



## **The Digital Abyss: Assessing the Preservation Crisis of Electronic Journals in Pakistan's Higher Education Landscape**

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### **Abstract**

Preservation of e-journals is important for long-term access. Yet, little is known about these practices in the developing world. This study aims to investigate e-journal preservation practices in university libraries of Pakistan. Data were collected through a survey from 63 public universities. Results revealed a passive implementation of these practices. Majority of institutions possessed digital content including e-journals, but a majority of them were not archiving e-journals. Very few were rarely archiving them while merely 1.7% were sometimes archiving them. None of the surveyed institutions had proper preservation practices. No significant differences were reported based on institutional type or geographical location, depicting a countrywide negligence related to preserving e-journals. Findings are interpreted through Rogers' Diffusion of Innovations theory. This consistent negligence in terms of preserving e-journals may be linked to the lower perceived advantage, higher complexity, and limited observability. The study provides first baseline evidence related to e-journal preservation in Pakistan. It also provides workable recommendations for policymakers and other stakeholders to play their role in developing the situation.

### **Keywords**

Electronic Resources, Databases, Research Productivity, Research Scholars, Scholarly Communication, Digital Preservation

### **Introduction**

Journals are vital in higher education and research which provide a channel for delivering knowledge and sharing research outputs and new concepts (Ware 2015). From their



emergence in the seventeenth century, journals have been playing an indispensable role in advancing science (Day, 2008). They enable the distribution of important information among academic communities, thereby contributing to the development of almost all disciplines. They also connect researchers, educators, and students, through shared space for exploring ideas and pushing knowledge that may further play a key role in scientific progression (Sugimoto & Larivière, 2018). According to Harrison and Stephen (1995) scholarly journals serve multiple varying purposes in the academic landscape, in accordance with the requirements of their readership.

In recent periods, the academic landscape has witnessed an extraordinary shift from print-based materials to digital platforms (Borgman, 2010; Rafiq & Ameen, 2012). As outlined in multiple studies, for instance, Ahmad and Rafiq, (2022), Ahmad and Rafiq (2024), Ahmad et al. (2023), and Khan et al. (2024), this global shift to digital platforms is due to reasons such as swift access, broader dissemination, and functionality benefits. Globally, memory institutions, academic institutions, and libraries, have embraced digital platforms and systems for improving accessibility, and go ahead beyond the occupants of only physical resources. The way people gain knowledge has been revolutionized, removing both financial and geographical obstacles.

One of the most important developments within this evolution is the appearance of electronic journals (ejournals). In the contemporary era, ejournals are indispensable in higher education because the reasons like convenience, cost-effectiveness, and ability to provide real-time access diverse scholarly communities (Khan et al., 2024). The acceptance of ejournals has increased researchers are increasingly relying on them to keep themselves updated about advancements in their fields. Their integration in research had enhanced the accessibility of information retrieval (Arshad & Ameen, 2023; Park, 2007). As a result, ejournals have become one of the fundamental source of scholarly literature for almost all the disciplines (Mering, 2015).

Although ejournals have become more common, but they also bring new challenges related to their preservation (Park, 2007; Rogers, 2009). In contrast to their printed counterparts, ejournals are inherently vulnerable to technological obsolescence, and data loss. The major issue with ejournals is cancellation of accessing as a result of subscription discontinuation. In case of termination of subscription, access is lost not only for the current content but also for the backfiles. This restriction of access is a major drawback of ejournals,



whereas in case of printed journals, the subscribing libraries or other institutions retain perpetual access and ownership to the backfiles even if they discontinue their subscriptions. This issue with e-journals arises due to licensing frameworks being imposed by publishers that usually restrict access for the subscription period only. These licensing frameworks make the institutions dependent on regular subscription payments (Day, 2008; Park & Choi, 2006). These restrictions can disrupt academic and research work, leaving scholars without access to important resources. Libraries and other academic institutions must therefore try to find solutions to keep e-journals preserved in the swiftly evolving technological scenario and publishers' contractual restriction.

