Synergetic Pillars in Managing Institutional Repository at Gadjah Mada University Library in Yogyakarta in Developing Scientific Communication

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Abstract

This paper aims to explore the management of institutional repositories at UGM (Gadjah Mada University) library through synergetic and interconnected pillars in building scientific communication in the library. In order to do this study, researchers use a qualitative-descriptive method to describe the phenomena of the research object obtained from the data through three techniques, namely: observation, interview, and documentation. Data analysis techniques used consist of three stages, namely: reduction, display, and verification/conclusion based on Miles and Huberman concept. Referring to the phenomena of the research object, there are at least three main pillars of institutional repository management that can be seen to encourage the development of scholarly communication at UGM Library, First, the human resources whose existence maintains the continuity of access and content updates; second, the technology used aims to improve and facilitate long-term access; and finally, the implemented policies function as a form of library care and responsibility in meeting the scientific information needs of academicians and public in general. These three pillars are considered as conceptual and technical constructs in building scientific communication among academicians at the library.

Keywords*: Institutional Repository; Scholarly Communication; Gadjah Mada University Library; Management Pillars*

1 Background

The development of information technology in college libraries has a significant impact on the use of scientific information sources ranging from conventional to digital services. The conventional era is mostly based on printed collections, while the digital era is characterized by collections in the form of digital files that can be accessed online through the internet network. This is in line with the views of Sulistyo Basuki (2011) which said that since the beginning the library has been designed to be flexible and accommodating to the development of its era. Technological mediation that penetrates all aspects of people's lives cannot be separated from library accommodation to answer the needs and challenges of the times. This phenomenon shows that technology not only changes the form of information packaging, but also challenges how to collect, disseminate and access it. It can be said that every college or university encourages its library to build creative and innovative services for users. Institutional repositories are one of innovations at college library services in managing various scientific works produced by academics to be served online.

Online access to scientific publications in digital format is a mechanical and cultural basis in institutional repository management. Open access to scientific publications produced by institutions is an intellectual transaction that is built through the relationship between the reader and the author when utilizing scientific publications. This digital technology-based scientific communication discourse is seen as a strategic effort for libraries in bridging relationships between users and authors through institutional repositories. This relationship becomes a virtual scholarly communication among academicians as a core discourse in building institutional repositories. This is in line with the expression of Gayton (2008) saying that in carrying out the development of science, college libraries are often used as a forum for communicating and collaborating among library users. This situation was the beginning of this research to explore the repository of Gadjah Mada University.

In general, the selection of this locus is based on three main reasons. First, the object of this research study is focused on library whose repository has achieved the best position in the web of repositories ranking version conducted by the Cybermetrics Lab; second, the library is considered as representation among libraries in Yogyakarta. Its collection and repository software are better compared to other college libraries located in this place; finally, the implementation of institutional repositories in the library has long been carried out and has entered its eighth year, as the results of the authors' initial observations. Based on these reasons, we believe that this research becomes important to find out the phenomena of institutional repository governance analyzed from three aspects consisting of technology, human resources, and policy that become a significant part to discover how the UGM Library plays an important role in managing institutional repositories to become a good space for developing scholarly communication.

2 Literature review

2.1 Institutional Repository: Basic Concepts and Development

The presence of digital format scientific publications made the university realize the importance of institutional repository as an infinite space that must be developed in the development of college scholarly communication. Institutional repositories are a strategic means to publish the results of academic research and allow various parties to contribute to enriching their content. In this situation, institutional repositories act as systems that function to manage, disseminate, preserve institutional intellectual assets, and provide access to users, both part-text and full-text (Bonilla-Calero, 2013; Lynch, 2003). Repositories are information institutions that are widely used by users, including because they can be accessed online and public as illustrated in conservation activities (Nemati-Anaraki, 2018; Cho, 2017).

