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DIGITAL REPOSITORIES, E-BOOKS, AND ELECTRONIC JOURNALS IN MODERN LIBRARIES: A COMPREHENSIVE LITERATURE REVIEW

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Abstract

Libraries have always been more than just places to store books. That growth has clearly shifted toward digitalisation during the past three decades. All types of libraries worldwide academic, public, special, and national have been constructing digital repositories, purchasing electronic books, and moving their journal holdings nearly completely online. This study of the literature assesses the practical implications of that change, including the reasons for it, its advantages, its drawbacks, and its future prospects.

The first is digital repositories, which are structured digital archives that record, store, and make available the intellectual production of communities and institutions. The second is e-books, which have subtly but significantly altered how individuals read and how libraries gather information. The third is electronic journals, which are currently the primary means of scholarly communication across the majority of academic fields. For each, the overview examines the field's evolution, summarises the data on advantages and difficulties, and highlights practical implications.

The experience of libraries in Sub-Saharan Africa is given special emphasis in this review, with a focus on the Abrehot Library in Addis Ababa, whose Abay Digital Repository initiative lies at the nexus of the three topics discussed here. The analysis concludes that whereas digital tools provide real and substantial benefits for increasing knowledge access, they also pose ongoing issues with cost, infrastructure, preservation, licensing, and equity that call for careful and proactive management. A series of evidence-based suggestions for Abrehot Library and other comparable institutions in the area are developed using these findings.

Keywords: *digital repositories, e-books, electronic journals, open access, digital preservation, modern libraries, library services, Sub-Saharan Africa, Abrehot Library, knowledge access*

1. INTRODUCTION

Consider attempting to describe a library from forty years ago to a modern student. You would describe a big building with shelves arranged in rows, a card catalogue, a librarian who knew where everything was, and a rigid closing time. Additionally, you would have to clarify that you couldn't read the book until it was returned if it had been borrowed by someone else. Some of that sounds almost mediaeval from where we are right now.

One of the most significant shifts in the history of information organization and dissemination has been the transition from that environment to the modern world of digital libraries. According to Borgman (2007), scholarship in the digital era is a fundamental reorganisation of the infrastructure of knowledge, involving a shift in what is feasible as well as a change in format. Lynch (2003) made a similar argument regarding digital repositories in particular, contending that they were more than just a more practical means of carrying out what libraries had always done; rather, they represented crucial infrastructure for a new era of scholarly communication.

This review of the literature focuses on three components of that infrastructure that are now essential to the operation of contemporary libraries: electronic journals, which have largely replaced print in scholarly communication; e-books, which have revolutionised the acquisition and reading of monographs; and digital repositories, which gather and preserve digital content. These three together make up what most people imply

when they discuss a digital library nowadays, and any institution managing the digital transformation must comprehend what the study indicates about them.

This evaluation is presented from the viewpoint of the Abrehot Library in Addis Ababa, Ethiopia, which is working on the Abay Digital Repository as part of a larger initiative to increase Ethiopian scholars, students, and the general public's access to digital knowledge. The international literature on digital libraries is both extremely relevant and occasionally requires careful adaptation due to Ethiopia's setting, which includes a youthful, fast-expanding population, major language diversity, and considerable variation in access to technology and connectivity. We have made an effort to keep that background in mind throughout our evaluation.

The Policy context: Digital Ethiopia 2030

The Digital Ethiopia 2025 Strategy, which was introduced by the Ethiopian Ministry of Innovation and Technology in 2020, outlines Ethiopia's national digital transformation plan, which is closely associated with the growth of Abrehot Library's Abay Digital Repository. With important pillars including digital infrastructure, digital government, digital literacy, digital skills, and the encouragement of innovation and entrepreneurship, the strategy lays out a thorough framework for hastening Ethiopia's shift to a knowledge-based digital economy (Ministry of Innovation and Technology [MInT], 2020). Ensuring that Ethiopian individuals, including students, researchers, professionals, and the general public, have fair access to digital content and knowledge services regardless of their geography or socioeconomic status is one of the strategy's main goals. This goal is explicitly embodied in the Abay Digital Repository. Abrehot Library is constructing exactly the kind of locally grounded digital knowledge infrastructure that the Digital Ethiopia 2025 Strategy envisions as a driver of human development, educational advancement, and economic competitiveness by establishing a freely accessible, centrally managed digital store of Ethiopian scholarly output, historical records, books, and research materials (MInT, 2020; UNESCO, 2012).

There is more to the alignment than just access. The digitisation of public services and the development of knowledge institutions as facilitators of the wider digital transformation are specifically prioritised in Digital Ethiopia 2023 (MInT, 2020). This concept acknowledges libraries and information centres as fundamental public infrastructure, and it views their digitisation as crucial to creating a workforce that is knowledgeable, competent, and capable of creativity. As the biggest and most well-known public library in Ethiopia, Abrehot Library holds a key place in this ecosystem. In addition to preserving and disseminating knowledge that might otherwise remain dispersed or unavailable, its digital repository helps Ethiopia achieve its national objective of lowering its reliance on outside knowledge platforms by constructing independent, locally run digital infrastructure (Lwoga, 2020; MInT, 2020). In this way, the Abay Repository represents a tangible institutional contribution to Ethiopia's national digital future rather than just a library project.

1.1 Objectives of the Review

- To trace the conceptual and theoretical foundations of digital repositories, e-books, and electronic journals in library practice.
- To synthesize the evidence on the benefits, limitations, and implementation challenges associated with each type of digital resource.
- To examine what the research tells us about digital library development in low- and middle-income country contexts, including Sub-Saharan Africa.
- To identify key trends and future directions that libraries need to be aware of and prepared for.
- To draw out practical implications for Abrehot Library and the development of the Abay Digital Repository.

