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Readiness For Digital Preservation In Indonesia

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READINESS FOR DIGITAL PRESERVATION IN INDONESIA

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ABSTRACT

Libraries using institutional repositories aim to manage and preserve digital content. As digital collection providers, they must be prepared to face various problems, especially policy issues regarding how digital collections can develop and can meet user needs in a relatively long time (long-term use). The problem that will be faced is the age of data storage media which can only last at least 10 years so that digital collections must be copied again to reduce the possibility of losing the information contained in digital collections. This problem is one of the reasons for the digital preservation of repository digital collections which are intellectual and cultural property as well as assets for the repository itself. This preservation is a form of organizational readiness in maintaining the existence of the library and preserving the collection so that it has a long term of use. This research uses descriptive quantitative method with a random sampling process with 100 respondents netted in the webometric. Library readiness in digital preservation reaches the consolidate stage, repository institution consolidates its resources for the development of digital preservation. The factors included in this readiness are organizational infrastructure, technological infrastructure, and resources.

Keyword: Readiness, Digital Preservation, Repository

INTRODUCTION

Information technology affects the way libraries work in collecting, storing, and disseminating information. Higher education libraries in Indonesia respond to this phenomenon by managing and providing digital information services. Efforts to collect, manage, store, and disseminate intellectual works of a tertiary institution in the context of the current "technological era" are known as institutional repositories (*institutional repository*). The emphasis given to the institutional or the institutional concept is to show that the digital material collected has a close relationship with the institution that created it (Pendit, 2008).

Indonesia as a developing country has also begun to use information technology to disseminate the work of its academic community, this is inseparable from the fact that students currently access more information electronically to meet their needs (Srirahayu, 2018). The development of digital collection management in Indonesia began when several researchers at ITB created IDLN with the launch of a digital library application known as the GDL, then in 1998 Petra University became the initiator with eight institutions that formed a network called Indonesian Christian Libraries-Virtual Library (InCU-VL) (Surachman, 2012).The development of electronic journals in Indonesia has also experienced very rapid development, from 2009 to 2016 the number has increased by 54% (Yanuar Yoga Prasetyawan, 2017).

The development of digital collections and institutional repositories in Indonesia will raise new problems, one of which is about digital preservation.Libraries using an institutional repository (IR) aim to manage and preserve their digital content for long-term use, but research (Robertson and Borchert, 2014) reveals that digital files that have been entered into IR do not mean they can be directly accessed and reused for long-term, and also data back-up activity is not sufficient to

preserve the digital collection in the long term because the backup is only used for short-term preservation. This is due to the very fast pace of technological change which means that the time frame of conservation actions to be undertaken is very much shorter than paper (Hockx-Yu, 2006).

Problems in digital preservation Harvey in Sari (2008) reveals that the problems that will be faced when choosing a digital collection include the age of data storage media which can only last at least 10 years so that digital collections must be copied back to reduce the possibility of losing information contained in digital collections, in addition to That equipment used such as hardware can experience obsolescence in a period of $\pm$ 10 years, so that digital collections need to be converted back in a new format and it costs a lot to update the hardware. Information security is also a problem in choosing digital collections, considering everyone can access these digital collections, so copyright needs to be considered.

In Indonesia, currently research on digital preservation is still not diverse and still discussing technically such as how to transfer collections for long-term access (Mustafa, 2015), digital collection preservation strategies on how libraries maintain their digital collections through emulation, refreshing, migration and data archeology (Musrifah, 2017). The importance of an organization to measure its readiness for digital preservation will help the organization to pay more attention to digital preservation of its digital collections. Organizations can clearly know their position and what steps they need to take regarding the readiness of preserving their digital collections.

Research Purposes

Higher education institutions in Indonesia have begun to prepare themselves to carry out their digital information preservation activities. Therefore, this research was conducted with the aim of knowing the readiness of universities in Indonesia in carrying out digital preservation activities using a research instrument in the form of a checklist that refers to the Cornell University Model which includes aspects of infrastructure readiness, technological readiness, and sustainable resource readiness.

