



The Sustainable Library of the Future: Embracing the New Age through Digital Transformation

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ABSTRACT

The sustainable library of the future lies at the crossroads of environmental consciousness and digital transformation. This research paper portrays a reimagined library in a rapidly changing world through the three defining dimensions: ecological responsibility, community engagement, and inclusive knowledge access. It starts with a vision being shared for a sustainable library, one that is far beyond the traditional conception of repositories but that more actively interfaces with the challenges in the concerns of sustainability, green partnerships and collaboration with resilience, environmental challenges, ethical information stewardship, and the ongoing march of technological evolution. A sustainable library should be an active player in global challenges in environmental preservation, information ethics, and technological evolution. It feels like a challenging way to navigate through digital collection curation, community engagement towards sustainability, green partnerships, and collaboration with resilience in environmental challenges toward integrating high-technology solutions. The same will be the importance of libraries in the future toward responsible data management, data preservation, and adherence to ethical handling practices. A sustainable library is not a concept but an organic entity that will change with the conditions it works within and become a lighthouse of knowledge, inclusiveness, and sustainability within a community. The

resulting work is a source of new insights and perspectives that contribute to the burgeoning discourse on sustainable libraries, enabling the foundation for transforming libraries into vibrant, environmentally conscious, and community-centred institutions well poised to meet the demands of the digital age.

Keywords: Sustainable Library, Future Libraries, Digital Transformation, Environmental Responsibility, Community Engagement

Received: 30 August 2024, Revised 14 November 2024, Accepted 25 November 2024

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1. Introduction

The state-of-the-art library is the inspiration for collective intelligence, standing at a critical juncture in its evolutionary journey. Libraries, admired supports of learning and knowledge repositories, now face a pressing need for modernization. The demands on modern libraries to evolve and transform have become imperative as the public continues to become more ecologically conscious and technically inclined. The present introduction intends to demystify such a paradigm shift and shed light on the way forward in making institutions sustainable in the face of dynamic needs in the present and future (Aldrich, 2018). The notion of a Sustainable Library has no conceptual boundaries and multiple orientations; all embraced under sustainable principles in their environmental, economic, and social dimensions. This is an example of living that goes far beyond conserving knowledge to ensuring the practice of ecological conservation and societal welfare. Such a view would redefine the library's mission to place it as a catalyst toward widened community sustainability goals. The Fourth Industrial Revolution has opened an era of digitization that has transformed lifestyles into one of the consumptions of information, therefore making libraries alive digital centres (Msauki, 2021). This epitomizes the call for libraries to go digital in improving their service of accessing, preserving, and disseminating knowledge. The current state of digital transformation has been a significant key in making the library viable, thus reducing environmental impacts while simultaneously serving community needs. At the same time, there was an urgent need for digital transformation. As the 4th Industrial Revolution has entirely transformed the ways of consumption of information and knowledge, there is, therefore, a desperate need for libraries to transform themselves into living digital platforms (Shenkoya & Kim, 2023). A sustainable library uses digital technologies that form part of its strategy, enhancing accessibility, preservation, and distribution of information. This paper further articulates the complex fabric underlying the "Vision of a Sustainable Library" that could change through digital ways. Sustainability is woven into libraries, making their immense impact on traditional roles available and continuing in a fast-changing global landscape (Ayinla & Aramide, 2022). The paper will, by and large, provide the backdrop to set on an explorative journey toward tomorrow's sustainable library, empowered by digital transformation and readied to conquer the challenges in the modern era (Jankowska, 2008; Jankowska & Marcum, 2010). This research aspires to enrich the ongoing discussion of sustainable libraries and their digital evolution, emphasizing the crucial linkage between both. Unwinding this nexus provides a critical gateway for the new theoretical and practical dimensions of sustainable libraries and digital transformations in an ever-evolving information landscape (Boyden & Weiner, 2000; Irajifar et al., 2023).

2. Sustainable Collection Development

Sustainable collection development in libraries must be practised within a perspective that balances the curation, management, and access to resources through ecological and social aspects. (Keerthipati et al., 2023; Lehner-Quam, 2022; Ortega-Martinez et al., 2022; Rachman & Ratnasari, 2022; Ransom, 2019). It undertakes an examination of digital collections and the promotion of accessible and inclusive collections. In this way, libraries realize their added value by growing within the community sustainably under changing information environments. (Ashraf et al., 2010; Beyene, 2016; Hauke et al., 2021).

2.1 Sustainable Curation of Digital Collections

It provides a critical shift from the traditional curating of collections in a print-based way to a dynamic and ever-changing digital repository. (Andresel et al., 2022). This is mainly because digital materials that are growing very fast, from e-books to multimedia files, call for judicious curation. (Angevaare, 2009). The selection criteria must move beyond simple relevancy to information through environmental impact assessments and long-term sustainability evaluations. Curating is the art of juggling a series of interests around sustainability imperatives, ensuring that digital collections remain vital, accessible, and viable over time. (Yakubu et al., 2022).