1.2 How This Review Was Conducted

Google Scholar, JSTOR, Scopus, the Directory of Open Access Journals (DOAJ), and the Library, Information Science and Technology Abstracts (LISTA) database were among the scholarly databases that we looked at. We also consulted the grey literature, which includes institutional white papers, policy documents, and reports from international organisations. These sources provided important information not found in peer-reviewed publications. Combinations of "digital repository," "institutional repository," "e-books in libraries," "electronic journals," "open access," "digital preservation," "library digitisation," and phrases unique to African libraries were among the search terms. Although previous foundational works were used when appropriate, sources from 1999 to 2024 were taken into consideration. The most significant sources were chosen for this evaluation after more than 80 were examined for methodological quality, relevance, and scope.

2. DIGITAL REPOSITORIES: COLLECTING AND PRESERVING KNOWLEDGE IN THE DIGITAL AGE

2.1 What a Digital Repository Is and Is Not

Any organised collection of digital files is frequently referred to as a "digital repository" in a loose sense. However, it has a more precise meaning in library and information science. According to Lynch (2003), a digital repository is a managed digital environment with clear regulations in place to guarantee that content is discoverable, legitimate, and accessible across time. Active governance is what sets a repository apart from a straightforward cloud storage folder or institutional website: repositories use consistent metadata standards,

put preservation strategies into place, give content persistent identifiers, and follow documented guidelines regarding who can deposit what and who can access it (Barton & Waters, 2004).

There are various types of repositories. A particular entity, usually a university, research centre, or library, maintains institutional repositories (IRs) to gather, preserve, and disseminate its intellectual output (Crow, 2002). Regardless of institutional affiliation, subject repositories compile content related to a certain field; some of the most popular examples are arXiv for physics and mathematics, PubMed Central for biomedicine, and SSRN for social sciences (Harnad et al., 2004). While aggregators like Open DOAR and BASE catalogue and index content from repositories worldwide, generating larger discovery layers across collections, national repositories function at the national level (Björk et al., 2014). Journal preprints and postprints, theses and dissertations, datasets, conference papers, technical reports, and increasingly multimedia resources including photos, audio, and video are all included in the majority of repositories (Ware & Mabe, 2015).

2.2 The Case for Institutional Repositories

The concept of the institutional repository gained popularity in the early 2000s when a number of factors came together: the technical infrastructure needed to create and manage repositories had become accessible and affordable; the open access movement was becoming more active and ambitious; and the cost of scholarly journal subscriptions was increasing more quickly than library budgets, to the point where even well-funded research universities were finding it difficult to keep their communities' access to the literature they needed (Suber, 2012; Crow, 2002).

The objective was nicely expressed in Lynch's early formulation (2003, p. 2). He defined an institutional repository as "a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members," presenting it as an active service in line with the institution's scholarly mission rather than a storage system. The framing has shown to be sturdy. The greatest institutional repositories are active centers of academic communication that link an institution's knowledge production to the global community, not just places to store items.

There is a lot of positive empirical data about what institutional repositories truly provide, especially when it comes to research visibility. Numerous disciplines and methodological approaches have documented the so-called "open access citation advantage"—the finding that articles freely available in repositories typically receive more citations than comparable articles locked behind subscription paywalls (Lawrence, 2001; Harnad et al., 2004; Swan, 2010). One of the most methodologically rigorous research in this field was carried out by Gargouri et al. (2010), who demonstrated a significant and consistent citation advantage for self-archived publications after correcting for self-selection effects. Open access articles generate significantly more citations and downloads than their subscription-only counterparts, according to Piwowar et al. (2018), who conducted a thorough review of millions of articles.

Beyond citation counts, repositories have been demonstrated to enhance institutional accountability and identity, facilitate knowledge transfer to non-academic audiences, and lower the cost of research access for those at institutions, especially in low-income nations, who cannot afford pricey subscriptions (UNESCO, 2012; Xia, 2012; Bankier & Gleason, 2014). In its open access guidelines, UNESCO (2012) stated unequivocally that publicly accessible repositories are a primary source of scientific material rather than an extra luxury for academics in Africa and other places with restricted subscription access.

2.3 Building a Repository: Technology, Metadata, and Preservation

The software platform, the metadata framework, and the preservation strategy are three technological domains that are essential to any discussion of how digital repositories operate.

Since the field's inception, open-source software platforms have dominated the institutional repository market. This is primarily due to the fact that these platforms are available to institutions of all sizes and budgets due to their active developer communities and zero licensing costs (Barton & Waters, 2004; Allard, Mack, & Feltner-Reichert, 2005). Originally created at MIT, DSpace has grown to be the most extensively used repository platform globally, with over 1,200 installations across more than 100 countries, according to a 2023 census (DuraSpace, 2023). The other two main platforms that are widely used are Fedora, which was created in collaboration with Cornell University and the University of Virginia, and EPrints, which was created at the University of Southampton.

Many repositories suffer with metadata, which is the organised descriptive information that makes repository material accessible and discoverable. The findability of deposited content is greatly decreased by poor metadata quality, such as incomplete records, inconsistent terminology, or no subject classification (Barton & Waters, 2004). While more specialised schemas like MARC, MODS, and DataCite serve specific content types and communities, the Dublin Core Metadata Initiative offers a baseline set of fifteen elements that are commonly utilised for basic interoperability. A researcher can search across multiple repositories at once thanks to the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH), which was created in the early 2000s and is now the standard method for repositories to share their metadata with aggregators and discovery systems (Lagoze & Van de Sompel, 2001). As web addresses change over time, persistent identifiers—specifically, Digital Object Identifiers (DOIs) and Handles—are crucial for guaranteeing that content stays accessible and citable (Paskin, 2010).

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In repository design, digital preservation the long-term commitment to maintaining digital content intact, authentic, and accessible is the area that is most frequently overlooked and has the most detrimental long-term effects if disregarded (Lavoie, 2014; Conway, 2010). Digital content does not age like paper does; if the software environment it depends on becomes outdated or unavailable, it could be completely inaccessible one day and completely intact the next. The OAIS (Open Archival Information System) Reference Model (ISO 14721) and the NDSA Levels of Digital Preservation (Lavoie, 2014) are two widely used frameworks that codify active preservation strategies, such as regular format migration, fixity checking to detect corruption, maintaining multiple geographically distributed copies, and preferring open non-proprietary file formats.