The implementation of institutional repositories as described by Babu (2012) is carried out by several main parties, namely, people, technology, and policies. Human groups as contributors and users consist of elements, authors, faculty members, students, researchers, information providers (vendors), reviewers, and publishing bodies. The technology as a medium consists of hardware, software, additional features (add-ons), applications, and search engines. While the policy relates to groups of funders, governments, agencies, the public, research institutions, and mandate legal institutions. The above conception can be seen in the following illustration.
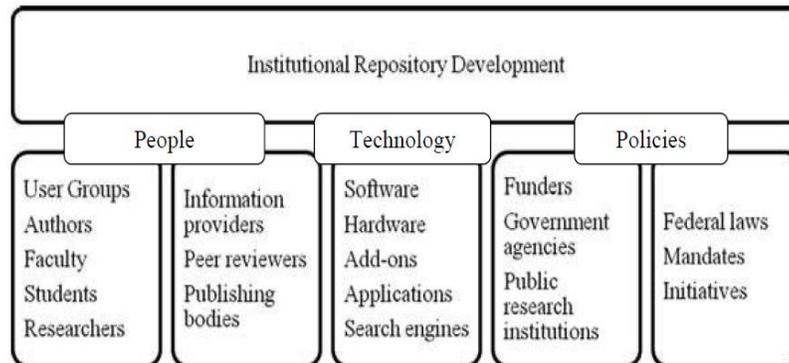
Figure 1: Development of Institutional Repsitory Aspect

The illustration above shows a synergy and collaboration in managing institutional repositories. The librarian is in charge of managing for easy access; technology is used as a medium to maintain and ensure long-term conservation that is user-friendly in increasing access globally; and academicians including lecturers are professions that carry out teaching, researching, community service, and producing scientific work. In other

words, an institutional repository is a reflection of an institution whose mechanical processes involve each member of the institution and continuous interaction between them. The concept can be illustrated through the chart below:
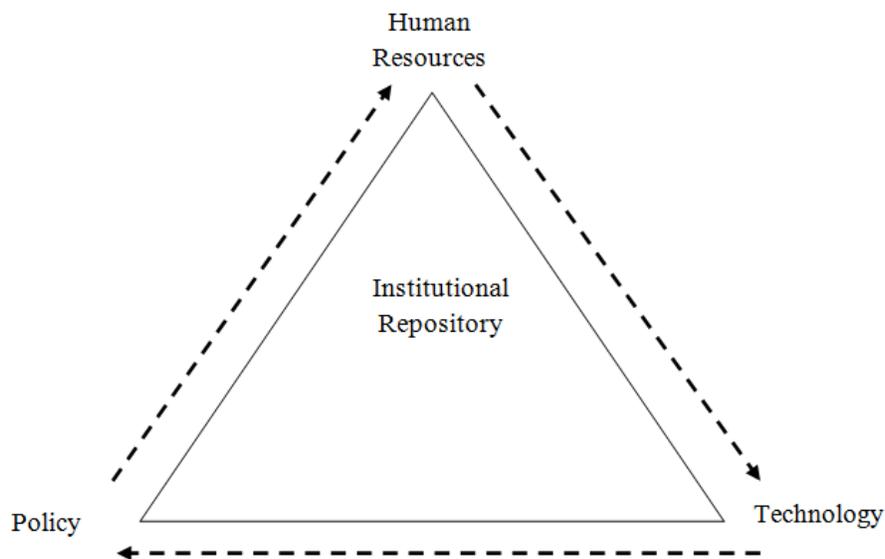

Figure 2: main component of institutional repository in a portrait of scholarly communication