For addressing these associated challenges, institutions may use preservation strategies such as LOCKSS (Lots of Copies Keep Stuff Safe) or Porticoo to preserve the contents at distinct locations, institutional repositories, regular backs, and adherence to the Open Archival Information System (OAIS) (Ahmad & Rafiq, 2024; Rosenthal et al., 2015). Implementing these strategies require technical expertise, funding, clear policies, and institutional commitment (Ahmad & Rafiq, 2022; Ahmad & Rafiq, 2023b; Ahmad et al., 2023). As e-journals use grows, preserving their long-term access and usability remains a key priority for academic libraries and institutions.

The importance of e-journals in Pakistan's higher education is equally significant. Academic institutions are increasingly relying on these e-journals for supporting their research, teaching, and learning environment. This transition from printed to digital platforms has increased in the recent years as a result of increased demand to foster academic and research output (Rafiq & Ameen, 2012). This increasing use and dependence on e-journals make the preservation aspect an important concern for Pakistani institutions. Because losing access to these electronic resources may seriously hamper the country's academic and research progress.

However, in Pakistan the preservation e-journals may be facing particular difficulties including the lack of tools, funding, and technical expertise (Ahmad et al., 2023). Although preservation mechanisms like LOCKSS, Portico, or local archiving systems have been adopted to some extent at global level (Mering, 2015; Narlock, 2021; Shah & Gul, 2019; Trehub & Wilson, 2010), their application in developing countries remains uneven and not sufficiently institutionalized. To maintain the continuity of e-journals in Pakistan, resolving the associated issues is important.



## Problem Statement

Ejournal protection is an important challenge for academic libraries in Pakistan. Their digital nature makes them vulnerable to loss, obsolescence, and restricted access (Ahmad & Rafiq, 2023a). Advanced digital preservation practices remain largely lower in Pakistani universities (Ahmad & Rafiq, 2024). While empirical evidence related to ejournals preservation in the local context is lacking. This study investigates existing ejournal preservation practices through a baseline survey.

## Significance of the Study

This study provides a sketch of ejournal preservation practices in Pakistani universities. This baseline evidence informs the policymakers, administrators, and library professionals with insights to address future accessibility challenges.

## Literature Review

Academic libraries and institutions worldwide are increasingly adopting the digital platforms, including ejournals. The preservation of these resources, particularly ejournals, has emerged as an important concern for these institutions worldwide.

The OAIS protocol establishes a foundation for digital preservation by establishing comprehensive guidelines to maintain continuity, usability, accessibility, and retrievability of digital content, including ejournals (CCSDS, 2002; Ghalandari, 2020; McMeekin, 2011). This foundational digital preservation framework focuses on important procedures like ingest, storage, preservation, and access. While adhering to these guidelines, academic institutions and libraries can maintain continuity of access to their ejournals. The rise of digital preservation increased need for collaborative efforts for developing new techniques, standards, and tools to counter the related technical challenges (Besser, 2007). And as a result of these collective efforts multiple tools and systems have been developed. One such example is the Portico. Established in 2005 with backing from JSTOR, Ithaka, the Mellon Foundation, along with the Library of Congress, Portico emerged as a leading third-party ejournal preservation archive, preserving millions of articles from thousands of journals worldwide (Kirchhoff, 2009). Another such system is LOCKSS, which was founded in 1999 at the Stanford University Libraries, but its development, funding, and expansion were deeply collaborative, involving universities, libraries, and funding bodies worldwide (LOCKSS Program, nd), In 2004, MetaArchive was the first Community LOCKSS Network established as a collaborative digital



preservation initiative to help libraries, archives, and other memory institutions collectively preserve their digital assets in geographically distinct locations (Halbert, 2009). These distributed digital preservation systems based on LOCKSS and Portico help memory institutions preservation their digital content, including e-journals, at geographically distinct locations (Kirchhoff et al., 2010; Mering, 2015; Reich & Rosenthal, 2009; Reilly, 2008; Rosenthal et al., 2015; Rusbridge & Ross, 2007; Shah & Gul, 2019; Tallman et al., 2020). Another such example in implementation is the Alabama Digital Preservation Network (Trehub & Wilson, 2010). Likewise, institutional repositories can be instrumental in preserving the organizational research output, though it may be at a limited scale.