LITERATURE REVIEW

Development of Research on Digital Preservation

Activity about digital preservation by IMLS in 2004 by giving ground to Northeast Document Conservation Center (NEDCC) to create a methodology that can be used to measure digital preservation needs. The first activity of the project is to collect quantitative data on the status of digital collections in museums and other cultural heritage institutions through an online questionnaire. Data shows that while 92 percent of institutions have digitized from sources, only 29 percent have written policies or plans for digitizing. While 59 percent of respondents reported that their digital material has a life requirement of 25 years or more, and only 13 percent wrote a plan or policy for digital preservation. This data shows that institutional planning for digitization is far behind the creation and confirms our view that institutions need assistance in policy development to link their digital activities to their strategic planning.

Research on organizational readiness was conducted by Daniel G. Dorner (2009) entitled Public sector readiness for digital preservation in New Zealand: The rate of adoption of an

innovation in records management practices using the Diffusion of Innovation Model used to discuss digital preservation as innovation and the level of readiness for digital preservation as the level of innovation adoption with the result is 42.4 % of organizations have knowledge of the basics of digital preservation but awareness of the importance of digital preservation is still low.

Other research on organizational readiness in digital preservation was carried out by Handisa (2017) which aims to identify the level of readiness of repository institutions for digital preservation at the Flinders Academic Commons Flinders University Library (FACFUL) and identify factors that affect the level of organizational readiness. There are three aspects studied, including: infrastructure readiness, technology readiness and the resources needed for digital preservation. This study uses a case study method with sample intensity. The data collection instrument used the Cornell University Survey of Institutional Readiness Checklist. The results showed that the repository unit at FACFUL was not ready to carry out digital preservation. The level of readiness of the Flinders University Library organization in digital preservation is at the lowest level, namely Acknowledgment. At that level, the Flinders Library is still in the stage of developing awareness of the importance of digital preservation. Furthermore, the factors that influence the lower level of readiness of the organization are the absence of a statement on the importance of digital preservation in collection development policies; limited funding and limited human resources who are competent in digital preservation. Factors that influence the lower level of readiness of the organization are the absence of a statement on the importance of digital preservation in the collection development policy; limited funding and limited human resources who are competent in digital preservation. The factors that influence the lower level of readiness of the organization are the absence of a statement on the importance of digital preservation in the collection development policy; limited funding and limited human resources who are competent in digital preservation.

Institutional Repositories

Institutional repositories (Lynch, 2003) are a set of services that offer the community to manage and disseminate the intellectual work created by its members. In this case, apart from providing access and distribution, there is also a need for commitment to the management of intellectual works, including performance in the long term. So that the intellectual work can be accessed for the long term or in other words the work is available as long as someone is in need. So that in building an IR it is necessary to collaborate between librarians, information technology, archivists, faculty and policy makers of a university. Meanwhile, according to Crow (2002) IR is a digital archive of intellectual work created by faculty, research staff,

IR is an information system whose function is to collect, maintain, disseminate and provide access to members of the community of the institution. Currently, IR is a tool that can support the tidharma of higher education, namely teaching, research and community service and at the same time the presence of IR will make an institution more visible to the outside world or the international community.

Purpose of Institutional Repositories

Institutions in creating and developing IR have several objectives and according to Alfa Network Babel Library (2007) the objectives are as follows:

- Maximize visibility to the international community.
- Make feedback on research.
- Produce or provide storage for intellectual works electronically for the institution.
- Provide access to academic information or intellectual work.
- Guarantee the long-term preservation of the intellectual work of the institution

Digital Preservation

Digital collections are vulnerable to damage because they depend on technology, for example hardware and software. This requires an effort so that the information contained in digital collections can be accessed by future generations. One effort that can be done is digital preservation, which is an activity to maintain digital collections so that they can be accessed at all times.

Based on *ALA Annual Conference* on June 24, 2007, digital preservation is an effort to combine policies, strategies and actions to ensure the accurate conversion of original content over time. Despite the challenges of media failure and technological change, digital preservation applies to both digital collections and reformatted content. Pendit (2008) argues that digital preservation is a planned and managed activity to ensure digital materials can be used as long as possible.