Scholarly communication has historically been known since the 20th century. It is present as a form of solution for the high cost of journal printing and the weak financial capacity of the library (Mabe, 2011). In response to this, libraries also changed the way in disseminating scientific information which was originally printed and into digital communication which later became more prominent in the scientific community (Lyman, 1997). Since then, scholarly communication has begun to be defined, for example scholarly communication is seen as a concept that leads to scientific dialogue activities between two or more people. This activity is in the form of utilization and dissemination of information that occurs in the academic environment through two channels, namely formal and informal (Baughman, 2015 and Liu, 2007). The form of scholarly communication through formal channels is exemplified in a way. First, publishing the results of research is through scientific publications, such as journals, proceedings and other types of scientific publications, while the form of informal channels, such as involving themselves in scientific activities are namely attending scientific orations, conferences and seminars (Rao, 2011); second, through the channel of scientific communication, it is a significant part because there are activities to exchange ideas and discuss the results of the research (De Silva, 2018). In addition, the two channels have a distinctive type, where the type of scholarly communication through formal channels is more long-term, and informal channel types only last for a short time (Meadows, 1997).

In addition, Reitz (2002) said that scientific communication is a useful tool for those who want to exchange information regarding the results of their research. This is exemplified by Shehata (2015) by publishing through journals or presenting directly through scientific activities, such as speeches, presentations, and the like as scientific dialogue spaces which are seen as the process of disseminating scientific work to the scientific community. This is a form of confirmation of the ownership of the idea, their motivation for improving academic careers (Mabe, 2011). Through this connection, Kling & Mckim (1999) interpreted scholarly communication not as a product, but rather as a repetitive process. The process according to Ho (2016) focused on generating, reviewing, disseminating, acquiring, preserving, discovering, accessing, and assimilating, which ultimately can develop knowledge in the context of scientific communication discourse.

Knowledge in the context of scientific communication discourse was created through social networks as a measured reputation space for writers (Klain-Gabbay, 2016). The writer's works can be conveyed through publishers and library intermediaries so that such intermediaries show the link between scientists, publishers, and libraries (Mukherjee, 2009). Scientists act as producers of scientific works, while publishers review, publish, and distribute them (Solomon, 2012). The library maintains the results of research, organizes, and helps researchers to find and access information that is relevant to their research topics (UNESCO, 2015). In this case, the college library is responsible for developing and promoting scientific publications actively and creating new ways of producing and communicating the results of Coble's research (2014). Thus, scientific publications are seen as a product of scientific knowledge, where the author's ideas are published until finally knowledge can develop widely (Abrizah, 2015; Halliday, 2001). Based on the building of the above paradigm, it can be used as a basis for scientific communication that cannot be seen in a single entity. It is built from a complex concept in which there are actors, processes, and products that are representative each other.

3 Method

The management of institutional repository is increasingly in its performance as a form of technological development and the demands of the academic community. This illustrates significance in the process of scholarly communication. This process is a way for creating innovation, in terms of technology, human resources, and policies related to access to scientific work, especially the final assignment of students which is the starting point for scholarly communication. Therefore, this research is important as an effort to understand the institutional repository management in supporting the development of scientific communication in UGM library. Thus, this effort is specifically seen in three important problems, namely:

1. What is the process of managing the scientific work through Eprints based repository software?
2. Who are the human resources responsible for developing institutional repository at the library?

3. What is the institutional repository management policy as an effort to develop the library?

In order to answer the above questions, this study uses a descriptive-qualitative method with an explorative approach to the phenomena of institutional repository management in the development of scholarly communication at the library. A qualitative method is used as an effort to naturally explore the empirical phenomena that occur at the university library. The technique of collecting data uses interviews, observation, and documentation. Interviews are used as the main data source, supported by other techniques. Interview results are used to map problems related to research problems, such as how the institutional repository is managed in the development of scholarly communication. This technique is carried out which is accompanied by observation technique. Observation aims to understand the real conditions in the field, such as seeing the empirical reality of management and the state of the repository that has been developed in the library. Meanwhile, documentation is used to understand documented information in the form of files stored in institutional repository, from the beginning to the present. Data on regulations, SOP (Standard Operational Procedures), and all matters relating to the management of institutional repository is found through this technique (Laugu, 2015).