2.2 Accessible and Inclusive Collections

The bedrock of sustainable library missions is about accessibility and inclusivity. Collection development should address physical and cognitive constraints in ways that work for the totality of our communities, leaning into universal principles (Pionke, 2016; Small et al., 2015). Formats must span a spectrum with accommodations for varied reading levels, languages, and sensory preferences. Collection development is a balancing act. A library cannot be genuinely complete or adequate in its mission if it does not take into account both environmental and social sustainability (Boyden & Weiner, 2000; Okojie & Igbinoia, 2023). Libraries can be spaces vibrant and inclusive, not only to store knowledge but to support communities and function as ecosystems in their careful curation and practice while keeping pace with evolving community needs and maintaining voices at the forefront (Ngulube, 2023; Tanner et al., 2021).

3. List of Tools for the New Age in the Digital Transformation of Libraries

It becomes imperative to digitize libraries in an ever-developing landscape, reshaping the very core of such strongholds of knowledge. The task of libraries should be to become part and parcel of the digital age to serve society better. This paper is, therefore, the guiding light that shows the way for libraries' digital transformation by enlisting an almost exhaustive list of essential tools and technologies that enable libraries to continue their journey in this brave new world (Suhaimi Bin Haji Abdul Karim, 2004). The core lay Library Management Systems (LMS) and Integrated Library Systems (ILS) - are back-office tools that unite operations. Examples of such platforms include Alma, Koha, and Ex Libris. They handle cataloging, acquisitions, circulation, and patron management. This way, libraries can gain organizational effectiveness and efficiency to deliver user services and make fact-based decisions based on data-driven insight (Asif & K. Singh, 2019; Beyene, 2016)

Libraries are a critical friend in the world of digital repositories and archives. The use of tools like DSpace, Fedora, and Islandora is concerned with the curation and preservation of digital content. They are converting libraries into guardians of digital heritage, where historical collections and exceptional archives can be made

perpetually available. Another critical area is metadata management and discovery tools to ensure resource discoverability among massive digital collections. OCLC's WorldCat, Ex Libris' Primo, and Open Refine help catalog and make metadata even more prosperous, and they provide facilities for federated search to make the end-user experience easy. The digital age demands the effective management of electronic resources, for which ERM tools have been designed. EBSCO's Full Text Finder, Sirsi Dynix eResource Central, and ProQuest 360 Resource Manager are some of the platforms through which the acquisition and maintenance of electronic resources is eased, providing patrons with convenient access to digital databases, journals, and e-books (Chunmeng et al., 2019).

Libraries have been undergoing digitalized content delivery and access tools to ensure streamlined access to digital resources. Tools like Open Athens, EZproxy, and VPNs enable remote access that is both secure and safe, thus creating room for users to access library services from anywhere easily; through this, availability and convenience are unlocked in a digital environment. Sixth, there are tools for digital archiving and preservation (Sanjeeva et al., 2023). In the digital epoch, one of the priorities of a library should be the preservation of its digital assets. Archivematica, Preservica, and LOCKSS are platforms where institutions can host digital content. The platforms ensure that valuable information remains accessible and usable in the long term.

3.1 Library Management Systems (LMS) are the backbone of modern libraries. Platforms such as Koha, Alma, or Evergreen have revolutionized cataloging, resource management, and user services. These systems empower libraries to enhance access to digital collections and ensure that resources circulate seamlessly in a digital environment.

3.2 Digital Content Management Systems are indispensable for organizing and preserving digital collections and archives. DSpace, CONTENTdm, and Omeka are indispensable platforms for presenting digital resources in a manner that will guarantee their accessibility over time and protect the knowledge contained for future generations.

3.3 Digital Preservation Tools Tools such as LOCKSS (Lots of Copies Keep Stuff Safe) and Archivematica shall ensure the long-term preservation of content in digital form. It follows from this that using such tools will guarantee that digital materials are preserved over time and, accordingly, accessible and usable, thereby keeping our cultural heritage and scientific accomplishments.

3.4 Open Access Platforms: DSpace, EPrints, or Open Journal Systems (OJS) provide great potential for making knowledge accessible. Open Access Platforms enable the making, sharing, and access to digital content online free of charge, thereby democratizing information and fostering innovation and collaboration.

3.5 Energy Management Systems are also gradually gaining priority for libraries that aim to minimize environmental impacts. Such systems of energy optimization for lighting, heating, and cooling ensure more sustainable and efficient operation of libraries.

3.6 RFID Technology Library Operations are Revolutionized with Efficient Book Tracking, Inventory Management, and Self-Checkout Systems. RFID technology changes user services and reorganizes the workflow in libraries by increasing operational efficiency. Other library discovery tools include Primo, Summon, and EBSCO Discovery Service, which also augment the discoverability of digital resources. These tools improve research experiences through full search and discovery functionalities, thus enabling users to find the infor-

mation they need. Digital archiving and preservation software, such as Preservica or the Archivists' Toolkit, allow for both the preservation of digital records and archives and public access to them. Long-term preservation of valuable historical materials protects our cultural heritage for the interest and benefit of future generations (Hakola et al., 2024; Kalpana & Gopalakirshnan, 2024; Vijaianand et al., 2024).