Digital preservation is an effort to maintain the ability to display, rediscover, manipulate and use digital information in the face of constant technological changes (Hedstorm in Sari, 2008). Slats in Sari, 2008 argues that digital preservation is focused on ensuring a digital collection that is created with computer systems and applications that remain and can be used for a long time even though the systems and applications used to create digital collections no longer exist.

Digital preservation is carried out in order to preserve digital collections so that they can last a long time and can be accessed by the next generation. Pendit, Putu Laxman (2008) revealed that there are ways that can be done in the digital preservation process, including: a) Technology preservation, b) Refreshing, c) Migration, d) Emulation, e) Archeology of the latest data is f) Media transfer to analog media

Organizational readiness in digital preservation

Organizational readiness in digital preservation can be seen from 3 (three) aspects, namely: aspects of infrastructure readiness, technological readiness, and sustainable resource readiness (Kenny & Buckley, 2005): 1) Aspects of organizational readiness (organizational infrastructure) are translated into the vision and mission of the organization, digital preservation policies and procedures, authority, and implementation; 2) Aspects of technological readiness (technology infrastructure) include digital collections, archival storage, storage practices, observation, depository, depository development, security, OAIS Compliance; and 3) The aspect of sustainable resource readiness (Resource) includes sustainable funding, staffing, and administrative structure.

RESEARCH METHOD

The research method used in this study is a quantitative method to determine the level of organizational readiness in digital preservation. The object of this research is university libraries which are included in the webometric version of the world ranking

(http://www.webometrics.info/en/Asia/Indonesia%20), totaling 2120 universities, the choice of universities that are included in the webometric is because one of the factors in assessing the This webometric ranking cannot be separated from the digital collection it has, the number of users who access it, etc. The sampling process is carried out by means of random sampling, where each university in the webometric has the opportunity to become a respondent. Determining the number of samples in this study will be carried out by calculating the Yamane formula (Burhan Bungin, 2005) with a precision value of 10%, then the sample size needed in this study is 95.50 so that it is rounded up to 100 respondents. Questionnaires are distributed online through the College email and / or library email or directly to the repository email if you already have one. Questionnaire collection will be stopped if the returned questionnaire has reached 100 respondents. The time needed for data collection is around 1 a month, there are some universities that refuse to fill in, and there are also those whose email addresses are no longer active.

The collected data is then processed and grouped according to research variables, then the conclusions are exchanged. Measuring the level of library readiness in digital preservation is used five indicators derived from Kenny & McGovern, 2002 as follows:

1. Acknowledge: Understanding that digital preservation is a local concern; the emergence of initiative develops awareness of organizations and staff about the importance of digital preservation

2. Act: Initiating digital preservation projects; repository agency begins its digital preservation

3. Consolidate: Seguing from projects to programs; At this level, the repository institution consolidates its resources for the development of digital preservation.

4. Institutionalize: Incorporating the larger environment; repository institutions integrate digital preservation as one of the main elements of organizational goals

5. Externalize: Embracing inter-institutional collaboration and dependency. The repository institution promotes digital preservation as part of collaborative collaboration with other repository institutions

RESEARCH RESULT

Table 1. Data Repository owned by Higher Education

Year	f	%
Less 1th	4	4
1-5 years	28	28
6-10	21	21
More than 10 years	47	47
	100	100

Respondents in this study amounted to 100 universities in Indonesia. From table 1, it can be seen that the data about the repository they have been around since when. 47% of tertiary institutions in Indonesia have had a repository for more than 10 years, so there are many digital data stored and managed.

Organizational Readiness in Digital Preservation

The development of information technology requires activities to maintain digital documents or information preservation to be carried out continuously so that the information contained in them can continue to be accessed and utilized in the future which is called digital preservation. Digital preservation activities pay attention to digital collections, which do not depend on technological changes or damage and copying, to digital transformation which tends to be complicated(Pendit, 2008). Therefore, there needs to be a long-term commitment to the maintenance of digital objects that have been obtained or created in an organization, especially the Higher Education digital repositories. The results of this study obtained the following data:

1. Aspects of Organizational Infrastructure Readiness

Data presented in the aspect of organizational infrastructure includes Mission, Regulations (Policies and Procedures), Authority, and Implementation.