2.4 Why Repositories Sometimes Fail to Thrive

Many repositories in practice fall far short of their promise, despite the compelling theoretical justification for institutional repositories and the mounting evidence of their worth. Low deposit rates are one of the most frequently reported issues. Research from Europe, North America, Asia, and Africa has shown that a significant percentage of faculty at institutions with established repositories either do not know the repository exists, do not know how to deposit their work, or do not see enough personal benefit in doing so (Kim, 2010; Swan & Brown, 2005; Xia, 2012).

Less than half of the researchers surveyed by Swan and Brown (2005) voluntarily deposited their work, despite the fact that most claimed they would if their institution demanded it. This pattern led Harnad (2006) to the logical conclusion that mandates are required because voluntary self-archiving is unlikely to fill a repository on its own. This is supported by the evidence. Compared to institutions and funders that only use incentive, those that have implemented mandatory open access rules, such as Harvard University, MIT, and the Research Councils UK, have significantly higher deposit rates (Gargouri et al., 2010).

The difficulties are exacerbated by other aspects in African university contexts. In a survey of East African colleges, Lwoga (2020) discovered that repositories were often understaffed, underfunded, and underpromoted. As a result, even in cases where a repository was technically operational, its contents remained small and its users were few. Similar similarities were found in the South African setting by Stilwell (2018). These studies all agree that a repository is an institutional commitment rather than just a technological artefact, requiring ongoing investments in people, policy, and promotion in addition to servers and software.

2.5 The Abay Repository in This Context

The Abay Digital Repository initiative at Abrehot Library is growing in a setting that is both most in need of digital repository services and most difficult to maintain, according to the literature. The library has a unique potential to create a repository that connects the scholarly communication function of a university IR with the larger knowledge-access purpose of a public institution because of its dual mandate to serve academic scholars and the general reading public. According to the literature, establishing a metadata quality workflow, developing clear and consistently enforced submission policies, actively reaching out to potential depositors, and making an early commitment to a sustainable preservation strategy are the most crucial early investments for a repository in this situation, rather than necessarily being technical (Lynch, 2003; Bankier & Gleason, 2014; Lwoga, 2020).

3. ELECTRONIC BOOKS: HOW DIGITAL READING HAS CHANGED LIBRARY COLLECTIONS

3.1 E-Books Defined: Formats, Platforms, and the Landscape of Digital Reading

A manuscript that can be read on a digital device, such as a laptop, tablet, smartphone, or specialised e-reader like a Kindle or Kobo, is referred to as an electronic book, or e-book (Armstrong, Edwards, & Lonsdale, 2002). An ecosystem of significant complexity is hidden by that straightforward definition. The most popular e-book formats are PDF, EPUB, MOBI, and AZW, however they are not always compatible with all devices. Numerous platforms, such as Amazon Kindle Direct, Google Play Books, ProQuest Ebook Central, and OverDrive, sell or license them; each has its own interface, business strategy, and set of limitations. E-book collection management has emerged as one of the most technically challenging aspects of modern librarianship due to the wide range of terms under which libraries can get and lend them (Walters, 2013; Vasileiou, Hartley, & Rowley, 2012).

he three main aggregator platforms ProQuest Ebook Central, the EBSCOhost eBook Collection, and SpringerLink—all give academic libraries access to a vast array of publications from numerous publishers through a single interface and contract. OverDrive (formerly known as Libby) and Hoopla, which offer popular e-books and audiobooks for lending, have emerged as the leading platforms for public libraries in several nations. In both situations, the aggregator model has greatly increased the selection of books that library patrons may access while simultaneously adding new levels of complexity related to digital rights management, licensing, and long-term access security (Walters, 2013; Polanka, 2011).

3.2 What E-Books Offer Users and Libraries

Research on the actual use of e-books in library settings reveals a more complex picture than either ardent supporters or doubtful detractors typically recognise. In a large-scale survey carried out throughout UK higher education, Rowlands et al. (2007) discovered that students were much more likely to use e-books for rapid reference—looking up a single term or jumping to a pertinent chapter—than for prolonged sequential reading. This result, which has been confirmed by other research, has significant ramifications for how libraries assess

the worth of their e-book collections: a title that exhibits low usage according to conventional print-borrowing metrics might be producing substantial value if it is regularly used for brief bursts of reference activity that would not be recorded as official loans.

Using data from the same JISC e-book observatory project, Nicholas et al. (2008) discovered that e-book usage in UK higher education was significant and increasing, but that faculty and students' awareness of the books' existence was largely dependent on library staff awareness and promotion. The literature consistently finds that, regardless of their quality or potential accessibility, digital resources that are not actively promoted are unlikely to be found.

E-books provide a number of operational benefits over print for libraries as institutions. They enable instant availability upon acquisition without waiting for delivery and do away with the physical processing stages necessary for print acquisitions, such as categorising, labelling, shelving, and re-shelving (Armstrong, Edwards, & Lonsdale, 2002). A single e-book can serve numerous readers at once under multi-user licensing agreements, which is not possible with print copies. Additionally, libraries have been able to increase the number of titles that are ostensibly available to users while tightly controlling costs thanks to patron-driven or demand-driven acquisition models, which pay for a title only when a user actually accesses it beyond a certain threshold (Price & McDonald, 2009; Walters, 2013).

3.3 The Frustrations: Licensing, DRM, and User Experience

E-books have been a source of both friction and emancipation, as anyone who has attempted to borrow an e-book from a library using a device they are unfamiliar with or who has discovered that the title they wanted is not available since all "copies" are already on loan will understand. The main issue is that, in contrast to print books, e-books are restricted by licensing agreements that explain in great detail what you can and cannot do with the content you have paid for, rather than the idea that once you buy something, you may do whatever you want with it (Polanka, 2011). These agreements differ greatly: some restrict or completely forbid interlibrary loan; some require libraries to repurchase access after a predetermined number of loans; some limit the number of concurrent users who can access a title; some impose embargo periods during which new titles cannot be lent; and some expire after a predetermined period regardless of usage (Walters, 2013).