3.7 Data Management and Digital Repository Software Fedora Commons or Dura Space are good, solid platforms for managing, preserving, and accessibility of digital assets. The systems enable libraries to manage and share digital resources, thus improving how information is accessed and used.

3.8 Library Website and Content Management Systems Word Press, Drupal, and Joomla are broadly used for the creation and management of library websites. LMS platforms enable digital resources and services with easy-to-use interfaces for the patrons to access library materials and information resources. Learning Management Systems have been identified as one of the key stakeholders in enhancing digital literacy, both for staff and users, through tools such as Moodle or Canvas in developing digital courses or training programmes (Mehmood Khalil et al., 2024). These systems play a significant role in helping libraries empower themselves to undergo digital transformation and create new value for educational delivery. In this respect, such tools for collaboration and communication, like Microsoft Teams, Slack, or Google Workspace, have the most substantial effect in changing ways of communication and collaboration among employees in the library. They provide easy interaction, management, and collaboration with staff and their external partners in project execution, ensuring efficiency and supporting innovations. Environmental monitoring systems are important for libraries that intend to preserve their physical collections. They monitor track temperatures, humidities, and other environmental conditions to ensure the best protection for valuable materials and artefacts (Ahammad et al., 2024).

Digital Signage and Way finding Systems offer information relating to the library services in a user-friendly way, as well as information pertaining to its sustainability initiatives. The systems will improve any user's experience with clearly communicated directions, announcements, and information in an interactive manner. Social media and Online Engagement platforms give libraries a means of keeping connected to their community and being able to promote their sustainability events and offerings. Facebook, Twitter, and Instagram will enhance the opportunity for a sense of community that feels inclusive and full of environmental awareness and causes among patrons. (Jha & Verma, 2024).

4. Community Engagement for Sustainability

Community engagement is central to all library sustainability practices. It unveils the reasons why libraries are already engaged in fostering sense-making, raising awareness of problems in the environment, and well-being in the community. It even seeks to plunge deeper into the subtleties of community engagement for sustainability by emphasizing creating concrete community connections through practical educational outreach activities. By such efforts, libraries have played a proactive role not only in the broader community-wide sustainability agendas but also served to place them right at the heart as the undisputed hub for knowledge sharing and societal betterment (Callahan Schreiber et al., 2024).

4.1 Building Strong Community Ties

Creating strong community ties lies at the heart of what makes the sustainable library mission even possible.

Collaboration and community connections are areas in which the library can further extend its ability to support even possible. Collaboration and community connections are areas in which the library can further extend its ability to support community needs and co-create successfully sustainable initiatives. (Fedorowicz-Kruszewska, 2019; Pun, 2020). Below is a more in-depth discussion of how libraries create and sustain these connections. It will seek to support community listening, assessing needs, and engaging to ensure library services and programs align with community priorities. (Brodie, 2012; Pitschmann, 2001). The same can be said of physical and virtual spaces' important role in supporting community gatherings, discussions, and collaborative projects. It also deals with supporting local businesses through cultural activities and, consequently, the economic ecosystem of a locality.(Carmen et al., 2024).

4.2 Educational Outreach Programs

Educational outreach programs actively champion sustainability by affording library users information, skills, and resources helpful for informed decisions—the development and implementation of educational outreach programs on inculcating environmental awareness and sustainable practices. Workshops, seminars, and events organized by the libraries include recycling, energy conservation, climate change, and ecological preservation given public action and responsibility. Educational programs in sustainable living go digital with book collections, e-resources, and toolkits.(Ole, 2018; Torres et al., 2024).

4.3 Green Partnerships and Collaboration

The idea of being able to do more about sustainability than is possible when not moving beyond the four walls of their buildings is what a green partnership and collaboration can do for the sustainable library. Green alliances and collaborations of multifaceted nature: an effort toward sustainability by partnering with eco-friendly organizations and positioning the library as an active player in the more extensive sustainability network. Some key strategies and benefits of consortia and networks, for example, in regard to resource sharing and cooperation, include joint regional conservation initiatives, regional sustainability plans, and shared repositories of sustainable resources. Such collaborations facilitate the sharing of best practices, research findings, and innovations on how to tackle environmental challenges through open communication and mutual support.(Hauke et al., 2021; Keerthipati et al., 2023; Ortega-Martinez et al., 2022).

4.4 Partnerships with Green Organizations

The partnerships enhance the libraries' efforts in sustainability, which is green, owing to special knowledge, skills, and resources. It examines the nature of these collaborations, precisely goal congruence and mutual benefit. Joint initiatives, be it to attain energy efficiency, waste reduction, or sustainable landscaping, among others, are available to libraries through such partnerships in a quest for green technologies, materials, and funding opportunities. (Hauke et al., 2021; Jones & Wong, 2016; Ortega-Martinez et al., 2022) Such partnerships often stimulate educational activities, workshops, and campaigns on best practices, which could be adopted using the expertise available from some partners.