Table 2. Organizational Infrastructure Indicators: Mission and Regulations

Indicator		Yes (%)	Not (%)	Do not know (%)	Total (%)
Mission	Mission	94	5	1	100
Regulations	Long Term Access Policy	57	34	9	100
	Weeding Rules	68	26	6	100
	Creation	71	21	8	100
	Storage	75	12	13	100
	Transfer	51	38	11	100
	Average	64.4%			

Commitment in the long term is very necessary for the maintenance of digital objects that have been obtained or created in a repository. This policy is important, namely as a basis for reference in the implementation of digital preservation put forward by (Morrow, 2000)that the preservation policy will facilitate the implementation of these preservation activities. Table 2 shows that 94% of repositories in Indonesia have a mission to maintain digital objects both explicitly and implicitly in their mission and vision. For example, one of the missions in the UGM library is "Providing lifelong learning facilities" which means that the library will ensure that the information it needs will be accessible as long as it is needed.

In implementing and carrying out the mission that has been made by an institution, it is necessary to have policies or regulations aimed at providing limits and references on how activities must be carried out in accordance with the objectives of achieving missions related to the maintenance of digital objects which include Long-term Access, Weeding, Digital Collection Creation, Deposit and Transfer Policy. Regulations related to the maintenance of digital collections are necessary for the long-term sustainability of access to the collections owned by the repository. This is not an easy thing because digital collections depend on hardware and software to be accessed, while hardware and software are constantly evolving where older versions are often not compatible with their predecessors.

Written policies and procedures that discuss long-term access to information held by the new repository are owned by57% repository. This shows that not all repositories have policies

regarding long-term access, but when viewed in the field, even though they do not have them, in fact, they have carried out digital collection preservation activities so that their collections can be accessed as long as needed. Such activities are like weeding. Preservation is maintaining collections for long-term access which require manpower, time and sources of funds, so it is necessary to separate which collections are still in use and which are not used. Weeding is the process of identifying and removing material that is no longer desirable from a larger material body ((Pearce-Moses and Baty LA, 2005). *S*As many as 68% of repositories in Indonesia already have regulations related to weeding.

Table 3. Organizational Infrastructure Indicators: Authority and Implementation

Indicator	Yes (%)	Partial (%)	Process (%)	Not (%)	Do not know (%)	Total (%)
Authority	20	30	20	20	10	100
Implementation	9	31	42	12	6	100

Based on table 3 above, not all regulations made above have been checked with the competent authorities. Authority consists of power and rights entrusted to office holders to carry out their responsibilities (Sutarno, 2006). This means that only 9% of the existing regulations have all been implemented. It can be seen that the institutions that implement these policies and regulations are still not prioritized by the related institutions.

2. Aspects of Technological Readiness (Technology Infrastructure)

Technology infrastructure is related to the use of technology used and supports in digital preservation activities. In this aspect, there are several indicators, namely Digital Collections, Storage, Observation (obsolescence), Depository Development (Depository Development).

Table 4. Technology Infrastructure: Digital Collection

Digital Collection	GIS	Audio visual	Number Files	Digital Image	Database	Organization Report	Ms. Office	e-Journal	The web	e-mail	Pdf
I have it (%)	19	54	64	68	70	77	84	90	93	93	98
Will Have (%)	29	17	20	19	17	20	5	6	6	6	2
Do not have (%)	52	29	16	13	13	3	11	4	1	1	0
Total (%)	100	100	100	100	100	100	100	100	100	100	100

Digital collections are non-print collections or collections that have been converted or transferred in a machine-readable format for the purpose of preservation and providing electronic access to collections, such as e-journals, e-books, reference works published online and stored on CDs. -ROM, bibliographic databases, and other web-based sources (Reitz, 2004). Broadly speaking, digital collections can be divided into 2 (two) groups, namely digitalized collections or printed collections that have been transferred in digital form and collections that are "born" in digital form (Lazinger, 2001).