The software tools used to impose these licensing restrictions, known as digital rights management technologies, have created still another level of annoyance. DRM systems often require users to install proprietary software, create accounts on third-party platforms, or negotiate opaque authentication procedures that occasionally fail for no apparent reason. These obstacles may be crucial for consumers who are already dubious about e-books (Walters, 2013). DRM puts libraries at long-term danger of losing access to content they have paid for if the platform that supports their e-book collection shuts down or modifies its terms of service (Adema & Hall, 2013).

User preferences are still changing. Although younger and more tech-savvy consumers have largely embraced e-books, a sizable portion of readers—in both developed and developing nations—prefer print for prolonged reading, find screen reading less comfortable, or have access to devices and connectivity that are too erratic to support e-book use (Rowlands et al., 2007; Stilwell, 2018). Device cost, data charges, and power supply reliability are all significant barriers to e-book uptake in Ethiopia and other African contexts, and library policy must take these factors seriously (Aina, 2004).

Another issue is the availability of content. English-language material from North American and European publishers dominates the worldwide e-book industry. Building e-book collections that truly benefit their communities is often a challenge for libraries in nations where other languages are widely spoken or where locally relevant knowledge is highly prized (UNESCO, 2012). The creation of e-book content in Amharic and other Ethiopian languages, as well as on subjects that are especially pertinent to Ethiopian readers and scholars, is both a necessity and an opportunity for Abrehot Library.

3.4 Open Access E-Books: An Alternative Route

Not every e-book has DRM and license limitations. Despite being younger and smaller than its journal counterpart, the open access monograph publishing movement has been rapidly expanding and provides libraries with a crucial additional means of growing their digital collections without having to pay for license (Adema & Hall, 2013; Snyder, 2013). Hundreds of thousands of volumes, including both recent academic monographs released under Creative Commons licenses and historical and public domain works, are now freely accessible through platforms including the Directory of Open Access Books (DOAB), Project Gutenberg, and the Internet Archive. One example of how the academic library community can jointly support open access book publishing at reasonable individual costs is the Knowledge Unlatched initiative, in which libraries pool contributions to fund the open access publication of scholarly monographs (Snyder, 2013). These OA pathways should be a key component of e-book collection strategies for libraries in low-income nations rather than an add-on.

4. ELECTRONIC JOURNALS: THE NEW NORMAL IN SCHOLARLY COMMUNICATION

4.1 How We Got Here: The Rise of the Electronic Journal

You might use the journal's history to tell the majority of the tale of how libraries have changed over the past thirty years. For more than three centuries, journals—compilations of peer-reviewed articles—have served as

the main conduit for scholarly and scientific communication. They were only available in print for the majority of that time, and getting access to them required being physically close to a library that had a subscription. All of that was altered by the transition to electronic distribution, which started cautiously in the early 1990s and picked up speed as the World Wide Web became widely available in the mid-1990s (Tenopir & King, 2000; Ware & Mabe, 2015).

The first fully electronic, peer-reviewed journals emerged in the late 1980s and early 1990s. The Online Journal of Current Clinical Trials, which debuted in 1992, and Stevan Harnad's Psycoloquy, which debuted in 1989, are frequently mentioned as pioneers (Ware & Mabe, 2015). These early tests were rough around the edges, but they revealed the technological feasibility of what many in the field had until then considered as a distant prospect. The shift from mostly print to primarily electronic journal holdings was well under way in academic libraries around the world by the early 2000s, when almost all major publishers were offering their content online in addition to or instead of print (Tenopir, 2003).

Technology was not the only factor in that shift. It was also fuelled by what became known as the "serials crisis" the sharp increase in journal subscription costs that started in the 1970s and hasn't really halted (Frazier, 2001; Suber, 2012). Libraries were forced to make difficult decisions between preserving access to journals that scholars required and preserving other portions of their collections as subscription costs rose at rates far higher than overall inflation for decade after decade. By providing libraries with access to additional titles through bundled "big deal" packages from large publishers, electronic licensing helped to partially address this issue. However, it also introduced new dependencies and forms of lock-in that many librarians found unsatisfactory (Bergstrom et al., 2014).

4.2 What Electronic Journals Have Made Possible

Beyond the obvious ease of not needing to visit a library, the transition to electronic journals has had profoundly positive effects on scholars. The entire content of articles in electronic journals, not only the titles and abstracts, can be searched at a fine level. References in papers are hyperlinked to the cited sources, and increasingly to data, code, and extra resources, providing a fully integrated network of evidence that paper journals could never imitate. Alert services let researchers know when their own work is cited or when new articles are published in journals they monitor. Additionally, the elimination of format and length restrictions has made it possible to publish research results that would not have been feasible or feasible in print (Ware & Mabe, 2015; Tenopir, 2003).

The operational benefits have also proved significant for libraries. Electronic subscriptions usually give users access to decades' worth of archived material in addition to fresh issues. Print consumption data could never provide collection managers with as much information about which journals are actually being read as usage numbers, even if they are flawed. Additionally, staff time has been freed up for other activities due to the removal of physical journal management responsibilities (checking-in, binding, storing, claiming missing issues) (Tenopir, 2003).

4.3 The Open Access Journal Revolution

The journal industry has had the most noticeable and significant influence from the open access journal movement, which aims to make peer-reviewed academic content freely accessible to anyone with internet access. The underlying argument is persuasive: a large portion of scientific research worldwide is funded by the government; it is carried out by academics who are paid salaries for conducting research and teaching rather than for each article; it is reviewed by other academics who provide their labour without compensation; and the results are locked behind subscription paywalls that prevent most people from reading them (Suber, 2012; Willinsky, 2006). From the start, open access was presented as a workable answer as well as an ethical requirement.

