) - Agree (A) – by respondents, while 49.9% - 0.99% was considered as Strongly Disagree (SD) – Disagree (D) by the respondents. If the percentage of response rate from the research question table was 50% or above, it was considered accepted, while a percentage response rate below 50% was considered rejected. The presentation, analysis, and interpretation of data are presented below.

### 4.1 Result and Analysis of Data

**Research Question 1:** What are the current strategies and technologies adopted for open access and digital preservation?

| S/N | ITEM | S A | A | S D | D | TOTAL |
|-----|------|-----|---|-----|---|-------|
| 1 | The institution actively implements digital preservation strategies in line with global best practices. | 9 10.46% | 67 57.62% | 7 6.02% | 3 2.58% | 86 100% |
| 2 | The library uses advanced technologies (e.g., cloud storage, digital repositories) for long-term preservation of academic resources. | 53 61.62% | 23 26.74% | 9 10.46 | 1 1.16% | 86 100% |
| 3 | Staff are regularly trained on the use of digital tools and platforms for open access publishing and preservation. | 44 51.16% | 10 11.62% | 22 25.58% | 10 11.62% | 86 100% |

**Key: Strongly Agree (SA) - Agree (A) - Strongly Disagree (SD) – Disagree (D)**

From Table 1 above, 76 (68.08%) fall within the Strongly Agree–Agree category, respondents agreed that the institution actively implements digital preservation strategies in line with global best practices, and 73 (88.36%) of respondents agreed, this item shows a Strongly agree and Agree among respondents believe that the library uses advanced technologies for long-term preservation, While 62.78% of respondents agreed, a notable portion (37.2%) disagreed. Nevertheless, the item still falls within the Strongly Agree–Agree category, indicating that staff training is perceived positively.

**Research Question 2:** What is the impact of open access and digital preservation initiatives on teaching, learning, and research?

| S/N | ITEM | S A | A | S D | D | TOTAL |
|---|---|---|---|---|---|---|
| 1 | Open access to digital resources has improved the quality of research outputs at the institution. | 73 84.88% | 5 5.81% | 3 3.48% | 5 5.81% | 86 100% |
| 2 | Digital preservation ensures continuous access to learning materials for students and lecturers. | 61 70.93% | 19 22.09% | 6 6.97% | 0 0.00% | 86 100% |
| 3 | Teaching staff frequently incorporate open-access materials into their course content and teaching methods. | 70 81.39% | 9 10.46% | 4 4.65% | 3 3.48% | 86 100% |

**Key: Strongly Agree (SA) - Agree (A) - Strongly Disagree (SD) – Disagree (D)**

**From Table 2 above shows that, 78 (90.69%) respondents agreed** that, Open access is viewed as having a very positive impact on research quality, and 80 (93.02%)**agreed that,** Digital preservation is crucial for academic continuity, while 79 (91.85%) agreed open access materials are widely used in teaching.

**Research Question 3:** What are the challenges faced by the College Library in implementing effective open access and digital preservation practices?

| S/N | ITEM | S A | A | S D | D | TOTAL |
|---|---|---|---|---|---|---|
| 1 | The library lacks sufficient funding to fully implement digital preservation technologies. | 59 68.60% | 18 20.93% | 7 8.13% | 2 2.32% | 86 100% |
| 2 | Inadequate IT infrastructure poses a major challenge to open access and preservation initiatives. | 64 74.41% | 20 23.25% | 1 1.16% | 1 1.16% | 86 100% |
| 3 | There is limited institutional policy support for the adoption of open access and digital preservation practices. | 47 54.65% | 25 29.06% | 8 9.30% | 6 6.97% | 86 100% |

**Key: Strongly Agree (SA) - Agree (A) - Strongly Disagree (SD) – Disagree (D)**

Table 3 strongly indicates that the College Library faces significant challenges in implementing effective open access and digital preservation practices. Insufficient funding, 77 (89, 53%) of respondents agree this is a major barrier, and 84 (97.66%) of respondents acknowledge that inadequate IT infrastructure is the most agreed-upon challenge, while 72 (83.71%) institutional policy support though a slightly lower agreement, still identify this as a concern.

**5.1 Summary of Findings**

Overall, the respondents largely agree that: The institution implements global best practices for digital preservation, the library uses advanced technologies for long-term preservation, staff receive regular training on digital tools for open access and preservation. This suggests a generally positive perception of current strategies and technologies for open access and digital preservation within the institution, with some room for improvement in staff training.