To select informants, a purposive technique is used. Informants were chosen based on the research objectives (Sugiyono, 2012; Arikunto, 1991). The aim of this technique is to understand how institutional repository management runs in supporting the development of scholarly communication. Those informants were taken from people who were considered to understand the repository and they were even involved in developing the institutional repository. To get valid data, the validation technique in the form of triangulation is used, namely technique, source, and extension of time.

Data analysis techniques use the model of Miles and Huberman (1994) and Denzin (1994) in three stages of the process, namely: data reduction, display, and verification/conclusion. Data reduction is the selection of data in accordance with the focus of the study so that irrelevant data is automatically ruled out. In the second stage in the form of data display, the selected data will be presented in systematic, organized, and patterned exposures in the relationship between the points that make it easy to understand. Finally, the verification stage is done through the presentation of conclusions; if there is different evidence, the conclusion will change following the latest evidence.
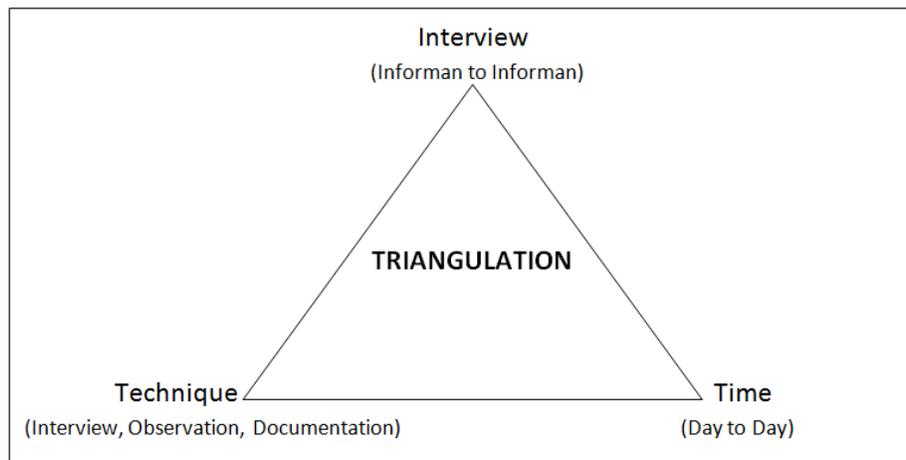
Figure 3: Triangulation technique

4 Results and Discussion

UGM Library (Gadjah Mada University Yogyakarta) began to develop a repository in 2013. This was marked by the registration of the official UGM repository site on Webometrics's Web of World Repositories (RWWR) so that the library could register its repository's web address to several open access consortia. Thus, the existence of this repository can be an alternative reference for researchers and a means for higher education institutions to demonstrate their existence towards scientific development with a variety of scientific works produced by their academic community. For this point, UGM library seeks to integrate several repository contents in UGM. The effort is guided by the UGM Library Circular to the Academic Directorate No. 216/PP/Perpust/2016 dated from 2 April 2015 concerning Student Final Self-Reliance Payments, which until now has become a legitimacy tool for developing the amount of reposted content of its institutions.

4.1 Technology

UGM Library according to one informant has used Eprints version 3.3.15 based on repository software. The software uses an application base: MySQL, Apache, Webserver, Perl, mod_perl, XML, DOM, RDF, CodeMirror, Flowplayer, and CPAN. The protocol (standard interoperability program) uses the Open Archives Initiative Protocol for Metadata Harvesting, Valid XHTML, Valid CSS, and Linked Data. This is important to emerge especially knowing the standards that are the reference in the process of collection, data entry, and connectivity between repository resources. Hardware specifications can be tailored to the needs, especially on hard disk storage media and RAM memory, for example Intel Xeon Processor, 4GB RAM memory, 350GB hot-swap hard drive. Software specifications for the operating system (OS) generally chosen are the Ubuntu Server operating