Even though e-journals preservation is an important task, unfortunately it has not been empirically investigated to a better level. Only a couple of studies have been conducted to highlight such practices with empirical evidence. For example, Rogers (2009) investigated the e-journal preservation methods applied in university and polytechnic libraries in New Zealand. The study outlined that a larger number of libraries kept parallel print subscriptions for backup purposes. While some of them negotiated with publishers for long-term access, although several libraries were not satisfied with the outcomes of their negotiations. A larger survey by Meddings (2011) among 475 libraries globally affirmed that nearly half (46.1%) had taken steps to preserve their subscribed e-journal through participation Portico, LOCKSS, and local storage systems. Another relevant study by Maron (2013) surveyed the higher education institutions in the United States confirming that only a third of the libraries were involved in e-journal preservation practices.

The review reveals a critical gap regarding sufficient empirical studies on e-journals preservation at the global level. While in Pakistan, no such study exists that outlines the e-journals preservation practices.

To go forward beyond focusing the descriptive details, the study will conceptualize Rogers' (1995) Diffusion of Innovations (DOI) theory to explain its findings. This theory delivers a comprehensive view to understand the consistent failure in terms of countrywide preservation negligence. The application of e-journals archiving may be restricted by the lack of perceived benefit, poor compatibility with print-based systems, lack of guidelines, and advanced procedural complications. Because of these problems, rather than just face occasional setbacks, Pakistani libraries more likely may not be adopting e-journals archiving at all.



## Methodology

In Pakistan, this study looked at how universities keep their online journals safe for the future. To do this, a survey was carried out in university libraries using a questionnaire. Survey was selected as it allows researchers to collect a wider viewpoint, which in turn helps to build a more representative understanding of the state of affairs. The study focused on public universities established before 2010. The intention behind focusing on only older universities was that these universities usually contain larger collections are comparatively self-sufficient in terms of technological resources. While on other hand the newer universities may not have attained sufficient level of maturity both in terms of collections as well as infrastructure to implement e-journals archiving activities. Thereby their responses would have negatively affected the already lower perceived e-journal archiving initiatives. Based on this selection and exclusion criteria, seventy universities were selected for final data collection.

Results included in this paper are a part of the larger survey on digital preservation conducted for the 1<sup>st</sup> author's doctoral study (see [Ahmad and Rafiq \(2024\)](#) for details). A structured questionnaire was used for data collection. Responses were ranked on a continuous ordinal scale starting from never and ending on always. This allowed respondents to specify how often they performed e-journals archiving. To provide a detailed analysis through statistical analysis, the respondents were also requested to mention their demographic information like institution type and its location.

Analysis of the dataset employed both descriptive and inferential methods. The responses were summarized using frequencies, percentages, means, and standard deviations. Non-parametric tests, including the Mann-Whitney U and Kruskal-Wallis H, were applied to examine differences and relationships among variables. These tests assessed variations and differences in e-journal preservation practices in terms of institutional type and geographical location. Non-parametric tests were chosen because the data violated the assumption of normality. The normality was checked through the Shapiro-Wilk and Kolmogorov-Smirnov tests.

## Results

### Demographic Details of Responding Institutions

Out of 70 institutions, 63 participated in the survey. Out of which, majority (85.7%) were universities, while 14.3% were degree-awarding institutions ([Table 1](#)). The survey



received responses from all provinces of the country, including Islamabad, the federal capital of the country. The response ratio was as follows: Punjab (30.2%), Khyber Pakhtunkhwa (22.2%), Islamabad Capital Territory (20.6%), Sindh (15.9%), Balochistan (6.3%), and Gilgit-Baltistan and Azad Jammu & Kashmir (4.8%). Majority (93.65%) had digital content, including e-journals. However, a small proportion (6.35%) lacked digital content. Further investigation was conducted into the preservation practices of the responding institutions with digital collections.