5. Adaptation and Resilience

This is libraries' adaptation and resilient contribution as they grapple with their environment and technologies. It addresses the interplay of the two facets into a sustainable library, putting more emphasis on preparedness in facing up to the challenges thrown at the environment and adaptability to technological advancements (West, 2019). Other services that libraries would relate to through conducting risk assessment and mitigation

measures would be environmental concerns such as disaster recovery plans and the construction of sustainable buildings. In this manner, libraries help build the resilience of the community by providing information and resources for preparedness and disaster response, making them the go-to resource when it comes to offering assistance during crises. They also advocate and promote conservation in the environment in order to create a sustainability culture. (Pionke, 2016; Ransom, 2019).

6. Emerging Digital Technologies

Libraries should adopt upcoming digital technologies and platforms to enhance accessibility, preservation, and user interaction in the ever-changing technological environment. Digitization efforts, open access initiatives, and emerging technologies such as AI and virtual reality have nearly reinvented the way libraries offer services and provide resources. Technological adaptation supports the ability to meet sustainability goals through the development of energy-efficient infrastructures and in overcoming digital divides in the community. (Boachie, 2018).

Sustainable innovation and technology play a fundamental role in the strategic direction of sustainable libraries; they communicate with the digital age and other environmental issues. The significant impact cutting-edge technologies have on transforming libraries to achieve sustainability objectives. Embracing innovation and technology enables libraries to extend their services sustainably, reduce environmental footprints, and attain better outcomes for their communities in this dynamic information landscape. (Asif & K. Singh, 2019; Cheryl, 2009).

It is vital for libraries to be relevant and current, and they need to approach the newest technologies. The libraries can effectively use contemporary and innovative technologies in practice, services, and infrastructure. It highlights the inclusion of modern digital systems and software to boost functions like cataloging, circulation, information management, and user services (Edwards, 2011). It further investigates the adoption of such disruptive technologies as the Internet of Things, augmented reality, and artificial intelligence in realizing better experiences and operations. Libraries should work with technology vendors and research organizations to be in a position to deploy emerging innovations. Enhanced digital literacy and technical skills in public members are also good since they enable patrons to carry out themselves effectively in the digital space (Jerkov et al., 2015; Rachman & Ratnasari, 2022).

But digital library practices are not only working towards replacing the material products with their digital versions; they are also moving towards practices of sustainability and environmental responsibility. Below is a discussion on how libraries have engaged with digitized technologies in designing a more sustainable future (Wilson, 2012). They can replace their energy-efficient computing equipment and lighting systems to manage low carbon emissions while sustaining advanced services. Digital collections and their access can reduce the need for physical material, saving resources and space. Environmental control in the library assures a sustainable environment with energy optimization and safety. Sustainability issues in information access are addressed through digital preservation strategies, which work to achieve long-term access to digital collections. There is improved accessibility geared toward the changing needs and preferences of users, which also leads to minimized environmental impact caused by library activities. (Boyden & Weiner, 2000).

7. Sustainable Architecture and Design

Sustainable architecture and design constitute the physical underpinnings of a green library; within such a

structure and layout, all components are not only ecologically responsible but also attuned to the library's mission as a centre for learning, community, and sustainability. The next part of this paper focuses on some of the core principles associated with sustainable architecture and design, specifically as they relate to creating eco-friendly library spaces and building designs that operate on a heightened level of energy efficiency. These considerations are crucial to ensure the library's physical infrastructure allows the institution to attain its sustainability goals.(Marcum, 2009).

7.1 Eco-Friendly Library Spaces

These range from the design of green library spaces, which will reduce effects on the environment while improving a user's experience within the space. The concept of principles of sustainable design, a responsible material use framework, to include natural ventilation and lighting (Khalid et al., 2021).

7.2 Biophilic Design in Libraries

Biophilic designs can be promoted by having indoor plants in a library or reading areas connected to outside spaces, bringing library patrons closer to nature. In addition, being ecological, the library spaces have rainwater harvesting and grey water recycling systems for optimal water use. Besides, sustainable landscaping has been emphasized as a significant component in designing spaces that are comfortable, flexible, and inclusive so that the library user perceives a welcoming environment to facilitate learning and community building with the least possible impact on the environment. (Gierbienis, 2019).

7.3 Building Design for Energy Efficiency

Energy-efficient building designs are central to sustainability. Adopting new models for efficient energy use gives libraries many ways to reduce their carbon footprint. To optimize building design and operation, which should include higher insulation, passive solar heating and cooling, and energy-efficient HVAC systems. A library will have numerous ways to benefit from smart building technologies, including sensor controls for lighting, automation, and energy management systems that will respond to the number of people and environmental conditions. Furthermore, including renewable energy sources such as solar panels, wind turbines, or geothermal systems can ensure an enhanced level of self-sufficiency in powering libraries. Sustainability certifications such as Leadership in Energy and Environmental Design (LEED) ensure that library buildings meet recognized sustainability standards (Jones & Wong, 2016; Liu et al., 2019; Pionke, 2016; Spodick, 2016).