There is overwhelming agreement among respondents that open access and digital preservation initiatives have a highly positive impact on teaching, learning, and

research. Most notably: They improve research output quality, Ensure uninterrupted access to learning materials, And are actively integrated into teaching practices. The data demonstrates institutional strength in adopting open access and digital preservation strategies, with tangible benefits reported in research, teaching, and learning.

The responses clearly highlight financial constraints, technological limitations, and policy gaps as the major obstacles to the successful implementation of open access and digital preservation at the College Library. Addressing these areas will be crucial to advancing digital initiatives and improving information access and sustainability.

## Conclusion

The study examined the critical roles of open access (OA) and digital preservation (DP) in the context of the Fifth Industrial Revolution (5IR), with a focused case study on the College Library of the Federal College of Education, Yola. The 5IR blends advanced technologies with a human-centred approach, necessitating a transformation in how academic institutions manage, share, and protect knowledge (Schwab & Zahidi, 2020). Within this transformative landscape, the study established that both open access and digital preservation are indispensable for improving equitable access to scholarly resources, supporting lifelong learning, and sustaining institutional memory.

Despite widespread awareness of OA and DP principles among library professionals and some academic users, the research revealed significant challenges, including inadequate ICT infrastructure, insufficient funding, limited staff capacity, and the absence of comprehensive institutional policies. These challenges align with findings from previous studies in Nigerian and African contexts (Adeleke et al., 2022). Notably, the Federal College of Education, Yola, like many tertiary institutions in developing countries, faces systemic constraints that hinder the full integration of OA and DP practices. Open access and digital preservation are not merely technological add-ons but strategic imperatives for educational institutions aiming to remain relevant and impactful in the digital era. For the College Library at the Federal College of Education, Yola, embracing these innovations will contribute to academic excellence, knowledge sustainability, and alignment with global educational trends.

## Recommendations

Based on the findings of this study, the following recommendations are made about the three key research questions:

I. **Funding:** The institution should prioritize budget allocation for digital preservation within its annual financial planning, recognizing its importance to academic continuity, the library can seek external funding and grants from international organizations, government agencies, and NGOs that support digital transformation in education, Public-private partnerships (PPPs) can also be explored to acquire digital infrastructure or services through cost-sharing models. Additionally, the library should develop a strategic funding proposal highlighting the long-term benefits of digital preservation to attract donors and institutional stakeholders.

II. **Inadequate IT infrastructure:** The institution should invest in modern IT infrastructure, including reliable internet connectivity, secure cloud storage systems, digital repositories, and backup servers, establishing a dedicated digital preservation unit with necessary hardware and software can significantly enhance operational capacity, regular maintenance and upgrading of existing

infrastructure should be scheduled to prevent obsolescence and ensure smooth operation, and the library can also explore open-source digital preservation platforms (e.g., DSpace, Greenstone) as cost-effective alternatives to commercial solutions.

**III. Limited institutional policy support**: The institution should develop and implement clear policies and guidelines that mandate and support open access publishing and digital preservation activities, advocacy and awareness campaigns should be carried out to educate college leadership, schools, and stakeholders on the benefits of open access and preservation practices, the library should collaborate with academic departments and the ICT unit to establish a digital preservation policy framework, aligning with international best practices (e.g., UNESCO, IFLA), and include open access and digital preservation in the institution's strategic goals to formalize commitment and encourage compliance.

**References**

Abdulsalami, T. L., Nwachukwu, V. N., & Salami, P. F. (2015). Digitization and preservation as means of accessing information in Nigerian university libraries: A case study of Bayero University, Kano and Kashim Ibrahim Library, Ahmadu Bello University, Zaria. *International Journal of Education and Practice*, 3(12), 296–310. https://www.researchgate.net/publicatio n/304243222.

Adeleke, A. A., Ojokuku, Y., & Ojo, J. O. (2022). Digital maturity of university libraries in Nigeria. In *Digital Transformation -Towards New Frontiers and Business Opportunities*. Intech Open. https://www.intechopen .com/ chapters /81833

Adigun G. O., Ajani, Y. A., & Enakrire, R. T. (2024). The intelligent libraries: Innovation for a sustainable knowledge ecosystem in the Fifth Industrial Revolution. *Libri*. https://www.degru yterbrill.com/document/doi/10.1515/lib ri-2023-0111/html?lang=en

Anyaoku, E. N., Echedom, A. U. N., & Baro, E. E. (2019). Digital preservation practices in university libraries: An investigation of institutional repositories in Africa.