system. Apart from being stable, it also has more community support if it experiences difficulties or other damage.
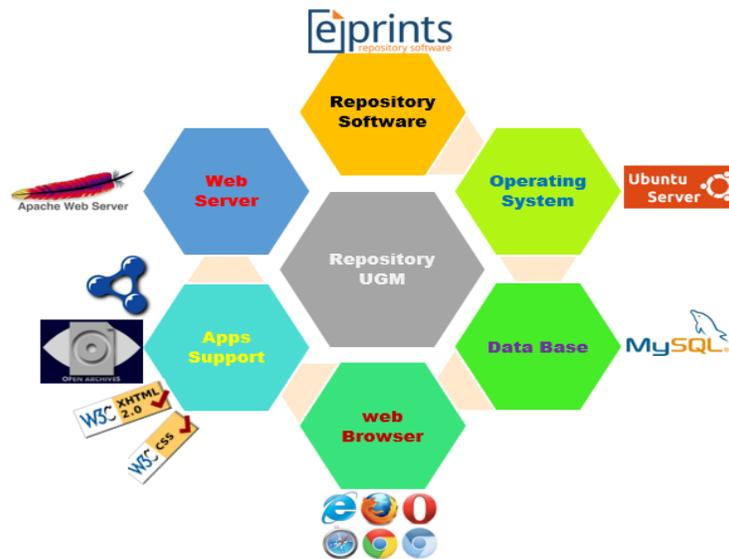

Figure 4: UGM Library Repository Technology

In connection with the issues mentioned, UGM Library conducts a repository design process through two stages, namely the identification of the system and the type of format of scientific work. System identification includes the repository application platform in UGM, metadata standards (Dublin Core), and data communication methods used (web services, OAI-MPH, XML). The identification of types of scientific work includes file formats/extensions, such as pdf, video and audio formats, while the level of authority of access includes private, public, and limited. Looking at the UGM repository system development scheme, it appears that at the three levels of development that are still experiencing the development process. First, the level process is also called the administrative level. This level generally has two core grand designs, namely Apps (set-up applications) including discovery services, multi-document viewer and analytical user authorization. The server level functions to manage application work processes, databases, indexing, determining keywords and/or details of subject collections. Secondly, the output level is the level that is referred to as the Front-End Level which serves to display the portal/web repository framework with search functions (simple and advanced search), access regulation, links, sharing and download settings. After the whole system development scheme runs as it should be, then a trial, review, and evaluation process is carried out to ensure all system functions are working properly.

The process of testing the system, according to the explanation of informants, aims to know for sure all technological components (hardware, software, and supporting applications) work well when accessed. After ensuring that all components are stable, a review is carried out to review whether there are parts that need to be

addressed, reduced and even replaced. Furthermore, the review process is carried out by the repository team and is assisted by all librarians, leaders, visitors and institutions. The aim is to obtain input, suggestions, and consideration for the smooth processing and dissemination of UGM academic community's works. After that, it was launched to inform the public about the institutional repository as a library service that accommodates all various scientific works of UGM academicians and hopes that it can be maximized for the development and sharing of knowledge.

4.2 Human Resources

Each library is ensured to have human resources who are responsible for handling and managing various service fields in the library. Being a necessity for them is required to work professionally in performing tasks, especially managing institutional repositories. This also applies to the management of the UGM Repository which is specifically handled directly by the DataBase and Network Field which is assisted by librarians in carrying out the responsibility of managing the institutional repository as one of its main tasks. Through this task, UGM Library according to informant is stated that they are trying to provide accountability to the public so that the works of UGM academicians can be accessed, especially research that has been funded by government and they will be free of charge. One of the efforts made by the repository manager to realize this is, for example, developing a repository and completing repository data migration. The development has been carried out since 2016, namely: the migration of faculty library databases, including ISIPOL, Economics and Business, Mathematics and Natural Sciences, Law, Geography, Psychology and Veterinary Medicine. This is in line with the presentation of the UGM Database and Network Field below

> "... The existence of Database and Network Fields as the person in charge of institutional repository
> is not only aimed at documenting the scientific publications of academicians and those published by
> UGM, but also the work of lecturers published abroad also documented in this repository as the work
> of academicians." (ASR, Inf.01)