**Table 1:** Demographics N=63

Demographic details of responding institutions	f	%
<i>Institution type</i>		
University	54	85.7
Degree Awarding Institutions (DAIs)	9	14.3
<i>Geographical location of responding institutions</i>		
Islamabad Capital Territory (ICT)	13	20.6
Punjab	19	30.2
Khyber Pakhtunkhwa (KP)	14	22.2
Sindh	10	15.9
Balochistan	4	6.3
Gilgit Baltistan and Azad Jammu & Kashmir	3	4.8
<i>Availability of Digital Content (including e-journals)</i>		
Yes	59	93.65
No	4	6.35

**EJournals Archiving Practices**

Table 2 highlights the *preservation practices* for e-journals among the 59 institutions that reported having digital content. Alarming, 91.5% of respondents indicated that they “*Never*” archived e-journals for preservation, while 6.8% “*Rarely*” archived them, and only 1.7% archived them “*Sometimes*”. No institutions reported frequent or consistent preservation practices. The low mean score (1.10) and standard deviation (.357) indicate that e-journal preservation is *significantly underdeveloped* in Pakistani libraries, posing a threat to the long-term availability of these resources.

**Table 2:** E-journals archiving practices (N=59)

Archiving practice	Never	Rarely	Sometimes	Often	Always	Mean	SD
Archiving of e-journal for preservation	54 (91.5%)	4 (6.8%)	1 (1.7%)	0 (0%)	0 (0%)	1.10	.357

**Scale:** *Never*=1, *Rarely*=2, *Sometimes*=3, *Often*=4, *Always*=5

**Differences in Archiving Practices (Institution Type)**

A Mann-Whitney U test was conducted to compare e-journal archiving practices between *universities* and *DAIs*. Results showed a lack of significant difference (p = .777)



among both the groups (Table 3). These statistics reveal that the e-journals preservation practices are equally lacking in these institutions.

**Table 3:** Mann Whitney U test to assess differences in e-journal archiving based on institutional type (N=59)

Archiving practices	Mean	SD	University n=50 Mean Rank	DAIs n=9	Mann-Whitney U	Z	p-value
Archiving of e-journal for preservation	1.10	.357	29.87	30.72	218.500	-.284	.777

**Variance in Archiving Practices (Geographical Location)**

A Kruskal-Wallis H test was applied for investigating variations in e-journals archiving practices based on geographical locations of the surveyed institutions (Table 4). Test scores showed a lack of any significant variance among the surveyed institutions based in different geographies (p = .476). Though there are some minor differences in the mean ranks, but as whole results affirm a homogeneously lower level of e-journals archiving across different geographies of the country. These results emphasize the need for a synchronized, national-level approach for resolving the preservation issue.

**Table 4:** Kruskal-Wallis H test to assess variance in e-journal archiving based on the geographical regions (N=59)

Archiving practices	Mean	SD	Islamabad (n=13)	Punjab (n=19)	KP (n=13)	Sindh (n=9)	Balochistan (n=3)	GB & AJK (n=2)	Chi-Square (df=5)	p-value
Archiving of e-journals for preservation	1.10	.357	31.96	32.21	27.50	27.50	27.50	27.50	4.533	.476

**Discussion**

Findings of the study while contextualizing through the DOI theory (Rogers, 1995), highlight a broader failure spectrum in terms of e-journals archiving. The significant lack of archiving practices is not purely a resource issue, instead it is an expectable consequence of the ways digital preservation is supposed within this framework’s context.

At the top, the comparative benefit of e-journals archiving is not instantly apparent. Due to funding constraints, library managements and university authorities may be under extreme pressure towards the provision of *instant* access to e-journals for their users. Whereas, investing



in the unseen archiving may offer lower level of noticeable short-term achievements as compared to spending funds on new subscriptions. The problem of preservation is a future issue, whereas the demand for contemporary content is a present one. This interprets the reasons why almost none are archiving e-journals regularly, although majority have them.