As of 2024, the Directory of Open Access publications (DOAJ), which was founded at Lund University in 2003, has listed almost 20,000 completely peer-reviewed open access publications. Even the most ardent early proponents of OA would have found this figure too high (DOAJ, 2024). In a historical analysis, Laakso et al. (2011) tracked the development of open access journal publication from its beginnings in 1993 to its acceleration after 2000, which was fuelled by financial requirements, technology advancements, and the rising acceptance of open access as a publishing paradigm.

The two main models of open access journal publishing are "green" open access, where authors self-archive accepted manuscripts in repositories while the journal itself is still subscription-based, and "gold" open access, where the journal is itself freely accessible and usually funded through article processing charges (APCs) paid by authors or their institutions (Harnad et al., 2004). A third model, sometimes referred to as "diamond" or "platinum" open access, involves journals that don't charge authors or readers and are instead supported by community funding, institutional support, or volunteer labour (Björk et al., 2014). The ambitious goal of requiring all research supported by its members to be published in completely open access venues was established by Plan S, which was introduced in 2018 by cOAlition S, a consortium of key European and worldwide research funders. Plan S has greatly expedited the speed of transition (cOAlition S, 2018).

However, the APC model has come under fire for generating new disparities. Researchers at well-funded institutions in wealthy nations can continue to publish freely if payment for publication moves from the reader side (subscriptions) to the author side (APCs). However, researchers without institutional funding support,

especially those in low-income countries or early-career positions, may find themselves effectively locked out of high-visibility OA venues (Tennant et al., 2016; Lwoga, 2020). One of the most hotly contested topics in modern academic publishing is the conflict between the open access concept and the financial viability of its predominant implementation approach.

4.4 The Big Deal and Its Discontents

One of the most popular and criticised aspects of the e-journal landscape is the "big deal" model, which allows major publishers to license their entire journal portfolios to libraries for a single bundled annual fee (Frazier, 2001; Bergstrom et al., 2014). It was criticised for giving publishers significant pricing power, creating long-term contractual lock-in, and making it extremely difficult for libraries to cancel individual titles within a bundle, even when usage data indicated they were hardly read. It was successful because it significantly increased the number of journal titles available to library users.

Bergstrom et al. (2014) Journals from large commercial publishers were frequently priced at multiples of what comparable journals from academic societies or open access publishers cost for equivalent content, according to research on the scope of price variance in the journal market. Larivière, Haustein, and Mongeon (2015) demonstrated how a few major commercial publishers have grown to control a sizable portion of all published research, creating a market concentration that made real competition and negotiation challenging. The implications of these agreements for libraries and institutions in low-income countries are still up for debate, but library consortia in several nations have responded by developing coordinated negotiation strategies, such as "read and publish" or "transformative" agreements that combine subscription access with open access publishing rights (Hinchliffe, 2019; Tennant et al., 2016).

4.5 Access Programmes for Libraries in Developing Countries

The emergence of access programs that offer free or inexpensive access to major journal databases has been one of the most practically significant developments in the e-journal landscape for libraries in low- and middle-income countries. Thousands of journals from major publishers are made available to qualifying institutions in qualifying countries through Research4Life, an umbrella program that includes HINARI (health sciences), AGORA (agriculture), OARE (environment), GOALI (law), and ARDI (science and technology) (Research4Life, 2024). In a similar vein, INASP's Programme for the Enhancement of Research Information (PERii) has helped partner nations in Africa, Asia, and Latin America establish more extensive research infrastructure as well as journal access (INASP, 2020).

Although significant limits have been identified, evaluations of these programs have typically demonstrated favourable benefits on access to the scholarly literature (Chan et al., 2005; Stilwell, 2018). Due to bandwidth limitations, many qualifying institutions' connections may be unreliable or slow while attempting to access huge journal databases. Particularly among students and less experienced researchers, awareness of the resources that are available is frequently limited. Furthermore, reliance on externally run access programs runs the risk of replacing rather than fostering the growth of sustainable indigenous capability and infrastructure. For any institution in a qualifying nation considering how to develop long-term digital library capabilities, these are crucial warnings.

5. THEMES THAT CUT ACROSS ALL THREE AREAS

5.1 Digital Preservation: The Long Game

The difficulty of long-term digital preservation is one issue that appears equally in the literature on repositories, e-books, and e-journals. Digital stuff is more brittle than it would seem. Although a PDF file appears to be permanent, opening it requires software, which depends on operating systems, which depend on hardware, and all of that is subject to rapid change. Large collections may become unavailable in a fairly short amount of time if digital content is not actively managed, such as by moving it to new forms, making frequent checks to make sure it hasn't been corrupted, and keeping numerous copies in various locations (Lavoie, 2014; Conway, 2010).

The most widely used conceptual framework for digital preservation is provided by the OAIS (Open Archival Information System) Reference Model, which is standardised as ISO 14721 and specifies the functional elements that a reliable digital archive must have. Institutions can evaluate and gradually enhance their preservation practices using the more useful maturity framework provided by the NDSA (National Digital Stewardship Alliance) Levels of Digital Preservation. When a publisher stops granting access, cooperative preservation agreements like LOCKSS (Lots of Copies Keep Stuff Safe), CLOCKSS, and Portico offer dark archive backup for journal content. This feature has proven useful on several occasions (Maniatis et al., 2005).

5.2 Metadata and Discoverability

One of the most crucial factors in determining whether information is truly used across repositories, e-books, and e-journals is the quality of the metadata. If it cannot be located, a meticulously organised collection of regionally relevant e-books or a wonderfully digitised collection of Ethiopian manuscripts won't have much of an impact on knowledge access. Poor metadata quality incomplete records, inconsistent terminology, and a lack of subject indexing in pertinent languages is frequently cited in the literature as a significant practical obstacle to efficient digital library services (Barton & Waters, 2004; Walters, 2013).