8. Sustainable Data Management

Sustainable data management reflects a library's commitment to environmental stewardship, preserving knowledge for future generations, and ethical information practices. It encompasses the various dimensions involved in sustainable data management: from data preservation to its access, and with ethical considerations in responsible handling practices. Data preservation and access illuminate the role of libraries as preservers of knowledge and accountable caretakers of information resources (Lucky et al., 2019; Pommerening, 2021).

8.1 Data Preservation and Access

One of the functions of a sustainable library is the preservation and accessibility of its data. The different ways libraries move forward with ensuring their digital and analog data are preserved and remain accessible, both in the present and the future. Preservation may include digitization efforts, data backup, and strategies for data longevity (Jerkov et al., 2015; Mathiasson & Jochumsen, 2023).It is focused on the fact that it's important

to use open standards and formats to keep away from data obsolescence. This scenario of mass digitization would, of course, require the digital preservation infrastructure of the libraries to be prepared with measures that can easily protect the collections from any possible loss of data and migration of formats. Besides, it shows that meta data creation and management are also significant to make the data more visible and accessible; thereby, library users can retrieve information resources to get more suitable information. Libraries may also want to work with open access principles, giving access to data that will share knowledge as far as possible. (Plale et al., 2013).

8.2 Ethical Data Handling Practices

The ethical core of the sustainable library's commitment to responsible information stewardship lies in its ethical data handling practices. In general, the ethical considerations in library policy, more so in data handling, include data privacy, security, consent, and compliance with data protection regulations. Emphasis has to be made on strict compliance with data protection regulations, respect for user privacy, and obtaining informed consent when collecting and using patron data (Subaveerapandiyan et al., 2024).

9. Conclusion

In the search for a sustainable future library, it is evident that libraries are in a unique and crucial position concerning furthering environmental responsibility, community well-being, and knowledge dissemination. The previous discussions delineate the various dimensions through which sustainability in the library context has evolved. Libraries have transitioned from their traditional roles as repositories of knowledge to becoming active participants in broader sustainability initiatives. This active institution represents a sustainable library, aligned to the needs of the modern world, adaptive to the highly dynamic landscape of information, and working as a steward of the environment by practising information work on an ethical foundation while ensuring inclusive participation in service provision.

The sustainable future library encompasses this vision of more than traditional roles and responsibilities. This indicates the library's commitment to the environment in access facilitation and embracing change through digital technology. It is a centre of innovation where environmental considerations are incorporated into its design, energy-efficient technologies are back in the running, and its digital collections serve informational and sustainability needs.

It is a space where collaboration forms the nucleus of innovation, and resilience answers environmental challenges. It is committed to ethical data handling, engagement with the community, and sustainability initiatives its disparate users can resonate with. Change for the future library needs to continue to respond to new challenges and opportunities, but the vision of a sustainable library remains at its core as a guiding principle.

As mentioned earlier, the road forward for libraries to achieve sustainability would be rich in promise and full of obstacles. Sustainable future libraries will have to lead their way amid the continuous pace of technological changes, information access challenges, and other environmental concerns surrounding them. It has to adhere to being inclusive, engaging the community, and ethical practice given the changing diverse user needs. The future library must continuously scan itself through self-assessment, adaptability, and innovation. It will adopt new technologies on purpose, seek to have more new partners, and have a focus on social change. The library's role as an arbiter of knowledge and a mediator of community interaction may not be altered. Still, it

keeps pace with change through the response to challenges and opportunities within the digital era under the necessity for sustainability.