Digital Library Perspectives, 35(1), 41–64. https://www.researchgate.net/publicatio n/329821975_Digital_preservation_pra ctices_in_university_libraries_An_inve stigation_of_institutional_repositories_i n_Africa

Ayodele A. & Oluwatoyin O. (2024). Preservation of theses and dissertations in the era of digitization: a case study of selected universities in Oyo state, Nigeria. https://discovery.researcher. life/article/preservation-of-theses-and-dissertations-in-the-era-of-digitization-a-case-study-of-selected-universities-in-oyo-state-nigeria/bd3733155b3638 c78780a5085960d847

Conway, P. (2020). Preserving digital scholarship: Infrastructure, challenges, and opportunities. *Digital Scholarship in the Humanities*, *35*(2), 321–333.

Enakrire, R. T., Oladokun, B. D. &Gaitanou, P. (2024). Paperless libraries: The trending way to go in the fifth industrial revolution. *Journal indexing and metrics*. 41(ISSUE 4). https://journals.

sagepub.com/doi/10.1177/02663821241 289793

Gantz, J., & Minton, S. (2021). *Data age 2025: The digitization of the world from edge to core*. IDC.https://www.seagate. com/ files/www-content/our-story/ trends/ files/idc-seagate-dataage-white paper.pdf

IFLA. (2020). *IFLA Guidelines for setting up a digital unification project*. International Federation of Library Associations and Institutions. https:// www.ifla.org/pu blications/node/6710

Indeed, (2024). 10 Examples of Research Designs That You Can Use For Research. Careerguide. https://hk.indeed.com/ career-advice/career-development /resea rch-design

Masenya, T. M. &Ngulube, P. (2019). Digital preservation practices in academic libraries in South Africa. *SA Journal of Information Management* 21(1). https://www.researchgate.net/publication /331576104_Digital_preservation_practi ces_in_academic_libraries_in_South_Af rica_in_the_wake_of_the_digital_revolu tion

Modiba, M. T., & Marutha, N. S. (2023). Artificial intelligence for records and archival management in South Africa: Supporting public digital archiving in the fifth industrial revolution. *ESARBICA Journal*, 42(1), 95-110. https://www.ajol.i nfo/index.php/esarjo/article/view/29025 0

OECD. (2020). *The digitalisation of education: A key to inclusion and equity*. Organisation for Economic Co-operation and Development. https:// www.oecd.or g/education/

Piwowar, H., Priem, J., Larivière, V., Alperin, J. P., Matthias, L., Norlander, B., ... & Haustein, S. (2018). The state of OA: A large-scale analysis of the prevalence and impact of Open Access articles. *PeerJ*, *6*, e4375

Raimo, N., Ricciardelli, A., Rubino, M., & Vitolla, F. (2023). Artificial intelligence and digital transformation: Key insights for organizational change. *Technological Forecasting and Social Change*, *184*, 122009. https://doi.org /10.1016/j. techfore.2022.122009

Raimo, N., Ricciardelli, A., Rubino, M., & Vitolla, F. (2023). Artificial intelligence and digital transformation: Key insights for organizational change. *Technological Forecasting and Social Change*, *184*, 122009.

Schwab, K., & Zahidi, S. (2020). *The future of jobs report 2020*. World Economic Forum. https://www3.weforum.org /docs/WEF_Future_of_Jobs_2020.pdf

Turkanović, M., Hölbl, M., Košič, K., Heričko, M., & Kamišalić, A. (2020). EduCTX: A blockchain-based higher education credit platform. *IEEE Access*, *6*, 5112–5127. https://doi.org/10.1109/ ACCESS.2018 .2789929

UNESCO. (2021). *Open science recommendation*. United Nations Educational, Scientific and Cultural Organization. https://unesdoc. unesco. org/ark:/48223/pf0000379949

Xiao, Y., Li, Y., & Liao, H. (2022). Green digital preservation: A framework for sustainable archival practices. *Journal of Documentation*, *78*(5), 1021–1037. http s://doi.org/10.1108/JD-09-2021-0182