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The efficacy of library discovery systems, which offer a unified search interface for all kinds of information, depends on obtaining rich, consistent metadata from every content source they index (Breeding, 2015). Longer-term potential for developing richer links across resources across platforms and organisations is provided by emerging linked data approaches that leverage semantic web technology. In order to promote better interaction between library systems and the larger web of data, the Library of Congress created the BIBFRAME effort as a replacement for the MARC format (Mitchell, 2016).

5.3 The Access Equity Question

Equity of access, or who truly benefits from the digital library, may be the most fundamental cross-cutting subject. A more equitable world is what digital resources promise: a researcher in Addis Ababa should have access to the same journal paper as a Harvard colleague. The truth is far trickier, as detailed by Willinsky (2006). The vast majority of people on the planet are excluded behind subscription paywalls. The disparity in access to devices, connectivity, and digital skills, or the "digital divide," is a real and significant issue. Readers and researchers whose first language is not English are disadvantaged or excluded by the predominance of English-language information in large databases. Furthermore, a system of scholarly communication that does not inherently serve the interests of the community it is meant to enlighten has been produced by the concentration of commercial publishing power in a few large firms (Larivière, Haustein, & Mongeon, 2015; Lwoga, 2020; UNESCO, 2012).

International policy frameworks that support open access, national investments in computing infrastructure and connectivity, institutional policies that prioritise access and inclusion, and library programming that fosters digital literacy and actively links underprivileged users to resources are just a few of the many levels at which action is needed to address these disparities (Chan et al., 2005; Stilwell, 2018). Although libraries cannot address these issues on their own, they are in a unique position to promote and carry out solutions within their purview.

5.4 Building Digital Literacy

The question of whether users are capable of utilising digital library resources, even when they are accessible, lies at the heart of everything said above. Evidence continuously demonstrates that even among educated and digitally active populations, digital literacy the capacity to locate, assess, use, and generate digital information effectively cannot be presumed (ACRL, 2016; Corrall, 2014). Many students are quite proficient on social media when they first start college, but many have no experience accessing library databases, assessing the reliability of sources, or navigating intricate digital collections. The disparity might be even greater for adult patrons of public libraries.

Research guides, library teaching programs, embedded librarianship models, and focused outreach to certain user groups are all strategies that have proven successful in fostering digital literacy and boosting usage of digital resources (Corrall, 2014; Nicholas et al., 2008). Research indicates that one of the most economical investments a library can make is to actively promote digital collections through education, demonstration, and continuous communication. No one profits from content that remains unnoticed on a server.

6. WHAT THIS MEANS FOR ABREHOT LIBRARY

The Abrehot Library and the advancement of the Abay Digital Repository are directly and practically impacted by the literature examined in this study. We go over each of the three primary topics in turn.

6.1 Developing the Abay Digital Repository

The Abrehot Library's investment in a digital repository is amply supported by the evidence. Abrehot's initiative is especially timely because of the gap in digital repository infrastructure in Ethiopia and the wider region, the well-documented benefits of open access deposits in terms of citation and visibility, and the compelling value of repositories for knowledge access in settings where subscription content is unaffordable. However, the literature also emphasises that the technical labour involved in establishing a repository is just the first step. Developing and consistently enforcing submission policies, creating metadata quality workflows, actively reaching out to potential depositors and users, and developing a long-term preservation strategy from the outset rather than as an afterthought are the more difficult tasks that will most likely determine whether the repository thrives or stagnates (Lynch, 2003; Bankier & Gleason, 2014; Lwoga, 2020). The history of East African repositories reported by Lwoga (2020) is a particularly pertinent caution: many well-intentioned repository projects have began with enthusiasm and subsequently gradually deteriorated due to insufficient investment in the human and policy elements.

6.2 Building an E-Book Collection

F or e-books, free access and locally relevant content should be the cornerstones of Abrehot Library's approach. Free Open Access (OA) e-books from DOAB, Project Gutenberg, and the Internet Archive should be prioritised because they have no DRM restrictions or licensing fees, which makes them more equitable and sustainable for users with different device access and connectivity. The library should look for solutions that allow for simultaneous multi-user access, steer clear of intrusive DRM, and don't place arbitrary restrictions on institutional or interlibrary lending when acquiring licensed content. Particular focus should be paid to the creation and digitisation of content in Amharic and other Ethiopian languages. A public library with Abrehot's mandate is especially well-positioned to assist close this gap in the commercial e-book market.

6.3 Maximising E-Journal Access

Abrehot Library should make sure it is fully using Research4Life programs and any other access efforts that Ethiopian institutions are eligible for when it comes to e-journals. Employees must be actively prepared to assist researchers in navigating these resources, comprehending what is and is not accessible, and utilising author manuscripts and OA preprint repositories as additional paths to content that might otherwise be blocked by a paywall. A library that recognises its role in knowledge access rather than just knowledge storage can also contribute to national policy discussions by supporting open access laws, better bandwidth and computing infrastructure, and local publishing and digitisation capacity.

6.4 Investing in People and Digital Literacy

Without concurrent investments in the abilities and expertise of both library employees and patrons, none of the aforementioned will reach its full potential. Employees must receive up-to-date, pertinent training in metadata standards, e-book licensing, e-journal administration, and digital repository management. In order to find and utilise the resources the library provides, users require proactive assistance. Decisions for collection and service development should be guided by regular user needs assessments, which enquire who is using what, what obstacles they encounter, and what would be helpful. A library that is well-versed in its community is better positioned to serve it than one that merely creates collections in the hopes that patrons will visit.

7. CONCLUSION

After thirty years of the digital library revolution, several things are evident. Digital repositories, e-books, and electronic journals have fundamentally revolutionised what is possible in library services. They have facilitated academic communication, increased access, enhanced discoverability, and provided libraries with operational efficiencies that were unthinkable during the print age. The research examined here provides careful empirical documentation of these genuine improvements.

However, it is equally evident that the shift to digital technology has not been smooth or fair. Licensing complexity, DRM constraints, infrastructure requirements, preservation demands, metadata hurdles, and continuing disparities in who really benefits from digital resources are all real problems that the literature documents with equal care. The takeaway from the global experience is not that digital is necessarily superior, but rather that getting digital right necessitates consistent, deliberate investment in people, practices, and policies rather than just technology.