They are tasked with not only managing hardware, software and the web, but also trying to ensure continuous repository readability and accessibility, such as backing up repository content files regularly. They try to keep abreast of developments, both software developments and developments in the needs of users related to repository access. Armed with library science education and computer science, they are tasked with managing and developing repositories, including updating Eprints Servers, restarting MySql databases, maximizing digital file uploads to enrich repository content, custom repository interfaces, and task acceptance validators the end of the academics, as shown below.
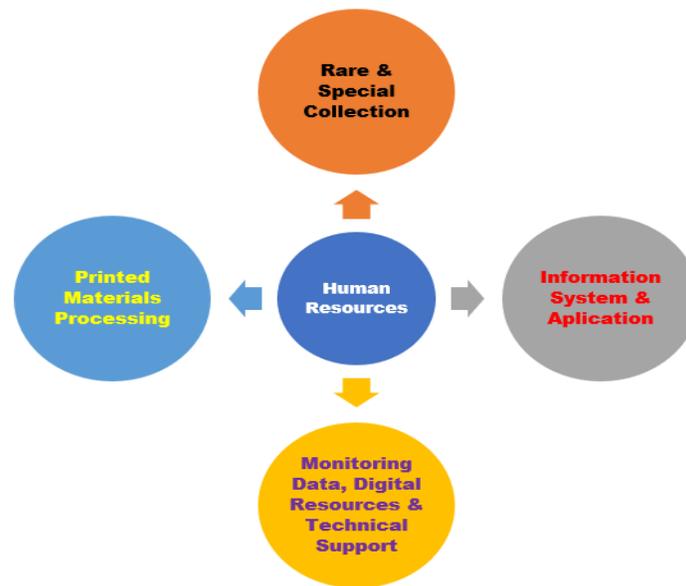
Figure 5: UGM Repository Manager Types and Tasks

The illustration above shows that the managers of UGM Repository are in charge of conducting business management and institutional repository development to maintain the continuity of access and update content. In this situation, this human resource becomes an initiative that supports the development of scholarly communication. The real manifestation of this effort can be seen from the increasing content every day, especially in the Latest additions menu on the repository portal.

4.3 Policy

UGM repository policy is a guide for staff doing processing, or work that is content development, such as determining the type of repository content that suits the needs of academicians and/or they are as users. The policy must also be a communication mechanism between librarians and users. Policies for academicians, such as students and their lecturers, namely they can deposit articles and scientific works that are owned so that they can be accessed by the public at large. Deposited data can be in the form of titles and abstracts only or include fulltext documents. This adjusts the wishes of the depositor by including the original publication link (if any) of the items deposited other than Final Project, such as article, book section, conference or workshop items, book, thesis, video, audio, teaching resource, and other.

Policies for staffs who carry out repository management, including, first, collections of academic research, such as scriptions, theses, and dissertations, are only shown abstracts and their metadata; second, generally works that can be downloaded content are scientific articles, both the work of students, lecturers, and articles written by

librarians; Finally, academic research on the web portal http://etd.ugm.ac.id is not provided in full text, only a few parts of the file can be downloaded, the rest must contact librarians who are responsible or come directly to the service section of the final works of the L5 Building II Floor or collection of scientific works on the second floor. Thus, a full-text final project can only be read on the premises via a local network using a computer in the library. There are approximately 64 computers available that can be used to access this collection. Related to this, the library is allowed to photocopy on certain chapters or pages in accordance with applicable regulations. The Final Collection was placed on the Thesis and Dissertation Service of L5 Building, 2nd floor of the Library of Gadjah Mada University. Searching online thesis catalogs and digital dissertations and their abstracts can be done through the Thesis and Dissertation Catalog, but access to full-text is currently still limited to the local network library. In addition, journal managers can deposit data from and into journals owned through the SWORD 1.3 protocol and then include the original sources.