Digital collections based on the nature of the media sources of information and their contents can be divided into 4 (four) forms (Pendit, 2008), including 1) bfull text text and resources, such as e-journals, e-books, e-newspapers, open access digital collections, and so on; 2) Metadata resources, including software in the form of catalogs, indexes, abstracts, and other resources that provide descriptive information; 3) Digital multimedia materials and websites on the internet.

From table 4 above, it can be seen that only 19% of respondent institutions already have geographic information systems in their data management, 54% of repository agencies have used audio-visual media as their digital collections. The digital collection in the form of file numbers is 64%, image files are 68%, the data base is 70% owned, organizational reports are 77% owned, Ms. The Office is 84% owned, e-journal is 90%, web collections are 93%, and the repository has the most of it is a pdf. Geographic Information System (GIS) as a computer-based information system for managing, storing and analyzing as well as retrieving geographically referenced data which has grown rapidly in the last five years. GIS is able to accommodate processing, storage,(Koko Mukti Wibowo, Indra Kanedi, Juju Jumadi, 2015).

The repository institution must be able to ensure that the file format stored in the repository supports long-term preservation. According to Kosasih (2009), digital collections have several storage formats including: 1) Types of digital text include: a) RTF (Rich Text Format), b) PDF (Portable Document Format), and c) Postscript; 2) Types of digital images / images, can be: a) TIFF, b) JPEG and GIF, c) Photo CD, d) PNG, e) Pyramid File Format, and f) Other formats such as: PICT, BMP, PDF and DjVU ; and 3) Types of digital video / film, can be: a) MPEG, b) MP3, and c) Digital Video Broadcasting.

Table 5. File Collection Storage Technology Infrastructure

File Storage	Access Copies (%)	Master Files (%)	Back-up (%)	Total (%)
On line	36	18	46	100
Magnetic Tape	20	15	65	100
CD, DVD or the like	34	16	50	100
SSD / HD	22	16	62	100

Digital preservation activities must be balanced with the existence of technology infrastructure in terms of file storage that allows retrieval / rediscovery and preserving electronic information sources to ensure long-term availability and access. According to (Gbaje, 2011), with the increasing use of the Internet (online) and computers in many information centers combined to pose significant challenges related to ensuring long-term preservation of electronic information sources it means that action is needed to address these challenges. Therefore, it is necessary to act on access copies, backing up, as well as master files in file storage as a medium, including online, magnetic tape, CD / DVD, SSD / HD. From table 5, file storage for access copies, mostly uses the online form (36%) for reasons of speed and ease of access by users, while for master files almost all forms of storage media are used. The form of storage in the form of magnetic tape is mostly used for data back-up by 65%, followed by hard drives and CD / DVDs.

Table 6. Obsolescence in File Storage

Obsolescence	File Format	Storage Media	Storage Drive
Yes (%)	33	61	61
Not (%)	67	39	39
Total (%)	100	100	100

In digital preservation activities, it is necessary to pay attention to actions to extend the use of digital content, one of which is the occurrence of technological obsolescence must be a concern, thus, preservation steps that can be taken by migrating and refreshing each format change, so that digital collections can still be accessed. With the refreshing process, digital collections moved from one medium to another, a similar medium or a newer medium to prevent obsolescence of computer technology by updating only the storage media. (Lazinger, 2001, p. 76) and the purpose of refreshing is to create digital collections that are more stable and also minimize the risk of data loss in the data transfer process. Furthermore, the migration process is carried out by transferring a digital collection of certain hardware and software configurations into other configurations, or from one generation of computer technology to newer computer technology. (Lazinger, 2001, p. 77) This migration process aims to preserve digital objects so that the stored digital collections can continue to be accessed by users. In particular, the process needs to be emphasized and should not be overlooked as a complete breakdown of existing technology to avoid. (George Firmin Kavishe, Frankwell Dulle, 2016). Therefore, in table 6, the respondents took action against obsolescence through the file format 63% did not and the remaining 33 percent did. In the storage media, the respondents were dominated by 61% and 39% did not apply. Furthermore, 61% of respondents have applied storage drives and only 39% of respondents have not implemented it.