This is a frightening and encouraging conclusion for Abrehot Library. It is encouraging since the library is constructing the Abay Repository at a time when there is more evidence than ever to justify investment in digital libraries and open access. It is sobering because the experience of similar institutions in East Africa and elsewhere makes it abundantly evident that long-term investment, institutional commitment, and user participation are necessary to fully realise the potential of digital library infrastructure.

We hope that this review offers a helpful foundation of evidence for the upcoming judgements. There is still a lot to learn and a lot of work to be done. Abrehot Library is in a good position to traverse the digital library, which is a direction rather than a destination.

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REFERENCES

[1] ACRL (Association of College and Research Libraries). (2016). Framework for information literacy for higher education. American Library Association. https://www.ala.org/acrl/standards/ilframework

[2] Adema, J., & Hall, G. (2013). The political nature of the book: On artists' books and radical open access. New Formations, 78, 138–156. https://doi.org/10.3898/NewF.78.07.2013

[3] Aina, L. O. (2004). Library and information science text for Africa. Third World Information Services.

[4] Allard, S., Mack, T. R., & Feltner-Reichert, M. (2005). The librarian's role in institutional repositories: A content analysis of the literature. Reference Services Review, 33(3), 325–336. https://doi.org/10.1108/00907320510611320

[5] Armstrong, C., Edwards, L., & Lonsdale, R. (2002). Virtually there? E-books in UK academic libraries. Program: Electronic Library and Information Systems, 36(4), 216–227. https://doi.org/10.1108/00330330210447181

[6] Bankier, J.-G., & Gleason, K. (2014). Institutional repository software comparison. UNESCO. https://unesdoc.unesco.org/ark:/48223/pf0000227115

[7] Barton, M. R., & Waters, M. M. (2004). Creating an institutional repository: LEADIRS workbook. MIT Libraries. https://hdl.handle.net/1721.1/26698

[8] Bergstrom, T. C., Courant, P. N., McAfee, R. P., & Williams, M. A. (2014). Evaluating big deal journal bundles. Proceedings of the National Academy of Sciences, 111(26), 9425–9430. https://doi.org/10.1073/pnas.1403006111

[9] Björk, B.-C., Kanto-Karvonen, S., & Harviainen, J. T. (2014). How frequently are articles in predatory open access journals cited? Publications, 8(2), 17. https://doi.org/10.3390/publications8020017

[10] Borgman, C. L. (2007). Scholarship in the digital age: Information, infrastructure, and the internet. MIT Press.

[11] Breeding, M. (2015). Library technology reports: Library discovery products. American Library Association.

[12] Chan, L., Kirsop, B., & Arunachalam, S. (2005). Open access archiving: The fast track to building research capacity in developing countries. SciDev.Net. https://www.scidev.net/global/opinions/open-access-archiving-the-fast-track-to-building-research-capacity-in-developing-countries/

[13] cOAlition S. (2018). Making full and immediate open access a reality: Plan S. Science Europe. https://www.coalition-s.org/plan_s_principles/

[14] Conway, P. (2010). Preservation in the age of Google: Digitization, digital preservation, and dilemmas. The Library Quarterly, 80(1), 61–79. https://doi.org/10.1086/648463

[15] Corrall, S. (2014). Designing libraries for research collaboration in the network world: An exploratory study. LIBER Quarterly, 24(1), 17–48. https://doi.org/10.18352/lq.9525

[16] Crow, R. (2002). The case for institutional repositories: A SPARC position paper. Scholarly Publishing and Academic Resources Coalition. https://sparcopen.org/wp-content/uploads/2016/01/SPARC_IR_final_release_102.pdf

[17] Directory of Open Access Journals (DOAJ). (2024). DOAJ statistics. https://doaj.org/about/#stats

[18] DuraSpace. (2023). DSpace repository statistics. Lyrasis. https://dspace.lyrasis.org/about/

[19] Frazier, K. (2001). The librarians' dilemma: Contemplating the costs of the 'big deal.' D-Lib Magazine, 7(3). https://doi.org/10.1045/march2001-frazier

[20] Gargouri, Y., Hajjem, C., Larivière, V., Gingras, Y., Carr, L., Brody, T., & Harnad, S. (2010). Self-selected or mandated, open access increases citation impact for higher quality research. PLOS ONE, 5(10), e13636. https://doi.org/10.1371/journal.pone.0013636

[21] Harnad, S. (2006). Opening access by overcoming Zeno's paralysis. In N. Jacobs (Ed.), Open access: Key strategic, technical and economic aspects (pp. 73–86). Chandos Publishing.

[22] Harnad, S., Brody, T., Vallières, F., Carr, L., Hitchcock, S., Gingras, Y., Oppenheim, C., Stamerjohanns, H., & Hilf, E. R. (2004). The access/impact problem and the green and gold roads to open access. Serials Review, 30(4), 310–314. https://doi.org/10.1016/j.serrev.2004.09.013

[23] Hinchliffe, L. J. (2019, April 23). Transformative agreements: A primer. The Scholarly Kitchen. https://scholarlykitchen.sspnet.org/2019/04/23/transformative-agreements/

[24] INASP. (2020). Strengthening research and knowledge systems: INASP annual review 2020. INASP. https://www.inasp.info/publications/

[25] Kim, J. (2010). Faculty self-archiving: Motivations and barriers. Journal of the American Society for Information Science and Technology, 61(9), 1909–1922. https://doi.org/10.1002/asi.21336

[26] Laakso, M., Welling, P., Bukvova, H., Nyman, L., Björk, B.-C., & Hedlund, T. (2011). The development of open access journal publishing from 1993 to 2009. PLOS ONE, 6(6), e20961. https://doi.org/10.1371/journal.pone.0020961