References

- [1] Ahammad, N., Bahry, F. D. S., Husaini, H. (2024). Sustainable library services with open-source library automation and digitisation software: A literature review. *Business Information Review*, 41(2), 59–68. <https://doi.org/10.1177/02663821241245509>
- [2] Aldrich, R. S. (2018). *Sustainable thinking: Ensuring your library's future in an uncertain world*. ALA Editions, an imprint of the American Library Association.
- [3] Andresel, M., Gordea, S., Stevanetic, S., Schutz, M. (2022). An Approach for Curating Collections of Historical Documents with the Use of Topic Detection Technologies. *International Journal of Digital Curation*, 17(1), 12. <https://doi.org/10.2218/ijdc.v17i1.819>
- [4] Angevaere, I. (2009). Taking Care of Digital Collections and Data: 'Curation' and Organisational Choices for Research Libraries. *LIBER Quarterly: The Journal of the Association of European Research Libraries*, 19(1), 1–12. <https://doi.org/10.18352/lq.7948>
- [5] Ashraf, T., Sharma, J., Gulati, P. A. (Eds.). (2010). *Developing Sustainable Digital Libraries: Socio-Technical Perspectives*. IGI Global. <https://doi.org/10.4018/978-1-61520-767-1>
- [6] Asif, M., K. Singh, K. (2019). Emerging trends and technologies for digital transformation of libraries. *IP Indian Journal of Library Science and Information Technology*, 4(2), 41–43. <https://doi.org/10.18231/j.ijlsit.2019.011>
- [7] Ayinla, B. A., Aramide, K. A. (2022). Sustainable Information Technology Practice in Libraries: In V. Okojie & M. O. Igbinoia (Eds.), *Advances in Library and Information Science* (pp. 22–42). IGI Global. <https://doi.org/10.4018/978-1-6684-5964-5.ch002>
- [8] Beyene, W. M. (2016). Realizing Inclusive Digital Library Environments: Opportunities and Challenges. In N. Fuhr, L. Kovács, T. Risse, W. Nejdl (Eds.), *Research and Advanced Technology for Digital Libraries* (Vol. 9819, pp. 3–14). Springer International Publishing. https://doi.org/10.1007/978-3-319-43997-6_1
- [9] Boachie, F. K. (2018). ICT Infrastructure Required For Sustainable Library Services In The 21st Century Issues And Challenges From A Developing Country's Perspective. *2018 5th International Symposium on Emerging Trends and Technologies in Libraries and Information Services (ETTLIS)*, 12–15. <https://doi.org/10.1109/ETTLIS.2018.8485190>
- [10] Boyden, L., Weiner, J. (2000). Sustainable libraries: Teaching environmental responsibility to communities. *The Bottom Line*, 13(2), 74–83. <https://doi.org/10.1108/08880450010327699>
- [11] Brodie, M. (2012). Building the Sustainable Library at Macquarie University. *Australian Academic &*

Research Libraries, 43(1), 4–16. <https://doi.org/10.1080/00048623.2012.10700619>

[12] Callahan Schreiber, R., Goeke, M. , Bequette, M. (2024). Community informed design: Blending community engagement and museum design approaches for sustainable experience development. *Curator: The Museum Journal*, 67(2), 441–457. <https://doi.org/10.1111/cura.12583>

[13] Carmen, E., Fazey, I., Friend, R. M. (2024). Community-based sustainability initiatives: The quality of relationships matter? *Sustainability Science*, 19(3), 905–920. <https://doi.org/10.1007/s11625-024-01492-8>

[14] Cheryl, P.-D. (2009). Web 2.0, Library 2.0, Library User 2.0, Librarian 2.0: Innovative Services for Sustainable Libraries. *Computers in Libraries*, 29(10), 16–21.

[15] Chunmeng, W., Jinzhu, C., Feiyun, Z. (2019). Research on Technology Empowerment in Digital Transformation of Library in Information Age. *2019 International Conference on Computer, Information and Telecommunication Systems (CITS)*, 1–5. <https://doi.org/10.1109/CITS.2019.8862115>

[16] Edwards, B. W. (2011). Sustainability as a Driving Force in Contemporary Library Design. *Library Trends*, 60(1), 190–214. <https://doi.org/10.1353/lib.2011.0030>

[17] Fedorowicz-Kruszewska, M. (2019). Sustainable libraries: Fashion or necessity? *JLIS*, 1. <https://doi.org/10.4403/jlis.it-12500>

[18] Gierbienis, M. (2019). Application of biophilic design in contemporary library architecture. *International Multidisciplinary Scientific GeoConference/: SGEM*, 19, 2. <https://doi.org/10.5593/sgem2019/6.2>

[19] Hakola, L., Hakola, E., Palola, S., Tenhunen Lunkka, A. , Lahtinen, J. (2024). Durable and sustainable smart tags for identity management and condition monitoring: Case study for reusable packaging and recyclable data carriers. *Packaging Technology and Science*, 37(2), 107–121. <https://doi.org/10.1002/pts.2781>

[20] Hauke, P., Charney, M., Sahavirta, H., Akullo, W. N., Cardoso, N. B., Chen, S., Claesson, L., Colvin, J., Huang, Q., Jones, L., Kavuri-Mutuku, P., Koudjam Yameni, S. J., Kutt, K., Landes, C., Leyrer, K., Mulumba, O., Mwanzu, A., Ochôa, P., Patron, I., Wong, W. (2021). *Going Green: Implementing Sustainable Strategies in Libraries Around the World*. Humboldt-Universität zu Berlin. <https://doi.org/10.18452/23283>

[21] Irajifar, L., Chen, H., Lak, A., Sharifi, A., Cheshmehzangi, A. (2023). The nexus between digitalization and sustainability: A scientometrics analysis. *Heliyon*, 9(5), e15172.N <https://doi.org/10.1016/j.heliyon.2023.e15172>

[22] Jankowska, M. A. (2008). A call for sustainable library operations and services: A response to ACRL's 2007 environmental scan. *College & Research Libraries News*, 69(6), 323–324. <https://doi.org/10.5860/crln.69.6.8005>

[23] Jankowska, M. A., Marcum, J. W. (2010). Sustainability Challenge for Academic Libraries: Planning for the Future. *College & Research Libraries*, 71(2), 160–170. <https://doi.org/10.5860/0710160>