As a second layer, the complications of innovation act as an influential barrier. As outlined by [Ahmad and Rafiq \(2022\)](#), and [Ahmad et al. \(2023\)](#), digital preservation is dependent not only technological infrastructure, but it also needs technical expertise and policy protocols. For libraries in a developing country like Pakistan, irregular electricity supply, low internet speed, and lack of technical expertise make implementing an OAIS-compliant repository extremely complex, resulting in a complete inaction.

The third layer, lack of observability, further emphasizes the cycle of negligence. As these institutions may not be archiving their e-journals due to the lack of local models to imitate. The paybacks of a safe, lasting collection continue to be an abstract idea instead of a tangible reality. The findings sharply contradict with the empirical evidence from technologically advanced countries ([Maron, 2013](#); [Meddings, 2011](#); [Rogers, 2009](#); [Trehub & Wilson, 2010](#)). Very low level of archiving was found in these institutions regardless of their type and geography. These facts confirm that broader national gap exists.

Leaving the issues unresolved will leave the e-journals vulnerable to accessibility discontinuation in future. In case of such mishap, the future researchers may face serious problems. Presently, more focus is placed on giving quick access to journals. Whereas, no attention is given on their protection for the future use. Although, this approach may be suitable for the existing academic landscape, but doing nothing for ensuring access in future may hamper the future academic landscape.

## **Conclusion**

This study gives a view of how university libraries in Pakistan are trying to preserve e-journals for the future. Today, e-journals are widely used in teaching and research. Even so, the work of saving and protecting them is still very limited in many universities. The problem is not linked to only one area or one type of university. Libraries across the country seem to face the same issues. If this situation continues, a lot of academic work may slowly be lost over time. Future students and researchers may then struggle to find important information from today's research. Because of this, more attention is needed from different groups. University leaders need to take this matter more seriously. National education bodies also have an



important role. Librarians, who work with these collections every day, should be included in planning and decision-making. Better progress will need clear policies and stronger systems for digital preservation. Libraries can also learn from international archiving programs and work together with them. At the same time, staff members need proper training. They should feel prepared and confident when dealing with digital archiving tasks. Without these steps, Pakistan may lose valuable research and academic records. This would affect not only local universities. It could also reduce the country's role in worldwide research and scholarship. Archiving e-journals is not only about technology. It is also about protecting knowledge and making sure it stays available for future generations. Students and researchers in the future should be able to learn from the research produced today, just as we continue to learn from older studies and past scholars. For this reason, archiving should become a normal part of library work. It should not be seen as an extra burden or something too difficult to manage. In the end, preserving e-journals means valuing knowledge and protecting it for tomorrow.

### **Limitations**

This study has some limitations which are important to be highlighted before its results could be generalized. Some of the limitations are:

- The research only covered public universities that were set up before 2010. Meaning the results may not be representative of what is the situation in private universities and in the universities established after 2010.
- The study relied on a survey. While surveys are useful for showing what is happening, they don't always explain why things happen.
- Data for this study was collected at one specific time, therefore it only gives a picture of the present archiving state and doesn't show how things might change in the future
- The dataset looked only at ejournal archiving. Other important areas, such as policies, metadata, or disaster planning, were not included.

Even with these limitations, the study may still be of value. It provides a good starting point by showing the current situation. It also opens the way for future research to explore the areas that were not included.

### **Future Directions**

Future research can take several practical steps. These ideas can help move from identifying problems to finding real solutions. Instead of just pointing out problems, it is possible to start finding workable answers. Here are some suggestions:



- Further studies should be conducted to try out low-cost archiving methods in a few universities to see what works in practice.
- Studies should also be conducted to see how some librarians or administrators have managed to make progress, even with limited resources.
- Studies should also be conducted to compare the costs of archiving e-journals and the risks of doing nothing.
- Also, studies should be conducted to look closely at existing policies to find where they fall short in setting path for e-journal archiving and what needs to be added.

Conducting research on these topics can help find solutions to the problems. These suggested studies would help institutions and decision-making bodies better formulate their planning to ensure the accessibility of e-journals for future use. Likewise, these studies may also help in improving the perception towards the preservation of costly resources for the future generations.

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