[27] Lagoze, C., & Van de Sompel, H. (2001). The Open Archives Initiative: Building a low-barrier interoperability framework. In Proceedings of the 1st ACM/IEEE-CS Joint Conference on Digital Libraries (pp. 54–62). ACM. https://doi.org/10.1145/379437.379443

[28] Larivière, V., Haustein, S., & Mongeon, P. (2015). The oligopoly of academic publishers in the digital era. PLOS ONE, 10(6), e0127502. https://doi.org/10.1371/journal.pone.0127502

[29] Lavoie, B. (2014). The open archival information system (OAIS) reference model: Introductory guide (2nd ed.). Digital Preservation Coalition. https://doi.org/10.7207/twr14-02
[30] Lawrence, S. (2001). Free online availability substantially increases a paper's impact. Nature, 411(6837), 521. https://doi.org/10.1038/35079151
[31] Lwoga, E. T. (2020). Examining research data management practices and institutional repositories in East African universities. Information Development, 36(3), 386–404. https://doi.org/10.1177/0266666919837480
[32] Lynch, C. A. (2003). Institutional repositories: Essential infrastructure for scholarship in the digital age. ARL: A Bimonthly Report on Research Library Issues and Actions, 226, 1–7. https://hdl.handle.net/10150/105454
[33] Maniatis, P., Roussopoulos, M., Giuli, T. J., Rosenthal, D. S. H., & Baker, M. (2005). The LOCKSS peer-to-peer digital preservation system. ACM Transactions on Computer Systems, 23(1), 2–50. https://doi.org/10.1145/1047915.1047917
[34] Ministry of Innovation and Technology (MInT). (2020). *Digital Ethiopia 2025: A digital transformation strategy for Ethiopia, 2020–2025*. Federal Democratic Republic of Ethiopia. https://www.mint.gov.et/digital-ethiopia-2025
[35] Mitchell, E. T. (2016). Building blocks of linked data: Literals and the relationship between vocabularies. Code4Lib Journal, 33. https://journal.code4lib.org/articles/11660
[36] Nicholas, D., Rowlands, I., Clark, D., Huntington, P., Jamali, H. R., & Ollé, C. (2008). UK scholarly e-book usage: A landmark survey. Aslib Proceedings, 60(4), 311–334. https://doi.org/10.1108/00012530810887962
[37] Paskin, N. (2010). Digital object identifier (DOI) system. In Encyclopedia of Library and Information Sciences (3rd ed., pp. 1586–1592). Taylor & Francis. https://doi.org/10.1081/E-ELIS3-120044418
[38] Piwowar, H., Priem, J., Larivière, V., Alperin, J. P., Matthias, L., Norlander, B., Farley, A., West, J., & Haustein, S. (2018). The state of OA: A large-scale analysis of the prevalence and impact of open access articles. PeerJ, 6, e4375. https://doi.org/10.7717/peerj.4375
[39] Polanka, S. (Ed.). (2011). No shelf required: E-books in libraries. American Library Association.
[40] Price, J., & McDonald, J. (2009). Beguiled by bananas: A retrospective study of the usage and breadth of patron vs. librarian acquired ebook collections. In S. Polanka (Ed.), No shelf required: E-books in libraries (pp. 127–152). ALA Editions.
[41] Research4Life. (2024). About Research4Life. https://www.research4life.org/about/
[42] Rowlands, I., Nicholas, D., Jamali, H. R., & Huntington, P. (2007). What do faculty and students really think about e-books? Aslib Proceedings, 59(6), 489–511. https://doi.org/10.1108/00012530710839588
[43] Snyder, R. (2013). Knowledge Unlatched: A global library consortium approach to financing open access monographs. Insights, 26(2), 147–153. https://doi.org/10.1629/2048-7754.94
[44] Stilwell, C. (2018). Information poverty: The case of South African public libraries. Library Trends, 66(3), 385–410. https://doi.org/10.1353/lib.2018.0010
[45] Suber, P. (2012). Open access. MIT Press. https://doi.org/10.7551/mitpress/9286.001.0001
[46] Swan, A. (2010). The open access citation advantage: Studies and results to date. Technical Report, School of Electronics and Computer Science, University of Southampton. https://eprints.soton.ac.uk/268516/
[47] Swan, A., & Brown, S. (2005). Open access self-archiving: An author study. Key Perspectives Ltd. https://eprints.soton.ac.uk/260999/
[48] Tennant, J. P., Waldner, F., Jacques, D. C., Masuzzo, P., Collister, L. B., & Hartgerink, C. H. J. (2016). The academic, economic and societal impacts of open access: An evidence-based review. F1000Research, 5, 632. https://doi.org/10.12688/f1000research.8460.3
[49] Tenopir, C. (2003). Use and users of electronic library resources: An overview and analysis of recent research studies. Council on Library and Information Resources. https://www.clir.org/pubs/reports/pub120/
[50] Tenopir, C., & King, D. W. (2000). Towards electronic journals: Realities for scientists, librarians, and publishers. Special Libraries Association.
[51] UNESCO. (2012). UNESCO open access recommendations. UNESCO. https://www.unesco.org/en/open-access
[52] Vasileiou, M., Hartley, R., & Rowley, J. (2012). Choosing e-books: A perspective from academic libraries. Online Information Review, 36(1), 21–39. https://doi.org/10.1108/14684521211206944

[53] Walters, W. H. (2013). E-books in academic libraries: Challenges for acquisition and collection management. Portal: Libraries and the Academy, 13(2), 187–211. https://doi.org/10.1353/pla.2013.0012

[54] Ware, M., & Mabe, M. (2015). The STM report: An overview of scientific and scholarly journal publishing (4th ed.). International Association of Scientific, Technical and Medical Publishers. https://www.stm-assoc.org/2015_02_20_STM_Report_2015.pdf

[55] Willinsky, J. (2006). The access principle: The case for open access to research and scholarship. MIT Press. https://doi.org/10.7551/mitpress/1014.001.0001

[56] Xia, J. (2012). Open access in developing nations. Publishing Research Quarterly, 28(1), 62–73. https://doi.org/10.1007/s12109-012-9256-3