In addition, academicians can upload their work independently in the UGM Repository, both those who have presentations at home and abroad can upload their work. This not only applies to students, but also other educators, such as lecturers can do the same because all academicians have obtained accounts so that they can upload their works independently. Independent uploading has provisions that include, first, a complete text has been approved by the supervisor/promoter, and is equipped with a stamp from the faculty or department or study program; page statement regarding the authenticity of the final paper signed by the author; abstracts/digest are made according to the language in the text, Indonesian, and English; Equipped with bookmarks, from chapters to sub-chapters; second, the Postgraduate Program Summary Manuscript (S2) has been approved by the supervisor, while for S3 level it is not required to be approved by the supervisor/promoter; third, self upload is done through the Upload Mandiri UGM application at the address https://unggah.etd.ugm.ac.id using the UGM e-mail account registered according to the study level of the student concerned, not the e-mail account as a lecturer, employees, and/or students at the previous level of study; fourth, if you do not have an email account, you can contact the Directorate of System and Information Resources (DSSDI) or the UGM Library. If all procedures have been prepared, students can take the independent upload stage as shown below.
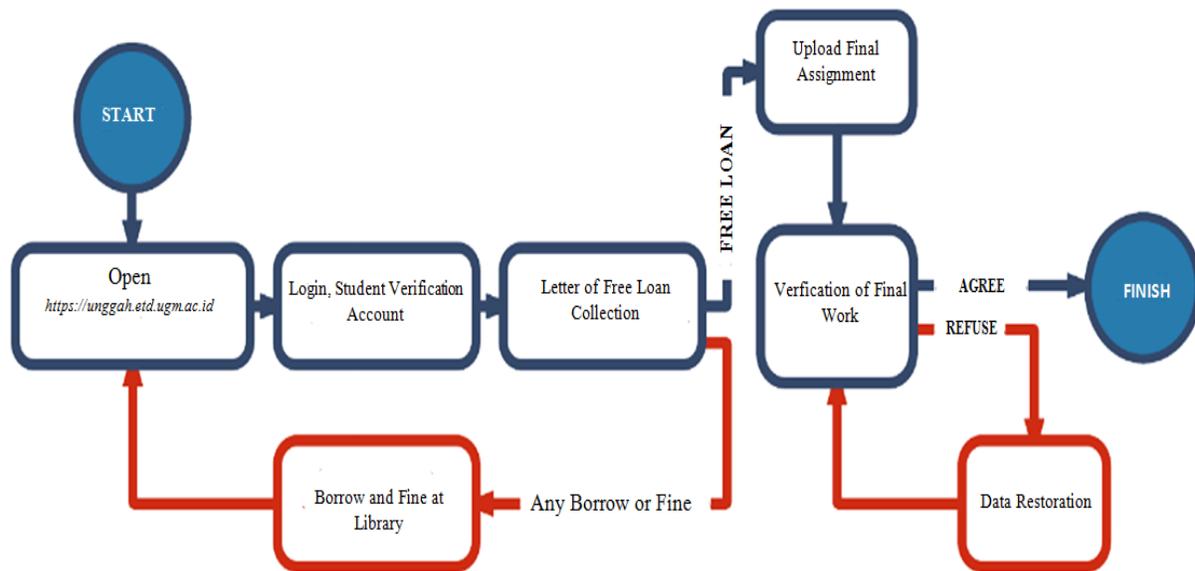
Figure 3: Independent Uploads of UGM Students' Final Works

Scientific work that has been verified by the officer and the status of the application for verification request is APPROVED, the depositor can print the Final Proof of Submission of Proof of Submission. Furthermore, the work will be processed by the library so that it can be accessed and published through the institutional repository. Generally, the process of handing over scientific work is carried out every year before the graduation period and since independent upload regulations have been enacted. Thus, the UGM Yogyakarta repository acts as a service unit that facilitates the dissemination and access of the scientific work of its academic community. Every scientific work, there are times when you can directly download the file. There is also a way to click on the available link. In addition, there are only works listed on the metadata. A variety of conditions are ue to, first, the work that can be downloaded directly in the form of articles (proceedings, journals (regional, national, and international), national seminar papers and international conferences); Book Section, as well as books, both published by Gadjah Mada University Press, faculty publications, and publications from outside publishers of UGM; Video (documentation and teaching); audio (seminar recording); teaching materials and other types of content in the form of guides / guidelines, decrees, research reports, research results, and so on.