Table 7. Depository Development Indicators

Indicator	Storage	Security Mechanism	OAIS-Compliant Depository
Yes (%)	68	60	50
Not (%)	18	15	13
Do not know (%)	14	25	37
Total (%)	100	100	100

Digital collections are prone to damage in an irreversible senseaca or not accessible again. This situation will turn into a time bomb that threatens the survival of digital collections in an institution. Therefore, in digital preservation activities, it is necessary to pay attention to the level of security, planning a digital storage area to organize / manage digital collections from time to time. In table 7, regarding the storage area planning, it was found that the respondents were dominated by 68% of their institutions having held storage places, 18% of which had no storage area planning, and the remaining only 14% of the respondent institutions did not know about their institutional storage plans. Regarding security mechanisms to prevent intentional or unintentional threats to protect data from unusual changes that can provide a level of confidentiality and integrity, as many as 60% of respondent institutions have security mechanisms for storage, 15% of respondent institutions do not have security mechanisms, and 25 % of respondents do not know

whether the institution has a security mechanism for storage areas. The Open Archival Information System (OAIS) focuses on the ability to access and interpret digital documents through information created to provide a procedure for migrating preservation processes to new technologies over time. 15% of respondents' institutions do not have a security mechanism, and 25% of respondents do not know whether their institution has a security mechanism for storage areas. The Open Archival Information System (OAIS) focuses on the ability to access and interpret digital documents through information created to provide a procedure for migrating preservation processes to new technologies over time. 15% of respondents' institutions do not have a security mechanism, and 25% of respondents do not know whether their institution has a security mechanism for storage areas. The Open Archival Information System (OAIS) focuses on the ability to access and interpret digital documents through information creation to provide a procedure for migrating preservation processes to new technologies over time. (R Moore & Smith, 2007). 50 percent of respondents' institutions use and develop OAIS-Compliant Depository for long-term maintenance of digital objects, 13% not use OAIS-Compliant Depository, then 37% do not know whether the institution uses the OAIS-Compliant Depository for the maintenance of its digital objects.

2. Aspects of sustainable resource readiness

Table 8. Variable Resources include Funding, Staffing, and Technology Infrastructure

Variable	Indicator	Yes (%)	Not (%)	Do not know (%)	Total (%)
Funding	Fund	45	36	19	100
Staffing	Special Staff	62	28	10	100
	Professional Expert	42	50	8	100
	Professional Technician	50	42	8	100
	Senior Management	44	35	21	100
	Trainer	30	54	16	100
	Outside Services	23	69	8	100
Technology Infrastructure	Technologies for Long-Term Maintenance Programs	61	23	16	100
	Special Fund for Technology	58	23	19	100

Resources aspects that support digital preservation activities include human resources, funding sources, and technology infrastructure. Within an organization / institution. Funding sources play a role in maintaining digital collections in an organization or institution. The funding framework serves as a reference for accommodating network installation costs, developing 'cloud' infrastructure and developing technical competencies for staff(Walters & Skinner, 2010). In table 7, it can be seen that as many as 45% of the repositories have special funding for digital preservation, the remaining 36% of the respondent institutions has no special funding for maintaining digital collections, and 19% do not know whether their institution has special funding or not.

Human resources are one of the most important assets. Human resources also act as mobilizing, directing, developing and maintaining an organization or institution in the various demands of society and times (Susilo Susiawan & Abdul Muhid, 2015). Human resources in digital preservation consist of various parts as seen in Table 8 above. Most of the repositories in Indonesia have special staff in the field of digital preservation, which is 62%, professional experts can be digital preserved only 42%, 50% are professional technicians, have senior management (44%) and trainers (30%). From table 7 it can also be seen that only 23% use the services of outside parties, meaning that the repository, including its digital preservation is managed by their own internal staff.

Technology infrastructure is related to the use of technology used and supports in digital preservation activities. In table 7, it is found that 61% of respondents' institutions have adequate technological infrastructure to build / continue digital maintenance programs accompanied by long-term quality improvements, 23% still do not have technology for long-term maintenance programs, the remaining 16% of respondents do not know. The last thing that is obtained from the table is the special funds for the development, replacement and improvement of technology every year where 58% have it, while 23% do not have it and the remaining 19% of respondents do not know about special funds in their institution.