- [24] Jerkov, A., Sofronijevic, A., Stanisic, D. K. (2015). Smart and Sustainable Library: Information Literacy Hub of a New City. In S. Kurbanoglu, J. Boustany, S. Špiranec, E. Grassian, D. Mizrachi, & L. Roy (Eds.), *Information Literacy: Moving Toward Sustainability* (Vol. 552, pp. 22–30). Springer International Publishing. https://doi.org/10.1007/978-3-319-28197-1_3
- [25] Jha, A. K., Verma, N. K. (2024). Social Media Platforms and User Engagement: A Multi-Platform Study on One-way Firm Sustainability Communication. *Information Systems Frontiers*, 26(1), 177–194. <https://doi.org/10.1007/s10796-023-10376-8>
- [26] Jones, L., Wong, W. (2016). More than just a green building: Developing green strategies at the Chinese University of Hong Kong Library. *Library Management*, 37(6/7), 373–384. <https://doi.org/10.1108/LM-05-2016-0041>
- [27] Kalpana, T. M., Gopalakirshnan, S. (2024). Electronic Sustainability in Libraries With Microcontrollers: Applications. In M. Khosrow-Pour, D.B.A. (Ed.), *Advances in Information Quality and Management* (pp. 1–16). IGI Global. <https://doi.org/10.4018/978-1-6684-7366-5.ch080>
- [28] Keerthipati, K., Nabhan Almaawali, Z. M., Sulaiman Alomrani, N. M., Sharma, K. C. (2023). Framework for Implementation of Sustainable Green Information Technology in Library Digitalization. *Journal of Energy Engineering and Thermodynamics*, 31, 31–37. <https://doi.org/10.55529/jeet.31.31.37>
- [29] Khalid, A., Malik, G. F., Mahmood, K. (2021). Sustainable development challenges in libraries: A systematic literature review (2000–2020). *The Journal of Academic Librarianship*, 47(3), 102347. <https://doi.org/10.1016/j.acalib.2021.102347>
- [30] Lehner-Quam, A. (2022). Diversifying and Transforming a Public University's Children's Book Collection: Librarian and Teacher Education Faculty Collaboration on Grants, Research, and Collection Development. *Collection Management*, 47(2–3), 157–178. <https://doi.org/10.1080/01462679.2021.1958400>
- [31] Liu, Q., Chen, J., Wu, K., Du, S. (2019). Sustainable Design Practice of University Library Building: Take the Guangdong University of Finance & Economics Library as an example. *IOP Conference Series: Earth and Environmental Science*, 242, 052046. <https://doi.org/10.1088/1755-1315/242/5/052046>
- [32] Lucky, M. N., Pasini, D., Spagnolo, S. L. (2019). Product Data Management for Sustainability: An Interoperable Approach for Sharing Product Data in a BIM Environment. *IOP Conference Series: Earth and Environmental Science*, 296(1), 012053. <https://doi.org/10.1088/1755-1315/296/1/012053>
- [33] Marcum, J. W. (2009). Design for sustainability. *The Bottom Line*, 22(1), 9–12. <https://doi.org/10.1108/08880450910955378>
- [34] Mathiasson, M. H., Jochumsen, H. (2023). The Sustainable Library: A retrospective case study of a public library sharing initiative. *Journal of Librarianship and Information Science*, 09610006231190131. <https://doi.org/10.1177/09610006231190131>
- [35] Mehmood Khalil, M., Ghazi, H. M., Habib, M. I., Faisal, S., Elahi, A. I. (2024). Guideline for Selecting the

Right Content Management System (RCMS) for Web Development: A Comprehensive Approach. *Journal of Computing & Biomedical Informatics: Special Issue on Artificial Intelligence and Emerging Technologies (SICAJET)*. <https://jcbi.org/index.php/Main/article/view/353>

[36] Msauki, G. (2021). Library 4.0 and Sustainable Development: Opportunities and Challenges. In J. P. Chigwada & N. M. Nwaohiri (Eds.), *Examining the impact of industry 4.0 on academic libraries* (pp. 31–44). Emerald Publishing Limited. <https://doi.org/10.1108/978-1-80043-656-520201012>

[37] Ngulube, P. (2023). From Orality to Digital Assets: Managing Indigenous Knowledge in Africa in the Wake of the Open Science Movement. *The Serials Librarian*, 84(5–8), 71–85. <https://doi.org/10.1080/0361526X.2023.2296880>

[38] Okojie, V., Igbinoia, M. O. (2023). *Global perspectives on sustainable library practices*. Information Science Reference, an imprint of IGI Global.

[39] Ole, A. C. (2018). Research skills, ICT application and sustainable library development. *Library Philosophy and Practice (e-Journal)*, 2018(Article number 1839), 1–17.