Second, works that have links are the results of academic research works, such as bachelor theses, master theses, dissertations, and other scientific research results. The works provided by the library are special portals (http://etd.repository.ugm.ac.id/) and downloadable content is only in the form of titles, abstracts, bibliography, conclusions, introduction, and table of contents, while the complete writing can be read in the Thesis/Dissertation

Room. The reason the library makes it separately is that it makes it easier for users in the download process, especially if it only requires certain parts without having to download as many as there are. Although a special portal is available, the bibliographic data can still be traced in the repository and a link is provided to guide the portal where the work is located. Third, metadata works without content are works that are still in the process of synchronization or adjustment problems that have not been completed. This process was caused by a repository system failure a few years ago, which caused some academicians to lose their metadata and some others recovered successfully. In this situation, UGM repository team is still working hard to fix it again so that it can be reused. For deleted content, the backup can be traced back to other servers, if it is not found, the officer will contact the academic community to return the scientific work files/documents back to the repository. This is done as a form of concern and responsibility of the library in fulfilling the scientific information needs of the readers who are organized through a series of policies. Therefore, the accumulation of UGM repository governance can be seen as the following illustration.
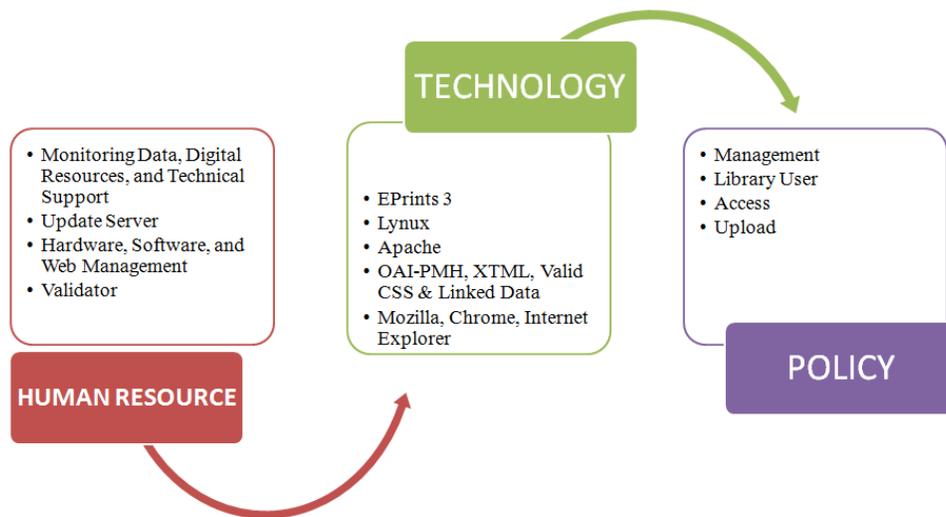

Figure 4: Synergetic pillars of the management at UGM Repository

5 Conclusion

Institutional repositories contribute greatly to the dissemination of knowledge. Knowledge will automatically develop in the context of scholarly communication. As a basis for conducting knowledge management, institutional repositories require effective and efficient governance, especially in aspects of technology, human resources, and policies that require systematic stages. Finally, the synergy of the three pillars was found, namely: technology can improve and facilitate long-term access while human resources can maintain the continuity of access and update the content repository. The policy can create order and form the responsibility of the library. In

addition to these three synergies, repository governance is also important to be examined further than the leadership style of the library head or it may also be caused by the atmosphere of campus learning or other things.

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