Analysis of Organizational Readiness Levels in Digital Preservation

From the results obtained, it can be seen that 94.4% of repositories in Higher Education already have a vision and mission that leads to digital preservation, where 60% of the vision and mission has been applied to regulations related to long-term access, weeding regulations, creation, storage, and transfer of digital material. When more than 50% of the information content to be included in the repository has provided requirements that need to be met for data upload. Only 20% of the regulations that have been made are reviewed by the leadership and only 9% have implemented all the regulations that have been made, Sissany31% have only partially implemented them, 42% are in the implementation process. This shows that the organization's policy and planning (repository) explicitly states its commitment to digital preservation by developing essential basic policies and by understanding the value of policies as part of the solution; the need to address access problems can drive the development of policies that enable conservation.

Technology infrastructure relates to the use of technology used and supports in digital preservation activities. In this aspect, there are several indicators, namely Digital Collections, Storage, Observation (obsolescence), Depository Development (Depository Development). The result is data processing is data 50% of the repository has various kinds of digital collections, but the most part is pdf format. The storage area has also begun to think about having backup data, there are several that have master files in various storage media. However, from the data it can be seen that 68% already have storage space, 60% of the repositories already have security systems and only 50% of the repositories support OAIS-Complain Depository for their digital content. The organization's technology infrastructure (repository) specifies a set of technical requirements that apply to each project, or, more likely, will design project-specific and reactive technical

requirements. Depending on the size of the project, the level of technology support obtained for the project, and the nature of technology support within the organization, digital content can be spread across multiple servers in multiple locations or co-located using available tools. Cross-project technology planning is less likely at stage 2 than at later stages. Depending on the size of the project, the level of technology support obtained for the project, and the nature of technology support within the organization, digital content can be spread across multiple servers in multiple locations or co-located using available tools. Cross-project technology planning is less likely at stage 2 than at later stages. Depending on the size of the project, the level of technology support obtained for the project, and the nature of technology support within the organization, digital content can be spread across multiple servers in multiple locations or co-located using available tools. Cross-project technology planning is less likely at stage 2 than at later stages.

The content and use of repositories in Indonesia have a tendency to assess the preservation-readiness of current collections, and to determine ongoing requirements for building and maintaining collections and resources. This can be seen from several existing repositories, especially the digital preservation section, which is supported by expert staff, technicians and also special funds (58%) for digital preservation, although not all of them. From this it can be seen that the repository which was originally a project for digitization and to facilitate access to collections owned by universities began to expand the scope of digital preservation from the project level to the institutional level, a process that ultimately led to the identification of redundancy, reduction of inefficiency, and priority setting, so that the level of Repository readiness higher education institutions in Indonesia related to digital preservation enter stage 3, namely Consolidate: Seguing from projects to programs.

Conclusion

The readiness of an institution or organization in preserving collections, especially digital collections (digital preservation), can be seen from adequate technological conditions, qualified human resources and is supported by professional experts as well as professional technicians and senior management. This readiness is also inseparable from the role of the institution which continues to provide understanding and explanation to employee staff about the importance of digital collections as a vital asset for the institution and digital preservation as a routine activity in the life cycle of the institution. Readiness for digital preservation is not only in the handling of digital collections in the short term such as database and server back-up, instead of digital media to analytics, digitization, and many more. The readiness of digital preservation in institutions is also in planning and collaboration with storage media agencies that can facilitate collection management, collection life cycle, as well as collection preservation. For this reason, institutions in Indonesia have reached the institutional stage. It begins with providing an understanding and alignment between the mission and vision of the institution as well as the goals and performance of employee staff to make preserving digital collections a crucial concern. After understanding the importance of digital preservation, there was an urge to take action, in which case the institution

began to carry out projects or activities for preserving digital collections. After that, consolidated by making preservation of digital collections a program and combining it with a larger environment so that institutions and their attributes can adapt to civilization and technological developments. However, no library has yet tried to embrace or collaborate with other libraries or agencies in preserving digital collections.

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