[40] Ortega-Martinez, E. A., Saavedra-Alamillas, C., Martínez-Camacho, H. (2022). Green Libraries: Current Situation in Mexico. In V. Okojie & M. O. Igbinoia (Eds.), *Advances in Library and Information Science* (pp. 130–141). IGI Global. <https://doi.org/10.4018/978-1-6684-5964-5.ch009>

[41] Pionke, J. J. (2016). Sustainable library services for all. *Library Management*, 37(6/7), 317–325. <https://doi.org/10.1108/LM-04-2016-0030>

[42] Pitschmann, L. A. (2001). *Building sustainable collections of free third-party Web resources*. Digital Library Federation, Council on Library and Information Resources.

[43] Plale, B., McDonald, R. H., Chandrasekar, K., Kouper, I., Light, R., Konkiel, S. R., Hedstrom, M., Myers, J., Kumar, P. (2013). The SEAD DataNet prototype: Data preservation services for sustainability science. *Proceedings of the 13th ACM/IEEE-CS Joint Conference on Digital Libraries*, 439–440. <https://doi.org/10.1145/2467696.2467762>

[44] Pommerening, A. (2021). Sustainable Data Management. In A. Pommerening, *Staying on Top in Academia* (pp. 129–136). Springer International Publishing. https://doi.org/10.1007/978-3-030-65467-2_10

[45] Pun, R. (Ed.). (2020). *The sustainable library's cookbook*. Association of College & Research Libraries.

[46] Rachman, Y. B., Ratnasari, W. (2022). Academic Libraries' Sustainable Preservation and Conservation Practices. *Preservation, Digital Technology & Culture*, 51(3), 121–129. <https://doi.org/10.1515/pdte-2022-0024>

[47] Ransom, M. (2019). Digital preservation in libraries: Preparing for a sustainable future. *Technical Services Quarterly*, 36(4), 421–422. <https://doi.org/10.1080/07317131.2019.1664117>

- [48] Sanjeeva, N., Naik, U., Machado, S. (2023). Remote Library Platforms for Accessing Electronic Resources. In *Dewey to Digital: Evolution of Libraries in the Information Age* (pp. 339–354). Lulu Publications.
- [49] Shenkoya, T., Kim, E. (2023). Sustainability in Higher Education: Digital Transformation of the Fourth Industrial Revolution and Its Impact on Open Knowledge. *Sustainability*, 15(3), 2473. <https://doi.org/10.3390/su15032473>
- [50] Small, R. V., Myhill, W. N., Herring-Harrington, L. (2015). Developing Accessible Libraries and Inclusive Librarians in the 21st Century: Examples from Practice. In B. Wentz, P. T. Jaeger, & J. C. Bertot (Eds.), *Advances in Librarianship* (Vol. 40, pp. 73–88). Emerald Group Publishing Limited. <https://doi.org/10.1108/S0065-283020150000040013>
- [51] Spodick, E. (2016). Sustainability – it’s everyone’s job. *Library Management*, 37(6/7), 286–297. <https://doi.org/10.1108/LM-04-2016-0024>
- [52] Subaveerapandiyan, A., Alam, A. F., Butdisuwan, S., Taj, A., Kataria, S. (2024). Exploring emerging technologies: Librarians’ awareness, challenges and ethical perspectives in Thai library contexts, with a focus on the metaverse. *Digital Library Perspectives*. <https://doi.org/10.1108/DLP-12-2023-0111>
- [53] Suhaimi Bin Haji Abdul Karim, H. (2004). Digital transformation of libraries in Brunei Darussalam: Addressing the sustainability issues of VILIS Brunei. *Program*, 38(3), 184–193. <https://doi.org/10.1108/00330330410547232>
- [54] Tanner, R., Ho, A. K., Aldrich, R. S. (Eds.). (2021). *Libraries & sustainability: Programs and practices for community impact*. ALA Editions.
- [55] Torres, R., Simões, A. R., Pinto, S. (2024). Research Impact and Sustainability in Education: A Conceptual Literature Review. *Education Sciences*, 14(2), 147. <https://doi.org/10.3390/educsci14020147>
- [56] Vijaianand, P., Nishanth, B., Vignesh, V., Vignesh, I., Gajendran, P. (2024). Energy Management and User-Centric Automation for Sustainable Library Operations. *2024 5th International Conference on Recent Trends in Computer Science and Technology (ICRTCST)*, 338–343. <https://doi.org/10.1109/ICRTCST61793.2024.10578532>
- [57] West, J. (2019). Toward More Sustainable Libraries. *Computers in Libraries*, 39(10), 15–17.
- [58] Wilson, L. A. (2012). Creating Sustainable Futures for Academic Libraries. *Journal of Library Administration*, 52(1), 78–93. <https://doi.org/10.1080/01930826.2012.630241>
- [59] Yakubu, H., Noorhidawati, A., Kiran, K. (2022). Sustainability of digital collections for Nigerian academic libraries: An exploration of conception, indicators for fulfillment and accrued benefits. *Malaysian Journal of Library & Information Science*, 27(1), 73–91. <https://doi.org/10.22452/mjlis.vol27no1.5>